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# WHY ONLY HUMANS WEEP

*UNRAVELLING THE MYSTERIES OF TEARS*



AD VINGERHOETS

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## Unravelling the mysteries of tears

Ad Vingerhoets

Professor of Clinical Psychology,

Tilburg University,

Tilburg, The Netherlands

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Ad Vingerhoets  
Tilburg  
August 2012

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## Epigraph

Lorenzo! Hast thou ever weigh'd a Sigh? Or study'd the Philosophy of Tears?  
(A science, yet unlectur'd in our Schools!) Hast thou descended deep into  
the Breast, And seen their Source? If not, descend with me, And trace these  
briny Riv'lets to their Springs.

Edward Young, *The Complaint*

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## Chapter 1

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# Why only humans weep: introduction to the theme

... we must look at weeping as an incidental result, as purposeless as the secretion of tears from a blow outside the eye, or as a sneeze from the retina being affected by a bright light...

(Charles Darwin, 1872)

### The mystery of tears

Tears have fascinated mankind for centuries. This is not surprising—tears are conspicuous and their power cannot be denied. Crying is a ubiquitous part of the behavioral and emotional repertoire of every healthy human being. It permeates our lives from the very beginning (e.g. “the primal scream”) until death. If we see someone crying, it is difficult, if not impossible, to ignore him or her. In particular, for helpless babies, it is a most effective means of communication, drawing attention and eliciting support and comfort from the parent or carer. It is clear that crying has a functional value for babies; it is an aid to survival. This was certainly so when our ancestors lived in more dangerous environments, with a serious risk from predators. Crying has its evolutionary roots in the separation calls that can be observed in nearly all offspring of birds and mammals when they are separated from their parents.

However, what followed in the course of human development is far less clear, and raises numerous questions which remain unanswered. Why do human adults still cry? And what is the function of their tears, since we have another, more flexible, more precise means of communication—namely language—with which to express our distress? Are humans the only animals that shed emotional tears? And if so, why is this? Charles Darwin (1872), in his seminal work *The Expression of the Emotions in Man and Animals*, had no satisfactory answer to these questions. He regarded tears as an exception to the rule that all behaviors and physiological processes that served no important adaptive function should have disappeared in the course of evolution. In his view, tears were just a coincidental side effect. Is it possible that Darwin overlooked some important functions of crying, and of tears in particular? Is there currently any evidence that emotional tears have, or ever did have, any additional function other than mere protection of the eyes? Why are tears the only body fluid that does not arouse disgust in others? Whereas most body fluids are considered even to be potentially dangerous because of the risk that they may cause contamination, tears are associated with purification.

Surprisingly, since the publication of Darwin's book in 1872, scientific interest in this remarkable behavior has been minimal, leaving a challenging job for researchers with an interest in tears and crying. Although there is a vast scientific literature on emotions and moods, as evidenced by a considerable number of specialist journals and many books, astonishingly little is known about crying. One will search in vain the indices of the major textbooks on emotions for terms such as "crying", "weeping", or "tears", although other aspects of emotional expression (including facial expressions of emotion) have been well studied by researchers with different backgrounds. A search of literature databases for research papers on crying primarily yields studies of crying in infants, whereas crying in older children, adolescents, and adults has remained largely unexplored.

In this book, my aim is to provide a first step in bringing together the major scientific and pre-scientific ideas about crying. I shall try to link these data to modern ideas about emotions, and to integrate them into a model that will incorporate the perspectives of all of the relevant disciplines. In addition, where possible I shall illustrate my ideas and research findings with case material drawn either from my own experiences or from the literature.

Why is adult crying regarded as insignificant or even irrelevant in the behavioral sciences? Is it because, at a basic level, tears are considered to be a mere symptom of sadness—a reflex-like, involuntary response? Symptoms generally do not receive much attention from investigators. Scientists are not interested in the butterflies in our stomach, but in love. They do not want to focus on the shivers or chills that are felt when listening to music, but rather on the experience of being emotionally moved. They are not interested in the trembling of our knees when we are in a state of fear. On the other hand, there is a limited literature devoted to blushing, which has some interesting parallels with crying (Stein and Bouwer, 1997). This emotional reaction is also said to be uniquely human, and it expresses some specific mood states (self-consciousness or embarrassment) in the most conspicuous part of our body, namely the face.

However, to regard crying as merely a symptom is a major misconception. The shedding of emotional tears is not just a symptom or sign of sadness and/or other emotions. Rather, it is a very complex *behavior* that is under the influence of biological, psychological, and sociocultural forces. Although an individual's crying behavior may seem rather stable, it actually changes considerably depending on the context and with increasing age. Indeed, crying is mysterious in many respects, and many obvious questions have yet to be answered satisfactorily.

At the same time, in the popular media there are some major claims with regard to the functions of crying. For example, the shedding of emotional tears has been depicted as an important coping behavior, with possible consequences for the individual's well-being. Some even assert that the failure to cry, or suppressing one's tears, may have serious negative consequences for health (Vingerhoets and Bylsma, 2007). If one conducts a quick Internet search, several additional claims may be encountered—for example, "Tears aren't just tears of sadness, they're tears of searching for the meaning of our fleeting existence" (Mary Beth Oliver, cited by Thomson, 2007). It has further been speculated that tears may inhibit aggression, promote social bonding, and elicit cooperative behavior. In the past, there have been several other remarkable ideas with regard to crying. For example, crying in men was once associated with virtues and a good character, whereas at other times in history the shedding of tears by men was mainly considered to be a sign of weakness. In addition, in the past theologians attached much value to crying when praying, and considered praying without tears to be less worthy and effective (Lutz, 1999).

A final major claim is that crying (and laughing) have been inherent features in the evolution of *Homo sapiens*, which have contributed substantially to who we humans now are. It has been

suggested that tears have played a major role in the development of our empathic skills, which in turn were crucial for our social development (Walter, 2006).

Claims such as these lend credence to the scientific study of emotional crying as an important phenomenon for understanding our own evolutionary development. Darwin's notion that tears serve no function (Darwin, 1872) is thus seriously challenged by folklore and popular psychology. However, what is the current scientific state of affairs?

Let us consider the following thought experiment, which is useful for investigating the functions of crying. Suppose that a (good or bad) fairy suddenly casts a spell on humanity, causing all adult humans to permanently lose their capacity to weep, and leaving us in a tearless world. What would the consequences be for mankind and society? Would loss of the ability to weep affect our physical and psychological health, and maybe even reduce our life expectancy? Would it have any impact on how we relate to each other, and on our social connectedness? Would we become less social and empathic, and more egotistic? Would it have a serious effect on our morality?

What answers does science currently offer? Popular literature has focussed much attention on emotional tears, as evidenced by the many lay concepts of and major claims about the presumed positive consequences of crying. However, the efforts of scientific investigators to unravel the secrets of tears are in stark contrast to this. Although the number of scientists conducting research on crying is limited, the backgrounds and perspectives of those working in this field vary considerably. Not only developmental, social, clinical, and cross-cultural psychologists, psychophysicists, psychiatrists, pediatricians, nurses, ophthalmologists, philosophers, anthropologists, ethologists, neuroscientists, and neurologists, but also theologians, historians, and classicists all contribute to the knowledge about the varied aspects of crying and tears. Unfortunately, however, the field currently lacks coherence, as there is little knowledge within these disciplines of the work of others, and there have also been few, if any, serious attempts to create a complete picture. Psychodynamic theories emphasize the role of crying as an outlet for emotional energy, stress theorists view crying as a way of coping, attachment theorists stress the importance of crying in order to maintain the connection between an individual and attachment figures, evolutionary biologists place much emphasis on the supposed effects of tears on social bonding and aggression reduction, and, most recently, the new field of moral psychology suggests intriguing connections between sentimental crying and morality. If science is to advance beyond a mere summation of isolated facts, it is important to attempt to integrate as many of the current available insights and findings as possible into a coherent framework. However, the question arises as to whether it is possible to integrate all of these very different insights into a more general and comprehensive theory.

The American biochemist William Frey (1985), a modern pioneer of crying research, described how his work attracted the attention of the media. I have had the same experience. From all over the world, journalists approach me with their questions about human crying. When I launched a popular book on tears in the Netherlands, the publisher told me that they were surprised by the very broad interest that it attracted. Children's magazines, women's magazines, general newspapers, and popular scientific programmes and talk shows all posed a variety of questions that I was supposed to be able to answer. For example, do only humans cry? What is or are the main function(s) of tears? Is crying healthy? Do women cry more often than men? Are there any cultural differences in crying? There is nothing new under the sun. Throughout the history of mankind, tears have had an aura of mystery, as evidenced by the role that they play in myths and legends and in rituals, so who would not want to know more about this common and intriguing behavior with which we are all so familiar?

On the other hand, there are those more practically orientated individuals who wonder about the relevance of this research. Are there not topics that deserve more attention? Is crying a sufficiently “serious” and “practically relevant” topic to justify scientists devoting their expensive time to it? Indeed, most if not all crying research is rather basic and yields little knowledge that is directly applicable in a practical setting. However, in clinical practice there is also much controversy about the functions and relevance of crying. For example, in the field of clinical psychology, crying in a therapeutic setting is viewed in very different ways. Some regard it as a behavior that only interferes with treatment and prevents progress, whereas others feel that crying may mark important gains in the therapeutic process, or that it functions as a cathartic process (‘t Lam, 2011).

Another example concerns the different views about the relationship between crying and depression. Examination of this relationship by means of diagnostic interviews and questionnaires reveals striking inconsistencies. Crying is considered by some to be completely irrelevant to the diagnosis of depression, whereas others regard frequent crying as a possible sign of depression. In contrast, there are those who assert that it is loss of the capacity to shed tears that reflects severe depression (Vingerhoets et al., 2007).

A final example concerns the way in which neurologists look at the increased crying of neurological patients—for example, after stroke (Nieuwenhuis-Mark et al., 2008). It is amazing how eager these clinicians are to label the excessive crying of these patients with stigmatizing and patient-unfriendly terms such as “emotional incontinence,” “pathological crying,” or “involuntary emotional expression disorder.” However, these clinicians should be aware that changes in emotionality and crying also occur in patients who have other serious diseases, such as myocardial infarction or cancer. I strongly feel that the use of such terms is inappropriate and should be avoided when one does not have any knowledge about “normal” crying. These are all sufficient reasons to investigate crying and to bring together and integrate within a common framework our current knowledge about crying.

Furthermore, from a cultural or historical perspective, several other fascinating facts about tears and crying can be uncovered. In legends and myths, tears are connected with vitality and (new) life. In some cultures there was a connection between tears and praying for rain such that, especially in times of drought, the production of tears was regarded as helping to please the gods and allowing them to bring the necessary rain (Patton and Hawley, 2005). Another issue that has been considered in many cultures is the uniqueness of tears to humans. In the past this has resulted in the application of this knowledge as a decisive test of whether or not someone was a witch or a werewolf (Poulakou-Rebelakou et al., 2009; Trevor-Roper, 1967). In theological discussions, questions were raised as to whether God is able to cry, whether angels are able to cry, and whether humans can shed tears in the afterlife and after resurrection. These are just a few examples of how tears in history have been interwoven with the everyday life of humans, being much more than just a symptom of sadness.

In order to gain a full understanding of crying and tears, one needs to have insight into the knowledge that has been collected in many different disciplines. Indeed, any attempt to fully understand crying requires a multidisciplinary effort.

Tom Lutz, the author of the book *Crying: the natural and cultural history of tears* (Lutz, 1999), asserts that “Our best understanding of tears comes not from the medical and psychological sciences, but from the innumerable poetic, fictional, dramatic, and cinematic representations of the human proclivity to weep.” As a psychologist and researcher, I naturally felt challenged by this provocative statement. However, I took it very seriously, and have devoted much time and effort to learning more about the historical, religious, cultural, and anthropological aspects of tears, which were less familiar to me. I found this enormously rewarding. I freely admit that this

literature has made me feel humbled and more aware that, in order to gain a proper understanding of crying, it is important to have a knowledge of these sources.

Therefore my aim is to bring together all of the puzzling aspects of crying in a coherent way, and thereby to come to a new understanding of the functions of crying and tears.

I am aware that this is an ambitious endeavor, which requires considerable effort. Kottler and Montgomery (2001) formulated the following explicit requirements for a comprehensive theory of crying:

1. insight into the biochemical, endocrine, and neurological mechanisms of the body that affect the threshold for weeping
2. explanation of the role of crying in groups, and of individual differences in temperament, personality, psychological health, and maturity
3. understanding the importance of the situational precipitants and environmental stimuli, as well as the broader cultural context
4. gaining insight into the very specific nature of tears, eliciting stimuli, and their precise meaning for the individual
5. analysis of the social and interactional dynamics of crying, including the communication messages, and possible functional benefits and secondary gains
6. unravelling possible unconscious influences (whether dynamic or systemic) that might regulate the crying behavior.

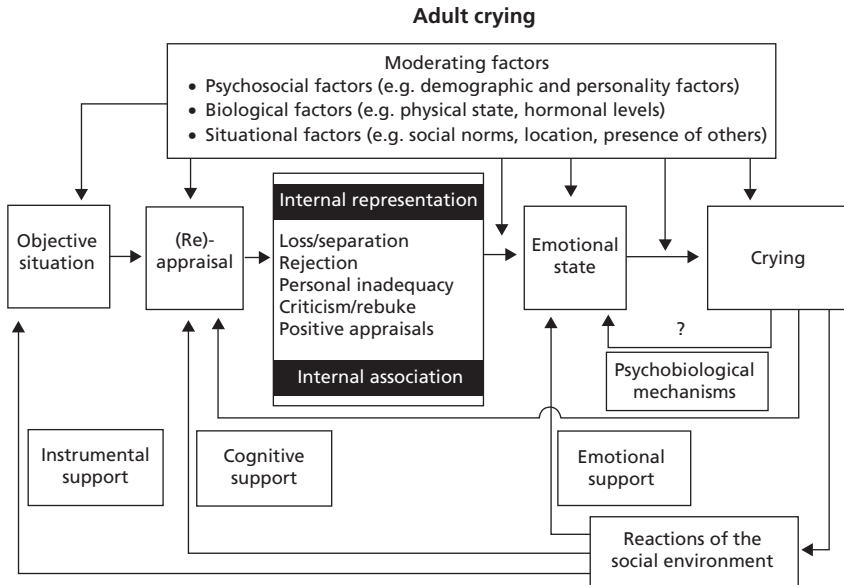
This book will attempt to address all of these issues. However, for the sake of clarity, and in order to avoid merely presenting a kind of smorgasbord of virtually everything that is known about human tears from the many different disciplines, without any structure and coherence, I first want to introduce a model that may be helpful for organizing the available literature, and to discuss it in a more systematic way.

## **A model of adult crying**

I consider crying to be the result of an interaction of psychobiological, cognitive, emotional, and sociocultural processes (see Figure 1.1). My model is based on a more general cognitive–emotional model, according to which both the nature and intensity of emotions are determined by the way that an individual appraises events and memories (Frijda, 1993; Lazarus, 1982; Neu, 1987; Vingerhoets et al., 2009). The term “appraisal” refers to the process of judging the personal significance of events as relevant and negative, relevant and positive, or irrelevant. The outcomes of these appraisals are a function of objective physical and social characteristics of the events, but also depend on the background features of the individual. These features include, among other things, the person’s current emotional state, their goals and ambitions, their previous experiences in similar situations, and their view of life (pessimistic or optimistic), as well as their perceived capacity to cope with the situation.

Emotions can be differentiated by the patterns of appraisal that initiate them. For example, perceived injustice may evoke feelings of anger, a perceived loss is associated with sadness, and a perceived threat may induce fear. In some cases, just one aspect of the appraisal process (e.g. who or what is considered to be responsible) determines the nature of the emotion. For example, a loss may induce sadness if it results from fate, whereas the same event may (in addition) evoke anger if another person is held responsible, or guilt if the individual affected by the loss feels personally responsible for it.





**Fig 1.1** Crying model introduced by Vingerhoets et al. (2000). Globally, a distinction is made between antecedents, moderators, and (intrapersonal and interpersonal) consequences. This model has guided me in the design of my initial studies. At the core there is a cognitive–emotion model, according to which the nature and intensity of emotions are determined by the appraisal of the situation. Our evaluation and interpretation of objective situations are a key determinant of our emotions and their expression. Reproduced from Vingerhoets, A.J.J.M., Cornelius, R.R., van Heck, G.L., and Becht, M.C. Adult crying: a model and review of the literature. *Review of General Psychology*, 4, 354–77. © American Psychological Association, 2000.

Appraisals subsequently put *emotion programs* into motion. These can best be described as response patterns that include physiological, expressive, experiential, and behavioral components, each of which has functional significance. An alternative term that is often used is *response tendencies*, highlighting the fact that the reactions may be modified or modulated (e.g. exaggerated, diminished, or even entirely inhibited) before they are expressed as observable behavior, emotion self-reports, or physiological changes. This modulation, which is thought to be determined by a variety of physiological, situational, and personal factors, is one of the chief reasons why the linkages among the various components of the emotion process in humans are rather loose. Thus in the case of crying, too, the association with a specific emotional state is not strong.

The shedding of emotional tears is a specific expressive response that can be evoked by a number of different appraisals (see the model discussed above). However, whether or not a person will cry when they are exposed to a particular emotional stimulus also depends on a number of personal factors (e.g. self-monitoring status, physical state, personality) and sociodemographic factors (e.g. gender, age), as well as a variety of situational and contextual factors (e.g. the presence of others who are crying, the salience of social norms with regard to crying). These moderating factors may in addition determine the degree of exposure of individuals to emotional situations, as well as the appraisal process. For example, in some cultures there are social rules which require that one attends the funeral of particular persons. Individuals, depending on their

personality, may also seek specific forms of stimulation (e.g. sensation seekers) or avoid specific situations (e.g. socially inhibited individuals). Other personality factors may strongly influence one's appraisal processes. Optimists may be expected to cry less frequently than pessimists, because they are less inclined to appraise events as negative and as serious threats.

Feeling and display rules (Kotchemidova, 2005; Matsumoto, 1990), which are imposed by the culture in which one lives, or the reaction of the social environment, are also regulators of the expression of emotions, including crying. A well-known example concerns the expression of sadness and pain in non-western cultures. In some cultures, ritual circumcision is not expected to be accompanied by any expression of pain or distress. In other cultures, during funerals, grief and sadness are expressed not by tears, but by rubbing one's head with ashes, wearing burlap clothing, or denuding one's breast and beating it. All of these examples demonstrate that the connections between sadness and crying are not as strong as we might think in all cultures.

Crying may subsequently have a psychological and/or physical impact on the crying individual him- or herself, and at the same time it can give rise to different (positive or negative) reactions among other people. The different forms of positive social support that may be offered to the crying person include instrumental support (to neutralize or remove stressors), appraisal support (encouraging the person to look at the situation in a different way), and emotional support, physical comforting behaviors (e.g. putting an arm around the person's shoulder), and uttering soothing words. Negative reactions may range from verbal disapproval to overt aggression.

Tears may have many different causes, ranging from irritation of the eye by onion fumes to sympathy for the situation of another, infant reflexes, and aid in emotional blackmail. However, the present model only concerns adult emotional crying, not reflex or irritant weeping, infant crying, or pathological weeping due to brain disorders, nor is the focus on the feigned, forced, or strategic tears that are shed to manipulate others or during rituals. Nevertheless, these issues will all be addressed in later chapters.

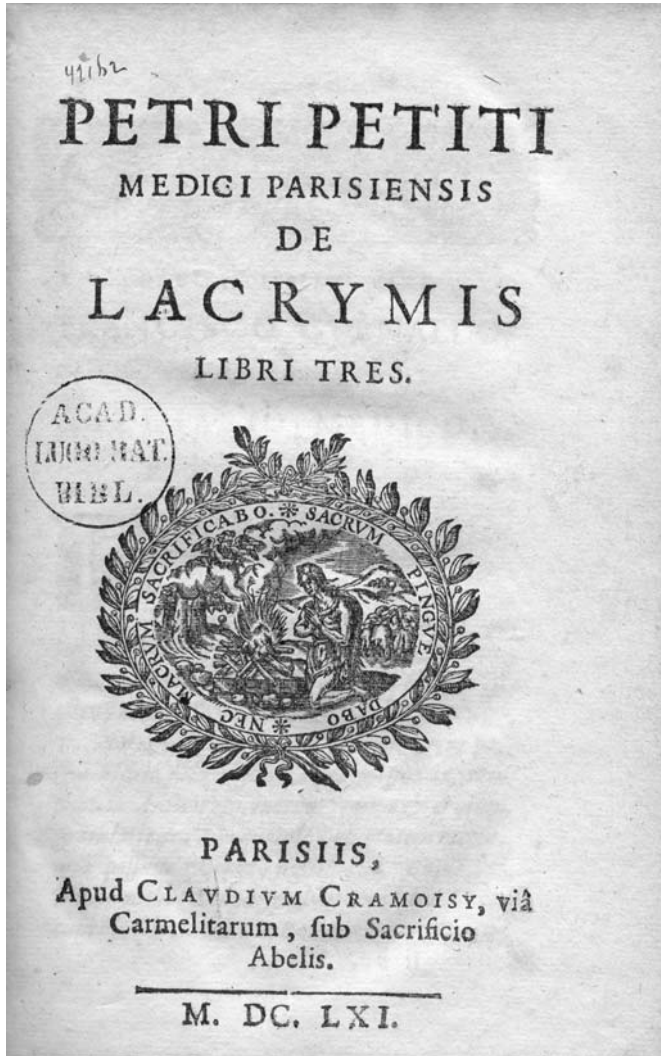
## **The study of crying**

Investigators who are interested in crying have to deal with the ethical limitations that restrict the possibilities for studying crying in the laboratory, whereas most real-life crying is almost or entirely unpredictable and/or cannot be examined in an ethically acceptable way. This is why most crying research has relied on self-reports, which may not necessarily be reliable and valid, because they may be biased by memory limitations and implicit theories of the participants. Given the lack of adequate research, I feel obliged to attach more value to information from case studies and what fundamental researchers may regard as methodologically rather weak research than might be justified, as well as to speculate and formulate thought-provoking hypothetical ideas, rather than provide definitive answers. In other words, this book is concerned less with scientifically established facts than with interesting but unproven ideas and theories about tears and crying.

I am not an advocate of any specific theory—I shall try to allow the facts to speak for themselves as much as possible. Having an open mind is, in my view, the best way to understand more about this intriguing phenomenon.

## **The outline of this book**

My model determines the structure of the book. Chapter 2 discusses ideas about the evolutionary origin and functions of crying. Chapter 3 focusses on the "hardware" of crying. It includes basic information about the lacrimal system and facial muscles, the composition of tears, the



**Fig 1.2** Cover of the book by Pierre Petit, published in Paris in 1661, entitled *De Lacrymis* (Horstmanshoff and Loots, 2012). It provides a wonderful overview of the knowledge and insights into tears and crying from antiquity until the seventeenth century. It is a blend of the ideas and theories of scholars such as Hippocrates and Galen, as well as quotes by writers and poets such as Homer and Ovid. The book almost immediately became obsolete, as a result of the discovery of the lacrimal glands one year after its publication. In addition, Petit's contemporaries, Marin Cureau de la Chambre and René Descartes, presented several new insights into crying. (With special thanks to Professor Manfred Horstmanshoff and Dr. Ineke Loots, who are currently working on an English translation.) © Leiden University Library, 2321124.

neurobiological mechanisms and brain structures involved in tear production, and how crying fits into current models of stress and emotions. Chapter 4 addresses the developmental aspects of crying. Although the focus of the book is on adult crying, I feel that it is essential to have some

insight into how this reaction evolves over the lifespan, from crying without tears to tearfulness without crying.

The remaining chapters closely follow my model. Chapter 5 discusses the antecedents of crying, and Chapter 6 considers the effects of tears on the crying individual him- or herself. Does crying bring relief and improve mood? Are there any beneficial effects? Chapter 7 examines the effects of tears on others. In the chapters that follow, the most important moderators are considered. The role of cultural factors, with a focus on cross-cultural aspects, is summarized in Chapter 8. Subsequent chapters address individual differences (Chapter 9) and gender issues (Chapter 10). Chapter 11 focusses on the relationship between crying and health, and demonstrates several possible links between the shedding of tears and several aspects of health and disease. Chapter 12 summarizes the insights that have been gained about the relationship between crying and some specific neurological disorders. In Chapter 13, I provide a highly selective overview of cultural and historical issues, in particular legends, myths, religion, and art. Finally, Chapter 14 summarizes the main conclusions and attempts to integrate the main insights into a theoretical framework.

Throughout the text I have included boxes that address popular and pre-scientific ideas about the issues under discussion, or that present some remarkable facts. I was fortunate enough to come across the seventeenth-century work *De Lacrymis* (“*On Tears*”), written by the French scholar Pierre Petit (also known as Petrus Petitus) (Petit, 1661) (see Figure 1.2). This work presents state-of-the-art knowledge with regard to tears from classical times until the seventeenth century. It proved to be a very rich source of interesting and often amusing ideas and explanations about the origin and functions of tears.

I cordially invite the reader to join me on my trip to what the French writer Antoine de Saint-Exupéry (1943) referred to as “the mysterious land of tears.” Prepare yourself for some amazing new facts, the debunking of several popular misconceptions, and the presentation of some new and challenging hypotheses.

I hope that this book will inspire the reader and challenge them to think about the functions of crying. I shall be satisfied if it helps individuals to deal more effectively both with their own crying and with their responses to the crying of others. In addition, I hope that it will enable the reader to develop a more critical approach when considering unproven, sometimes rather exotic and vague theories that reflect attempts to gain a better understanding of this intriguing phenomenon.

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## Chapter 2

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# The human nature of crying

Nature, in giving tears to man, confessed that he had a tender heart; this is our noblest quality

(Juvenal, undated)

### Defining crying

What is crying? How is it most appropriately defined and described? In the literature, one comes across the following definition:

a complex secretomotor response that has as its most important characteristic the shedding of tears from the lacrimal apparatus, without any irritation of the ocular structures, and often accompanied by alterations in the muscles of facial expression, vocalizations, and in some cases sobbing, which is the convulsive inhaling and exhaling of air with spasms of the respiratory and truncal muscle groups.

(Patel, 1993)

Most readers will agree that this is a very adequate and precise description of crying, but they will probably also feel that this highly technical description seems to be missing something very important. This simplified definition does not take into account the fact that emotional tears have an additional meaning, in that they serve to convey a certain message. What is also lacking is the association of crying with emotions, such as the expression of sadness, frustration, or perhaps even happiness.

In the past I used to start my talks and articles with the statement that crying is an emotional expression that marks all really significant events in our lives. In response to both negative events, such as exam failure, relationship break-ups, and homesickness, and positive events, such as special achievements, weddings, and reunions, humans often give way to tears. Important events evoke emotions, and emotions evoke tears—genuine emotional tears—which are not usually easy to control. At least, that is the common view of tears. Indeed, there can be little doubt that the shedding of tears often occurs when a person is experiencing strong emotions, but this is not the whole story. Having read the neurological, anthropological, historical, and theological literature, I have come to the conclusion that crying is not just a *symptom* that accompanies emotions. Rather, it is a complex biopsychosocial phenomenon, in the full meaning of the term. In order to understand crying, one cannot limit oneself to studying the recent relevant psychological literature. Weeping may also occur

without the experiencing of any emotions. This happens not only in neurological patients, but also during some rituals in certain cultures. The shedding of tears is governed not only by neurophysiological processes, but also to a large extent by culture, which shapes our crying behavior. Until recently I was convinced that the application of modern psychological research methods was the only effective way to gain real insight into the actual nature of crying. However, as this book will demonstrate, I am now aware of how limited that notion is, and of the strength of the impact of cultural and other factors on crying.

Let us return to Patel's definition of crying (Patel, 1993). Many scholars will criticize it. Neurologists may argue that, for them, crying is predominantly an involuntarily symptom of neurological disorders. In contrast, anthropologists, historians, and theologians will point to the limited view of this definition, because it does not do justice to phenomena such as ritual weeping, weeping processions, and the shedding tears of while praying, all of which strongly suggest that crying is primarily a voluntary behavior. However, criticism will not only originate from outside psychology; fellow psychologists may also consider this view as just one rather narrow way of looking at this phenomenon. Indeed, perspectives on crying vary widely. According to some, a developmental psychological approach is necessary if one really wants to understand tears. In their view, crying should be regarded as an attachment behavior, which facilitates the bond between the child and its attachment figures. Evolutionary biologists will not hesitate to go even further and consider crying in an evolutionary context. In contrast, researchers with a background in stress research will argue that crying should be regarded as a coping mechanism—as just one way to deal with uncontrollable stressful situations. However, social psychologists will disagree with this view, and argue that crying is primarily about communication. Which of these various views is correct? Or is there a kernel of truth in all of these different perspectives?

Aside from all of these different approaches and hypotheses, are there any points of view that are shared by most, if not all, scholars with different backgrounds? There is, at least, much agreement that the capacity to cry is a universal, typical, and uniquely human behavior. A further notable aspect of crying is that it seems to be associated with a whole gamut of emotional states, ranging from sadness to euphoria. Whereas we only feel the “butterflies in our stomach” when we are in love, and the trembling of our knees when we experience fear, crying (and also, although probably to a lesser degree, blushing), in contrast, seems to be linked with a wide range of emotions, even opposing ones. Many of the physical symptoms that accompany these emotions—the butterflies, weak knees, sweating palms, and so on—are also less conspicuous to or even entirely hidden from external observers. However, when we cry, we send out a clear signal. What, though, does it convey? And what does it tell us about crying?

Crying can be viewed as a sign of distress, as a signal to others, as a coping mechanism, or even as a symptom of a compromised health state. There is further ritualized crying of groups. Thus those who regard crying as merely a symptom of sadness have far too limited a view, which does not do justice to the many different aspects of this behavior. If one aims to obtain real insight into and understanding of crying, the latter should be regarded as a *behavior* that needs to be investigated from a number of different perspectives. Box 2.1 describes various different ways of assessing crying.

In what follows, I shall expand on the specific nature of crying and whether there are different kinds of crying. First I shall focus on the question of whether—and if so, why—only humans shed emotional tears.

## Box 2.1 The assessment of crying

There are three ways to measure crying:

- ◆ self-report measures
- ◆ observational measures
- ◆ objective measurement of tear production

Each method has its own inherent strengths and weaknesses.

### Self-report measures

Major advantages of self-report measures are that they can be easily and flexibly applied, and they can address a number of interesting issues. There are currently several different instruments available, which sometimes have misleading names. For example, the Weeping Frequency Scale (or Crying Frequency Scale) does not actually measure crying frequency, but rather crying proneness.

Most data have been collected by means of the Adult Crying Inventory (ACI) (Vingerhoets, 2001), which is a fairly comprehensive questionnaire consisting of five parts, which address the following aspects:

1. general crying proneness
2. crying and coping
3. implicit theories of determinants of crying
4. the most recent crying episode
5. crying and the menstrual cycle.

Often researchers are only interested in the assessment of crying frequency. In that case, I recommend the following two questions:

1. How often have you cried in the past 4 weeks?
2. When was your most recent crying episode?

With regard to the first question, a 4-week period seems to be the optimal time span for such retrospective frequency estimates. The second question has the following fixed response alternatives: (1)  $\leq 1$  day ago; (2) 2–5 days ago; (3) 6–10 days ago; (4) 11–30 days ago; (5) 1–6 months ago; (6) 7–12 months ago; (7)  $> 1$  year ago.

The combination of both questions is particularly important when assessing men, because nearly 80% of adult men answer the first question with a response of 0 or 1, which may lead to problems with further statistical analysis. The responses to the second question generally, especially for men, show a better distribution, which gives an improved fit for subsequent statistical analysis (e.g. the association with personality or well-being, etc.). Correlations between these two measures typically yield values of approximately  $-0.55/-0.60$ , which indicate adequate validity. There are also substantial associations with crying proneness measures.

The inherent weaknesses of self-reports concern the possible bias due to poor memory and social desirability. Memory problems may be reduced by adapting a diary method, asking participants to report their daily mood and, when they have cried, also to provide details

*(Continued)*



## Box 2.1 (Continued)

about the crying episode. However, the problem with this method, certainly in men, is the low frequency of this behavior, which makes long assessment periods necessary.

### Observational measures

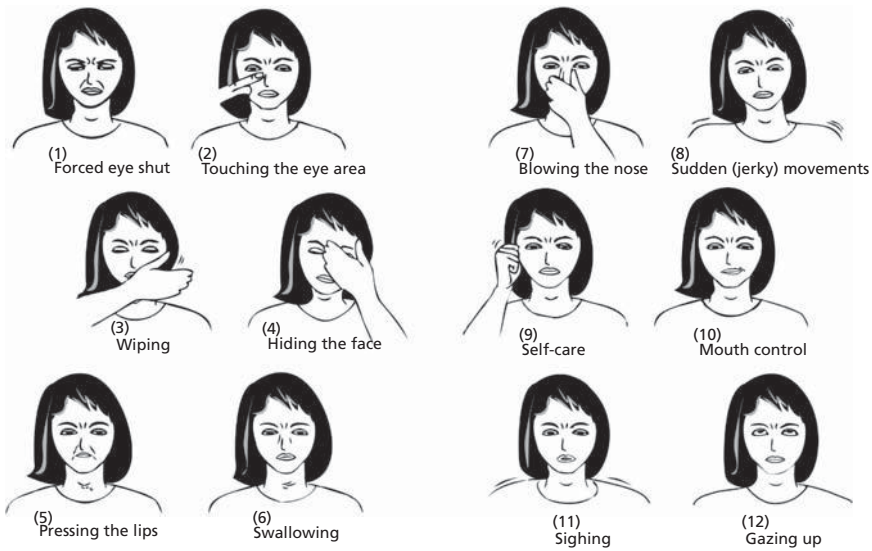
I am aware of only one observational study of crying. The Swiss psychologist Hans Znoj induced crying by instructing bereaved individuals to memorize their deceased spouse, to imagine that they were present in the room, and to talk to them as if they were present (Znoj, 1997). He made video recordings and developed a scoring system for the systematic analysis of the participants' crying behaviors. The observer measure includes the following variables:

- ◆ the exact onset and end of tear production. The raters had to determine these as accurately as possible. For all timing purposes, the raters used the video recordings
- ◆ the coding of specific crying-related behaviors.

Some of the scored behaviors result from tear production (e.g. blowing the nose, wiping the face, swallowing), other behaviors might reflect a combination of resisting tears and crying (e.g. forced eye shutting, pressing the lips together, grimacing, sighing), and a third category of behaviors might be particularly defensive (e.g. hiding the face, touching and petting the face, and gazing upward).

Two raters, who were unaware of the objective of the study, were trained to code the videotaped behaviors displayed during the monologues. Training took about 15 hours, using a subset of the videotaped materials. After their training, the raters watched a large subset of the videotapes and coded them independently. The scoring procedure was very reliable, and there was 88% agreement between raters ( $\kappa = 0.75$ ). The total crying times as established by the two raters were strongly correlated (0.95). The following 12 behaviors (see also Figure 2.1) were differentiated and scored in 30-second segments.

1. *Forced eye shut* was checked when the distance between eyebrow and eye lid became very close, as in squinting.
2. *Touching the eye area* was checked every time the region around the eye was touched with a finger or with a tissue. However, when extended wiping occurred, it was recorded under the separate category of *wiping*. If, at the same time, the eye was also closed, *forced eye shut* was scored as well.
3. *Wiping* often occurs when tear production has stopped. It aims to recover the visible effects of the tears. Sometimes wiping is combined with *touching the eye area*.
4. *Hiding the face* may accompany wiping. Lowering the head and covering parts of the face are regarded as another form of face hiding.
5. *Pressing the lips* was checked only in cases of marked pressing, not when the individual was merely closing their mouth during a pause while talking. The lips become narrow, as if withholding something. Sometimes pressing the lips is accompanied by swallowing.
6. *Swallowing* occurs relatively often while crying or after the crying period, when tears are abducted via the nasal channel.
7. *Blowing the nose* generally occurs when tears clog the nasal channel, because this action may unblock the nose.



**Fig 2.1** Specific crying-related behaviors that were distinguished in the observational analysis designed by Znoj (1997). Reproduced from Znoj, H.J. When remembering the lost spouse hurts too much: first results with a newly developed observer measure for tears and crying related coping behavior. In: A.J.J.M. Vingerhoets, F.J. van Bussel, and A.J.W. Boelhouwer (eds) *The (Non)Expression of Emotions in Health and Disease*. pp. 337–52. © Tilburg University Press, 1997, Znoj, H.J., with permission.

8. *Sudden (jerky) movements*, in particular when directed upwards, can be interpreted as a sign of high levels of tension. The moving parts of the body (shoulders, head, arms) were all checked accordingly.
9. *Self-care*, such as caressing or petting, or organizing features (e.g. combing), can be regarded as comfort-giving behaviors which might help to overcome feelings of distress.
10. *Mouth control* refers to movements around the mouth that do not consist of merely pressing the lips together—for example, trying to smile when one is distressed (the smile is often asymmetrical), playing with one's lips or licking the lips with one's tongue, and grimacing. This category was scored whenever the muscles around the mouth were more active than could be expected from mere talking.
11. *Sighing* includes sobbing, sighing, sneezing, and any other action that involves taking in or letting out air in a pronounced and noisy way.
12. *Gazing up* is effortful and often very brief, because when a person is crying their eyes are normally directed downwards, and are closed or semi-closed. Extended gazing upward under such circumstances might be a sign of “fighting” tears, or it could occur for a number of other reasons. For example, in Znoj's monologue task, the bereaved person was instructed to talk to the deceased individual, who might be imagined as located in a higher place than the study participant.

(Continued)

## Box 2.1 (Continued)

### Objective measurement of tear production

A simple test that is often applied in clinical practice to quantify tear production is the *Schirmer test*. This involves measuring the extent of wetting of filter paper by tears. Special pre-cut, standardized paper strips (measuring 35 x 5 mm, and bent at 90 degrees 5 mm from the end of the strip) are used. The paper strip is hooked over the lower eyelid border. After 5 minutes it is removed and the length of the moistened area (in millimetres) is measured. Less than 10 mm of moisture is considered to be abnormal, and about 15 mm is the norm. Currently, the *phenol red thread test* is also utilized. This involves the use of a sterile cotton thread, which is treated with phenol red dye, rather than filter paper strips. The thread changes color when it comes into contact with water, and the length of the colored part is then measured. However, there are serious concerns about the reliability and validity of these tests. An additional problem is that the tests may be experienced as rather irritant and unpleasant by the study subject.

This test has only been utilized once for the study of emotional tearing. Psychologists Mindy Delp and Harold Sackeim examined the effects of mood manipulation on tear production using this method (Delp and Sackeim, 1987). The induction of sadness resulted in an observed increase in lacrimal flow in women, but not in men.

## Is crying unique to humans?

The answer to this question is both “yes” and “no,” depending on the definition of crying. It is a definite “yes” if we take crying to mean the shedding of emotional tears, but it is a definite “no” if we view crying as a behavior that aims to attract the attention of the mother and to solicit care. In former times, both crying and laughter were considered to be so-called “properties” of humans, in the Aristotelean sense of only applying to humans. Blushing is a third emotional expression that is absent in animals. However, a significant difference here is that animals are not physically equipped to blush, whereas they do have the necessary “hardware” to produce emotional tears. Nevertheless, even the well-known crocodile tears just appears to be a mythical phenomenon, for a description of the origin of the expression “crocodile tears”, see Box 2.2.

## Box 2.2 The origin of the expression “crocodile tears”

The following information is largely based on Bartelink (1986) and Shaner and Vliet (2007).

The expression “crocodile tears” is used in several languages to refer to a hypocritical, false, or insincere display of emotion. Much has been written about the origin of the term, but these accounts are invariably incomplete and frequently erroneous. The weeping of crocodiles has been described by many authors, but not always to indicate hypocrisy. Other explanations for the crying of these animals relate to pain and suffering, greed, the luring of people, and a method of making a human’s head more digestible. My search resulted in the following reconstruction.

Although the Roman writer Pliny the Elder (AD 23–79), author of *Natural History*, is frequently cited as the first to describe weeping crocodiles, this is not in fact the case. Most probably it is his follower, Claudius Aelianus (c. AD 175–235), who deserves this honor. In *On the Nature of Animals*, a curious collection of brief stories about natural history, occasionally including allegorical moral lessons, he also described weeping in crocodiles. However, this clearly is not the origin of the present-day expression “crocodile tears,” because according to this account inhabitants of the Egyptian city Edfu, also known as Apollopolis, “catch crocodiles in a drag net, and having hung them up on persea-trees, they beat them with many blows and flog them as men are flogged, while the animals whimper and shed tears; then they cut them down and feast on them” (cited in White, 1960). This crocodile’s weeping thus seems to have little to do with hypocrisy.

A few centuries later, St Asterius, Bishop of Amasea (c. AD 400), wrote that “crocodiles mourn over the human heads they devour and weep, not from repentance, but because heads have no edible flesh.” Again, therefore, there is no hypocrisy involved, but rather greed. This story has also been attributed to the twelfth-century Archbishop Eustathius of Thessalonica, “who lends his ears to fables.”

In the *Physiologus*, a didactic text written or compiled in Greek by an unknown author, of unknown date (estimates range from the second to the seventh century AD), descriptions of animals, birds, and fantastic creatures, and sometimes of stones and plants, are given, often with associated moral content. Crocodiles and their weeping are portrayed in two different ways. In the first, the crocodile is described as an animal that eats a man from the feet to the spinal column. When only the head is left, the crocodile stops eating and weeps about his victim. However, in a deviant parallel version, it is made clear that it is the hair on the head of the victim that prevents the crocodile from eating the head. Only after it has first been moistened with hot tears does the head become digestible. A similar account can be read in the fifteenth-century collection of Greek proverbs of Michael Apostolius, who explains that the crocodile’s hot tears result in the human head losing its hair, and thus becoming more edible.

In the thirteenth century, Bartholomaeus Angelicus, a Franciscan monk, wrote in his encyclopedia of natural sciences, “If the crocodile findeth a man by the brim of the water, or by the cliff, he slayeth him there if he may, and then weepeth upon him and swalloweth him at last.” At about the same time, Guillaume le Clerc wrote in his bestiary, based on a certain version of the *Physiologus* and the seventh-century work *Etymologiae* by Isidore of Seville, about the crocodile not only eating man, but also forever after lamenting his victim, as long as he lives. These are probably the oldest examples of the connection between crocodile weeping and hypocrisy, although the link is not very specific.

Probably one of the oldest texts in which the expression is very specifically used in the modern-day sense dates back to the twelfth century, when Magister Vincentius from Kraków described an individual who “followed the funeral procession of his brother with crocodile tears.”

There are also several more recent sources, in particular from the fifteenth century, which have been incorrectly cited as the origin of the expression. For example, a frequently quoted source is Sir John Mandeville, who wrote in his travel book *The Voyage and Travail of Sir John Mandeville*: “In many places of Inde are many crocodiles—that is, a manner of long serpent. These serpents slay men, and they eat them weeping” (Mandeville, undated).

(Continued)

## Box 2.2 (Continued)

Although controversial, the following text has been attributed to Leonardo da Vinci (1452–1519):

“THE CROCODILE HYPOCRISY.

This animal catches a man and straightway kills him; after he is dead, it weeps for him with a lamentable voice and many tears. Then, having done lamenting, it cruelly devours him. It is thus with the hypocrite, who, for the smallest matter, has his face bathed with tears, but shows the heart of a tiger and rejoices in his heart at the woes of others, while wearing a pitiful face.”

The famous Dutch humanist Desiderius Erasmus Roterodamus (1466–1536) also included the expression in his *Adagia*, a popular collection of proverbs, which mostly originated from classical texts, and show considerable overlap with the previously mentioned collection of Apostolius. Remarkably, here it is said that the crocodile starts to weep when he sees a man and subsequently swallows him. The expression *Κροκοδειλον δακρυα*, “crocodile tears,” is used to describe those who pretend to be deeply affected by the distress of anyone for whose destruction they themselves are responsible, or for whom they are planning some great disaster. This is very close to the tears of the emperor Bassianus, of whom Aelius Spartianus notes that he wept whenever he heard the name or saw a likeness of his brother Geta, whom he himself had killed. Others relate that it is the natural habit of a crocodile, when roused by hunger and planning some treacherous attack, to fill its mouth with water, which it sprays over the path along which it knows that other animals, or men, will come to drink. The plan is that, when they have fallen on the slippery descent and cannot make their escape, the animal will then seize and devour them. When it has eaten the body, it softens the head by shedding tears on it, and then consumes that, too.

There can thus be little doubt that quotes attributed to Edmund Grindal, Archbishop of York and of Canterbury (1519–1583), are also incorrectly cited first sources.

Of particular importance for the increasing popularity of the expression was its use by Edmund Spenser (1552–1599) in *The Fairie Queen*, and by Shakespeare (1564–1616) in *Othello*, where women are accused of shedding crocodile tears in order to get their own way. For example, Othello says to Desdemona “O devil, devil! If that the earth could teem with woman’s tears. Each drop she falls would prove a crocodile. Out of my sight!” (Act 4, Scene 1).

Whereas up until this point the crocodile’s tears had been mainly attributed to pain, greed, or quasi-repentance over the killing and eating of his prey, in 1565 the slave trader Sir John Hawkins introduced another clarification of the weeping of these animals: “In this river we saw many crocodiles. . . . His nature is ever when he would have his prey, to cry and sobbe like a Christian body, to provoke them to come to him, and then he snatcheth at them.” The implication is clearly that the crocodile *lures* his prey with false weeping. This description has also occasionally been wrongly attributed to Sir John Mandeville (see above).

In conclusion, the exact origin of the expression “crocodile tears” with its present-day meaning of hypocrisy is uncertain, although there is compelling evidence that it was a common expression in late medieval times.

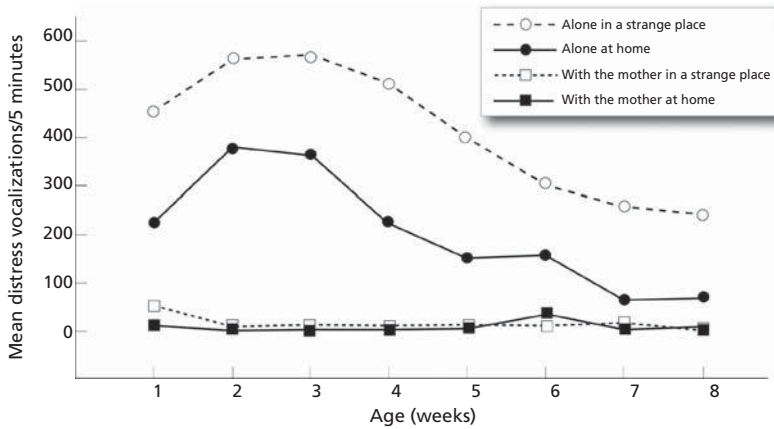
Do these reptiles really have the capacity to shed tears? They do have tear glands, which secrete a fluid that helps to clean the eye, lubricates the passage of the nictitating membrane across the eye's surface, and probably also inhibits bacterial growth. These basal tears are normally only noticeable if the crocodile has been out of the water for a long time and the eyes have started to dry out. The ophthalmologist George Lindsay Johnson has reportedly squeezed the juice of an onion mixed with common salt into the eyes of four species of crocodile. This rather crude experimental test failed to evoke reflex or irritant tears, unmasking the myth of weeping crocodiles.

For the sake of completeness, harpies, which are mythical creatures that are usually portrayed as women with wings, or birds with a woman's head and sharp claws, have also been depicted as creatures who weep about their victims to express their repentance and regret, when they become aware that the victims bear a resemblance to themselves.

We currently still agree with the notion of crying as a unique human trait. Although one occasionally reads about the shedding of “emotional” tears by non-human animals, more systematic research, including interviews with veterinarians, zoologists, directors of zoos, and animal trainers, has revealed that the evidence that non-human animals shed emotional tears is weak at best (Frey, 1985). Nevertheless, those who have reported on weeping in animals include some individuals with great authority. Charles Darwin (1872) refers to case examples of elephants weeping when they are in a situation of powerlessness—admittedly based on hearsay rather than his own observations. Gorillas may cry, according to Dian Fossey, who in her book *Gorillas in the Mist* (Fossey, 2000) describes the tears of a sick gorilla, Coco. Elsewhere she has reported observing tears falling from a captured young animal's eyes when it saw the forest again. Jane Goodall, on the other hand, asserted that chimpanzees express their sadness by means of a specific vocalization and facial expression, but not by shedding tears (Goodall, 2000). My own favorite anecdote concerns the weeping of two cows when they were separated after having always lived together. Aquatic mammals such as seals, dolphins, and whales secrete a watery mucus that protects their eyes from the excessive salt content of seawater, but this has nothing to do with emotional crying. The overflow of these “tears” due to lack of a drainage system may easily have been misconstrued as the shedding of emotional tears.

So, if it exists at all, weeping among animals is extremely uncommon. However, this is not to say that other animals do not have a possible “homolog” behavior that serves the same function. A homolog, in this case, is behavior that does not necessarily bear any resemblance to human crying, but that serves a similar function—attracting attention and eliciting caregiving behavior. More generally, all mammals have their own specific ways of attracting attention and gaining sympathy. It is extremely important for the survival of all rather helpless offspring to be able (with their limited capacity) to obtain from others—especially their parents—food, shelter, protection, and aid in removing sources of pain (Craig and Badali, 2002; Scott, 1969).

The neuroscientist Jaak Panksepp (1998) and ethologist John Paul Scott (1969) have reported on the separation cries of several species, including chickens, guinea pigs, rats and dog pups, which can all be interpreted as signs of emotional distress, as well as a signal of the need for help and retrieval by the mother. Dog pups whine within a range that is audible to humans, but the calls of rat pups are in the ultrasonic range (30–50 KHz), which is too high for us to detect, but perfect for communication purposes at a distance from the mother rat. Figure 2.2 shows the numbers of distress calls produced by young guinea pigs under four conditions. It clearly



**Fig 2.2** Number of distress vocalizations in young guinea pigs as a function of age, presence or absence of the mother, and being in a familiar or unfamiliar environment. Reproduced from Pettijohn, T.F. Attachment and separation distress in the infant guinea pig. *Developmental Psychobiology*, 12(1), 73–81. © 1979, John Wiley & Sons, with permission.

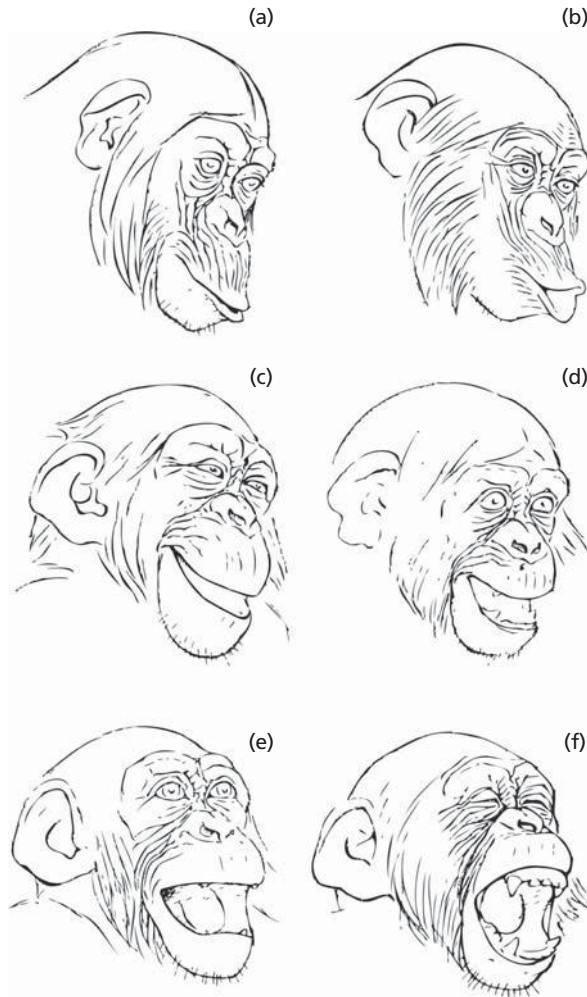
demonstrates that these sounds are seldom if ever produced in the presence of the mother. If the mother is absent, the number of distress calls also seems to depend on the young animal's age and where it is located. In a familiar environment, considerably fewer distress signals are emitted than in a new and strange environment. In a very similar way, human babies also generally quieten immediately when placed in close contact with the body of the mother or carer (or at least their smell), or with their siblings (see also Chapter 4).

These vocalizations developed early in mammalian evolution, their main function being to re-establish contact between the mother and the offspring when they become separated. In addition, they may be used when an animal is suffering from physical pain caused by injury or disease, stimulating others to provide support, which may also have had survival value (Craig and Badali, 2002).

The separation or distress calls of humans have much in common with those of other primates. The existing differences can be attributed mainly to differences in the size of the individual. Larger animals with more massive vocal folds and a large lung volume generally produce longer and lower-frequency cries compared with small animals (Newman, 2007). In addition, some apes have developed specific facial expressions to communicate what humans express with their tears. For example, the Russian ethologist Ladygina-Kohts (2002) carefully observed and reported the behavior of the young chimpanzee, “Joni”, that she raised in her own home in Moscow. She also identified a kind of weeping behavior and expressions in this animal (see Figure 2.3).

More recently, the Dutch primatologist Jan van Hooff (1984) also investigated the possible homologs and phylogenetic precursors of crying, as well as of those of smiling and laughter, in primates. His extensive observations of facial expressions in apes during social interactions resulted in the identification of some expressions that probably fulfill similar functions to human crying. These include the “bared-teeth scream face,” the “pout face,” and, especially in the chimpanzee, a modified version of the “pout face,” namely the “stretched pout–whimper face” (see Figure 2.4).

In most primates, the “pout face” is typically displayed by the infant during periods of separation from their mother, and ceases after they have been reunited. It is associated with

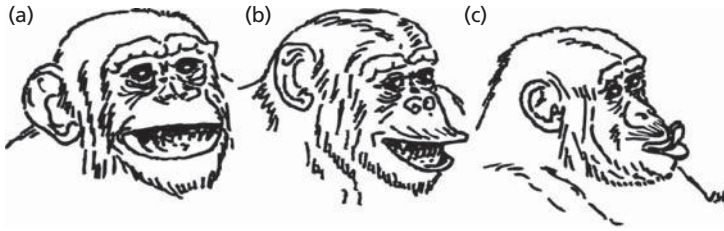


**Fig 2.3** The Russian ethologist Nadia Ladygina-Kohts may be considered to be one of the first cognitive primatologists. Between 1913 and 1916 she kept a young chimp, called Joni, in her home. She made many systematic observations of Joni's behavior and exposed him to several tests, and she compared his behavior with that of her child. This drawing represents six different facial expressions: (a) attention, (b) excitement, (c) common smile, (d) inviting smile, (e) laughing, and (f) crying. Reproduced from Ladygina-Kohts, N.N. *Infant Chimpanzee and Human Child: a classic 1935 comparative study of ape emotions and intelligence* (trans. F.B.M. de Waal and B. Vekker). © 2002, with permission from Oxford University Press.

helplessness, and is especially effective in eliciting a nurturing reaction from the mother. When making this face, the muscle tone is typically low and there is a reluctance to move. Interestingly, in adult chimpanzees, begging may also be accompanied by this specific expression.

The “bared-teeth scream face” is exhibited in particular when a serious threat or danger is perceived, but it may also signal surrender, preventing the animal from being attacked. Thus





**Fig 2.4** The three facial expressions of primates, which, according to Jan van Hooff, may be functionally equivalent to human crying. (a) The “bared-teeth scream face.” (b) The “stretched pout–whimper face.” (c) The “pout face”, which is not only observed in youngsters, but also in adults in begging situations. Reproduced from Van Hooff, J.A.R.A.M. *Het gelaat als uitdrukkingsmedium: een vergelijkende beschouwing* [The face as a medium of expression: a comparative approach]. In: A.J.J.M. Vingerhoets (ed.) *Facetten van Emotie* [Facets of Emotion]. Lisse: Swets & Zeitlinger. pp. 115–46. © 1984 Van Hoof, J.A.R.A.M., with permission.

this expression seems to serve an appeasement function in particular. The mother and allies generally respond by providing support, and the predator responds by withdrawing. This demonstrates that although non-human primates do not laugh, smile, or cry like humans, they do use specific facial expressions with the same purposes.

Because, as I shall make clear later, crying is linked predominantly not only with being separated from the mother and with physical pain, but also with powerlessness or helplessness, one may further speculate as to whether there is also a specific animal behavior that is displayed particularly in situations where the animal has no behavioral alternatives. In this respect there might be some functional correspondence with “displacement behavior,” which is thought to result from energy that is blocked in terms of its normal expression. In addition, there are examples of distressed animals displaying purposeless, repetitive, stereotypical actions. Such behavior patterns are interpreted as coping strategies for dealing with uncontrollable stress and frustration (Troisi, 2002). Animal researchers have suggested that displacement behavior may serve two main functions. In addition to having signal value to other members of the species, such a behavior may also result in a reduction in tension, due to the release of endogenous opioids. As we shall see later, these are also the two functions that might be associated with crying.

Thus answering the question about whether only humans cry with a simple “yes” does not do full justice to this complex state of affairs. Several other species have the capacity to display behaviors, and even certain facial expressions, that appear to a large extent to be functionally equivalent to human crying. The only distinctive and specifically human feature is the capacity to shed emotional tears.

## Evolution and tears

The fact that the shedding of emotional tears is restricted to humans raises a number of questions.

- ◆ Why do only humans produce emotional tears?
- ◆ What precisely do these tears *achieve* for them?
- ◆ What has caused weeping to become “hard-wired” in humans, and only in humans?

- ◆ What is or has ever been the advantage for human babies of who cried with tears, compared with their tearless counterparts?
- ◆ Are there any clues to a survival value or sexual selection effect that may explain the shedding of emotional tears by human adults?

Although acoustical separation or distress calls are part of the behavioral repertoire of all mammalian infants, in only a limited number of species are such calls also emitted by adult animals (Winslow, 2010). The challenge is thus to explain not only why humans have a visual sign added to the acoustical call, but also why this capacity to produce tears is maintained throughout life. Why don't we just make a noise if there is something wrong, and limit it to our infancy, like most other mammals? Do tears perhaps also serve specific functions for human adults as well?

The common explanation of why only human infants shed emotional tears is that they are very helpless and dependent on their parents for so long compared with other animals. But is this really a convincing and satisfactory explanation? What is wrong with the mere acoustical distress call? Many infant primates make various crying sounds without shedding tears, and are nevertheless perfectly capable of attracting parental attention and of surviving. Human infants in their first weeks of life also manage to survive without shedding tears (Darwin, 1872). Thus the distinctive evolutionary benefits of tears apparently first come into play when the newborn is a few weeks old. The real challenge for scientists is therefore to come up with plausible theories of how (adult) tears may ever have contributed to the reproductive success of humans.

## Attempts to explain human tears

In the scientific literature, eight attempts to explain human tears can be identified. Although not all of them can be taken seriously, I will nevertheless briefly mention them, because some of these theories are very popular and have received much attention in the popular media. I shall begin with what I consider to be the less serious explanations, and end with those for which the evidence is more substantial.

### Hardy: the aquatic ape theory

A very unlikely hypothesis proposes that our capacity to produce tears results from the fact that we originate from aquatic apes. Advocates of the aquatic ape theory (AAT), which was originally formulated by Alistair Hardy, explain a large number of the physical differences between humans and apes by assuming that our ancestors lived in coastal and river regions (Hardy, 1960). According to this view, wading, swimming, and diving for food exerted a strong evolutionary effect on the ancestors of the genus *Homo*, which is partly responsible for the split between the common ancestors of humans and other great apes. Elaine Morgan, a major advocate of this theory, considers the biochemical composition of human tears, just like hairlessness, bipedalism, and other human oddities, to be an adaptive response to saltwater living (Morgan, 1997). However, many problems are associated with this theory, and it is not viewed seriously by academic scholars.

### MacLean: "Smoke Gets in my Eyes" tears

A second, again improbable hypothesis has been proposed by the well-known neuroscientist and emotion expert Paul MacLean. He argued that our emotional tears originated about 1.4 million years ago, when the use of fire became more common, and our ancestors burned the corpses of their beloved family and tribe members. According to MacLean (1990), it was the smoke from

these fires that might initially have generated tear-producing reflexes. Subsequently, the production of tears became a conditioned reflex, due to the association of fire and ceremonies with emotional events. However, this hypothesis cannot explain how such a conditioned reflex could ever have become part of the normal genetically determined human behavioral repertoire. According to this theory, tears do not seem to have any additional survival value, and it is also unlikely that individuals whose eyes produced tears when exposed to smoke were more attractive to the opposite sex, thus favoring sexual selection.

### **Frey: detoxification**

A third and very popular hypothesis about the function of crying has its basis in classical times, but reached the height of its popularity with the formulation of the previously mentioned American biochemist William Frey (1985). It states that the importance of the shedding of tears lies in the removal from the blood of toxic substances that are released when humans are under stress. This detoxification would also explain why many people report feeling better after having cried. Frey draws a parallel with urination, and compares the lacrimal system with our kidneys, which filter our blood and separate the waste products. This of course raises several questions, such as why this mechanism would not also work in other animals, all of which may occasionally suffer from stress. This hypothesis will be discussed in more detail in Chapters 6 and 11.

### **Montagu: the mucus defense mechanism**

A more substantial explanation has been proposed by the American anthropologist Ashley Montagu, who speculated that the shedding of tears originated as a protective mechanism for preventing the rapid drying out of the mucous membranes of an infant's nose and throat (Montagu, 1960). This mucus is important for our defense against pathogenic invaders, such as bacteria, fungi, dust, and gases, which implies that its proper functioning is of utmost importance for our health. Thus, if drying out of the mucous membranes results in impaired functioning and increased vulnerability, tears have an extremely important role, and indeed would contribute to survival. This protective effect is further enhanced by the fact that the tears contain (among other substances) the antibacterial enzyme lysozyme, which reduces the risk of contracting upper respiratory infections. Thus the possible harmful consequences of the drying of the nasal mucosa are very effectively neutralized by crying with increased tear production, which is drained through the nose.

However, this hypothesis fails to take into account the following:

- ◆ Newborns do not produce emotional tears in the first weeks of life, when they are also weak and vulnerable.
- ◆ Tears only wet part of the structures that are prone to drying up.
- ◆ Other mammals produce all kinds of noises (e.g. bleating, bellowing, roaring) which are not accompanied by tear production.
- ◆ During other activities that are accompanied by extreme levels of inhalation and exhalation (e.g. intense physical exercise, shouting, singing) there is no increased moistening by lacrimation.

### **Roes: Kindchenschema**

A fifth hypothesis has been proposed by the Dutch ethologist Frans Roes (1989). Central to this hypothesis is the observation that adult members of several species, when they find themselves

in situations over which they have no control, typically tend to mimic the helplessness of their young offspring (Roes, 1989). Indeed, in almost all animal species the specific features of newborns stimulate care and nurturing reactions and inhibit aggressive impulses in an almost reflex-like way. According to the Austrian ethologist Konrad Lorenz, infantile features, in particular the characteristic relatively large head, the predominance of the brain capsule, large and low-lying eyes, and a bulging cheek region serve as a *Kindchenschema* (infant schema) with an “innate releasing mechanism” for affection and nurturing in adult animals and humans, which is very helpful for gaining the attention and care of parents and others (Lorenz, 1943). These characteristics all are well known from cartoon figures (e.g. Bambi, Mickey Mouse, Calimero, etc.) and stuffed animals (especially the teddy bear), and are especially applied to induce tenderness and caregiving. Women are more sensitive to these stimuli than men, and there is an association with empathic skills and feelings of being connected to others. Recent neuroscientific research has uncovered the neural basis of these innate releasing mechanisms (Kringelbach et al., 2008).

In addition to the morphological infant characteristics, specific “childish” behavior in animals seems to serve a similar purpose. Juvenile birds and primates sometimes behave like helpless newborns, particularly in begging situations. For example, a young hungry sparrow with a well-developed ability to fly may, in the presence of a parent, helplessly shake its wings, imitating the poorly coordinated wing movements of newly hatched offspring to support its begging for food (Roes, 1989). As described earlier, in chimpanzees the “pout face,” which is the typical expression of youngsters when separated from their mother, can be observed in older animals when they are begging. If juveniles that behave in this way receive more food and support than those that do not display such behavior, this imitation will increase their fitness, and thus has the potential to become part of the behavioral repertoire of a species even beyond infancy.

Human crying, and in particular the shedding of tears, is thus, according to Roes (1989), favored by natural selection because the tears and other facial expressions that occur during crying make the face look more like the face of a young helpless child. This effect is believed to be the result of at least four factors:

- ◆ the moistening of the face, which may remind us of the faces of newborns, wet with amniotic fluid
- ◆ the uncoordinated, almost spasmodic respiration, which is similar to the initial respiratory efforts of a newborn
- ◆ the correspondence of the acoustical aspects of human crying to the separation or distress calls of other animals
- ◆ the closed eyes, the wrinkled skin around the eyes, the spotted coloration of the facial skin, and the open mouth, all of which are typical crying expressions shared with newborns.

Because a newborn has little to offer apart from its own appearance and very limited behavioral repertoire, it is plausible that precisely these aspects are used to mobilize parental care and protection. Adequate parental reactions are favored by natural selection in the species in which newborns need such parental support. However, this still does not explain why only humans, including adults, shed emotional tears.

### **Murube: suffering symbol theory**

The Spanish ophthalmologist and crying expert, Juan Murube, has introduced a sixth, intriguing, and most worthwhile hypothesis (Murube, 2009; Murube et al., 1999; see also

Provine, 2011 for a very comparable hypothesis). He points out that, for our ancestors, reflex tears (see Chapter 3) were actually the very first visible signals of physical pain and discomfort (when the eye is in some way affected). According to this view, the tears that reflect emotional pain have developed from this original signal of physical pain in a very similar way to that in which bared teeth have developed as a signal of anger from eating, and expressions of disgust have evolved from food rejection and vomiting (“from oral to moral”) (Rozin et al., 2009). Provine postulates that the increased tear production is also related to the presence of *nerve growth factor* in tears, which stimulates wound healing. The connection of tears with the expression of physical pain certainly makes sense. In many respects, not least functionally, emotions and physical pain have much in common. In both cases, successfully stimulating others to provide succor and comfort is crucial, and it is easy to imagine that it had evolutionary advantage for our ancestors.

It is also notable that a similar development occurred in the brain. When a person feels “emotionally” hurt, the same brain structures are activated as when they are physically hurt (Eisenberger and Lieberman, 2004).

### **Walter: social bonding and coherence**

A seventh hypothesis has been proposed by the American science writer Chip Walter. According to that author, the importance of human tears lies in the role that they have played in the evolution of social bonding and social coherence (Walter, 2006). He compares the role of tears with the major role that our thumbs and big toes have played. Whereas our toes were important because they allowed us to stand and walk in an upright position, and our thumbs were essential because they made it possible to make and use tools, our tears in Walter’s view have contributed significantly to our social development. Because our ancestors lived in savannah areas, outside the safety of the jungle, there might have been an increasing need to form social bonds and to communicate with others, thereby creating the potential for collaboration. The importance of this is best illustrated by a brief consideration of the evolutionary context. For most of early human history, large nocturnal-hunting carnivores surrounded our ancestors, who had no access to physically safe sleep sites. (Note that humans cannot sleep in trees or on cliff edges, because they lose all muscle tone during REM sleep.) In such an environment, the main protection against predators was a close-knit social group. The human brain evolved under conditions that promoted the sense of social belonging and social connectedness, providing the basis for feelings of relative safety. This might also have stimulated the development of both body language (including tears) and normal language.

Walter (2006) regards tears as the result of “the powerful marriage of intellect and emotion,” allowing humans to reflect on their feelings. The involvement of new brain structures, in particular the prefrontal cortex, which regulates our emotions and their expression, among other functions, is consistent with this idea. This author has been further inspired by the ideas of the Israeli biologists Amotz Zahavi and Avishag Zahavi (1997), who introduced the concept of the “handicap principle” to elucidate why animals have in their repertoires particular behaviors that require large amounts of energy and resources, and that at the same time attract large—even dangerous—amounts of attention. The power of these behaviors, according to this theory, lies in the fact that they might have acquired the status of an *honest* signal. Infants of our ancestors had to deal with the problem that their crying could not only attract the desired attention of their parents, but also possibly lure potential predators. Thus, although crying is very important for survival, because it elicits the necessary caregiving and protection, infants would do better to refrain from crying, unless it is really necessary, because they may jeopardize their own safety. This has contributed to making crying a honest signal, which means that it reliably signals the

qualities of the signaller to the receiver, and that it is only applied when the signaller is genuinely in need of help. Note, however, that Walter focusses here on the aspects of acoustical crying, rather than on the importance of tears. This hypothesis therefore also fails to provide a convincing explanation of the origin and uniqueness of human emotional tears.

### **Hasson: appeasement and trust**

In the final attempted explanation, the Israeli evolutionary biologist Oren Hasson emphasized the fact that tears blur our vision, thus seriously interfering with the human capacity to effectively demonstrate aggression (Hasson, 2009). This is why tears, according to Hasson, have developed into an honest signal to others that the crier will do no harm. The perception of someone as not being threatening may subsequently have a positive effect on others—the tears serve as a “white flag”, and in doing so they fulfill an appeasement function and facilitate social bonding. This is a fairly straightforward and attractive theory, and Hasson’s theory that appeasement, the display of social trust, and a need for attachment play a crucial role seems very plausible. However, I have doubts about the validity and necessity of his “handicap” hypothesis. In addition, the question again arises as to why other primates could not have benefited from such a development.

### **Intermediate conclusion**

Eight possible explanations for the fact that (only) humans shed emotional tears have been identified. However, on closer scrutiny, for at least three of these hypotheses (those proposed by Morgan, MacLean, and Frey) there is little evidence to substantiate them. The remaining five hypotheses (those of Ashley, Roes, Murube, Walter, and Hasson) all pose interesting ideas with some evidence to support them. However, it remains unclear why tears would not have been of benefit to other primates, or what specific characteristics of other primates may have prevented the development of emotional tears. I shall now attempt to outline an alternative explanation.

## **Towards a new explanation of human tears**

Given the limitations and the different drawbacks of the previous attempts to explain human tears, I felt that there was a major challenge to try to offer a more satisfactory explanation that incorporates some important facts about tears and adequately addresses the main problems associated with the previously described hypotheses. I shall start by summarizing what these important facts and premises are. First, tears are part of a visual (and perhaps also *olfactory*) emotional signaling system, which should be considered separately from the acoustic aspects of crying. Secondly, children, as well as women of childbearing age, cry most frequently. Thirdly, the reasons for adult crying predominantly involve social issues, such as loss, rejection, and conflict (particularly for women). Finally, with increasing age, tearfulness seems to assume more importance at the expense of the acoustic aspects of crying. In addition, it must be recognized that tears result from a process that has occurred only in humans and not in other animals. The explanation for this is most likely to be linked to the extreme helplessness of human infants, which was the consequence of the increase in brain size which subsequently resulted in premature birth. More than any other primate species, human babies depend totally on their mothers for life-sustaining care for at least two years, and are partially dependent for many more years. Humans are thus born prematurely, with a rather undeveloped brain—they are almost blind, deaf, dumb, and without autonomy of posture, movement, coordination, or temperature regulation. This extreme helplessness (particularly the fact that it is impossible for human infants to cling to their mother’s fur) was accompanied by several other anatomical

modifications, and the development of a whole gamut of behavioral and psychological mechanisms to ensure better and longer parental care of infants.

Evolution has favored children not only with many juvenile anatomical features that provoke caregiving responses, but also with the capacity to laugh and cry, because these behaviors contribute to the passing on of one's genes to new generations. In a similar vein, it is also the claim of attachment theory that humans are genetically equipped with attachment behaviors that have been designed to promote not only the proximity of the caregiver, but also the provision of support in all kinds of dangerous, even life-threatening situations, and thus contribute to the survival of the youngsters. However, it should be noted that nothing has yet been stated here about the specific role of tears.

In conclusion, it has been widely proposed that crying in general may have a crucial role in enabling helpless creatures to elicit care, support, and protection. However, the specific role of tears remains relatively unaddressed. I shall now attempt to explain why tears have developed as the solution to the problems and challenges of our ancestors, both infants and adults.

### The role of tears

One may speculate as to whether the role of tears is to meet a behavioral need that balances the positive effects of acoustic crying (as an urgent signal) with its apparent disadvantages (attracting the attention of strangers and even predators). This would imply that weeping is particularly applicable in situations that involve close interaction, especially with caregivers and others from whom one might expect succor.

Have tears solved the serious problem caused by the distress calls of young mammals attracting not only the attention of parents and protectors, but also that of predators? In an environment where there are many predators, distress calls are unnecessarily dangerous signals for less helpless creatures (i.e. children with developed motor and language skills) who can move towards their caregivers. For close interactions, a visual (and/or olfactory) signal is sufficient and safe.

The large, complex human brain continues to develop after birth, which implies that it remains highly plastic and susceptible to modification by the environment for many years after birth, probably until at least 15 to 20 years of age in humans. This unique characteristic makes it possible for humans to fully develop their special cognitive and social skills, which make them unique in the animal kingdom. Throughout the extended period of childhood, adults play a major role in both positive and negative life experiences, teaching and supervising. Children tend to remain receptive to this tutelage, pliable and flexible, until they reach adulthood. This period of childhood, which is characterized by relative immaturity, is also unique in the animal kingdom. It pre-eminently features developing behavior, including the gradual replacement of acoustic crying with a visual signal that has the same strong effect on others.

The combination of tears and acoustic crying might imply that the effects of tears might be dependent on who has been attracted by the distress calls. The sight of tears encourages parents to provide caregiving. In the case of neutral strangers, tears should stimulate them to feel a social bond with the infant and to provide aid and support. In contrast, predators and aggressors should be mollified and made less aggressive. Thus one may consider the effects of (infant) tears (caregiving, social bonding, and reducing aggression) on one social dimension. However, this still does not fully satisfactorily answer the question "Why tears?"

Let me first try to answer the question of why emotions in general are displayed in particular on the human face. For a good understanding of this, it is helpful to be aware that social interactions (e.g. mother-child interactions, pair bonding, mating) in the majority of mammals are under the influence of olfactory information. This explains why these animals have a relatively

high ratio of limbic brain structures (in which olfactory information is processed) to cortical brain structures. However, in Old World primates and humans, it is the visual cortex in particular that has become enlarged, so that it represents up to 50% of the total neocortex, whereas the relative impact of the olfactory brain system has dramatically decreased (Broad et al., 2006; Curley and Keverne, 2005). These major functional and anatomical brain changes probably reflect the increased importance of *visual* information in social interactions, at the cost of olfactory information. Living in social groups requires an honest, clear, and unambiguous exchange of information about one's behavioral intentions and well-being. With the development of a brain that is optimally equipped to process visual information, reliable visual cues—such as facial emotional expressions, including tears—may have acquired an increasingly important function in the evolution of *Homo sapiens*.

Approximately 200 million years ago, the common ancestors of mammals underwent development of the facial muscles that gave them the ability to suck milk from their mother's breast. In humans, the development of their fine-grained facial musculature together with the loss of facial hair and the development of sweat glands (it has been suggested that the lacrimal glands originated from sweat glands) allowed them, more than any other species, to express a wide variety of emotions—such as joy, anger, surprise, sadness, fear, and pride—via the face. The face is also a most appropriate vehicle for expressing emotions, because it is the main source of information (the eyes) and attack (the mouth), and thus attracts the attention of others. However, with regard to some very important functions the facial musculature alone apparently could not provide a sufficiently clear and strong signal. Tears and blushing contributed to a more conspicuous and powerful signal. This raises two questions. First, which are the precise underlying states of these expressions, and what do they convey? Secondly, and strongly linked to the first question, why is it important that the specific messages are easily and accurately recognized by others, and that the risk of misinterpretation of the specific underlying states is minimized? A plausible answer is that they have something in common that is crucial for survival, or that facilitates sexual selection, these being the two driving forces of evolution. Perhaps both of these emotional expressions signal to others appeasement and supplication, resulting in greater mutual trust and stronger social connectedness, which in turn create the necessary conditions for greater cooperation. This may also explain why submissive postures, such as praying, begging, and confession, are often associated with tears. In addition, since longtime, praying, crying, and singing together in ritual ceremonies, even when it failed to achieve the desired outcome (e.g. influencing supernatural agents to ensure success in endeavors such as hunting and warfare, healing the sick, avoiding evil, or securing fertility), resulted in a reduction in anxiety of individuals as well as increased social coherence (Dissanayake, 2008). Common adult crying may thus have an impact both on individuals and on society at large.

With regard to the effects at the individual level, I want to point out some notable similarities between tears and the pheromones that play a major role in many important social interactions in a large number of mammal species. First, at least in mice, it has been demonstrated that the basal tears contain sex pheromones, which indicates that such a connection is not unlikely (Kimoto et al., 2005). Secondly, it has been shown that, at least in some animal species, such as squirrels, distress calls are accompanied by the release of pheromones (Sherman, 1985; Verheggen et al., 2010). In addition, there is evidence that pheromones in particular may have an impact on hormones such as prolactin and oxytocin, which—as I shall discuss later—also play a major role in crying (Root Kustritz, 2005). Finally, an Israeli study demonstrated that when men sniffed female tears (compared with saline) they showed less sexual arousal, as evidenced by lower testosterone levels and less activity in sex-associated brain structures (Gelstein et al., 2011).



I also attach much value to Murube's suggestion that emotional tears may have had their origin in the reflex tears, due to eye infections, which made individuals look rather helpless and dependent on others (Murube, 2009; Murube et al., 1999). The superfluous production of tears containing antibacterial agents may both have helped them to overcome any infection and triggered the support of others, which both have contributed to their survival and reproductive success. Thus tears may literally have been "a matter of life and death."

The fact that crying is a behavior that is shown most frequently by those who are "weak" (i.e. children, and women during their fertile years, in particular) seems to support the notion that tears can function as alternative "weapons," which can compensate for a lack of strength and power.

## Are there different kinds of crying?

When talking with journalists and other laypeople, I have often noticed that it was implicitly or explicitly assumed that there are different kinds of crying or different kinds of tears. Initially this surprised and confused me, as I had considered crying to be a mere physiological response. Of course, just as we may laugh for different reasons, so also tears can be evoked by different situations and events, and crying can vary in intensity, ranging from moistening of the eyes to sobbing, wailing, and choking, accompanied by strong bodily movements. There can be no doubt that crying may manifest in very different ways, and individuals may vary considerably in the way that they cry in particular situations. It is conceivable that each individual may also have their own specific "style" of crying.

However, does this also imply that there are real, qualitative differences in crying? My initial answer was a definite "no." Independent of the nature of the eliciting conditions, the physiological process of tear production is very similar across different situations. The question of whether there are different kinds of crying thus does not make sense when considering crying in merely physiological terms. Similarly, we can perspire because we are in a sauna, because we are exercising strenuously, or because we are experiencing embarrassment, but this does not necessarily imply that these are physiologically qualitatively different reactions. Nor do we have different kinds of goose pimples, different kinds of saliva production, or different kinds of blushing. Even if the biochemical composition of the tears differed considerably, this is not sufficient reason to conclude that, in a physiological sense, the crying is qualitatively different, because the biochemical content of tears (in a very similar way to that of saliva and urine) depends on other factors, such as the composition of the blood. Since, in all cases of emotional crying, the same "hardware" and the same biological processes and mechanisms are involved, there is just one kind of tear production. However, if we consider crying as a *behavior*, rather than as a physical process like sweating, salivation, or urination, it is clear that there can indeed be different kinds of crying.

Mothers often assert that they can distinguish between the different kinds of crying of their babies. However, adult crying can also be manifested in many different ways, and it can be accompanied by many different behaviors. A lump in the throat, superfluous salivation, wailing, sobbing, sighing, hiding one's face, wiping away the tears, closing the eyes, and lowering the eyebrows are all examples of different manifestations of crying. Thus crying may be associated with a wide range of possible (supporting) behaviors (see also Figure 2.1).

In the limited scientific literature on crying there have been some attempts to distinguish between different kinds of crying. For example, on the basis of a sophisticated statistical analysis of descriptions of crying episodes, the British psychologists Don Williams and Gabriela Morris identified two different kinds of adult crying (Williams and Morris, 1996). The first type is rather

intense, long-lasting, and difficult to stop, while the second type is more diverse in appearance and more controllable. The question, of course, is whether this is just a matter of intensity or degree, rather than representing two different kinds of crying.

However, when I first studied the work of the American social worker Judith Nelson, I understood that it may indeed make sense to distinguish between qualitatively different types of crying. Her ideas originated in the work of the British child psychiatrist John Bowlby, who formulated his well-known and influential attachment theory that addressed the quality of the mother–child relationship (Bowlby, 1969). His theory proposes that human babies are endowed to form strong emotional bonds with the individuals who care for them (so-called “attachment figures”). In order to promote the formation of such a bond, infants are genetically equipped with “attachment behaviors” that stimulate the proximity of their attachment figures and elicit help and support. Along these lines, Nelson considers crying to be an attachment behavior that is maintained throughout adulthood, in that it signals to others that one is in distress and needs help and care (Nelson, 2005).

According to attachment theory, when a child experiences separation from the mother or caregiver, it is possible to distinguish between three global kinds of reaction (Nelson, 2005). The initial “protest crying” is characterized by loud, persistent, and very irritating screams that reflect an attempt to reverse the situation and restore the loss. It is a signal that is unlikely to be missed, and its objective is clear—to let everyone in the environment know that fast action is needed to neutralize the current situation. It is a powerful signal to others to take action to do something about the cause of the distress. Montagu (1942) suggests a link between this kind of crying and adult swearing. In contrast, the subsequent “sad crying” is quieter and more subdued, and is designed for a completely different purpose—to elicit emotional support and shape new attachment bonds after a loss. This type of crying predominantly signals a state of helplessness, and it occurs when all previous efforts to reverse the situation have been unsuccessful. It is an urgent invitation to provide succor and comfort. Indeed, this is the kind of crying that particularly evokes empathy and sympathy.

When there is ultimately no reunion with the lost person or object, and no adequate replacement is available, a stage of detachment may be reached in which there are no tears. This “detached crying” reaction to a loss or separation is typically characterized by a lack of tears, and represents extreme hopelessness, dejection, and withdrawal. Nelson (2005) asserts that these three kinds of crying can also be differentiated in adults. For example, detached crying may accompany severe depression and sadness, and may occur after a person has been exposed to severe traumatic experiences.

Amazingly, independently of and apparently without any awareness of the work of Nelson, Swedish researchers who were analyzing the crying of terminally ill cancer patients also identified three rather similar kinds of crying (Rydé et al., 2007). These investigators described the first type as “intense and despondent, often uncontrollable crying.” This type of crying appeared first, when patients were confronted with events that they could not cope with, such as the initial diagnosis of their disease, which made them aware that they were close to death and that their assumed and predictable future was suddenly curtailed. The accompanying feelings may differ in nature, but often include a sense of loss of control, powerlessness, hopelessness, despair, and also anger. Typical questions with which they struggled were “Why me?” and “What did I do wrong?” Occasionally, feelings of fear and sometimes panic also emerged.

The second type of crying that these researchers recognized was characterized as a “little,” silent, calm cry, during which tears flow slowly down the cheeks, and the emotions are released in a more controlled manner. This type of crying is regarded more as a conscious way of coping

with situations or feelings—as a strategy for expressing and communicating feelings that are not easy to describe verbally to others, such as family members and healthcare professionals. It is a “last-resort” action that is used in difficult situations. This gentle kind of crying is said to be beneficial in a number of different ways, as it evokes emotional support, strengthens relationships, and opens up important channels of communication.

These researchers described the third type of crying as a feeling of “crying inside.” No tears are visible on the outside, or at most the eyes may become watery, but this lack of tears is in apparent contrast to the strong internal emotions. A major difference to the ideas of Nelson (2005) is that Ryd  et al. (2007) emphasized the role of feelings of shame about showing one’s emotions and weeping, leading to strong inhibition of crying. Nelson, in contrast, stresses that during this phase the individual has literally lost the capacity to shed tears.

These three kinds of crying can all be viewed as attempts to come to terms with one’s situation and to strive to achieve emotional balance. This involves exposing one’s vulnerability. In the presence of close family members or friends, it represents a call for emotional support, while at other times, particularly in the presence of less familiar people, it may indicate that one needs to be left alone. Indeed, some argue that crying may function as a distance regulator, so that in some situations it can bring people together, whereas in others it pushes them away, depending on the relationship that those people have with the individual.

A final distinction that deserves attention is that made by Murube et al. (1999). These authors argue that there are two global kinds of tears, namely those associated with *requesting* help and those concerned with *offering* help—in other words, those that are shed when we are suffering ourselves, and those that are shed when we are sympathizing with the suffering of others. To explain this phenomenon, these researchers introduced the “symbol inversion theory”, according to which core symbols that are very similar, but which differ in some specific respects, are used to convey diametrically opposed states. In this case, in order to express empathy our ancestors used the “requesting-help” core symbol (i.e. tears), but some aspects (e.g. the acoustical ones) were changed in order to convey a diametrically opposed emotion, namely the offering of help, solidarity, and empathy. However, this difference is not reflected in a different expression.

## Genuine and feigned tears

The previous classifications are thus based on the way that people cry (with or without wailing and tears). Another insightful categorization that has a long tradition focusses on the social context and the sincerity of the tears. In the historical and anthropological literature, which will be discussed further in Chapters 8 and 13, one comes across several instances of voluntary or “pseudo-crying”, in particular during praying and rituals (Ebersole, 2000). At other times in history, and in different cultures, the degree of control that humans had over tears appeared to be comparable with our level of control over laughter and smiling.

The following attempt at a classification, which has some striking parallels with different kinds of laughter, may help to provide a better understanding of crying in different cultural settings.

A distinction can be made between real, genuine, emotional tears and feigned tears. The feigned tears can be further differentiated as follows:

- ◆ “social” tears (i.e. those shed during social and cultural rituals), the purpose of which is to emphasize and facilitate social bonding
- ◆ “manipulative” tears (e.g. those shed during praying, begging, or seduction), the aim of which is to reinforce prayer, begging, requests, and so on, and thereby to influence others

- ◆ “magical-power” tears, which are shed during some important social events (and also at funerals), with the aim of eliciting special powers to achieve some objective.

Understanding the distinctions between different kinds of crying (and their functions) might in turn contribute to a better understanding of crying and tears. Since this behavior never occurs in a social vacuum, but rather in a specific social and cultural context, it can only be understood by taking into account the details of the specific setting. The extent to which emotional and feigned tears really differ will be discussed in Chapter 8, which focusses on the role of culture.

## Conclusion

In this chapter I have highlighted several issues concerning the nature and origin of human crying. First, crying (or, more precisely, the production of emotional tears) should not be regarded as a physiological reaction, but rather as a behavior, that is unique to *Homo sapiens*. I further addressed the prevalent theories about the origin of tears, and then proposed an evolutionary-based alternative. I emphasized the effects of tears, which are dependent on who has been attracted by the distress vocalization (i.e. mother, stranger, or predator). The effects may be summarized as the eliciting of care and protection, the promotion of social bonding, and the reduction of aggression. I proposed that these functions also explain why crying is a behavior that occurs most frequently in children and women, who may lack the strength and power to deal with major threats in other ways. I also differentiated between different kinds of crying, both in terms of phenomenology and on the basis of the context in which they occur. This may contribute to a better understanding of the diverse functions of tears in different settings.

In the next chapter I shall discuss the necessary “hardware” that enables us to produce (emotional) tears, and the connection between crying, stress, and emotions.

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## Chapter 3

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# Crying and adaptation: the hardware

Tears are the blood of the soul.

(Anonymous)

Almost every animal species has its own specific environment (“habitat”) to which it has become optimally adapted. One species may be found only in the African jungle, another may occur in the Asian mountains, and a third may be confined to the South American rainforest. In each case the physical anatomy and behaviors of these animals have evolved to become optimal for their particular living environment. This specialization is a major strength, but at the same time it is also a major weakness, which becomes dramatically manifested when the environment of these animals changes rapidly. This is one of the reasons why so many animal species are endangered—they lack the flexibility and the capacity to cope adequately with changes in their habitat, and they therefore become vulnerable.

Humans, in contrast, can live in a much wider range of environments, including hot deserts, rainforests, and very cold areas. In addition, they have a remarkable capacity to adapt fairly quickly to changes in their environment. This is due to their complex brains, which are responsible for their well-developed intellectual and cognitive functions, including the ability to develop and work with tools. In addition, and this should not be underestimated, they have the advantage of their social skills—that is, their preparedness and capacity to cooperate with other members of their species. Humans have been described as an *ultra-social* species, and as *super-cooperators* (Nowak and Highfield, 2011). This willingness and capacity to collaborate with others has been facilitated by the fact that they can understand reliable information about the feelings and behavioral intentions of their conspecifics, which results in increased mutual trust. Humans are also quite unique in the animal kingdom in that they take care of the elderly, the sick, and disabled. Insight into how others feel must have been crucial in the development of these important interpersonal and prosocial behaviors (Killen and De Waal, 2000).

The brain plays a crucial role in all of these unique human qualities, because it governs the following three processes:

- ◆ the *perception* of possible threats and (social) assets, and the interpretation of reliable information collected by the senses
- ◆ a *memory* function, which is very important for the rapid evaluation of (previously encountered) situations, which facilitates learning

- ◆ *effector* functions that stimulate the muscles, autonomic nervous system, hormones, and immune system to deal adequately with challenges and threats, or with positive reactions from others.

Stress reactions and emotions are primarily designed to facilitate adaptation, that is why they are very fast and efficient; it does not require time-consuming cognitive processing to react to a wide variety of threats and signs of safety, comfort, and kindness (Nesse and Ellsworth, 2009; Tooby and Cosmides, 2010).

Thus emotions are not only helpful when facing major threats, but are also extremely important for adequate social functioning in a complex society. Whereas anger is an emotion that stimulates aggression, other emotions aim to reduce aggression and antisocial behavior and, as such, have contributed to the development of present-day society. In particular, emotions such as guilt, shame, and regret prevent us from behaving in socially unacceptable ways. When norm violations occur, these same emotions may reduce aggression and stimulate appeasement in others. Mutual trust and understanding, as well as adequate control of aggression, are the foundations of human society.

Finally, there is a link between emotions and morality (Haidt, 2007; Solomon, 2004). Although most emotions are triggered because they serve self-interest and help to deal with threats and assets in the broadest sense of these terms, there is also a subcategory of emotions (e.g. elation, awe, gratitude, disgust, indignation) that seem to be elicited more by what is going on in society and how humans in general interact (e.g. what we see in films and read in books) (Tan and Frijda, 1999). This mostly concerns highly esteemed human values (e.g. justice, altruism, self-sacrifice), which are closely linked with morality, another building block of human society.

It is in the evolution of these complex social and moral emotions that the main functions of (adult) crying, and in particular tears, must be searched for. Tears serve to signal some important messages both to the crying person him- or herself, and to others, but what is the content of these messages? How does crying fit within current theories relating to stress and emotions? To understand this connection, it is helpful to be aware that stress reactions, contrary to what is often suggested in the literature, are not just a matter of “fight or flight.”

## Differential stress reactions

The biological manifestations of stress and emotion are currently described mainly in terms of increased activation of the sympathetic nervous system (Christensen and Jensen, 1994). This is the branch of the autonomic nervous system that is particularly active during threat, challenge, and physical and mental effort. Activation of this system helps the organism to prepare for action—“fight or flight.” Increased heart rate and blood pressure, as well as the redistribution of blood from the internal organs to the muscles, all facilitate a quick and adequate behavioral reaction to a threat. Anxiety and anger are the prototypical emotions associated with this reaction.

Unfortunately, the modern literature on stress has failed to make it sufficiently clear that the sympathetic nervous system does not play a major role in all kinds of stress reactions and negative emotions. There is compelling evidence that the neurobiological mechanisms involved in emotional states such as sadness, grief, and separation distress are qualitatively different from the systems associated with anxiety (Henry and Stephens, 1977; Scott et al., 1973). There is growing insight into the importance of the second branch of the autonomic nervous system, namely the parasympathetic nervous system, in certain stress reactions and emotions (Porges, 2003). Remarkably, this system was initially considered to be active mainly, if not exclusively, during positive states of recovery, rest, and relaxation. However, this view is now obsolete and must be abandoned. This parasympathetic branch apparently has two aspects. On the one hand, there



is a connection with positive emotions, relaxation, growth, and recovery, but on the other hand there is also a link with helplessness and powerlessness.

Nearly 50 years ago, clinicians described the so-called *giving up–giving in syndrome*, which is a very different kind of stress reaction to the fight-or-flight reaction (Engel, 1962; Engel and Schmale, 1972). Whereas the latter reaction can be considered to be designed specifically to support an active approach to a threat and the associated expenditure of energy, the former reaction is characterized by passivity and conservation of energy. This system becomes activated when one realizes that one is unable to cope with the situation. The parasympathetic nervous system is activated, and this is manifested, among other observable physiological processes, in a decreased heart rate.

The sympathetic and parasympathetic nervous systems are the two branches of the autonomic nervous system, which regulates the control of all kinds of body functions (e.g. heart rate, respiration, digestion, sexual responses). The evolution of the autonomic nervous system has gone through three global stages, each with an associated behavioral strategy (Porges, 2003). In the first stage, digestion and responding to threats by depressing metabolic activity were the major functions. At the behavioral level, immobilization behaviors prevail. The second stage is characterized by increased activity of the sympathetic nervous system which, as outlined above, is capable of increasing metabolic output to support the physiological processes that facilitate the fight-or-flight response. Finally, and most importantly for crying, in the third stage, which is unique to mammals, cardiac output can be rapidly regulated to foster engagement and disengagement with the environment. Interestingly, this mammalian vagus (primarily parasympathetic) system is neuroanatomically linked to the cranial nerves that regulate social engagement via facial expression and vocalization. It is thus plausible that there is also a link with crying. This notion is consistent with the fact that the secretion of tears is predominantly under the influence of the parasympathetic system (Dart, 2009). In brief, there seems to be a close connection between helplessness, increased activation of the parasympathetic nervous system, and the production of emotional tears.

The psychologist Shelley Taylor has postulated a third kind of stress reaction, namely the *tend-and-befriend* reaction (Taylor, 2006). This author argued that, from an evolutionary point of view, the fight-or-flight response is not a feasible option for women with young, helpless children who are exposed to serious threats and need protection. Women in prehistoric times would have fared better if they joined with other women in order to be better able to resist threats as a group, as well as jointly caring for the offspring. An additional interesting claim made by Taylor concerns the role of the hormone oxytocin in this reaction. As I shall briefly discuss later in this chapter, this hormone, among others, appears to promote relaxation, confidence, and willingness to trust others.

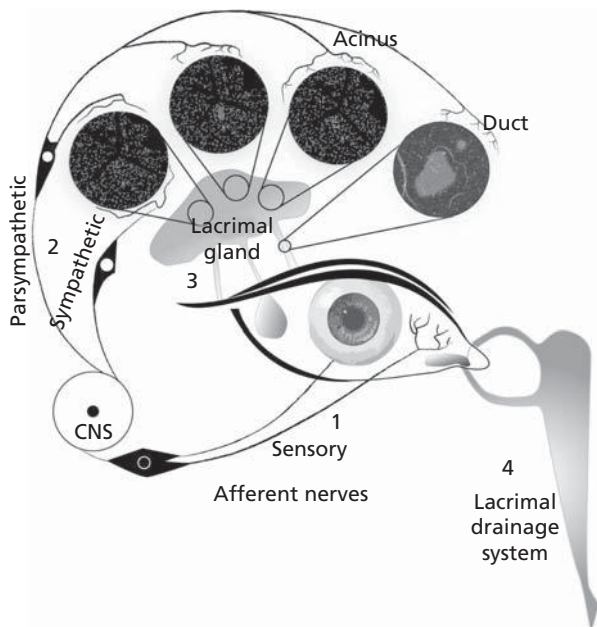
This tend-and-befriend reaction is thus thought to occur especially, although not exclusively, in women. However, John Bowlby's attachment theory has already emphasized the activation of our attachment system in stressful or threatening situations, resulting in an increased desire for proximity to a known and trusted other (Bowlby, 1969), even pets (Kwong and Bartholomew, 2011). This holds for any person of either gender and any age. The finding that women with (young and helpless) infants in particular may benefit from such a reaction does not necessarily mean that this reaction is limited to females. Since tears also may serve to reduce aggression and to facilitate social bonding, a link between crying and this stress reaction seems plausible.

Whereas tears do not fit the well-known fight-or-flight reaction, they certainly make sense in relation to the other two stress situations, which may occur when a fight-or-flight response is not possible or is not appropriate. In particular, when one feels overwhelmed and powerless, and

there is nothing to fight with or to flee from (e.g. in the case of the death of a close family member or friend), the other stress reactions may be more adaptive. These are generally situations where a strong appeal to others is important. This is the pre-eminent condition in which crying seems to be the most adequate response.

## The neurobiological aspects of crying

The biological pathway to emotional tears is provided by nerves, originating from the parasympathetic and sympathetic nervous system, in conjunction with hormones, released by the pituitary (a small brain structure that secretes hormones, also known as the master gland) (Dart, 2009) (see Figure 3.1). However, this knowledge does not mean that we have good insight into the precise role of the different brain structures and neurohormones involved in crying. Extensive neurobiological studies in humans have not been conducted until now. Our knowledge is solely based on animal investigations and observations in patients with brain pathology or neurological disorders, who might cry without feeling any affect, and patients who are undergoing brain stimulation. However, animal studies cannot of course yield any information about the specific role of the brain in the production of emotional tears. Unfortunately, the information about the different (neuro)biological aspects of crying is rather disparate, and there have been few attempts to bring all of this evidence together (e.g. Dart, 2009; MacLean, 1990; Messmer, 2009; Newman, 2007; Panksepp et al., 1980; Parvizi et al., 2009; Treacher Collins, 1932; Van Haeringen, 2001).



**Fig 3.1** Schematic representation of the neural innervation of the lacrimal gland by parasympathetic nerves, although there is also a minor role for sympathetic nerves. CNS, central nervous system. Reprinted from Dart, D.D. Neural regulation of lacrimal gland secretory processes: relevance in dry eye diseases. *Progress in Retinal and Eye Research*, 28, 155–77. © 2009, with permission from Elsevier.

One of the problems that hinders the study of precisely which brain structures are involved in crying concerns the activity of numerous muscles associated with changes in facial expression and respiration, which also have to be orchestrated by the brain. This means that it is quite difficult to disentangle the role of brain structures in the experience of feeling, in its expression, and its regulation. In an ideal study of the neurobiological aspects of crying, brain activity would be measured not only when the study participants were sad, with and without tears (preferably with no additional muscle or vocal involvement, such as sobbing), but also when they were happy, with and without tears. Unfortunately, due to the complexities of performing this type of research, such a study has not been undertaken until now.

## Brain structures and stimulation

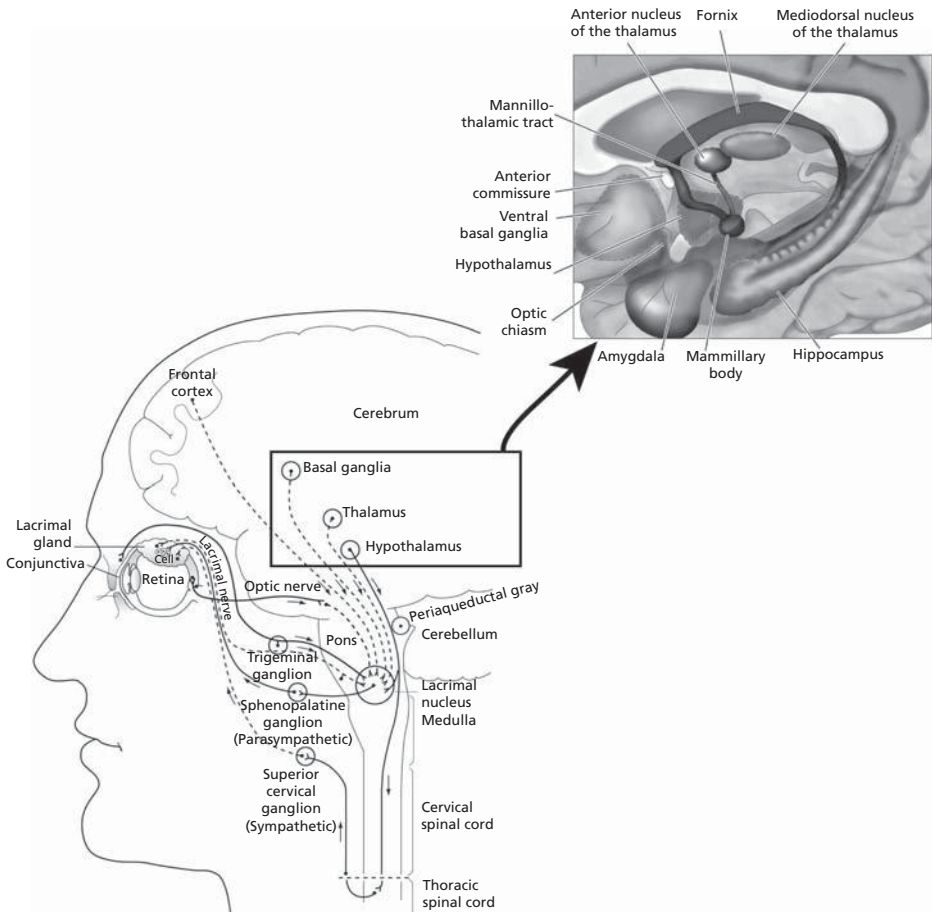
Since human crying is thought to have evolved from animal distress or separation calls, which are in the vocal repertoire of all mammals, research findings obtained in animals may also help to increase our insight into the involvement of specific brain structures and biochemical substances relevant for at least the acoustic component of human crying (Newman, 2003, 2007; Panksepp, 1998). This has yielded the following global picture (the location of the different structures in the brain is shown in Figure 3.2).

Animal studies have revealed that the most important neural structures involved in animal distress calls are the periaqueductal gray (PAG) and the dorsal anterior cingulate cortex (ACC) (Newman, 2007; Nieuwenhuis, 1996). Stimulation of the PAG can elicit these separation distress vocalizations, whereas lesions appear to decrease them. In addition, an intact ACC is needed for the production of these separation calls. Electrical stimulation of the ACC in macaques leads to the spontaneous production of distress vocalizations, whereas ablating this structure in squirrel monkeys eliminates the spontaneous production of distress vocalizations. Interestingly, in macaques such ablation also resulted in a decrease in affiliative behavior, potentially reflecting a reduced need for social closeness, as social separation is no longer experienced as stressful. Furthermore, the prefrontal cortex and the amygdala, both parts of the emotional brain, have been demonstrated to play a role in distress vocalizations. Lesioned animals demonstrated changes in cry structure suggestive of a blunted affect, and showed dramatic decreases in the production of distress calls. The involvement of the amygdala has been further confirmed in a study showing its role in the dysregulation of affective stability after sleep deprivation (Yoo et al., 2007). This may explain why sleep-deprived individuals have a lowered threshold for crying.

Studies in humans have also pointed to the role of the ACC in the unpleasant sensation associated with both physical pain and social pain, two conditions that are predominant in the induction of crying (Eisenberger and Lieberman, 2004). Also relevant in humans during voiced speech (which shares some laryngeal control mechanisms with crying) is an increase in blood flow into the PAG, as well as into the cerebellar vermis and parts of the thalamus.

Observations in brain-damaged / neurological patients suggest that the critical triggering sites for crying are probably located in the medial and ventral prefrontal region and in certain brainstem nuclei. More specifically, the pons and the cerebellum are essential parts of a control mechanism, which can switch on and off, and can modulate crying (and laughing). In normal circumstances, this whole system is under the influence of the prefrontal cortex, which is essential for the adjustment of crying and laughter to the context. Damage to these structures may result in inappropriate crying (and laughing).

An impressive illustration of what may happen after brain stimulation concerns a 65-year-old woman who underwent electric brain stimulation treatment for Parkinson's disease (Bejjani



**Fig 3.2** Schematic representation of the brain, with particular emphasis on the structures and nuclei implicated in the shedding of tears. This includes parts of the limbic or emotional brain (e.g. cingulate gyrus, amygdala), the center of executive functioning, which is important for the regulation of emotions (i.e. the prefrontal cortex), the neural connection with the lacrimal gland (lacrimal nucleus), and several brain structures (e.g. periaqueductal gray, pons, cerebellum) that are involved in the motor accompaniments of crying (e.g. facial muscles, muscles of the respiratory system, vocal cords).

et al., 1999). When the current was switched on, not only did her Parkinson's symptoms disappear immediately, but also she stopped her conversation quite abruptly, cast her eyes down and to her right side, and then leaned slightly to the right. Her facial expression became one of deep sadness. After a few seconds she suddenly began to cry. The tears flowed abundantly and her entire demeanor was one of profound misery. Soon she was also sobbing. Subsequently, she began to talk about her profound sadness, her mental and physical exhaustion, and her hopelessness. "I'm falling down in my head," she said. "I no longer wish to live, to see anything, hear anything, feel anything ... I'm fed up with life, I've had enough... I don't want to live anymore... I want to hide in a corner ... I'm crying over myself, of course." When the current was switched off, it took approximately 90 seconds for the patient to recover emotionally. The sobbing stopped as abruptly as it had started, and the sadness disappeared. She smiled, relaxed, and for the next five minutes was joking. "What was this all about?" she asked. She had felt awful, but did not know why this was so.

However impressive this example might be, it does not yield much insight into the specific brain structures involved in crying, as here again there is a confounding of sadness and crying. The crucial test for learning more about the role of the brain structures that are specifically involved in crying is one in which brain activity is measured in individuals who are experiencing the same emotions with the same intensity, with some crying and others not. Until now no studies have been undertaken to make systematic comparisons of what is happening in the brain, when comparing the following three states, namely sadness without tears and crying, sadness with tears and crying, and tears and crying without sadness. Even then it could be argued that differences in the activation of brain structures are related to several other processes, rather than specifically to the facilitation or inhibition of crying (see also Damasio, 2004).

Clearly the major limitation of animal research is that animals do not shed emotional tears, but human studies also have failed to address the neurobiology of the production of emotional tears, which explains why there is still a lack of knowledge in this respect. As far as is known, only one investigation to date has specifically focussed on crying and the brain. This was a Japanese study, in which the activity of the medial prefrontal cortex (mPFC) was recorded in eight individuals who cried in response to an emotional movie (Kamiya et al., 2008). The investigators distinguished three consecutive phases, namely the pre-tear stage, the tear-triggering stage, and the crying stage.

A gradual increase in the activity of the mPFC in the pre-tear stage was observed, followed by a spiky increase when the participants started to cry. The investigators wondered whether the spiky activation might indicate a switch from sympathetic to parasympathetic activation. However, it has yet to be established whether the increased mPFC activity indeed precedes the onset of tears, or whether it merely reflects the awareness of the crying in the brain. There is thus still a strong need for more research on the involvement of different brain structures in crying and, specifically, the production of emotional tears. In particular, the production of tears connected with tender feelings and sentimental or moral feelings also need special attention of brain researchers.

## Neurochemical substances

In addition to the role of different brain structures in crying, one may speculate about the involvement of some specific neurochemical substances, such as (neuro)hormones and neurotransmitters (Markianos et al., 2011; Newman, 2007; Panksepp, 1998; Panksepp et al., 1980; Scott et al., 1973). Of direct relevance for the activation of the tear glands are the parasympathetic neurotransmitters, acetylcholine and vasoactive intestinal peptide, and the sympathetic neurotransmitter, noradrenaline (Dart, 2009). In addition, there are several other neurotransmitters and neurohormones that play a major role in the emotional brain, and that probably play a crucial role in crying. The following three neurotransmitters may all play some part in the regulation of crying.

*Serotonin* is a neurotransmitter, its main function being to transmit information in the brain and from the central nervous system to other cells in the body. It is partly synthesized in serotonergic neurons in the central nervous system, where it has various (mainly inhibitory) functions. It is commonly known as a “mood neurotransmitter”, and when present in insufficient quantity is responsible for depression. However, it is also thought to be involved in aggression, appetite, sleep, and muscle contraction. The presence of sufficient serotonin in the brain promotes a balanced emotional state. This is achieved in part by decreasing the activity of certain excitatory neurohormones, such as dopamine and noradrenaline. Serotonin also plays a significant role in

some cognitive functions, including memory and learning. Some classes of antidepressant drugs increase the brain levels of serotonin, thereby resulting in mood improvement.

A single dose of an antidepressant belonging to the subgroup of so-called selective serotonin reuptake inhibitors (e.g. Prozac) increases the brain levels of serotonin very quickly, and effectively reduces both crying in neurological patients suffering from excessive crying, and the crying of healthy women (Parvizi et al., 2009; Van der Veen et al., 2012). This suggests that serotonin influences the threshold for shedding tears, although other interpretations cannot be excluded. The possible importance of serotonin for crying is further substantiated by the observation that human emotional tears contain serotonin. In addition, there is some preliminary evidence that in the post-partum blues, which are characterized by frequent crying episodes, low serotonin levels may also play a critical role. These low serotonin levels are probably the consequence of the rapid changes in plasma amino acid levels that are caused by the discontinuation of maternal–fetal metabolic exchanges.

*Endogenous opioids* are morphine-like substances that are secreted by the brain. There are three major families of opioids, namely the dynorphins, the enkephalins, and the endorphins. They are well known for their effects on pain perception and the induction of the “runner’s high.” However, they are also involved in many other physiological and psychological processes, including nausea, mood, emotional responses and, among others, addiction, alcohol and food cravings, and respiratory depression. The different receptors for these substances are distributed all over the brain, but the concentration of receptors differs considerably among the different brain structures. The amygdala and the hypothalamus have the highest concentrations. Also relevant are the opioid antagonists (e.g. naloxone, naltrexone), which may block or reverse all of the effects of opioids. In humans, as already mentioned, emotional and physical pain share a common neurobiological basis, with the emotional distress component being superposed on an evolutionarily older endorphin-based pain network.

Research on separation-induced crying in several animal species (Newman, 2007; Panksepp, 1998) has demonstrated the involvement of these substances in social attachment, which reflects the bond between the offspring and their attachment figure. Social attachment is a kind of “primary emotion,” comparable with feeding and drinking, and connected with an innate neural structure. This explains why the separation call is immediate, reflex-like, and consistent across species, with no previous learning being required.

The administration of morphine, which is very similar to endogenous opioids, generally results in a decrease in crying, whereas treatment with naloxone, which is an opiate antagonist, typically tends to increase this behavior. More specifically, low doses of morphine reduce considerably the separation distress cries of isolated rat pups, primates, guinea pigs, and dogs (for an overview, see Newman, 2007). The fact that a reduction in crying can also be easily achieved by reuniting the isolated animals with their mother or their littermates suggests that opioids are important regulators of the response to social distress. Low brain levels of opioids probably signal an aversive social situation and motivate the animal to engage in social interaction.

Similar effects have been observed in rat pups, rhesus macaque infants, guinea pigs, and domestic chicks. Since there are several subtypes of opioid receptors in the brain, there have also been some attempts to determine which of these subtypes are involved in distress calls (in rat pups). There is preliminary evidence that so-called mu and delta agonists suppress crying, whereas the kappa agonist is associated with increased crying. Furthermore, it is interesting to note that the concentration of opiate receptors is particularly high in the cingulate gyrus of rhesus macaque monkeys.

The *alpha-2-adrenoceptor* system is the third neurochemical system that is assumed to be involved in (infant) crying (Newman, 2007). Alpha-2-adrenoceptor agonists (e.g. clonidine) reduce separation calls, whereas their antagonists (e.g. yohimbine) lead to increases in crying. Moreover, there is some evidence for the role of benzodiazepine receptors and cholinergic pathways.

In addition, the following (neuro)hormones merit consideration.

*Neuropeptides.* There are some good reasons for postulating the involvement of the neuropeptides vasopressin and oxytocin in crying. Oxytocin, which is released from the posterior part of the pituitary gland, has been demonstrated to decrease distress cries in isolated rat pups. It is a well-known hormone in obstetrics, because of its role in the onset of the delivery and lactation. Lactating mothers react to the sound of crying infants by releasing increased amounts of oxytocin, which stimulate the production of breast milk (the “milk let-down” reflex). Oxytocin levels increase in response to physical touch, massage, and sexual stimulation. Not only does oxytocin play a major role in the bonding process between mother and child, but also subsequent studies with animals and humans have revealed that bonding processes in general, including romantic attachment, but also even prosocial and moral functioning, might be influenced by oxytocin. It is also noteworthy that oxytocin has strong stress-dampening and anxiety-reducing effects (Carter et al., 2009; Heinrichs and Domes, 2008; MacDonald and MacDonald, 2010; Neumann, 2008; Zak et al., 2007).

However, recent research suggests that oxytocin also has a “dark side” (De Dreu et al., 2011). The love and trust that it promotes are not extended toward everybody, but rather just toward an individual’s “in-group.” Rather than promoting trust of everyone, oxytocin strengthens “in-group trust” and decreases “out-group trust.” Thus it may orchestrate special bonds with offspring and mates, including the use of aggression to protect these relationships. In summary, this hormone plays a significant role in social attachment, bonding, prosocial behavior, and love. Far less is known about vasopressin, which in some respects appears to serve similar functions in men to those that oxytocin serves in females, although in other respects it seems to have quite opposite effects.

The crying research pioneer William Frey has suggested that *prolactin* has a major role in crying (Frey, 1985; for a more detailed description, see Chapter 10). This hormone is released by the anterior part of the pituitary. Its secretion is primarily controlled by inhibiting factors, which are substances released by the hypothalamus. It is well known in gynaecology and obstetrics, because of its role in the regulation of the menstrual cycle, fertility, and reproduction, and it is responsible for breast milk production post-partum. Its plasma levels increase during pregnancy, and peak concentrations are measured in the first few days after the delivery.

Prolactin has also been demonstrated to play a key role in caregiving and parental behaviors in several animal species (Bachelot and Binart, 2007). For example, new mothers who fail to show increases in prolactin levels after the delivery often do not provide adequate care for their offspring, and may even neglect them. In human fathers, too, prolactin appears to have an effect on how they respond to the baby’s cries (Fleming et al., 2002). More precisely, fathers with higher prolactin levels were more alert to and responded more positively to the cries. In particular, in experienced fathers, large increases in prolactin levels in response to cry stimuli have been observed. I shall address the possible role of prolactin in crying in more detail in Chapter 10.

*Testosterone* is a major male sex hormone. It is released from the testes, but its production is also under the control of the pituitary, which exerts its influence via luteinizing hormone. Testosterone plays a major role, together with other male sex hormones, in the development of the male secondary sex characteristics, such as facial and pubic hair, a lower voice, development of muscle mass, and the typical male hair loss (Christiansen, 2004).

Testosterone production responds to exposure to stressors. Depending on the nature of the stressor, its level might be increased (in the case of stressors that require an active coping strategy) or decreased (when passive coping and helplessness prevail). Furthermore, it is sensitive to social status. Men with a high status and power have higher plasma concentrations of this hormone. In losers of a match or competition, a decrease in testosterone levels is observed, whereas the winners typically show an increase. In this context, the relationship with aggression and sexual arousal is also important. High levels of testosterone are linked with aggression and increased sex drive. Fathers and non-fathers with lower testosterone levels show higher levels of sympathy and/or need to respond to infant cries to which they are exposed than fathers with higher testosterone levels (Fleming et al., 2002). There is also some evidence that testosterone reduces empathic qualities and decreases generosity. In short, in many respects the behavioral effects of testosterone appear to be the opposite of those associated with oxytocin. Administration of testosterone to male animal offspring reduces their distress vocalizations, whereas castration of male animals results in longer utterances (Panksepp, 1998).

*Cortisol* is well known as a stress hormone, and is secreted by the adrenal cortex, under regulation of the pituitary, mediated via adrenocorticotropic hormone (ACTH). Its main bodily functions include control of glucose metabolism, regulation of blood pressure, and immune function, including the inflammatory response to infection. Increases in blood, urinary, and salivary levels have been observed after exposure to a wide range of acute (both laboratory and real-life) stressors. There is some evidence that cortisol in particular is released in response to helplessness and loss of control. Such short-term increases in cortisol levels have adaptive value because of their positive effects on energy levels, immunity, and memory, among other factors. However, this is not the whole story. In chronic stress conditions, and in individuals with post-traumatic stress disorder or chronic fatigue syndrome, cortisol levels in the blood may be lowered. This also causes an imbalance of the endocrine system and probably also the immune system, resulting in increased vulnerability to both mental and physical health problems (Lupien et al., 2009).

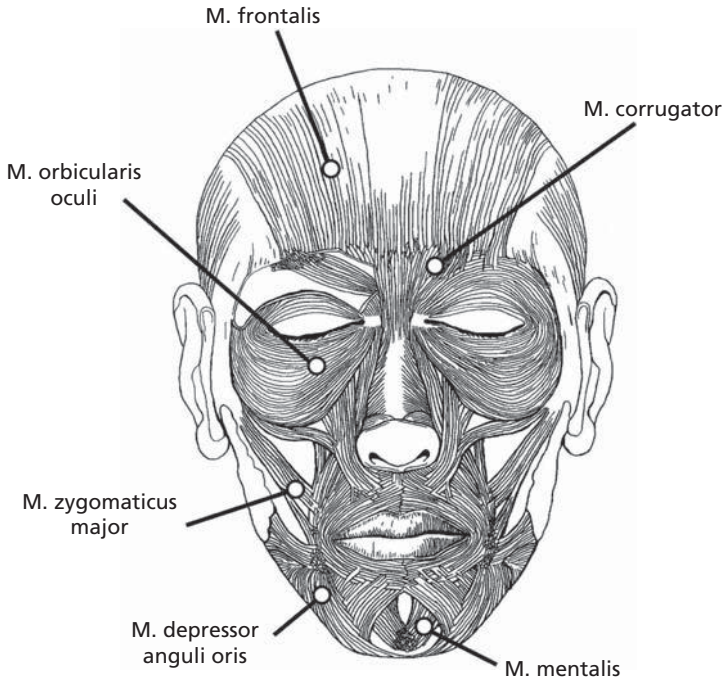
In conclusion, the neurobiology of crying is fairly complex, with the involvement of several brain structures linked with emotions and attachment, and several substances that exert an influence on the activity and interactions of many different brain structures. I shall now focus on the facial muscles that are involved, the lacrimal glands, and the composition of tears.

## The facial muscles

Charles Darwin (1872), on the basis of his careful observations of real crying infants and pictures, first described in detail which and how facial muscles are involved in the crying response. He emphasized that (infant) crying is not just the secretion of tears. In its fullest form, it is accompanied by sobbing, certain vocalizations, and additional specific changes in the facial musculature.

The human facial musculature is extremely well developed and complex compared with that of other animals. Humans have approximately 30 facial muscles, which are located in the eyelids and eyes, the nose, the lips, the masticatory system (cheeks) and the anterior cranium (forehead). Figure 3.3 shows the facial muscles that are most important for crying. Again this demonstrates the complexity of the crying response and the fact that, with regard to elucidating the brain structures involved in the expression of emotions, including crying, not only is there activation in the brain structures relevant to the experience of emotions, but there must also be a well-orchestrated interplay of the different parts of the brain involved in their expression, at different levels, (i.e. face, body, behaviour), and their regulation.





**Fig 3.3** Schematic representation of the facial muscles that are also important for crying. Our face is considered to mirror our mind, and it does certainly provide an important indication of our inner feelings. The many small and larger muscles enable us to manifest a wide variety of facial expressions. In addition, both blushing and the production of emotional tears are important emotional facial signals.

## The lacrimal system

Our eyes are extremely important because they enable us to receive reliable information about the environment that is subsequently transmitted to the brain. This allows us to respond adequately to imminent danger and changes in conditions, as well as to positive stimuli. However, our eyes are also very vulnerable and therefore need adequate protection. In addition, compared with our skin, which forms a very efficient barrier between the internal structures of our body and all kinds of external pathogens, our eyes are weak points in our general body defenses. Thus not only is it important that the eyes are well protected in order to prevent the loss of their primary function, namely vision, but also adequate protection is crucial for the defense of the internal structures of the body against potential harmful invading organisms such as viruses, bacteria, and fungi. Tears therefore have to fulfill at least three important functions (Murube, 2009). First, they must facilitate vision. Secondly, they have to protect the eye, and facilitate recovery and healing if damage occurs. Thirdly, they have to serve as a barrier against pathogenic micro-organisms, thereby protecting the internal structures of the body.

All terrestrial animals—amphibians, reptiles, birds, and mammals—produce basal tears to keep the surface of their eyes moist (Murube, 2009; Van Haeringen, 2001). The formation of the lacrimal apparatus was one of the changes that took place during the evolution of fishes into amphibians, which were the first vertebrates that were able to live outside the water. The eyes of

fishes are bathed by the fluid medium in which they live, so they do not need a lacrimal apparatus. Human fetuses have already developed a lacrimal system several weeks before birth.

The human lacrimal system consists of the lacrimal glands, the pre-ocular tear film, and the lacrimal drainage system. The lacrimal glands are responsible for the production of tears, whereas the lacrimal drainage system removes tears, which pass through the lacrimal punctum, canaliculus, and lacrimal sac, and then via the nasolacrimal duct to the mucosa of the nasal cavity (see Figure 3.4).

There are two main types of lacrimal gland—basic secretors and reflex secretors. The basic secretors are located in the margin of the eyelids and the conjunctivae. They are particularly important for the production of mucus and oil, which serve to prevent excessive evaporation and, more generally, to protect the eye and the internal structures of the body. These basal tears are both an important lubricant and a blood substitute for the cornea. They transport oxygen and carbon dioxide, and play a central role in the cellular economy of the ocular surface and conjunctiva by facilitating an optimal extracellular environment. This is critical for the main functions of these structures, which include antimicrobial defense, wound healing, and keeping inflammatory responses, such as allergic reactions, at bay.



**Fig 3.4** Schematic representation of the eye, the lacrimal gland, and the tear ducts. The lacrimal glands are located in the upper, outer portion of each orbit, in the lacrimal fossa of the orbit formed by the frontal bone. Tears pass over the eye's surface and are abducted via the lacrimal puncta and the lacrimal sac into the nasolacrimal duct. Weeping occurs when the drainage capacity of the lacrimal puncta is inadequate, and tears start to flow over the cheeks.

Each time the eye blinks, this basal lacrimal fluid is spread across the surface of the eye. These basal tears are thus secreted continuously during waking hours at a rate of approximately 1  $\mu\text{L}/\text{minute}$ . The secretion rate appears to be adjusted according to the rate of fluid loss by evaporation and drainage to the nose, thus preventing the accumulation of tear fluid. The production of basic tears is significantly reduced and may even cease altogether during sleep, probably because of the substantial reduction in eye irritation and light-induced stimulation. After waking, there is rapid adjustment to the altered conditions.

In ophthalmology, there is a further distinction between reflex and emotional tears (Murube, 2009), although emotional tears are considered to be a special kind of reflex tears. The term “reflex tears” refers to several different kinds of tears, including irritant tears (produced by trauma, infections, foreign bodies, gases, etc.), as well as tears produced in response to blinking, yawning, laughing, vomiting, etc. The main function of reflex tears is to wash away irritants (e.g. onion fumes) (see Box 3.1), dust, and other debris, or to minimize the effects of injury to the eye. There are sensory nerves in the corneal networks that detect these irritants and send impulses to the brainstem, which regulates most involuntary bodily processes, such as heart rate, swallowing, food digestion, excretion processes, and breathing, and which also controls the release of these tears by the lacrimal gland.

Reflex tears (including emotional tears) are produced in the almond-shaped lacrimal glands that are located in the upper, outer portion of each orbit, in the lacrimal fossa of the orbit formed by the frontal bone (see Figure 3.4). Box 3.2 provides an overview of pre-scientific views about the origin of tears.

Basal, reflex (irritant), and emotional tears appear phylogenetically in this sequence (Murube, 2009). As mentioned earlier, basal tears first developed in amphibians, and were subsequently maintained in reptiles, birds, and mammals. Reflex tears, in contrast, are not present in the great majority of amphibians and reptiles, but occur in most if not all other species. Emotional tears are only shed by humans. What is more interesting is that this same sequence can also be seen in human ontogenetic development (Murube, 2009). Whereas basal tears are already present in the fetus several months before birth, reflex tears first occur several days to several weeks after birth, and emotional tears do not appear earlier than a few months after birth.

The main functions of basal and reflex tears are to protect the eye and to facilitate vision, whereas the function of emotional tears must be associated with other communication areas. However,

### Box 3.1 Onion tears

What makes people “cry” when they are chopping onions? The often heard answer is that the chemical substance propanethial S-oxide (often referred to as thiopropanal S-oxide) is released into the air during the chopping process. This substance is relatively volatile. When its vapors come into contact with the moist eye, a small amount reacts to form sulphuric acid, which causes the burning and itching sensations. Once such a lachrymator is detected by the central nervous system, it triggers a response from the tear glands, resulting in the release of extra tears which dilute the irritant. However, this explanation is not entirely accurate, because onions do not normally contain this substance, but may produce it to protect the plant against herbivores. Thus propanethial S-oxide first appears after a series of chemical reactions that occur after the onion has been damaged.

### Box 3.2 Pre-scientific views on the origin of tears

The question about the origin of human tears is certainly not a new one. Since early times it has fascinated scholars. Such old “anatomically incorrect” depictions of the human crying mechanism, however unscientific, reveal something of the mystical nature of tears attributed to them by some of societies’ most educated individuals. Tears were generally thought to originate from the heart, the blood, or the brain, although in ancient Greece the eyeball was also suggested to be the main source of tears.

Probably the oldest idea is that tears originated from the heart. The Egyptians held this view in about 1500 BC, and in the Old Testament one reads that tears result from the breakdown of the firm substance of the heart, which becomes weak and subsequently turns into water. Aristotle (384–322 BC) also embraced a “cardiocentric” view of the origin of tears.

The philosopher and physician Empedocles (c. 490–440 BC), in contrast, postulated that when a person is troubled by a powerful passion of the soul, the blood is disturbed and turns into tears, in much the same way as whey develops from milk.

Another popular model has its origin in the theory about digestion proposed by Galen (AD 129–199/217), according to which there are various phases of digestion involving the transformation of food into components that are useful for the body. During each phase a specific organ extracts the elements that are most useful for itself, and passes the remainder on to the next organ. This process starts in the stomach, continues in the liver, and subsequently takes place in the kidneys. The kidneys perform a third purification of the blood, in order to get rid of the superfluous fluid that food normally contains. Part of this is excreted as urine, while the rest is excreted in the form of sweat and tears. All three kinds of fluid are regarded as “serous excrements.”

Hippocrates (c. 460–377 BC), known as the “Father of Medicine”, and later, in particular, Avicenna (AD 980–1037), the Persian founder of modern medicine, were among the best-known advocates of the idea that tears originated from the brain. According to Avicenna, two specific nerves were responsible for the transport of the tears from the brain to the eyes.

A well-known explanatory model for the production of tears emphasized the role of contraction (or “stricture”) and dilatation (or “looseness”) in crying. More precisely, it was supposed that in case of sadness or grief, the heart (c.q. the brain) strongly contracts, while it expands when a person is experiencing joy, resulting in loose pores.

In later times, the popularity of these different models, or slight variants of them, waxed and waned. For example, the German abbess and mystic Hildegard von Bingen (1098–1179) developed the theory that sadness leads to a mixture of distinct humors in the heart. Through the action of sighing, the watery substance of the blood may be filtered out, and this fluid is secreted via the eyes.

Interestingly, Leonardo da Vinci (1452–1519) still adhered to the idea that the heart was the source of tears, an idea which was at odds with the prevailing views of that time. Although many of his drawings of the inner workings of the human body are accurate down to the smallest detail, he also believed that there were tubes which passed from the tear ducts straight to the heart. He believed that tears well up from the heart to the eyes, passing through the canal of the nose.

Timothy Bright (1550/1–1615), a British physician well known for his work on depression (or, more appropriately, melancholia), was an advocate of the idea that tears originated from

(Continued)

### Box 3.2 (Continued)



**Fig 3.5** One prevailing classic explanation for the origin of tears was that they result from a kind of vaporization process. Emotions (or rather passions) were often considered to heat the heart, which subsequently produced water vapor that rose to the head, and condensed near the cold eyes, where it was thus converted into tears. This process was thought to be especially active when a person was in love, because in that condition the heart was extremely hot. This seventeenth-century picture (called an *emblemata*) shows this connection in a symbolic way. Tears reveal that the fire of love is burning quite intensely.

the brain, given his 1586 description of tears as “the excrementitious humidity of the brayne.” Similar convictions were voiced, among others, by the French physician, Laurent Joubert, who in 1579 wrote that “when the brain is compressed, it ejects great quantities of tears.”

A popular notion that was held by Descartes (1596–1650) among others drew a parallel with meteorological processes, and specifically with the development of rain. According to this view, tears are formed of vapors akin to sweat; they are turned into water when the normal evaporation process is increased by the intense heat of the heart caused by the passions, resulting in condensation near the cold eyes, where they are pressed out by the eyelids as tears, in a process similar to the formation of rain. Others emphasized the parallel with distillation processes. Tears were considered to be the product of a distillation process, which was also compared with religious purification (see Figure 3.5).

With the discoveries made by William Harvey (1578–1657) in the seventeenth century about the circulation of blood, cardiocentric ideas were again revitalized, and many scholars asserted that tears originated from the blood or the heart.

However, Galen had already alluded to the existence of a kind of lacrimal system. Subsequently, it was the Italian anatomist Giovanni Battista Carcano Leone (1536–1606) who provided the first adequate description of the nasolacrimal ducts, and some years later the German anatomist Salomon Alberti (1540–1600) published his studies of the lacrimal apparatus in a volume entitled *De Lacrimis*.

Nevertheless, it is the Danish scholar Niels Stensen (also known as Nicolaus Stenonianus or Steno) (1638–1686) who is generally considered to have discovered the lacrimal gland in 1662. In his *Anatomical Observations*, he described how “The fluid flowing from these glands and their vessels, observable between the eyelids and the eyeball, flows down through punctum lacrimalis into the nose.” He concluded that tears originate from these glands, and not from the brain or the heart, as had been previously believed. He further demystified tears with his statement that they are nothing more than fluid intended for keeping the eye moist. He was certainly the first to provide experimental evidence that the tears produced by the lacrimal gland were derived from arterial blood.

The British anatomist Thomas Wharton (1614–1673) provided “a description of the glands of the entire body”, which he described as excretory, reductive, and nutrient in his treatise *Adenographia*, which was the first thorough account of the glands of the human body. With regard to the lacrimal glands, he wrote that “It cannot be denied that the glands produce some fluids, though not in the quantity in which the tears flow.” Subsequently, Mauritius Herminghuysen was among the first to describe the working principles of the tear glands.

In conclusion, by the end of the seventeenth century a valid anatomical conception of the entire lacrimal system, including an accurate description of the lacrimal duct, showing its true position in the eye and the route taken by the tears, had become widely available.

the reader should note the hypothesis of Murube (2009) and Provine (2011) (see Chapter 2), which suggests that there is not in fact a very clear distinction between reflex and emotional tears, but that the difference is basically a matter of physical versus emotional pain, similar to the situation in the brain, where there is also a significant overlap between the structures involved in physical and emotional pain. Assuming that these physical and emotional pain tears can be regarded as lying on the same dimension, I propose that, with increasing age, we can also distinguish between empathic pain tears, societal pain tears, and sentimental (or perhaps moral) tears. I shall elaborate on this notion in the remainder of this book.

## The biochemical composition of tears

Initially, tears were considered to be more or less similar in composition to other body fluids, in particular sweat and urine. The first chemical analysis of tears was reported in 1791 by the French chemists Antoine François Fourcroy and Nicolas-Louis Vauquelin, who concluded that salt, mucus, and water were the main constituents. In 1928, the presence of high levels of lysozyme (a bacteriolytic enzyme) in tears was demonstrated (Frey, 1985).

Currently, we know that the composition of tears varies considerably among species, but that the tears of humans and higher primates are very similar (Van Haeringen, 2001). Their composition is not only dependent on the specific time of day and the method of tear collection, but

also varies according to the individual's psychological state, age, level of physical activity, health status, sleep deprivation status, and smoking status, among other factors.

The components that have been identified in tears include proteins, enzymes, lipids, metabolites, and electrolytes (Provine, 2011; Tiffany, 2003; Van Haeringen, 2001). Specific lacrimal proteins, which are present at relatively high concentrations in human tears, are lysozyme, lipocalin, nerve growth factor, and lactoferrin; all of these substances are involved in the defense and/or healing mechanisms of the eye. The presence of these substances suggests that nature is aware that a wound in the eye can present a risk to one's survival. Tears thus support the self-healing capacity of the eye.

The predominant immunoglobulin in tears is secretory immunoglobulin A, which provides protection against microbes that multiply in body secretions. These tear enzymes have a number of different sources. Some are secreted by the lacrimal glands, while others are produced by or released from the epithelial cells of the cornea and the conjunctiva. A smaller number originate from the plasma. Occasionally, very high levels of manganese have been reported in tears, compared with the levels in blood (Frey, 1985). However, in a recent overview of the composition of tears, no reference was made to high manganese concentrations (Tiffany, 2003).

William Frey investigated the intriguing question of whether emotional tears differ from irritant tears in terms of their composition, and found that the protein concentration of emotional tears was 24% higher than that of irritant tears (Frey, 1985). The implications of this finding are unclear, although it is generally regarded as evidence that tears help to remove toxic waste products from the blood. However, this is a very dubious interpretation. In addition, I have twice tried to replicate this finding, by collecting tears from women who were watching dramatic movies and also when they were chopping onions. Mood ratings confirmed that the films did indeed evoke strong emotions, whereas chopping onions did not. However, although we applied fairly sophisticated and sensitive analysis methods, we failed to find any systematic differences in the composition of the two types of tears.

## Conclusion

Crying and the shedding of emotional tears result from a complex interplay of activity of certain brain structures, nerves, neurotransmitters, and neurohormones. Ultimately, it is the brain that in some way provides the first signal to start tear production. Emotional crying does not just require the involvement of the emotional or limbic brain; the many structures that are involved in crying (e.g. tear glands, respiratory system, facial muscles) all require the involvement of different parts of the brain, resulting in a well-integrated reaction. This well-orchestrated reaction is thus linked to some specific psychological states—most probably associated with helplessness, being removed from one's attachment figures (e.g. mother, partner, or even one's children or one's pets), and/or physical pain—which during evolution have generalized to several other forms of distress and suffering, and maybe even their opposite states.

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## Chapter 4

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# Crying over the lifespan

Babies cry, kids weep, adolescents whine, and adults shed tears.

(Deborah Zeifman, 2001)

Crying and the shedding of tears typically mark the important moments—both sad and joyful—in our lives, from the very beginning (“the primal scream”) until our death. However, crying is primarily considered to be a behavior displayed by infants and young children. When adults cry quite readily, they are sometimes referred to as “cry babies.” This raises the question of the extent to which infant and adult crying are similar, because this development of crying with age is not simply a matter of a decrease in frequency. In several respects, crying appears to become a more complex phenomenon as we grow older and become less dependent on others.

According to the developmental psychologist Deborah Zeifman (2001a), much can be learned about adult crying from the study of infant crying and from adopting a developmental approach. She further emphasizes not only that human crying shows a certain pattern of development, both in its phenomenology and in its functions, but also that there are remarkable consistencies and continuities. These insights will be helpful in understanding why adults continue to cry—a phenomenon which, together with the tears, is quite exceptional in the animal kingdom.

There can be little doubt that, in the early days of mankind, infant crying contributed significantly to survival by eliciting care and protection from the caregivers (Soltis, 2005; Zeifman, 2001b). This is particularly important for human babies, because they are among the most immature, helpless, and dependent of all young mammals. Human newborns may even be regarded as fetuses for another nine months after birth, compared with the offspring of most other species. As such, they do not have any control over their environment, and they have only a limited capacity for temperature regulation. Crying is therefore an apparently simple yet very efficient behavior that allows them to have at least some control over their life and, importantly, to increase their likelihood of survival. In general, caregivers are eager to react promptly and effectively, and to remove the sources of threat, to feed the infant, or to provide physical contact. Support for this view of infant crying comes from the fact that, across diverse cultures, by far the most common responses to infant crying are to pick up the baby, put it to the breast and/or nurse it.

The sound of infant crying results in powerful biological reactions in caregivers, particularly in women. For example, this sound has been shown to elicit strong reactions in specific brain structures, including the amygdala (for a review, see Swain and Lorberbaum, 2008). This happens even when no conscious attention is paid to the sound. This suggests that the very characteristics of crying render it a kind of signal that cannot be ignored, so that it is very likely that potential caregivers will react to it. In addition, infant crying causes a rise in breast temperature in lactating females, and a milk let-down reflex, which is mediated by the hormones prolactin and oxytocin. As explained in the previous chapter, oxytocin also promotes the development of the bond between the mother and her child.

In this chapter I shall focus in particular on the antecedents and properties of infant crying, and on how crying normally develops in the first years of life. I shall then briefly review the possible functions of infant crying. Finally, I shall describe in detail the further major developmental changes in crying, and its likely determinants from the newborn stage to adulthood.

## Crying in the newborn

After the first crying performance, immediately after the delivery, which signals that the infant is alive and well, the initial seemingly unpredictable crying of newborns is gradually replaced in two respects by a certain rhythm, which seems to be relatively independent of caregiving characteristics (Barr, 1990; St James-Roberts and Halil, 1991). Box 4.1 summarizes the classic notions about newborns and their crying. However, nowadays, crying is first and foremost an attachment behavior, which stimulates the caregiver to fulfill the child's need to be held and comforted (Bowlby, 1969). Figure 4.1 shows the crying frequency of newborns as a function of physical contact with the mother.

### Box 4.1 Old conceptions of infant crying

The fact that babies cry immediately after they are born has not gone unnoticed throughout historical times. Several explanations for this observation have been proposed. The first theory was that babies were thought to shrink from life. Others attached more value to the idea that the soul was sad, because it had to change its comfortable and luxurious accommodation for a dirty body. A more earthly variant of this theme is that it is the transition from the warm pleasant womb to the cold uncomfortable world outside, where one is in addition gripped by a strange woman.

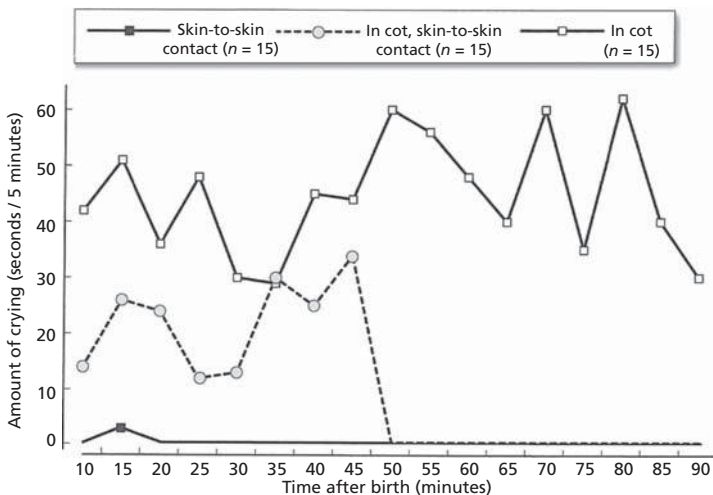
The sixteenth-century French humanist Josephus Justus Scaliger introduced a completely new idea. He believed that the crying resulted from the fact that the baby had had to hold its breath for such a long time that it now needed to snap at the air.

Hippocrates and Aristotle agreed that babies only laugh and weep in their dreams. When awake, babies were not considered to be able to cry or weep before they were 40 days old, nor could their laughter be evoked before this age by touching or tickling.

It was also known that newborns do not produce tears during the first weeks of life. This was explained by their inability to have an excess of black bile (atra bilis) in their very hot wet original state, as that substance is very cold and dry. However, not all tears were considered to originate from black bile. It was thought that some might have their origin in a superfluity of serum, just

like urine and sweat. Another prevalent notion was that, since babies do not have a mind that could make them feel any sorrow, newborns could only feel and cry over the pain of the body. Children cry often because their small bodies are damaged more quickly by heat or cold, by contact, or in many other ways—for example, because they are more likely to develop all kinds of diseases. This is particularly important so long as they are unable to talk, because they have no other way of expressing their *dolour* except by crying and weeping. However, Galen also emphasized that crying was not just due to *dolour*, but often also because of anger. An additional decisive factor that was proposed to explain the considerable tearfulness of infants was that their brains are very large and humid compared with the rest of the body.

John Bowlby considers crying to be one of the five instinctual responses that underlie the child's bond with their mother (the others are sucking, smiling, clinging, and following) (Nelson, 2005). Acoustical crying is indeed primarily an effective way for the infant to communicate their needs to the parent or caregiver. Infant crying has been referred to as the “acoustical umbilical cord,” because it serves to establish and maintain a close connection between the infant and the caregiver (Ostwald, 1972), although it will also stimulate adult non-parents to provide care and protection (see Chapter 2). In a similar vein, laughing also facilitates the bond with caregivers at about 4 months. Both behaviors act as social releasers of an instinctive response in the mother. The crying of babies is stopped not only by supplying food, but also by other (mainly kinaesthetic, tactile, or even olfactory) stimuli associated with the mother. Even the mere odor of the infant's mother or of another new mother may effectively attenuate their crying. If the mother is not present and her odor (e.g. a hospital gown that has been worn by her) is also not available, a bottle containing a sugar-water solution may pacify the baby. However, one of the main

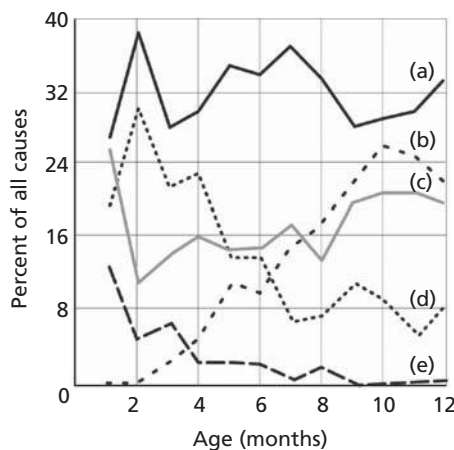


**Fig 4.1** Graph illustrating the effect of skin-to-skin contact between mother and child on the crying of infants. Babies in a cot cry relatively often, whereas among those that have skin-to-skin contact the crying is very limited. Data from Kennell, J.K. and Klaus, M.H. Bonding: recent observations that alter perinatal care. *Pediatrics in Review*, 19, figure 1. © 1998 American Academy of Pediatrics.

differences between infant crying and the distress calls of animals is that the latter immediately stop when the young animal is reunited with the mother, whereas human infants are unique in that their crying continues and seems to become independent of the initial precipitating causes (Zeifmann, 2001a).

Even in the very first year, some important developments in crying occur. In a similar way to what has been observed in adults (see Chapter 5), babies seem to cry more often in the evening hours. This diurnal rhythm is established within the first 10 days of life. In addition, there is a gradual increase in crying frequency until it peaks at 6 weeks, followed by a decrease until 4 months, at which time it remains fairly stable until the end of the first year. However, this is not the whole story. The apparent stability in crying frequency conceals dynamic underlying developments. During the first year, crying changes in terms of the situations that provoke crying and its functional significance (Bayley, 1932). Figure 4.2 shows how the attributed causes of crying develop in the first year. These very robust changes in crying probably partly reflect central nervous system development and maturational transitions during the first months of life, because they seem to occur independently of caretaking style or culture (Zeifman, 2001b).

The decrease in crying following its peak at approximately 2 months seems to be linked to a more general decrease in the lability of infant emotions. Some investigators have proposed a link with the change from endogenous to exogenous control of crying. In the first 2 to 3 months of life, as opposed to later in development, infant crying results mainly from “internal” causes, whereas from that time onward external factors increasingly come into play. In other words, the so-called reflexive crying that lacks a connection with external events or caregiver behavior is gradually replaced by more responsive crying, paralleling the transition from reflexive smiling to responsive or social smiling. This development probably reflects maturation of the forebrain, especially its inhibitory influences on limbic brain processes. Thus whereas babies at first often



**Fig 4.2** Development of infant crying during the first year, according to specific attributed causes. (a) Specific test situations. (b) Strange places/people. (c) Continued handling. (d) Fatigue at the end of the test. (e) Colic (based on Bayley, 1932). Reproduced from Bayley, N., A study of the crying of infants during mental and physical tests, *Journal of Genetic Psychology*, 40, p. 320, figure 1 © Taylor and Francis, 1932, with permission.

seem to cry for no discernible reason, after a few months their crying tends to become increasingly associated with external events.

Authors such as Aletha J. Solter have argued that the crying infant is attempting to restore its mental equilibrium, which can be achieved through close physical contact with the mother (Solter, 2001). Therefore an interesting question is to what extent the physical contact is a necessary condition for the restoration, or whether the crying alone is sufficient to fulfill these needs.

These “internal” explanations suggest a link with the supposed cathartic effects of adult crying (Zeifman, 2001b). However, one should be aware that it is hard to evaluate this kind of speculation, as it is very difficult, if not impossible, to confirm or refute it with well-designed research. Although there are a considerable number of psychologists and pediatricians who believe that the crying of babies also serves as a stress-release mechanism, and even prevents emotional and behavioral problems at a later age, to date no studies (not even methodologically flawed ones) have yielded any evidence in support of this notion.

The main reason for infant crying is separation from the mother. Infants also cry consistently for approximately 3–3.5 hours after their last feed and after painful stimuli (e.g. a vaccination). Cold also stimulates crying, as does being exposed to other babies’ distress vocalizations. Some authors have speculated as to whether this is the first sign that humans are genetically equipped with empathic skills, but some regard it as a reaction similar to those that occur in response to any other loud noise. Furthermore, infants may cry without any apparent cause. In extreme cases the term “colic” is applied (see Box 4.2).

#### **Box 4.2 Colic: excessive crying in babies**

Colic is the term used to refer to excessive inconsolable crying of unknown etiology in babies. It affects around 16–40% of newborn infants in western cultures. A widely applied definition is the so-called “rule of three,” which defines colic as crying for more than 3 hours a day, at least 3 days a week, for at least 3 weeks.

A distinction is made between possible intrinsic causes (e.g. food allergies, immaturity of the gastrointestinal tract, progesterone deficiencies) and extrinsic causes (e.g. maternal anxiety, inappropriate handling, tobacco smoke, breast milk, over- or underfeeding).

The relevant literature on this topic is conflicting in many respects—for example, with regard to the assumed cause of colic, its specific nature, and, as a consequence, recommendations for its treatment. Infantile colic is often regarded as being the result of painful contractions of the gut caused by allergy to cow’s milk, lactose intolerance, or excess gas. Surprisingly, the levels of the stress hormone cortisol, which is released in response to pain and stress, are not elevated in babies suffering from colic, which seems to dismiss a significant role for gas-related pain or other discomfort. Others consider colic to be a predominantly behavioral problem resulting from a poor parent–infant interaction, with a difficult temperament of the infant being the major determinant of inadequate parental reactions. Then there are those who suggest that infantile colic is actually a collection of etiologically different entities that should be distinguished from each other.

Because of the wide speculation about possible causes, many different interventions have been suggested, some of which have been evaluated. For example, the gut hypothesis has led to interventions such as replacing cow’s milk with soya milk or protein hydrolysate (hypoallergenic), low lactose, or fiber-enriched formula milk, using herbal tea, and using drugs to

*(Continued)*

**Box 4.2 (Continued)**

reduce painful contractions of the gut or the formation of gas. The behavioral hypothesis has resulted in interventions such as modifying parental responsiveness, learning ways to calm the baby (e.g. the use of motion and sound), and reducing stimulation. However, it is not yet clear which of these treatments is most effective, nor is it clear whether some infants will benefit more than others from a specific intervention.

Parents are first given general advice and reassurance, and some obvious explanations, such as hunger, cold, inadequate feeding techniques, or somatic problems that cause pain or itching, are checked. In addition, a detailed diagnosis takes into account the measures that the parents have already tried, the attributions and fears of the parents, their caregiving routines, and how they respond to the crying.

The parents must also be advised that infantile colic is generally a self-limiting condition, which resolves by 3 to 4 months of age, that is not due to a disease or to anything that the parents have or have not done to their infant. Subsequently, the parents' responsiveness (sensitive differential responses) should be stimulated—they should check for hunger when the infant is crying, check the nappy, avoid carrying and holding the infant for long periods, try to establish a regular pattern during the day, and learn not to intervene immediately when the infant cries. Furthermore, careful documentation of the timing and amount of crying is recommended.

These recommendations are generally accompanied by advice to the parents not to exhaust themselves, and to leave their baby with other caregivers when necessary. Next, a 1-week trial with hypoallergenic formula milk based on whey or casein may be started. Drug treatment of infantile colic should not be prescribed in primary care. Follow-up consultations are recommended in order to evaluate the effects of the proposed measures and to discuss alternative approaches. As it is not yet clear to what extent the different interventions, including dietary treatment, low lactose formula milks, and herbal tea are effective, treatment is mainly a matter of trial and error. An explanation for the increased crying cannot be found in more than about 10% of cases.

There are two alternative and opposing explanations of colic that differ in several important respects from the foregoing account. The Canadian pediatrician Ronald Barr considers colic to be the extreme of normal crying, and his perspective is primarily evolutionarily based (Barr, 1999). The psychiatrist and pediatrician Barry Lester takes the opposite view, and regards colic as basically a different form of crying (Lester et al., 1990).

Barr's view of colic deviates markedly from the more mainstream views described above, and consequently his recommendations for remedying the condition also differ in some important respects. Key to his challenging evolutionary perspective is the view that excessive crying ("colic") should be regarded as an activity that infants *do*, rather than an illness that they *have*. He further argues that the typical western caregiving style is the main cause of this phenomenon. His ideas have been inspired by how the !Kung San hunter-gatherers in Botswana deal with the crying of their babies. Barr emphasizes four major differences between caregiving by these people and current western caregiving practices. First, their babies are in constant direct body contact with them, because the mothers carry them in their arms or in a sling (kaross) all the time, rather than the baby being removed from the mother and placed in a crib or stroller. Secondly, as a consequence of being carried in the sling, the babies are

for most of the time kept in an upright rather than a supine position, which, according to the cultural beliefs of the !Kung San people, stimulates development. Thirdly, rather than being fed according to a fixed time schedule, !Kung San babies are allowed to feed continuously (for 1 or 2 minutes per feed, with approximately three to four feeds an hour). Finally, mothers in this culture are much more responsive and swift to react to the crying of their newborns (they react within 10 seconds for 92% of the time).

Surprisingly, there are striking similarities in the frequency and pattern of crying of babies from western and !Kung San cultures during the first 3 months. So the difference lies not in the number of times the babies start crying, but rather in the amount (i.e. duration and severity) of crying and the occurrence of colic. This is why Barr believes that typical western caregiving practices, such as widely spaced feeds and little physical contact, may potentiate crying.

Barr further explains that crying has several beneficial effects for the child, in particular when the crying bouts are frequent but of short duration. From an evolutionary perspective, the first benefit is that crying has an impact on the feeding behavior of the mother, which is important for growth and survival. There is some evidence that frequent feeding has a positive effect on the composition of the breast milk, particularly the fat concentration. Moreover, suckling-induced elevation of prolactin levels delays subsequent successful conception, which makes it less likely that the current infant will have to compete with another baby who also demands the care of the mother.

Yet another effect of the immediate reactions to the crying is that the baby wastes much less energy on crying, and this energy can instead be used for growth. It has been estimated that these energy savings can be as much as 13%.

Finally, Barr emphasizes the importance of positive social–communicative interactions with the mother, such as smiling, talking, and face-to-face interaction, and how the continuous proximity of the caregiver results in a decreased risk of the offspring becoming the victim of predators.

According to Barr, western civilization has lost its insight into the design and meaning of the crying behavior of newborns, which has resulted in caregiving practices—such as separation from the caregiver—that promote increased crying, which may in turn have a damaging effect on positive caregiving. Barr therefore believes that a major change in western caregiving practices is needed in order to reduce the prevalence of colic.

Another important question is whether colic in early infancy has any effect on later emotional development. This is not yet entirely clear. In one study, maternal behavior and ratings of temperament failed to distinguish between babies with colic and normal babies at 5 and 10 months, although boys with colic in particular showed less emotional self-regulation. Follow-up of colicky infants until they were 3 to 8 years of age suggested that hours of fussing, rather than real crying, might be an early marker of poor sensory processing, immature coping strategies, and attention-deficit hyperactivity problems. Other studies have reported preliminary associations with more negative affect during meals and recurrent abnormal pain, allergies, and psychological disorders (Canivet et al., 2000; DeSantis et al., 2004; Savino et al., 2005).

Whereas Barr thus regards colic as the extreme of normal crying behavior, and as not qualitatively different from normal crying, Lester considers that colic differs not only quantitatively but also qualitatively. He points to the characteristic loud and high-pitched

*(Continued)*



**Box 4.2 (Continued)**

paroxysmal crying episodes, coupled with the facial grimacing, which clearly indicate that the child is experiencing pain. Characteristic features are the increased motor activity, clenched fists, flexion of the elbows, knees that are either drawn up or stiff and extended, and a general hypertonic musculature. Some investigators have postulated that there might be a connection with an imbalance in the autonomic nervous system, and more specifically with the dominance of the sympathetic nervous system and low parasympathetic drive, which may imply a lack of self-regulatory capacity for soothing. However, to date there has been no convincing evidence for this view.

The way that infants cry depends on the eliciting factor, but there is some disagreement about which types can be distinguished. Some authors believe that only pain-related and non-pain-related cries can be identified. Others distinguish three basic types of crying (a “hunger” cry, “mad” cry, and “pain” cry) (Wolff, 1969, 1987), or four types (a “birth” cry, “pain” cry, “hunger” cry, and “attention” cry) (Zeifman, 2001a,b). However, recent research has been able to reliably categorize pain, sadness, hunger, fear, and anger cries on the basis of both facial expressions and cry characteristics (Pal et al., 2006). If parents are able to decode the meaning of the crying, this may facilitate the taking of effective action, such as removal of the source of distress, or providing food or warmth and physical contact. Thus baby crying is an early kind of language which not only communicates that there is something wrong, but also may give a clue as to what is wrong.

A major difference between early human infant crying and the distress calls of other mammals is that only human infants may continue with their crying, sometimes even inconsolably, when being held by a caregiver (Wolff, 1969, 1987; Zeifman, 2001b). In other words, once an infant has started to cry, the crying may become totally independent of the eliciting factors, and may perhaps be governed by internal causes. Initially, after approximately 10 weeks of age, it seems to be more directly linked to external events.

Interestingly, the way that infants cry is also influenced by their mother’s native language. Analysis of the crying sounds of newborn infants of German and French mothers revealed that these babies were crying in their native language (Mampe et al., 2009). In the French language, most sentences end with an upward inflection, whereas in the German language sentences tend to end with a downward inflection. The crying sounds of French babies tend to have a more questioning inflection, whereas in German babies the cry tends to sound more definitive. Babies thus mimic these sound structures in their crying, and are already “learning” the language from their mothers while still in the womb.

However, for the purposes of this book not only acoustic crying is relevant, and the focus is on the production of emotional tears in particular. Charles Darwin correctly observed that the production of irritant tears, but also especially emotional tears, occurs both phylogenetically and ontogenetically late in development (Darwin, 1872). His careful observations revealed to him that infants do not shed emotional tears until they are several weeks old. As was mentioned in the previous chapter, basal tears are already present in the fetus to some degree, and then, after birth, there are first the reflex tears (physical pain tears) and subsequently the emotional pain tears. Darwin reported that one baby starting weeping when it was 20 days old, whereas another

was 104 days old when it shed tears for the first time. One of Darwin's own children cried with dry eyes until it reached the age of 139 days. Recent, more systematic studies of baby crying revealed that it took 4 weeks for emotional tears to reach normal adult values (Isenberg et al., 1989; Rohatgi et al., 2005).

## Crying in later infancy

Whereas babies initially cry to promote proximity to their caregivers, by the time they are about 8 months old they also cry in particular at the sight of strangers, or when alone in an unfamiliar environment (Brackett, 1933, 1934; Zeifman, 2001a). The newly acquired capacity to recognize strangers, unfamiliar situations, and abandonment reflects the ability to remember, and to compare situations and people, resulting in fear. This fear develops at around the time when infants become mobile, so it seems to serve the purpose of curbing possible dangerous explorations. In order to be effective in attracting succor from any distance, a pre-mobile infant that is separated from its caregiver has no choice but to utilize an acoustic signal to alert the caregiver. Acoustical crying is an effective alarm system for alerting the caregiver in the event of impending danger and threats, especially new or unfamiliar people and surroundings that the infant encounters when the capacity to crawl and walk develops further. In this way crying facilitates and supports independent exploration of the environment, and thereby contributes to the further development of the individual. Other developments that take place around this time include the exhibition of more integrated behaviors, with a tuning of verbal and non-verbal behaviors, including crying, looking, and reaching. The observation that deaf parents do not respond appropriately to the crying of their infants, despite the visual cues associated with it, demonstrates that mere visual cues are inadequate in this phase of development. Note the similarity with the distress calls of young animals, which are also uttered more frequently in the absence of the mother and in an unfamiliar environment (see Figure 2.2).

In addition, neurological development still continues to play a role. For example, 10-month-old babies who cried during a brief separation from their mothers showed greater activation in the right frontal brain, compared with the babies who did not cry (Davidson and Fox, 1989). This is why researchers wonder whether frontal brain activation asymmetry may reflect differences in the threshold for reactivity to stressful events and vulnerability to particular emotions.

In summary, whereas newborns initially howl into emptiness, and their cries do not appear to be directed at anyone, but are just an expression of their state, by the age of about 1 year the crying of infants seems to be more deliberately targeted—they cry more when there is someone around to hear them than when there is not. Box 4.3 provides some insight into the different cultural and more scholarly views about how to deal with infant crying.

### Box 4.3 How to deal with baby crying

Throughout the ages and across different cultures, advice as to whether, when, and how one should attend to infant crying has varied greatly. Needless to say, major determinants of this advice and related practices are implicit theories and current culture-specific interpretations of crying. In some times and cultures, mothers respond very quickly, often by breastfeeding, whereas at other times and in other cultures crying may be ignored.

*(Continued)*

### Box 4.3 (Continued)

For example, the Kogi, a Colombian tribe, completely ignore the crying of their infants. Even if the babies cry desperately, no action is taken by the caregivers to comfort them in any way, or to satisfy their need for food, warmth, or physical contact. This results in a substantial decrease in their crying, which is accompanied by a rather stoical endurance of all these hardships. There are more examples of cultures in which the crying of children is dealt with rather inconsistently and unpredictably, depending on the whim of the adults. Even beating and slapping of children for crying has been described. The justifications vary considerably, but are often connected with growth and development. For example, the Kurds believe that crying may develop the voice, and Taiwanese mothers explain that crying is a form of infant exercise. Others emphasize that crying stimulates the growth of the intestines or merely physical growth. In Japan, there are even organized baby crying contests, to which eager mothers bring their babies. Sumo wrestlers and high priests are available to coax babies into a maddened state of wailing. The baby that cries loudest and longest wins the contest, and the rationale is that the competition will generate good health for the babies.

In the western world, the question of how to deal with the crying of babies is hotly debated, and there is much controversy. For example, the great American pediatrician L. Emmet Holt (1894) believed that a crying child should never be picked up unless it is in pain. He considered the crying of a baby to be a kind of exercise, which explains why he recommended that a baby should be left to cry for 15 to 30 minutes a day. The psychologist John B. Watson, the famous founder of behaviorism, emphasized that infant crying serves no purpose and may have predominantly negative effects. In *Psychological Care of Infant and Child* (Watson, 1928) he describes the ideal happy child as someone who is “an autonomous, fearless, self-reliant, adaptable, problem-solving being, who does not cry unless physically hurt, is absorbed in work and play, and has no great attachments to any place or person.” Watson also warned against the dangers of “too much mother love,” and advocated strict routines and tight control over the child’s environment and behavior. He believed that if the crying of a child was not ignored they would certainly develop neuroses and spend a large part of their life lying on the couches of psychoanalysts.

The well-known but also controversial Dr Spock took a more balanced view. He does not believe that it is good to allow a baby to cry for long periods if there is a way to comfort them, not because crying will cause them any physical harm, but because of what it might do to their own and their mother’s “spirits.” Others take a more extreme view and are convinced that it is best to allow babies to cry themselves to sleep. The “cry it out” approach (Ferber, 2006) assumes that falling asleep on one’s own is a skill just like any other, and that a baby can master this skill if it is given the opportunity. Supporters of this approach feel that if a baby learns to soothe himself to sleep at bedtime, he can use the same skill when he wakes up at night or during a nap. However, this view has met with much criticism. Sears (2009), who is one of its critics, has summarized research findings which demonstrate that excessive crying is harmful to children.

However, the bottom line seems to be that children who are reared in non-western cultures in which crying is discouraged do not appear to suffer from any health or psychological problems at later stages of development, challenging the idea that the reactions to infant crying are decisive for healthy development.

## Crying in toddlerhood

In contrast to the extensive literature on crying in babies, remarkably little is known about crying in later development, particularly in toddlers and during childhood. Based on the scarce research that is available, the following global picture emerges (Brackett, 1933, 1934; Landreth, 1941). After the peak of stranger anxiety, at around 1-2 years of age there is a fairly dramatic reduction in crying. The appearance of planned, deliberate action towards the end of infancy, and the opportunity that it presents for goals to be thwarted, results in frustration as a major trigger of crying. From then on, crying is mainly manifested during temper tantrums or other situations in which frustration is experienced (e.g. when the child does not want to comply with parental wishes). This is usually accompanied by wailing or whining, and verbal negotiations with the offending parent, while tears are streaming down the child's face. Most characteristic of these crying episodes is the loss of muscle tone and inactivity, including sitting or lying on the floor. Other situations that frequently elicit crying include caregiving episodes, and times when the child is subjected to physical constraints (e.g. during nappy changing, bathing, and dressing). In addition, pain, physical injuries, and separation from the parents remain important triggers of tears and crying.

At this age, when the child becomes more physically independent and linguistically competent, crying is partly replaced by whining. Whining is a vocalization, often coupled with speech, that is used to make a request, lodge a complaint, or represent discontent (Sokol et al., 2005). Compared with crying, it has the potential to convey a more specific message.

In two classic studies (Brackett, 1933, 1934; Landreth, 1941), boys and girls aged 18–48 months were observed at a nursery school during free play as well as during routine activities, such as eating, bathroom, and bedroom situations. They laughed for 6.7% of the time and cried for 2.5% of the time during which they were observed. Remarkably, there were many situations that brought about laughing at one time and crying at another. Laughing and crying thus appeared to be interchangeable in some situations. This supports the notion that either the brain structures responsible for these opposite, although in many respects similar, behaviors are close to each other, or that it is difficult for young children to “label” physical arousal clearly as either positive or negative.

In children over 2½ years of age, little crying occurs when they are separated from the mother. Falls and quarrels are the commonest reasons for crying, particularly when they are caused by another child. The majority of crying is associated with social contacts, and nearly half of the crying episodes are caused by physical contact. Boys are most commonly involved in instigating crying in both boys and girls. Crying during routine caregiving situations (e.g. dressing, eating, and toileting) shows a stronger decrease than crying during play activities.

In this same study, a relatively strong association between crying and temperature was found. The children were much more likely to cry when the weather was cold, but no such relationship was found for laughing. As mentioned before, this crying might have been helpful in serving to generate warmth.

Individual differences in the crying frequency of preschool children, among others, are related to the availability of other means of communication, especially language (Kopp, 1992). Children with more advanced language skills than their contemporaries are less likely to resort to crying than children with less developed skills. This suggests that, at this age, crying is especially likely to be used when alternative means of communication are either unavailable or fail to achieve the desired goals. As just said, whining might be regarded as a transitional form of crying, as the child becomes more physically independent and linguistically competent. Caregivers probably perceive it as rather similar to crying.

## The functions of infant crying

So far I have mentioned four possible functions of infant crying. In addition to being an alarm signal and an attachment behavior, crying might be relevant to or merely reflect maturational processes in the brain, and it may also generate warmth in cases of exposure to low temperatures. However, there are some more interesting and controversial hypotheses about the different roles of baby crying (Barr et al., 2000; Soltis, 2005). Moreover, crying is regarded as having a positive influence on the feeding behavior of the mother, the composition of the breast milk and energy savings, which are important for the infant's growth and development (Barr, 1999). In addition, and related to the previous issue, frequent feeding, mediated via increased levels of the hormone prolactin, causes lactational amenorrhea, which prevents the mother from becoming pregnant (Barr, 1999). This results in reduced competition for food and parental attention, thereby increasing the likelihood of survival. Moreover, crying stimulates the closer proximity of the mother, resulting in more social–communicative interactions between the mother and child, and a decreased risk of the offspring becoming the victim of predators. Finally, crying is thought to convey information about the health status or fitness of the baby, which in former times, when resources were limited, was important to prevent caregivers from investing in non-viable offspring (Furlow, 1997; Lagasse et al., 2005; Lummaa et al., 1998).

The crying of sick babies differs from the crying of healthy babies in two respects. Most notable is the fact that when premature or sick babies (e.g. those with neurological disorders, impaired metabolism, or infectious diseases) cry, they do so at a higher pitch than their healthy counterparts. Normal crying is in the 300–600 Hz range, whereas the pitch of crying of babies with health problems is typically higher than 600 Hz (Furlow, 1997). Infant cries that deviate markedly from the norm thus indicate poor health. In addition, this crying is experienced not only as more urgent and distressing, but also as more aversive. The crying signal thus provides the parents with extra information about the health status or, in evolutionary terms, the fitness of the baby, in addition to possible visual informational input (e.g. physical deformities).

For our ancestors this was particularly relevant, because there would be little point in parents investing their time, energy, and limited resources in offspring who were very unlikely to pass on their genes to the next generation. If only limited resources are available, one has to make choices and give priority to those offspring that appear to be more viable.

Although to date very little human research has addressed this issue, it has been demonstrated that mothers with twins react faster to the crying of healthy babies than to that of babies with a compromised health status (Mann, 1992). High-pitched crying and variably pitched cries increase the risk of non-optimal parental responses, and the infant may be ignored. Mothers of premature infants are also more likely to withdraw from their infant's cry, rather than respond to it. The bonding process between mother and child may therefore be delayed or even inhibited when the baby does not display evidence of appropriate fitness and/or when the mother does not have sufficient resources to feed all offspring (Robson and Kumar, 1980). Thus mother love appears to be less unconditional than we would generally like to believe. Worse still, (unhealthy) crying may even be a major cause of child abuse (Reijneveld et al., 2004), particularly if it exceeds a certain intensity and duration and it fails to result in the desired effects of caregiving.

When the chances of survival are low for a particular infant (e.g. due to poor health status), the mother may therefore cease to invest resources in it, in an attempt to increase her overall reproductive output. For example, resources may instead be redirected to an existing older sibling who has successfully passed through the critical infancy period, or limited resources may be conserved for investment in possible future offspring whose fitness is expected to be higher than that of the unpromising newborn.

Indeed, in some African cultures and in Brazil, anthropologists have observed that sick babies are at serious risk of being neglected and not receiving appropriate maternal care (Osifo and Oku, 2009; Scheper-Hughes, 1992). In wealthy western societies, a delayed or impaired bonding process has been reported after a complicated delivery and premature birth (Brody, 1981). Thus infant crying serves as a source of information about the physical status of the child, allowing the parent to decide whether or not to invest in him or her. In evolutionary terms this was important for ensuring the successful forwarding of the parent's genes.

Clearly, considering infant crying from an evolutionary perspective contributes to a better understanding not only of the positive immediate and long-term consequences of infant crying—especially when the crying bouts are fairly frequent but of short duration—but also of the problems associated with “unhealthy” crying (Barr, 1999). However, it is not just the evolutionary perspective that reveals the positive effects of infant crying. Crying is not only dependent on the stage of development, but may also itself play a role in development. Adults' attempts to appease crying infants typically include behaviors such as feeding, rocking, stroking, and singing, which may have two effects on the child. First, such behaviors alleviate the discomfort and pain. Secondly, at the same time they provide the opportunity to experience new external stimulation. After a crying infant has been pacified, it opens its eyes, becomes more alert, and monitors its surroundings. In this way, crying ultimately also facilitates perceptual cognitive exploration.

The functions of infant crying that have been discussed here are not necessarily mutually exclusive, and this is a further reason to be impressed by the multi-functionality of this behavior. However, note that none of the explanations specifically addresses the role of tears, but rather they all concern the acoustical aspects of crying. I shall now discuss these developmental aspects in more detail.

## **The further development of crying during childhood and adolescence: changes and similarities**

It has been postulated that crying, together with (social) laughing, persists into childhood and later life because both behaviors have a key role in facilitating social bonding and cooperative behavior, while at the same time inhibiting aggression (Hasson, 2009; Montagu, 1989). Both are unique human ways of expressing strong emotions and conveying a sense of commonality among all human beings. How exactly, though, does crying develop?

With increasing age, there is first of all a major change in crying frequency. Humans show significant decreases in crying frequency with increasing age. In addition, some noticeable changes in the phenomenology of crying can be observed, with more emphasis on tearfulness and less on the acoustical aspects. Moreover, the situations that make us cry tend to be different.

One of the messages of this book is that, globally speaking, increasing age is accompanied by a transition from tears of physical pain to those of emotional pain, empathy, societal pain, and finally sentimentality and perhaps even moral awareness. In addition, a gender difference emerges, with women as the frequent criers, whereas the shedding of tears by men is less common (Vingerhoets and Scheirs, 2000). During this period the influence of the parents and peers is also manifested. In families with less rigid ideas about gender roles, boys may feel more free to express their emotions, including crying (Bronstein et al., 1996; Zeman and Shipman, 1996). Furthermore, with increasing age, implicit theories about the effects of crying may show some remarkable developments. With regard to the latter issue, children have reported that crying increases their sadness, whereas inhibiting their tears is felt to reduce the negative feelings (Stegge et al., 2004). These children indicated that they considered stopping crying to be the

most effective way to decrease feelings of sadness—a view with which the majority of adults clearly do not agree. Rather, adults generally feel that crying reduces distress and discomfort, whereas withholding tears intensifies such feelings.

In order to gain an adequate understanding of the further development of crying behavior, it must be considered in a broader context, focussing particular attention on the more general maturation process. Previously, I emphasized the importance of the development of language and motor control. The former equipped the child with a more advanced communication system. The development of increased motor control resulted not only in greater stability and the prevention of falls and other painful experiences, but also in the ability to move away from or towards individuals, which may result in new experiences that induce crying. However, this very development at the same time decreases the necessity for an acoustic emergency signal to elicit aid and succor. When one can move towards others, a visual signal is sufficient.

In addition, the following cognitive and emotional developments may be critical. First, the social emotions, such as shame, guilt, regret and empathy, start to emerge, while at the same time primary emotions, particularly fear and frustration, may decline in frequency and intensity of expression (Lewis and Wolan Sullivan, 2005). Crying may then also occur when the child is aware that they have done something wrong.

Subsequently, with the further development of cognitive processes and increasing awareness of others as human beings with their own cognitions and emotions (known as “theory of mind”), some major developments occur with regard to the reasons why children cry. Whereas initially young children only cry for egocentric reasons (e.g. pain, lack of warmth, unfulfilled basic needs), later in their development they may also cry because they have developed the capacity to understand, and in some way also experience, the emotions of others (i.e. they have developed empathy). For example, they may cry when watching a movie such as *Bambi*, because they sympathize with Bambi when he is sad that his mother has been killed (Sternbach, 1962).

Emotion regulation refers to the capacity to control the experience and expression of emotions. This concerns both positive and negative emotions, such as anger, disappointment, and distress, which people are expected to express in socially appropriate and acceptable ways, or occasionally even to inhibit completely, depending on who is with them. Children and adolescents who are better able to adequately regulate their emotions and who have good insight into the emotions of others (both of which are basic features of emotional intelligence) are more socially competent and tend to be better liked by their peers than those who lack the skills to regulate their emotions adequately (Mavroveli et al., 2007; Petrides et al., 2006). This may be due to the fact that there is a connection between emotional intelligence and a willingness to display prosocial and helping behavior when placed in a situation where a peer is in need of assistance. The development of emotional intelligence strongly determines one’s success in establishing bonds with others, and the development of social skills.

Having control over one’s emotions (i.e. over their quality, intensity, and duration), or postponing their expression until one is in a more appropriate setting, is another skill that is strongly linked to one’s socio-emotional development. There seems to be one remarkable discrepancy when comparing infant and adult crying. Infants use crying as a behavior for drawing others toward them, whereas adults often conceal crying behavior from others, and seek privacy before engaging in it.

Recent sophisticated brain imaging research has shown how the processing of emotions in the brain of a child develops between the ages of 7 and 17 years. In young children, the emotional activity is mainly localized in primitive subcortical areas of the emotional brain, such as the amygdala, which have no connection with the cerebral cortex. This may explain why there

is no point in asking a 6-year-old to tell you why they are feeling sad, as the speech area in the brain is not aware of the emotional turmoil in other parts of the brain. However, as a person gets older, the cerebral cortex (especially the frontal area) becomes more involved in the modulation of emotional responses. Consequently, a 17-year-old is better able to explain what she is feeling, and why, in great detail and without much difficulty. However, the study also revealed a striking gender difference, in that this development occurs earlier in girls than in boys, where the locus of emotional control remains localized in the amygdala for longer. This is why asking a 17-year-old boy to talk about his feelings is often as unproductive as asking a 6-year-old boy to do so (Sax, 2005).

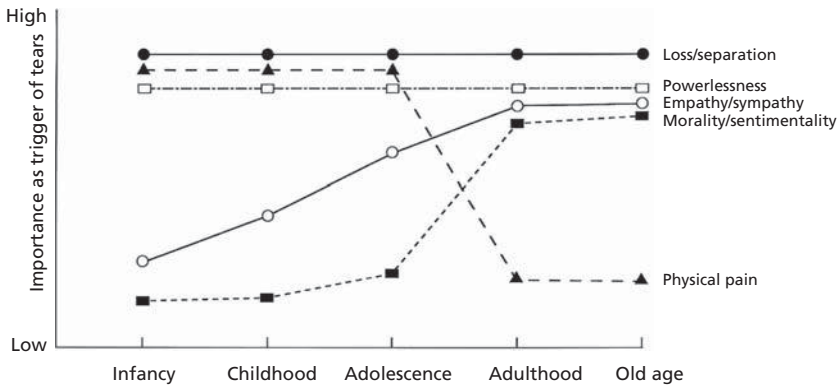
All of this demonstrates the connection between developments in crying and the broader biological, cognitive, and socio-emotional development of the child. If an infant cries when their parent leaves the room, it can be concluded that an emotional bond has formed between that parent and child. Increasing awareness of the reactions of other people to their crying may result in the child manipulating others with tears. One can then distinguish between, on the one hand, crying that occurs in response to a physically or emotionally painful situation and, on the other hand, crying that occurs in anticipation of the reactions to that behavior. The classic example is the child who has hurt himself, but does not start crying until he sees his mother, which suggests that the child has insight into normal adult reactions to this behavior (Hart et al., 1964). When we see a boy fighting back tears after having been insulted or bullied in the schoolyard, he is demonstrating his acquired ability to inhibit crying and to regulate his emotions. Children cry more often when in the company of their parents than when with peers or strangers, among other reasons because of the anticipated negative consequences (Fuchs and Thelen, 1988; Zeman and Shipman, 1996). However, occasionally (e.g. after having told a lie) crying may be more likely to occur in front of their parents because of the expected reduction of negative reaction, as anger and punishment.

There is indeed evidence that children who cry readily are preferentially targeted for taunting and bullying by their peers (Schwartz et al., 2001). It is therefore not surprising that children learn to direct crying towards individuals who are highly motivated to provide care for them, and inhibit crying in the presence of those who may be disinclined to tolerate it. The trend that is evident across development is increased selectivity when choosing target audiences. Inhibition of public crying extends through adulthood, when crying most often occurs in the privacy of one's own home, with no strangers present.

The most fundamental similarity across ages is that adolescents and adults, like infants, cry as a result of distressing circumstances, such as frustration and emotional pain, often in connection with separation, or with real or potential losses. As adults are capable of meeting most of their own physical and psychological needs independently and can use language, crying becomes relatively rare in adulthood, and occurs more often as a result of emotional pain, rather than physical pain, deprivation, or injury. More specifically, adult women cry between two and four times a month, whereas the crying frequency for men seldom exceeds once in two months.

Feelings of loneliness, conflict, separation, loss, frustration, and helplessness remain the most common reasons cited or suggested for crying at all ages (Vingerhoets et al., 2009; see also Chapter 5), despite the dramatically different circumstances that give rise to these feelings at different ages. A pilot study that compared crying antecedents of adolescents and adults revealed the following major differences. Injuries and physical pain, as well as psychological states, were important elicitors of crying among adolescents, whereas this was not the case for adults. However, "sentimental crying" was more important in adults, whereas it was not an issue among adolescents (Beck, 2010).





**Fig 4.3** Postulated changes in the importance of specific crying-eliciting conditions with increasing age.

Adolescence is a critical period during which the child has to separate from their parents and establish their own identity. More than ever before, the child has to be directed to others, and away from the parents, as their social world expands. The growing interest in romantic and sexual relationships, which is characteristic of this phase of life, stimulates prosocial and moral development by focussing attention on personal relationships and behaviors that foster and promote intimacy. Engaging in a romantic relationship involves helping, caring for, and sharing with another person, and increases the adolescent’s capacity for sympathy and empathy—both of which are indispensable correlates of prosocial and moral behavior (Eisenberg, 2000; Eisenberg and Fabes, 1991; Fabes et al., 1999). All of these developmental processes can be monitored when focussing on an individual’s crying behavior. Sympathy, empathy, and morality are not only all-important determinants of prosocial and moral behavior, but are also closely linked to the shedding of tears.

With a further increase in age, symbolic stimuli (e.g. poems, novels, films, music) become increasingly important as antecedents of crying (see Figure 4.3). Thus the antecedents of crying are no longer limited to one’s self or to one’s immediate social circle, but may be related to what is going on in the world (“societal pain”), which in turn is finally followed by sentimental (or moral) tears—that is, crying in response to witnessing bravery, comradeship, altruism, justice, and any other moral feelings (Tan and Frijda, 1999).

In terms of its appearance, full-blown adult crying resembles infant crying in several important respects, including structural features (i.e. crying face and tears, heavy vocalizations, rhythmicity of wailing, and so on) (Roes, 1989), which suggests that there is at least some continuity in phenomenology across development. It remains a compelling signal of physical or emotional distress in adulthood, and a means of soliciting aid and assistance from others, as it was in infancy. However, although many of the components of crying remain constant, there are also some remarkable changes in the importance of the various components. Whereas crying in infancy is predominantly an acoustic signal, in adulthood a visual signal, namely the shedding of tears, is most characteristic of crying. Because of this, infant crying researchers have focussed their research efforts mainly on the production of distress vocalizations and their effects on others, whereas adult crying researchers have directed their attention specifically to the effects of the production of tears. This raises the question of whether there are any additional important qualitative differences between crying in children and adults.

## The development of the gender difference in crying

So far we have discussed the theoretical considerations about the relationship of developments in crying to broader socio-emotional development, but what do we really know about crying during this early phase of life? Surprisingly, the developmental literature on crying after the second year (when its frequency drops off considerably) is very limited, and the adult literature typically focusses on crying during college years, with undergraduates being the most common participants in psychological studies. However, it is also important to gain an insight into the development of crying of normal children, and to know more about the development of the gender difference. It is generally believed that the difference in crying frequency between men and women is not present from birth onward. An American study requested practicing clinical psychologists and social workers to estimate the age at which boys and girls start to show differences in the frequency with which they cry (cf. Hastrup et al., 2001). The mean predicted age was 8.4 years, with most estimates during the elementary school years or earlier. These findings showed a striking similarity to the estimates obtained from the parents of teenagers. Professionals and parents thus agree that—compared with girls—boys show a reduction in their crying during childhood. The question is, of course, to what extent such estimates are supported by research findings.

So far we have been considering estimates, but what research data have been obtained to date? There are at least some research findings which strongly suggest that a gender difference in crying is indeed not present from birth onward, although the research results that have been reported appear to be inconsistent. A study of neonates by Grunau and Craig (1987) revealed that boys showed a shorter latency time than girls to crying and to displaying facial action following heel lancing. However, in a study of premature infants, no gender differences in the behavioral reactions, including crying, were found (Stevens et al., 1994). Another study failed to demonstrate gender differences in the total amount of time spent crying in infants aged 2 weeks to 6 months who were experiencing acute pain (Fuller, 2002). Finally, in a well-designed study, girls appeared to shed emotional tears more quickly than boys when exposed to a standard stimulus (i.e. an arm-restraint procedure) in which a female experimenter grasped the infant's wrists and held them immobile on a high-chair tray for up to 3 minutes (Camras et al., 1998). If the child started to cry, the arm was released after 7 seconds. However, in apparent contrast to this observation, there is also evidence that boys cry more often than girls (St James-Roberts, 1993). The explanation for this finding is that male infants probably have more reason to cry, because their behavior puts them at greater risk of painful experiences and frustration, associated with their strong exploratory drive and rough play. Therefore the crucial question is not whether male and female babies differ in crying frequency, but—more interesting and relevant—whether both genders differ with regard to crying in response to exactly the same stimulus. These seemingly conflicting findings thus highlight the fact that a relatively simple outcome, such as the frequency of crying, is not so unambiguous and easy to interpret. An individual's crying frequency is the result of several factors, including exposure to emotional stimuli, appraisal, crying threshold, and emotional self-control (Bekker and Vingerhoets, 2001; Rottenberg and Vingerhoets, 2012, see also Chapter 9).

This seeming discrepancy once again demonstrates the limited value of a crying frequency measure. Without any insight into related differences in exposure to emotional situations and the pressures that are experienced to control one's tears, it is not clear what such differences in crying frequency really indicate, and how exactly they relate to other developments. For example, it has been found that even at a young age there are differences between girls and boys in

emotion talk, and analyses of parent–child dialogues have revealed that preschool boys use fewer words that are descriptive of emotions than girls of the same age.

However, to date only a few studies have focussed on the frequency of crying (cf. Hastrup et al., 2001). The earliest relevant UK study demonstrated that girls and boys first begin to show a divergence in crying frequency not before the age of 13 or 14 years (Shepherd et al., 1971). In a more recent study in the USA, 240 families provided data on crying episodes in children aged 1–12 years. Older children, who often spent time away from their parents, were requested to report their crying episodes at mealtimes, but in all cases the parents kept written records of crying episodes. The monitoring took place during the summer months when the children were not attending school, but family vacations and periods spent out of town were excluded. As expected, a substantial decline in crying was found with increasing age, but there was no clear differential decline between girls and boys. Although the numbers of participants in each gender–age group were relatively small, the results suggest that there is a tendency for boys to cry as frequently as girls, at least until the age of 12 years.

In a second study (see also Hastrup et al., 2001), children in the age range 10–17 years were included, with three age groups (10-, 11-, and 12-year-olds) overlapping with the first study. In this case, a self-monitoring method was used with the participating children of 157 families, instead of parental reports. A substantial decrease in crying frequency between the ages of 10 and 17 years was found, with boys showing a greater decrease than girls after the age of 12 years. Again, the age at which there was a greater decrease for boys than for girls was found to be around 13 years. These findings thus seem to support the hypothesis that the onset of adolescence is associated with the development of a gender difference in crying.

However, in some more recent studies from the Netherlands, gender differences were detected as early as 11 years of age. It is unclear how these differing results can be explained. It is possible that they may reflect cultural influences (although these have yet to be specified), or that they result from differences in methodology between the studies.

The first Dutch study (Van Tilburg et al., 2002) collected information about the crying of children aged 11–16 years. Boys reported a significantly lower 4-week crying frequency and crying proneness than girls. In a second study, involving 186 children aged 9–13 years (Jellesma and Vingerhoets, 2012), again substantial differences were found between boys and girls, with boys reporting less crying.

In a third Dutch study (Beck, 2010) the focus was not on crying frequency, but rather on the antecedents of crying in adolescents. As already mentioned, compared with adults, these adolescents (aged 12–16 years) reportedly cried more often because of injuries, physical pain, and their psychological state, whereas witnessing suffering, witnessing positive events, and personal inadequacy were substantially less important. It is particularly notable that, in addition to the observed differences compared with adult crying antecedents, the boys and girls in this age group did not demonstrate the differences in eliciting factors that have been observed in adults. For example, fairly similar percentages were found for conflict and witnessing positive events, whereas the percentages of adult men and women who reported these antecedents differed considerably. With regard to the timing of crying, boys cried mainly in the afternoon (65%), whereas girls cried equally often in the afternoon and at night (both 43%). This is also a very different pattern to that which has been observed in adults, who mainly cry between 6.00 pm and 10.00 pm (see also Chapter 5). Explanation of these differences is open to speculation with regard to the relevance of eliciting factors and who is present. However, it is clear that the crying behavior of adolescents is still evolving in many respects.

In summary, we still have only a limited knowledge of the development of the gender difference in crying, and the other developmental processes to which it is linked. However, it is certain that this development cannot be viewed independently from other processes of both biological maturation and socialization. Probably the more biologically determined differences in crying threshold develop quite early, whereas crying frequency, in which environmental factors play an important role, start to exert their influence later in development.

## Why adult humans continue to cry

Why does human crying continue into adulthood? In animals there are remarkable differences in how the production of distress calls develops with increasing age. In some species (e.g. several birds) they are displayed almost exclusively by helpless youngsters, and the adults have no or only limited crying in their behavioral repertoire. In other species (e.g. rats, dogs), adult animals also produce these sounds in certain situations. Adult humans also show strong continuity in crying, with the changes in “morphology” discussed earlier, over the lifespan. It thus seems as if the expression of negative (and perhaps also positive) feelings is much more important for humans than for many other species. An obvious explanation is the connection with the *neotenic* characteristics of humans (Gould, 1977; Montagu, 1989). This means that human infants’ anatomical and behavioral characteristics are maintained during the course of development, even beyond reproductive age. The major advantage of neotenic brains is that they remain highly plastic and susceptible to modification by the environment for many years after birth, probably until 20–25 years of age in humans. In the animal kingdom, only humans have a childhood—that is, an extension of their infancy, during which they still are dependent on adults, while having the opportunity to grow and develop further in the interplay with cultural influences. In such conditions, the shedding of tears as a “light” version of acoustical crying seems to make sense.

Childhood, is crucial for the development of our intelligence, conscience, memory, and other higher cognitive, motor, and integrative functions. This development is also of key importance for our unique adaptational skills. Depending on the specific circumstances and environmental pressures, different genes may express themselves, thereby optimizing the individual’s adaptive capacity.

Thus not only juvenile anatomical features but also juvenile behaviors are carried into later adolescence and beyond. Changes in crying behavior therefore result not only from internal developmental processes, but also probably from exposure to environmental factors and the reactions from members of one’s social environment, in particular one’s parents and peers. According to the anthropologist Ashley Montagu, crying and laughing are chief among the traits of children because of their crucial importance for our social development and several other social aspects, such as sympathy and empathy, the inhibition of aggression, and the facilitation of social bonding, all of which facilitate cooperative and helpful behavior (Montagu, 1989).

In adulthood, the unique sentimental tears also gain significance. These may be regarded as moral tears, because the situations that induce them quite often concern major moral and societal issues, such as self-sacrifice, forgiveness, justice, and altruism. As such they also convey a sense of solidarity among mankind.

In conclusion, this chapter demonstrates that, from the very beginning, crying is a highly dynamic human behavior that in several respects shows important developmental changes with increasing age. However, a constant factor is that crying is a compelling social behavior at any age—a behavior that signals a need for assistance when an individual is feeling alone, or helpless to meet their own needs. Changes in crying over the course of infancy

and childhood are linked to broader biobehavioral developmental changes that guide and support the growing capabilities of the child. Adopting a developmental approach to crying is useful not only for understanding the developing child, but also for understanding adult crying. Changes in crying occur not only in relation to developmental changes in motor and language skills, but also in relation to cognitive and socio-emotional developmental changes. There is still much to learn about continuities and discontinuities in crying across the entire lifespan, and specific developments in the kind of situations that trigger tears and their precise links to empathy and moral development. From Chapter 5 onwards, the focus will be exclusively on crying in adults, beginning with a discussion of the antecedents and the context of adult crying.

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## Chapter 5

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# The antecedents and context of crying

When the clothed, washed body lay in the coffin on the table, they all went up to it for a last farewell and they all wept. Nikolovska wept from a suffering bewilderment that rent his his heart. The countess and Sonya wept from pity for poor Natasha and because he was no more. The old count wept because he felt that soon he too would have to take that dreadful step. Natasha and Princess Maria also wept now, but they did not weep from their own personal grief: they wept from a reverent emotion that came over their souls before the awareness of the simple and solemn mystery of death that had been accomplished before them.

(Leo Tolstoy, 1869)

Asking people what kinds of situations typically evoke emotional tears generally produces predictable answers. We cry at funerals. We cry when we have to say goodbye to friends who move to another country, or in reaction to a relationship break-up. We cry when we are watching a sad movie or reading an emotional poem. Sportsmen and women shed tears when they are beaten, but also when they are enjoying the glorious moment of a victory. Most people will agree that crying usually occurs in situations that elicit strong emotions.

How often are we confronted with such extraordinary situations as the death of close friends? How often do we experience humiliating defeats or glorious victories? Do we have to deal weekly or monthly with close friends moving away? Fortunately, our everyday lives are not filled with accumulations of such dramatic emotional situations. Nevertheless, women cry between two and five times a month, and men about once every two months. This suggests that the great majority of our crying episodes are not elicited by events that have such a strong emotional impact, but rather that they are associated with more frequently occurring, probably more trivial and mundane situations. What exactly do situations that make our tears flow have in common? What are their truly distinctive characteristics?

As outlined in the previous chapter, in babies and young children crying is generally—if not exclusively—regarded as a sign of distress or pain in response to pre- or perinatal trauma,

illness, overstimulation, developmental frustrations, physical pain or discomfort, frightening experiences, and—last, but not least—unfulfilled basic needs, in particular separation from the mother. However, for adults the reasons for crying appear to be far more diverse and complex. As noted earlier, adult crying differs in several important respects from the crying of babies, not least in the situations that elicit it. This relates to cognitive, social, and moral development, social awareness, and the greater capacity to control one's tears. Thus adults may cry in response to the symbolic representations of misfortune of others (e.g. as portrayed in sad films or books), broader societal issues (e.g. disasters, or the feeling that the world is bad or sinful), and other broad or abstract (existential) concepts. Furthermore, they possess the cognitive qualities necessary to adequately consider and evaluate the emotional impact of events such as the death of others, or major sporting achievements, as well as to appreciate the unique attributes of acts of altruism, love, and patriotism.

Because adults are generally very aware of their social environment, there are possibly also other factors that exert facilitating or inhibitory influences, resulting in either an increased level of crying, a temporary delay, or the deliberate withholding of tears (Vingerhoets et al., 2001, 2009). The model outlined in Chapter 1 clearly indicates that situations or events will only induce a specific emotional state if they have been appraised in a particular way. These specific emotional states may in turn elicit a crying response if there are not too many opposing forces that prevent the shedding of tears. It is therefore important not only to focus on possible specific triggers, but also to take the broader context into account. For this reason, this chapter will address both the antecedents and the specific (i.e. social) setting of crying.

It is probably because of the influence of the latter factors that crying in adults is still a mystery in many respects. Although the close association of crying with certain emotions, such as sadness, is well known, crying is also common in situations where sadness is clearly not the predominant emotion, and, conversely, people can experience sadness without shedding tears. Which environmental factors and other contextual features play a role? How do they do so? Is the presence of other people important? Is there any link with the time of day? This chapter will attempt to answer these and other related questions.

I shall start with a brief overview of theories on crying, as far as they are relevant to a better understanding of the eliciting factors. I shall also provide some examples of research that has attempted to categorize tear-inducing situations, including partially unpublished results of our International Study on Adult Crying (ISAC), which is concerned with the most important tear-eliciting situations. In the final part of the chapter, attention will be focussed on the broader context of crying, and two main questions will be addressed. First, where and when do people cry? Secondly, who is most often present when people shed tears? In summary, the aim of this chapter is to collate what is known about the conditions that trigger and moderate a crying response.

## The causes of tears: different perspectives

Scholars with a wide variety of backgrounds have speculated about the kinds of situations and feelings that make people cry, and they all have made numerous attempts to categorize these eliciting factors. The simplest summary of all the more serious attempts might be as follows: “crying antecedents include all kinds of situations that cause physical or emotional pain”—in other words, crying signals suffering and distress. A major advocate of this notion is Charles Darwin, who argued that “Weeping seems to be the primary and natural expression . . . of suffering of any kind, whether bodily pain short of extreme agony or mental distress” (Darwin, 1872, pp. 157–8).

However, this answer is too simple and broad, and lacks the necessary precision to advance our understanding of crying. Furthermore, it often seems to overlook crying that occurs for positive reasons.

Understandably, the ideas about which types of situations evoke tears are closely linked to theories about the functions of tears. In this respect there are two main viewpoints, which are not necessarily mutually exclusive (cf. Kottler, 1996). First, those who emphasize the *intrapersonal* function of tears believe that crying protects the individual against emotions that are too strong, or that crying facilitates physiological and psychological recovery after the experiencing of intense emotions. This category also includes those scholars who believe that crying promotes or signals self-transformation or the harmonization or reintegration of a person's self-concept (e.g. Barbalet, 2005; Katz, 1999).

In particular, psychoanalysts (e.g. Breuer and Freud, 1895; Koestler, 1964; Sadoff, 1966) have embraced the theory that crying represents a kind of hydraulic overflow process (i.e. a kind of safety valve). Tears are thought to represent the overflow of emotions that have passed a certain critical level for the individual, thereby preventing an excessive build-up of emotions. There is a draining off of energy that has been mobilized during the period of distress. Thus a crucial aspect according to this view is the *high intensity* of emotions, independent of their specific nature.

A related view is that tears represent the emotions and feelings that cannot be discharged by action, but only by specific biological processes, such as the flowing of tears (e.g. Bindra, 1972; Crile, 1915). In other words the tears help to discharge the tension, accumulating in the body in situations that the individual cannot cope with adequately. Interestingly, in the older literature the same function has also been attributed to laughter, which has been regarded as purposeless muscular activity, the main aim of which is to release nervous energy.

Then there is the hypothesis that emphasizes the cognitive perspective (Efran and Sprangler, 1979), and proposes that crying results from the *reappraisal of the factors that induced emotional arousal*, which subsequently leads to a resolution of the underlying emotional conflict. In other words, the tears mark the shift from arousal to recovery, signalling that the worst is over. In this way all tears can be regarded as tears of relief or of joy. This notion thus contrasts strongly with the view that all tears are associated with negative emotion.

Throughout history, from the seventeenth-century British philosopher Thomas Hobbes until, very recently, the Dutch emotion psychologist Nico Frijda, scholars have argued that crying most commonly occurs in situations in which people feel helpless, give up or give in, and experience a loss of control (Frijda, 1986). The German philosopher Helmut Plessner and the Italian psychologists Maria Miceli and Cristiano Castelfranchi, in their analysis of the elicitors of crying, reached very similar conclusions (Miceli and Castelfranchi, 2003; Plessner, 1940). They considered perceived helplessness or loss of control to be the key underlying factor that most, if not all, situations that stimulate tears have in common. Interestingly, some scholars in this tradition (e.g. Plessner, 1940) have asserted that the communicative or expressive aspect of weeping is secondary or merely incidental. This is in strong contrast to the convictions of other authors, as we shall see below.

According to some authors, from helplessness it is just a small step to the notion that places more emphasis on the social or *interpersonal* functions of crying (e.g. Hasson, 2009; Murube et al., 1999; Provine, 2011; Walter, 2006). Globally speaking, this would predict that we shed emotional tears in particular when we are incapable of dealing adequately with a situation and are therefore in need of help or comfort from others, in particular those to whom we are close. Here the emphasis is on the interpersonal and communicative functions—to signal distress to others in an attempt to elicit succor, comfort, and support (e.g. Kottler, 1996).

According to this view, humans most commonly cry when they are in need of support from others. A similar notion originates from a very different perspective. Attachment theorists, such as Judith Nelson, claim that crying is an attachment behavior designed to elicit help and emotional support from one's attachment figures (Nelson, 2005). One step further is the claim that tears also strengthen the mutual bonds between people—for example, by reducing aggression or offering help (Hasson, 2009; Murube et al., 1999; Provine, 2011; Walter, 2006). Thus, according to this view, crying may be expected to be more frequent in situations in which it is important to induce sympathy, empathy, or comfort, and/or to reduce aggression.

In the literature there are several examples of attempts to classify and categorize tear-eliciting situations. For instance, the psychotherapist Jeffrey Kottler (1996) has presented the following taxonomy of crying episodes:

1. physiological response (to irritants, but also to exhaustion or orgasm)
2. reminiscence
3. redemption and release
4. in connection to others
5. grief and loss
6. despair and depression
7. joyful and aesthetic transcendence
8. vicarious experience
9. anger and frustration
10. manipulative tears.

Others who have attempted to categorize crying have generally used fewer categories and different labels. For example, the philosopher and novelist Arthur Koestler (1964) came up with the following more limited classification:

1. raptness
2. mourning
3. relief
4. sympathy
5. self-pity.

These different views demonstrate that there is considerable disagreement about what investigators regard as the prototypical situations that make us cry, as well as what the situations that trigger tears have in common. Therefore the real challenge for scientists is to come up with ideas that allow as many of these crying episodes as possible to be fitted within one theoretical framework.

On the one hand, then, there is a wide range of different views about the question of what makes us cry. On the other hand, helplessness and the inability to act appear to be recurring motives, as are the loss of or problematic relationships and interactions with others, especially attachment figures. However, these are just theories. To what extent are these ideas supported by research findings?

## **What has research on the causes of crying taught us?**

In normal conditions, crying is generally elicited by external stimuli (e.g. social situations, social events) or internal stimuli (e.g. thoughts, memories), however apparently trivial and mundane

these may sometimes be. There have been several different approaches to addressing the question “What makes people cry?”. For instance, the focus of attention has been either on emotions or feelings that have the potential to elicit crying (“What did the individual *feel* when their tears began to flow?”), or on situations (“What *happened* or what was *going on* when they started to cry?”). However, the precise status of emotions and feelings in relation to crying is unclear. Should they be regarded as the real triggers of crying, or merely as factors that set the stage for tears? Or should they instead be considered to be a consequence of crying? The latter view is consistent with the emotion theory of William James, according to which it is the perception of somatic reactions that is the emotion (James, 1884). In other words, we do not cry because we are in an emotional state, but rather we become emotionally upset because we notice the tears flowing down our cheeks. Box 5.1 presents some classical theoretical notions about the links between tears and emotions.

### Situational and emotional antecedents of crying

The American psychologist Alvin Borgquist (1906) was the first to study crying more systematically. Like Charles Darwin (1872), he also made use of an extensive network of travellers, ethnologists, and missionaries, whom he sent his specially designed questionnaires in order to learn more about crying in different cultures. He collected further data from his students. Based on a thorough analysis of the introspective descriptions of the crying states that he had collected, Borgquist identified three main types of crying situations—grief or sadness, anger, and joy.

Borgquist found that conditions which contained elements of sadness, helplessness, or hopelessness were by far the most important. However, he also pointed out that sympathy and fear were often important accompanying feelings. In addition, he emphasized the possible role of physical conditions, including nervousness, fatigue, and pain. He concluded that the crying response is “the physical accompaniment of a mental state which is a recognition of an inability to remove certain painful or oppressive conditions; the cry appears when the feeling has reached a certain intensity” (Borgquist, 1906, p. 165).

I shall not bore the reader with detailed descriptions of all the other relevant studies, such as those conducted by Lund (1930), Young (1937), Bindra (1972), Frey (1985), Soares (2003), and others. Instead I shall focus on our own findings, because they are currently the most comprehensive. I shall also discuss a recent Austrian study (Benecke, 2009) that applied a very different but interesting research methodology. In Box 5.2 some major pitfalls and problems associated with the study of crying are discussed.

Within the context of the International Study on Adult Crying (ISAC), substantial similarities with regard to crying-inducing situations among men and women in different countries were found. As can be seen in Table 5.1, conflict situations, experiences of loss, and the witnessing of suffering were the most frequently reported triggers of crying. Our findings also confirmed that men cried more frequently than women when experiencing positive events, whereas women reported crying considerably more often in conflict situations.

The psychotherapist Cord Benecke made video recordings of psychiatric interviews conducted with 120 women with a variety of psychiatric problems (depression, anxiety, eating disorders, etc.) and with a group of healthy participants. Approximately one-third of the women cried at some stage during the interview. Analysis of the specific triggers of their crying first of all confirmed the importance of the well-known category of loss, including loss associated with death, separation, rejection, and feeling misunderstood. However, the participants also cried because of feelings of anger with their former partner, or with God, whom they blamed for the loss of a

## Box 5.1 Antique conceptions

Pierre Petit, summarizing the ideas of classical writers, came to the conclusion that tears basically resulted from sorrow or joy (Petit, 1661). His contemporary, the philosopher René Descartes, asserted that the great majority of tears were shed not just because of sadness, but rather as a result of a combination of sadness and love. However, he also acknowledged that tears could be shed as a result of happiness (Descartes, 1649).

### Article 131. How one cries from sadness

The other cause is Sadness, followed by Love or Joy or in general by some cause that makes the heart drive a lot of blood through the arteries. Sadness is needed, because in cooling all the blood it contracts the eyes' pores. But because it also diminishes the quantity of vapors—which must pass through them—in proportion as it contracts them, this does not suffice to produce tears unless the quantity of these vapors is simultaneously increased by some other cause. And there is nothing which increases it more than the blood sent to the heart in the passion of Love. We see too that those who are sad do not shed tears continually, but only intermittently, when they make some new reflection upon the objects they are fond of.

(Descartes, 1649)

Scholars at this time also had already suggested that tears were only associated with moderate sadness, not with the most intense form of it.

### Article 128. About the origin of tears

As laughter is never caused by the greatest Joys, so tears do not come from extreme sadness, but only from that which is moderate and accompanied or followed by some sensation of Love, or Joy as well.

(Descartes, 1649)

An illustration of this idea is the anecdote of the Egyptian king Psammenitus, who was defeated by the Persian king Cambyses and was forced to watch the captives parading past. Among them were his daughter dressed in slave's attire, and his son on his way to be executed. Psammenitus looked at this scene without batting an eyelid. However, when a little later on an old drinking friend turned beggar passed by, he burst into tears. When Cambyses asked for an explanation of this paradox, Psammenitus answered that some grief is simply too fierce for tears.

loved one. The second major group of triggers concerned positive events and social relationships. Helping friends, the joy associated with one's children or grandchildren, and the newly discovered love of one's parents are some representative examples of such triggers. It was very often the case that the positive event or relationship that was experienced had not been expected or hoped for. Tears were often shed when these individuals noticed that, in a world full of pain, evil, and misfortune, an unexpected source of positivity and goodness can come as a complete surprise (Benecke, 2009).

A third approach to learning more about the types of situations that evoke crying is to show study participants a dramatic movie and then ask them to report which scenes evoked tears in them. A major advantage of this methodology is that it allows an accurate comparison of actual crying behavior in different groups (e.g. men vs. women, young vs. old participants, different personality types) or under different circumstances (e.g. alone vs. accompanied by friends

## Box 5.2 The study of crying-eliciting situations: pitfalls and problems

Unaware of all of the problems and pitfalls typically connected with this topic, I initiated a study on the antecedents and consequences of crying, inspired by the work of emotion researchers Harald Walbott and Klaus Scherer (Walbott and Scherer, 1986). These investigators had developed a questionnaire to collect information about the experience of different emotions. We adapted this questionnaire to make it more fit for our purposes, and then started to collect data. When we were trying to categorize the reported antecedents, we became aware of the problems associated with the identification and classification of the various triggers of crying. We felt that it was important to make a distinction between the following:

- ◆ situations, memories, and symbolic stimuli
- ◆ emotions and feelings
- ◆ physical or mental states, which probably should not be regarded as real antecedents but rather as moderators (i.e. factors that decrease or increase the threshold for crying).

One of the first problems concerned the difficulty in distinguishing between objective situations and closely related feelings and emotions. For example, people described as a crying-inducing situation the fact that they *felt* lonely, rejected, homesick, or humiliated. In the case of someone who reports that he suffers from homesickness, one could argue that the objective situation is being separated from home, and the accompanying feeling/emotion is homesickness (unfortunately, this term was not then included in our list of emotions/feelings). However, is it really about being separated from home, or more specifically is it about missing the home environment? And what about feeling lonely? What is the accompanying objective situation? Is it being alone? Probably it is not. Loneliness is more likely to be a more permanent state of feeling socially isolated, rather than the mere fact that one is alone at a specific moment in time.

This illustrates some of the difficulties that are encountered when trying to make a distinction between objective events or situations and the feelings that are reported by respondents. In several cases it was not possible to describe the antecedents in objective situational terms.

Another serious problem that we encountered concerns the fact that the emotions that accompany crying are seldom experienced in a pure form, and that different emotions may occur simultaneously or in rapid succession. This makes it difficult not only for the researcher to categorize the emotions, but also probably for the respondent to report them adequately. Frustration, anger, disappointment, sadness, and helplessness are some of the terms most often applied. It is unclear precisely to what extent respondents are able to differentiate between them and to report them reliably. Very often it is a mixture of feelings, with helplessness or powerlessness as crucial elements, that elicits the crying response.

A third problem that we encountered was that people appeared to be able to suppress crying and delay it until a later, more appropriate point in time. For instance, tears were only shed after one had isolated oneself from a group or an opponent in a conflict situation, or when one had finished a particular task (e.g. sportsmen who do not cry during the match, but only shed tears once the game is over). Other examples of this are when an individual does not start to cry until they are alone in their car driving home, or when they are united with their partner, or lying in bed reflecting on what has happened at work, or finally reacting to a message that they received earlier that day. Since music, books, films, and TV reports, as well

as official memorial ceremonies, may occasionally bring back memories of tragic events, but also have the capacity to induce emotions in their own right, it was not always easy to determine what actually makes people cry when they are exposed to such situations. For example, when someone becomes tearful when listening to a specific song, what is the real trigger? Is it the music itself? Is it the excellent performance? Are the lyrics or revitalized memories of the association with a certain life experience responsible?

A fourth major problem that we encountered was that crying investigators failed to recognize the difference between, on the one hand, *susceptibility to crying* or a *tendency to cry* (i.e. *crying threshold*) and, on the other hand, *actual crying behavior*. This distinction is extremely important because there are substantial differences between the answers to questions representing hypothetical situations that ask the participant to indicate how likely it is that they would shed tears in such situations, and the answers to questions relating to what actually caused the most recent crying episode. The difference between these two questions can best be illustrated by the example of the death of loved ones. Not surprisingly, this event ranks highest among the hypothetical situations that make people cry. However, this is fortunately a rather rare event, which implies that it is rarely mentioned when individuals are asked to report on their most recent crying episode. Physical pain and homesickness are two more examples of strong elicitors of crying that are hardly ever mentioned when adults are asked to report on their most recent crying episode. In other words, people are generally most likely to cry for seemingly rather trivial and fatuous reasons that do not appear on lists of strong emotional situations that have great potential to trigger tears. Conversely, we only rarely shed tears in response to events that have a strong and universal potential to make people cry. Only a few situations rank high on both lists. For male students, the loss of an intimate relationship is such an event, and for women watching sad movies ranks high on both lists.

Thus, depending on the research method that is applied, a different picture emerges with regard to the question of what kinds of situations trigger tears. Asking respondents about the crying-inducing potential of situations (e.g. the death of a loved one, broken relationships, weddings, etc.) yields different responses to those obtained when requesting information about the respondents' last actual crying episode. In the latter case, conflicts, feeling rejected, and personal inadequacy appear to be more important.

**Table 5.1** Causes of last crying episode cited by adults ( $n = 5715$ ); percentage values are shown (Vingerhoets, unpublished data).

	Men	Women	Total
Loss	29	24	27
Conflict	14	23	19
Witnessing suffering	18	14	16
Personal inadequacy	10	11	10
Witnessing positive events	17	7	12
Psychological state	9	11	10
Physical state/pain	2	3	3
Combination of causes	5	8	6



or strangers, at different times of day, during different phases of the menstrual cycle, after having taken a psychopharmacological agent). This kind of research can be very helpful for learning more about factors that inhibit and facilitate the crying response, as it provides the researcher with at least some control and the potential for systematic manipulation. In addition, given the relatively short time interval between the crying and the reporting of this, the quality of the data is likely to be considerably better than in typical retrospective studies that ask respondents to report on crying episodes which occurred weeks or even months earlier.

To this end, we used the film *Once Were Warriors* (Tamahori, 1994), which depicts a dysfunctional Maori family living in New Zealand. The parents, Beth and Jake, were members of the local native tribe until the elders disapproved of their marriage. Jake is a violent man who beats his wife frequently when he is drunk, yet he obviously loves both her and his family. The eldest son is rebellious and is joining a local gang of punks, while the second son, Boogie, is often arrested for violations and is sent to a boys' home. Grace, the oldest daughter, has taken on the maternal role in the family, and looks after her younger siblings. One night, during one of her father's wild parties, she is raped by her father's best friend, Bully. Shortly after the rape, she hangs herself in the backyard. After the funeral, Beth comes across Grace's diary and finds out about the rape. Outraged, she goes to the bar to confront Jake and Bully. Jake does not believe his wife until she shows him the diary. Subsequently, Jake beats the life out of his friend. Beth realizes that too much has happened for the situation ever to be repaired, and she decides to leave Jake, taking the children with her.

The following scenes made female psychology students cry (the percentages represent the proportion of the participants who indicated that they had cried during the scene) (Vingerhoets, unpublished data):

- ◆ Beth, the mother, finding her daughter, Grace, who has hung herself in the backyard (35%)
- ◆ Grace's funeral (33%)
- ◆ the rape of Grace by Bully (21%)
- ◆ Jake's physical abuse of his wife (18%)
- ◆ Beth and the children saying goodbye to their aunt after the funeral (11%)
- ◆ the final scene, in which Beth and the children leave Jake (7%)
- ◆ the scene in which the body of Grace lies in state (5%)
- ◆ Beth's confrontation of Jake and the rapist about her discovery (5%)
- ◆ Grace's boyfriend kissing her dead body at the funeral (4%)
- ◆ the youngest son, Boogie, being sent to a boys' home (2%)
- ◆ Beth and Jake singing a Maori song together (1%)
- ◆ Beth, the mother, explaining to Boogie why she will not be able to visit him at the boys' home (1%)
- ◆ the daughter sadly walking alone in the city (1%)
- ◆ the scene in which Jake is drunk (1%).

These results demonstrate that people may cry in response to very different situations. However, none of the above scenes was so powerful that it made more than one-third of the participants cry.

What do all of these findings show us? When scrutinizing the different categories, it becomes clear that it is often a motley bunch of emotional states, feelings, situations, and physical conditions

that results in tears. Generally speaking, as predicted by our model, tears indeed result from a complex interplay of different factors. Not only are specific triggers needed, but also the state and personal history of the individual and the context determine the ultimate response—crying or not crying. It is doubtful whether crying is ever directly induced by physical states (with the exception of pain and illness), but rather such physical states generally influence the threshold at which tears are shed. Other stimuli, however weak, are always necessary to elicit tears.

This summary of relevant theories and the results of pertinent research shows that recurrent crying themes include not only grief, loss, interpersonal conflicts, anger, frustration, helplessness, powerlessness, and/or perceived inadequacy, but also positive, joyful experiences. However, this still does not provide a complete picture. In Table 5.1 at least four important antecedents namely physical pain, homesickness and separation anxiety, crying to reinforce requests and prayer, and, last but not least, love are lacking.

Particularly in infants, children, and even adolescents, pain is an important reason for shedding tears. In infants, crying is considered to be a pain behavior, which means that it is strongly associated with experiencing pain. However, as can be seen in Table 5.1, adults rarely cry because of pain.

Homesickness and separation anxiety, like physical pain, are strongly connected with crying in children and adults. These conditions seem to be more strongly associated with crying than severe depression, because they concern prototypical attachment situations that elicit tears. Key to both states is the separation from people (and pets and places) to which one feels strongly attached. Note that the term “separation call”, which is used in animal studies, specifically refers to the condition of being separated from the mother. Systematic studies are lacking, but anecdotal evidence in the case of homesickness (cf. Matt, 2007, 2011 see also Chapter 11) is impressive (see also chapter 11).

Tears are also a well-known adjunct to requests and prayer (cf. Lutz, 1999). The historical and cross-cultural literature provides numerous examples of tears accompanying prayer, requests, confession, repentance, and appeasement (see also Chapter 13). In a similar vein, crying is also known to be used as a manipulation technique (this will be discussed in more detail in Chapter 7).

With regard to love as an antecedent, I shall merely point out that, since classical times, the connection between crying and love has been emphasized. However, it could be argued that love should not be regarded as an antecedent of crying, but rather as a moderating variable, which implies that it affects our susceptibility to the shedding of tears. The limited knowledge about the psychobiology of love (low brain serotonin levels and elevated oxytocin levels) (Fisher, 2004; Marazziti, 2005) supports the idea of love resulting in a low threshold for shedding tears. Probably the precise role of love in crying is in some respects similar to that of fatigue, in that it lowers the threshold for crying (see also Chapter 9).

A theoretical consideration of the antecedents of tears would not be complete without a discussion of the role of positive and sentimental feelings. In the following section I shall summarize the relevant literature on this topic.

## **Positive emotions, tender feelings, and sentimental tears**

People seem to shed tears not only as a result of negative emotions, but also in response to positive feelings. However, there are some theorists who challenge this view. They argue that people are rather inaccurate when they report that they are crying for positive reasons, since, on closer scrutiny, in many cases negative reasons are found lurking beneath the surface—it is their conviction that the positive feeling is only temporary and that it is the negative association that makes us cry (Feldman, 1956). There is at least substantial anecdotal evidence to support this idea. Consider the

following examples. When the Dutch horsewoman Anky van Grunsven was asked why she cried when she was standing on the platform having received her Olympic gold medal, she explained that her tears were to do with the fact that her father had died some months previously. Her tears were in fact due to the impossibility of sharing this moment of extreme happiness with him. According to other gold medal winners who cried, their tears were associated with reflecting on their painstaking efforts to qualify, or the problems they had encountered in the process of qualifying (e.g. due to serious injury or other problems). Similarly, crying during ostensibly positive experiences such as reunions may be caused by memories of the less happy times when meeting people who missed each other very much. These examples nicely illustrate the importance of being careful about drawing hasty conclusions when considering and trying to explain crying in response to positive situations. Katz (1999), on the other hand, has pointed out that joyful crying experiences often have a bitter-sweet nature because they celebrate a sense of relief at having overcome something terrible.

The frequent crying at weddings may often be caused by memories of close friends or parents who have passed away, or who for other reasons could not attend. In addition, the shedding of tears at weddings may be related to the symbolic loss of the bond with the parents.

Charles Darwin was also aware that tender feelings are difficult to analyze (Darwin, 1872). This problem is possibly one of the reasons why they have long been neglected within the behavioral sciences, despite the strong association between tender feelings and tears, as indicated in Darwin's statement that "They [these feelings] are remarkable under our present point of view from so readily exciting the secretion of tears."

An alternative explanation that also challenges the idea that unalloyed happiness is an antecedent of crying regards "happy" tears as resulting from the helplessness associated with the inability to express one's happiness in an appropriate way. Being overwhelmed by joy, beauty, or altruism, the individual does not know how to express these feelings, how to behave, what to do, or what to say (Tan and Frijda, 1999).

The helplessness hypothesis is thus a parsimonious explanation that refers to crying not only as the result of general negative emotion, but also more generally as the result of a perceived inability to act adequately (Miceli and Castelfranchi, 2003). Thus there are some good reasons for challenging the idea that positive emotions also have the power to evoke tears (for a discussion of the tears of Olympic winners and losers, see Box 5.3).

### Box 5.3 Olympic tears

David Matsumoto, psychology professor at San Francisco State University and former coach of the US judo team, together with Bob Willingham, the official Olympic judo photographer that year, conducted a study on the facial expressions of winners and losers after the medal matches—in which the top two competitors vie for gold and silver, and the next two compete for bronze or fourth place. In addition, Willingham photographed the medallists' facial expressions as they stood on the podium and listened to the national anthem. It appeared that seven female judokas (17%) and one male judoka (2%) cried immediately after the match. Surprisingly, only one loser (silver medal) cried and seven winners (three gold and four bronze medals) shed tears. At the same time, it was found that 13 out of 14 gold medal winners also smiled immediately after the final match, whereas most of the silver medal winners expressed sadness. These data thus suggest a paradoxical reaction of extreme happiness combined with tears, and sadness without tears (Matsumoto and Willingham, 2006; Matsumoto, personal communication).

However, before more definitive conclusions can be drawn, it is helpful to know more about the kinds of “positive” stimuli that evoke tears. An initial more systematic study of the antecedents of tender feelings accompanied by tears revealed that people predominantly became tearful in response to the beauty of nature, music, films, infants, young animals, and other people they love, or people doing something special (Damen, 1999). More precisely, three distinctive categories could be discerned, namely aesthetics-related issues (e.g. beautiful art, nature, poems, songs), films and sentimental objects (e.g. puppy dogs), and social events (e.g. weddings, reunions, making love).

The film expert Ed Tan and the Dutch emotion expert Nico Frijda analyzed sentimental reactions to films (Tan and Frijda, 1999). According to these authors, real life only exceptionally triggers such reactions, with tearfulness being the most characteristic component, whereas sentimental feelings are typically associated with cultural products, mainly of relatively low standing, such as soap operas, tear-jerkers, country and western music, blues, and kitsch or “camp” products. The reaction is usually a mixture of feelings rather than a single pure emotion, and a particular feature is that people are often surprised by the intensity of their feelings. They feel overwhelmed and do not understand and cannot explain why they react so strongly. Also characteristic is confusion about the reason for the tears.

More theoretically speaking, it seems as if there is no conscious appraisal of the situation, that almost automatically seems to elicit a reaction. The emotion seems to come first, followed by an appraisal process, rather than the other way round.

Tan and Frijda (1999), also in this context, emphasize the experienced helplessness and the willingness to yield to and accept the state and “merge” with the situation. What follows is a loss of control over one’s emotional regulation processes that in turn may lead to the experience of a variety of strong, unbridled emotions, in particular empathy, sympathy, and pity. Also typical is the undifferentiated “black-and-white” appraisal—the situation is perceived as basically either good or bad, and there is no room or time for any gray areas. Identification with the situation depicted in a film or addressed in a song is also essential. There is a strong tendency to be able to relate to the main character and—especially for women—to relate to the role of caregiver in the case of sick children, or in the case of mentally disturbed individuals or criminals who desperately need some love, to bring them back on the right track. Furthermore, the typically strong emotions reported by new mothers when watching films about or reading about children who become ill or who are the subjects of abuse or injured in accidents may result from the awareness that their caregiving responses are urgently needed.

Tan and Frijda (1999) have identified three main themes that give rise to sentiments. The first is the “separation–reunion” theme, which is a prototypical attachment theme. As a possible explanation for the powerful effects of this theme, the authors suggest that it may be related to one’s own experiences of being separated from one’s parent, or to a fairly universal need to bond with other people. For men, it especially concerns situations that depict comradeship and acceptance by one’s father, other family members, or specific subcultures (e.g. during or after initiation rites) that may trigger tears (for a discussion of the tears of soldiers in World War One, see Box 5.4).

A second recurring theme is that of “justice in jeopardy”, also referred to as the “moral rectitude under seduction” theme—in a bad world, the good overcomes many hindrances and obstacles. This theme closely corresponds to the classical “virtue in distress” motive. Other related themes include incorrect suspicions, and the “rough diamond” motive, characterized by surprising selfless actions and/or self-sacrifice. The explanation for this powerful motive might be found in the romantic belief that we live in a good and just world. We value and cherish this idea, and we experience much satisfaction and sentimental feelings every time we feel strengthened in these beliefs.

### Box 5.4 Tears in the trenches

The French historian André Loez analyzed the occurrence and meaning of crying by French soldiers on the battlefield and in the trenches during World War One, based on the analysis of letters and diaries (Loez, 2004). It appeared that the general rule among combatants was to control one's tears, because they were considered to be a sign of weakness. Everyone thus did their utmost to hide and control their tears. The display of emotions was simply not acceptable; even seriously wounded men were told to be silent when they cried. If they did allow their tears flow, they were referred to as "femmelettes." Both soldiers and those in higher ranks thus could not afford to show their emotions, and expended much effort in controlling them when breaking the news of a soldier's death to his comrades, which of course resulted in extremely strong emotions. However, tears had no place on the battlefield, because they seemed to imply a serious breach in the display of courage. In this specific setting, where patriotism, heroism, and masculinity prevailed, there was simply no room for tears. Certainly it was completely unacceptable for tears to interfere with adequate functioning.

Even those who lost a family member were denied the right to cry: "Soothe yourself, you have no right to cry for such a beautiful death, facing the enemy among his *poilus* he loved so much and who loved him."

Nevertheless, in order to allow the necessary venting of emotions, rituals of mourning were organized, in which the shedding of tears was given a place within the context of patriotism. In this specific setting, tears were acceptable, because here they were not a sign of weakness, but rather a kind of patriotic tribute. Although tears could be shed here, one was still expected to remain in complete control over oneself.

Finally, there is the "awe–inspiration" theme, which emphasizes the importance of an awareness of how tiny and insignificant we are. This may occur in particular in situations that overwhelm us. A huge and impressive building, the vastness of a landscape, or the beauty of a painting or a piece of music are all examples of triggers of fascination. We might experience an urge to merge with the stimulus, giving up our own identity to become part of something greater. The evolutionary background to this feeling may be found in the admiration of successful conspecifics, which promoted the imitation of behaviors that eventually resulted in improved fitness of the followers. It is assumed that awe is in some way the result of generalization of admiration of impressive individuals to all kinds of impressive stimuli.

In an attempt to find a common denominator, Tan and Frijda (1999) have suggested that all three themes share an appeal to an idealized, paradisiacal state, with innocence, purity, and peace as characteristic elements. Sigmund Freud had already referred to such a state when discussing the oceanic feeling that precedes the development of individuality (Freud, 1927). It is a state in which the child is still part of a greater whole. In this state, there is no distinction between the "I" and the rest of the universe. This explains the typical action tendency to give up one's autonomy and to yield to the greater whole, which is strongly connected with action tendencies of the above-mentioned emotions—empathy, sympathy, pity, and the feeling of being connected. The characteristic increased tendency to be as close as possible to the protagonist, and to care for, protect, or help them, is the logical consequence. These emotions thus also ultimately reflect social connectedness.

The emotion philosopher Robert Solomon has suggested a most interesting elaboration when discussing sentiments (Solomon, 2004). He emphasizes the link between sentiments and morality. Since sentiments are typically accompanied by tearfulness, we cannot deny them. These reactions occur predominantly when we are confronted with exceptionally moral behaviors, having to do with justice, altruism, gratitude, compassion, and the counterparts of immoral acts (injustice, sins, egoism, and selfishness). He also stresses that the reactions are unexpected and often difficult to understand. It thus seems as if these feelings can occur without any awareness of appraisal processes. This confirms the notion that morality is not learned, but rather that a moral instinct has evolved in the human mind (Haidt, 2007; Hauser, 2006). There is currently accumulating evidence that morality is not merely a culturally determined phenomenon that we acquire during our childhood, but rather it is a biological given that is “hard-wired” into us, in a similar way to our capacity to learn a language.

This might also imply that these sentiments determine our behavior at an unconscious level, and that they signal to us, via our tear glands, that something really important is happening—as if our subconscious pinches us to make us aware of the relevance of the situation. This may in particular concern either behaviors that demonstrate very basic human values, or exactly the opposite—behaviors that are not compatible with such values.

Moral emotions, such as elation, sympathy, gratitude, awe, admiration, and indignation, typically arise automatically, without the conscious involvement of rational processes (Haidt, 2007; Keltner and Haidt, 2003). It is interesting that these specific feelings in particular are accompanied by tears.

## Situations that cause humans to shed emotional tears: an integral view

Where does all of this leave us? My attempt to bring together and integrate research findings finally yielded the following list of situations and their “counterparts” as possible triggers of tears:

- ◆ Death/loss
- ◆ Divorce, relationship breakdown
- ◆ Separation
- ◆ Conflict
- ◆ Loneliness, solitude
- ◆ Defeat
- ◆ Powerlessness and/or failure
- ◆ Emotional suffering
- ◆ Old, discarded, worn out
- ◆ Sin, egoism, world is bad
- ◆ Tiny, vulnerable, helpless
- ◆ Physical pain
- ◆ Seeing others suffering
- ◆ Childbirth
- ◆ Wedding
- ◆ Reunion
- ◆ Harmony, comradeship
- ◆ Social bonding, union
- ◆ Victory
- ◆ Extraordinary performance
- ◆ Extreme happiness, rapture
- ◆ Young, vulnerable, with potential
- ◆ Justice, altruism, world is good
- ◆ Overwhelming, mighty (or almighty), awesome
- ◆ Orgasm
- ◆ Seeing others feeling very happy

In order to reach the core of what makes humans cry, it is important to try to find out what these situations have in common. Are there one or more distinctive elements that are shared by these situations? I think that at least the following two aspects can be distinguished. First, as already indicated, there is the theme of helplessness and incapacity with regard to adequate functioning. Clearly, a second major aspect is attachment and social connectedness. Crying occurs particularly when there is a real or threatened loss of much valued social contacts (which is all the more threatening when one is helpless) including pets (Kwong and Bartholomew, 2011). Humans not only have basic, more physiological needs, but also have a need for (physical) contact with their mother (as is also emphasized by attachment theory) and, at a more advanced age, with other people. Several psychologists have emphasized that human beings are first of all social, if not *ultra-social*, creatures. Abraham Maslow has placed love and social belonging just after physiological needs and safety in his hierarchy of human needs (Maslow, 1943). More recently, social psychologists such as Roy Baumeister and his colleagues have convincingly demonstrated our need to belong, and the very negative effects of social rejection (Baumeister and Leary, 1995). Finally, James Coan (2008) has introduced his “social baseline theory,” which postulates that an individual alone should be regarded as someone in a state of deprivation; an individual is first complete as a social creature if he or she has social connections (Coan, 2008).

This social connectedness also explains why we are inclined to shed tears when we ourselves, other people to whom we are close, or the more abstract “society at large” are in distress or, conversely, are functioning extremely well. Those situations in which we shed tears in order to achieve some goal (requests, supplication, and prayer) may be accompanied if not supported by tears, because of their power to create a bond and to elicit succor.

However, even this list of potential triggers of tears still does not fully explain the kinds of situations in which people cry, because for no single antecedent (although the loss of a significant person comes very close to it) does the situation seem strong enough to reliably act as a trigger for tears. An important lesson that I have learned from my research is that exposure to emotional stimulation is generally a necessary, but definitely not sufficient, condition for evoking crying. For a more accurate understanding of the conditions that evoke tears, additional information is needed about the psychological and physical state of the individual, as well as the specific social context (for an example of the role of context in relation to the tears of the American hero, General Schwarzkopf, see Box 5.5). Even when an individual is highly emotional, crying may not necessarily immediately occur. People appear to have the capacity to control their tears and to delay their crying reaction until a later, more appropriate moment. It is not entirely clear why they do this, as this issue has not been dealt with specifically in systematic research, but the following are some possible explanations:

- ◆ waiting until others have left (e.g. strangers, the boss, a child) or have appeared (e.g. partner, mother, best friend)
- ◆ exposure to cues (e.g. discussion of emotional events) that reactivate emotional memories
- ◆ when discussion of an emotional event results in a major reappraisal of the emotional situation.

What are further situational factors that determine whether or not crying will actually occur in a particular situation? As was made clear in the model presented in Chapter 1, they probably include person-related factors (both physical and psychological state and trait variables, which will be addressed in Chapter 9), cultural factors (which will be addressed in Chapter 8), and the specific context of crying (for a description of some examples of crying while driving a car, see Box 5.6).

### Box 5.5 When generals do and do not cry: the role of context

When General Norman Schwarzkopf (commonly known as “Stormin’ Norman” or “The Bear”) was interviewed by Barbara Walters toward the end of the Persian Gulf War, he became tearful as he answered personal questions. When the interviewer expressed her surprise, because she felt that generals should not cry, Schwarzkopf explained that generals do not cry during battle, but that they do so afterwards. He emphasized that he withheld his tears in front of his troops during the Gulf War not because he did not feel things deeply, but because his role demanded otherwise: “They don’t want a general to cry, and that’s very important to me.” However, he admitted that he could cry when alone in bed missing his family, or at a Christmas Eve service in the company of his troops. He explained that he was then fulfilling a different role, acting not as a commanding officer, but rather as a father figure, and as a focus for communal emotions.

### Box 5.6 Crying while driving a car

In our ISAC project, we occasionally noticed that respondents reported that they first cried after an emotional event when driving home in their car. Something might have happened at their workplace, but at that time their tears were inhibited, and they were only allowed to flow later on. This fits the idea that tears can be delayed until a more appropriate moment. The American grief specialist Paul Rosenblatt also noticed that people relatively often cry while driving and, being concerned about traffic safety, he devoted a special article to this phenomenon (Rosenblatt, 2004). He also came across several examples of bereaved individuals who reported that they cried often when driving alone in their car. One may wonder whether the monotony of driving—a task that can normally be performed automatically and without any conscious effort—produces a certain state which either facilitates the emergence of painful memories that can normally be repressed by distracting activities, or which lowers the threshold for shedding tears. On familiar roads when the traffic is light and there are no distractions, drivers particularly often let their minds wander. In addition, when alone in a car one has the privacy in which to let down one’s guard, and to feel and think. Furthermore, in a car, music and other kinds of stimulation may play a role. Some examples of quotes by bereaved parents are given below.

*Kathy:* I remember getting into my car every day, crying all the way to work, then getting to work and working, getting in my car and crying all the way back home.

*Steph:* I used to remember driving and looking at beautiful trees and saying “I shouldn’t be looking at these, because [our son] is never going to see them again.”

*Stan:* There have been times when my grieving while driving was set off by a particular song on the car radio.

*Elaine:* That’s a little hard to drive by there. I don’t think you can ever drive by there that you don’t think of that [talking about driving past the place where her son died when the tractor he was driving overturned].



### Box 5.7 The Room of Tears in the Vatican

In the Vatican in Rome there is a room where newly elected popes go to be dressed in white soutane for their first presentation to the world. This place is called the “Room of Tears,” referring to the fact that many a newly elected pope, having entered the room, subsequently broke down in tears. The mixture of positive and negative emotions that they experienced when they became aware of the responsibility that they held and the enormous burden they had just taken on as holder of such a monumental office—being the representative of God on earth for many—resulted in a state of uncertainty and doubt about their ability to do justice to such a task.

With regard to the specific context, we found that in nearly 75% of the crying episodes the crying response occurred immediately after the situation that had precipitated it (i.e. the interval was less than 15 minutes). However, in about 10% of the cases the tear-eliciting event had occurred more than one day previously, which raises the question of why it took so long before the tears started. A closer look at the context may help us to understand which factors facilitate or inhibit crying. The focus here will be on time, place, and who is present. Box 5.7 provides a brief description of the “Room of Tears” in the Vatican, where many newly elected popes reportedly allow their tears to flow abundantly.

### Further aspects of the eliciting situation

In our international crying study (ISAC) we included several questions designed to enable us to learn more about the situation that made the respondent cry, such as “Who was considered responsible?” and “Was the situation expected?” This yielded the following information.

Most often, crying individuals considered themselves to be responsible for the situation, but their partner, family, or relatives were also frequently blamed. The crying-inducing situations and the crying itself generally did not occur out of the blue—they were often anticipated. In only 11% of the cases did the tears come as a complete surprise. In addition, consistent with what we concluded about the central role of helplessness, most respondents reportedly felt powerless and unable to cope with the situation. These findings once again emphasize that crying often implies the lack of an adequate response for dealing with the situation.

However, this additional information still does not explain why individuals who seemingly experience similar emotions may nevertheless differ in their crying. Nor does it explain why the same individual may shed tears in one situation, but not in another setting. Is crying more likely to occur at one particular time than another and in one specific environment or context than another?

One relevant factor may be whether the individual feels that crying is appropriate. In every culture people have their own ideas about whether or not it is acceptable to cry in a given situation. Research in the UK by Fox (2004) revealed that the most acceptable reasons for crying were as follows:

- ◆ the death of a person to whom one was close
- ◆ a birth
- ◆ the break-up of a relationship

- ◆ physical pain
- ◆ sad or happy moments in films.

In a representative sample from the Netherlands, I found that men and women agreed that sadness, happiness, physical pain, and being rejected were valid reasons for shedding tears. Self-pity, in contrast, was definitely not considered to be a justifiable reason for weeping. However, this is not the whole story. Analysis of the situational context also yields some interesting results.

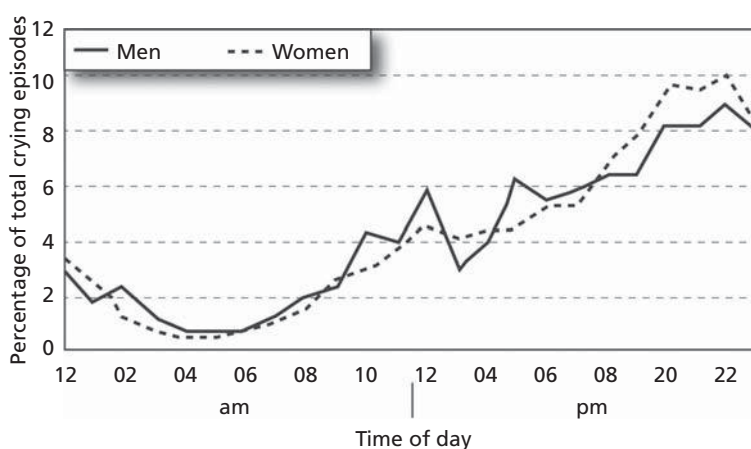
## The situational context of crying

### The time for tears

The American comedian and writer Robert Orben claims that the best time to make people laugh is during the evening hours. It was his experience that the likelihood of getting a laugh increases as the day progresses. Does this also hold true for crying? As described in Chapter 4, babies do indeed have a preference for crying in the evening hours, but do adults have a similar preference?

William Frey recorded when people cried, and found a dramatic increase in the frequency of female crying between 07.00 and 10.00 pm, whereas no significant variations were detected between 09.00 am and 7.00 pm (Frey, 1985). In three studies involving nearly 10 000 observations, we also established a clear diurnal rhythm for adult crying (Vingerhoets, unpublished data). As can be seen in Figure 5.1, between 04.00 am and 10.00 or 11.00 pm there is a gradual increase in crying. This is true for both men and women, and for crying in general and also specifically for crying in response to music. The obvious next question is, of course, how we can explain this variation over the course of the day. Why is the evening the best time for shedding tears?

There are several possible explanations, which are not mutually exclusive. In terms of exposure, there is first of all an increased opportunity for conflict with one's partner and children, due to the fact that this is the time when the family is most likely to be together. In addition, it



**Fig 5.1** Graph showing crying frequency according to time of day in men and women, based on the analysis of over 10 000 crying episodes. Human adults cry most frequently in the evening. Both men and women have a similar daily rhythm. From 04.00 am until 10.00 or 11.00 pm there is a gradual increase in crying frequency.

is the commonest time for watching television or sad movies, or for listening to music, all of which are important stimuli for crying. Finally, in relation to the discussion on delayed crying, talking with a partner or close family member about something that happened during the day (e.g. a conflict at work) may easily reactivate emotions and tears. In a similar manner to what we observe in children, who may inhibit their crying until they see their mother or father, adults may also withhold their tears until they are in the company of an attachment figure, most commonly their partner. Another factor that may play a role is that after a hard day's work we may feel tired, which lowers the crying threshold. The latter may also be lowered because we feel safe at home, either alone or with people to whom we are close, with no strangers present. Finally, the possibility cannot be excluded that, in some form or other, we still have the circadian crying rhythm that we are born with.

### The presence of others

The presence of others is another factor that can either inhibit or facilitate the shedding of emotional tears. We have established that, in the majority of cases (75%), people cry at home, with either no one (37%) or just one person (29%) present (Vingerhoets, unpublished data). Men are most likely to cry in front of their wife or partner (73%), then a female friend (50%) or their mother (47%), but are much less likely to cry in front of a close male friend (29%) (comparable results have been reported by Fox, 2004) (see also Lombardo et al., 2001). Women are also most likely to cry in front of their husband or partner. When people cry "alone", it is not clear how alone they really are. Anecdotal evidence suggests that they may have their pets with them, or they may have diaries or letters from attachment figures, or remember them or imagine that they are with them again. God may also occasionally be regarded as a symbolic attachment figure.

Although in the majority of cases the respondents did not try to hide their tears, they rarely shed tears in the presence of strangers. Thus, in general, people are more likely to cry when they are alone or with individuals to whom they are close than when they are in the company of strangers. This may be because they fear that their tears may be perceived as a sign of self-indulgence, weakness, or manipulation. For male adolescents, crying is one of the most likely acts to induce shame. The shedding of tears may also be inhibited because one does not want to upset others or make them lose control. For example, parents may not want their children to see them cry, because they are aware that their crying may cause them severe distress (Fox, 2004).

On the other hand, the presence of one's partner may facilitate crying, which may seem reasonable if crying is considered to be an attachment behavior (Nelson, 2005). Children cry more when they are with their parents than when in company of peers (Zeman and Shipman, 1996). Similarly, students who have a partner cry more often than those who are single (see Chapter 9). Cardiac and cancer patients also shed more tears if they have a partner. Even more surprising is the finding that individuals who feel lonely, although they report more distress, cry less than individuals who do not feel lonely.

Also relevant in this respect is the observation that crying can be rather contagious. Seeing other people cry may make the beholder cry, too, as may happen during funerals, when listening to music, or in other public situations (Hatfield et al, 1994; see also Chapter 7). Women in particular are sensitive to this form of emotional contagion. In contrast, many men report that they save their tears of grief for private settings rather than public ones.

In conclusion, little is known about the precise influence of the social context on crying, despite the obvious power of other people to affect one's emotional experience and expression. The time of day may also be important, although this may in fact be related to factors such as

fatigue, exposure to emotional stimuli, and the presence of individuals to whom one is close, or the absence of strangers.

It is clear that the presence of people to whom one is close may stimulate tears, whereas the presence of strangers generally decreases the likelihood of crying, unless they happen to be people who need to be manipulated, such as supervisors, judges, or a jury in a trial (see also Chapter 7). Thus the presence of others may either stimulate or inhibit crying, depending on the relationship with them, and especially on their anticipated reaction.

## Conclusion

Study of the evoking conditions and the social context of crying episodes has revealed some important aspects of crying. First, it appears that although situations such as the death of individuals to whom one was close, relationship breakdown, weddings, homesickness, and physical pain all have great potential to induce tears, they are hardly relevant as crying-inducing events, due to their rather infrequent occurrence. In contrast, more everyday situations such as interpersonal conflict, feeling rejected, experiences of personal inadequacy, listening to music, and watching emotional films appear to be quantitatively far more important in eliciting tears. Thus it is not severe states such as grief, heartbreak, and homesickness, but rather more mild states, such as sadness, joy, anger, frustration, self-pity, and in particular helplessness and powerlessness that are the most frequently reported emotions associated with adult crying. The role of fiction and symbolic stimuli should certainly not be underestimated. Music, films, novels, and poems have a strong power to elicit tears in adults.

However, in order to gain a full understanding of the functions of crying, merely knowing what kinds of situations elicit crying is not sufficient. It is, of course, also important to know what the consequences of crying are. What does crying do for the individual who is shedding tears? And what are the effects of crying on others? How will they react? These issues will receive more attention in the next two chapters.

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## Chapter 6

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# The intra-individual effects of crying

... what did the onion juice do? It did what the world and the sorrows of the world could not do: it brought forth a round, human tear. It made them cry. At last they were able to cry again. To cry properly, without restraint, to cry like mad. The tears flowed and washed everything away. The rain came. The dew. Oskar has a vision of floodgates opening. Of dams bursting in the spring floods ...

(Gunter Grass, 1959/1961)

In what ways are tears helpful for a crying adult? In the previous chapters, where the emphasis was on the phylogenetic and ontogenetic aspects of crying, the focus was mainly on the importance of (acoustical) crying for infants. Crying and tears, certainly for helpless children, seem to be designed specifically to serve *interpersonal* functions—to (re-)establish the bond with (significant) others. But what about the effects of crying on the crying individual? What is the precise impact of crying and tears on the person who sheds them? How does crying affect the adult crier? Does the mere act of crying have any effects on how or what the crier feels, thinks, or does?

Folk psychology and the popular media leave us in little doubt about the matter (Cornelius, 1986). Having a good cry does wonders! It brings relief, facilitates recovery, and it is even healthy! It seems as if, in the popular media, much more attention is given to the effects of tears on the crying individual him- or herself than to their effects on others. Does this bias reflect current knowledge about tears? What kinds of effects have been found in research?

The shedding of tears is a form of emotional expression and, as such, it also feeds back to the crying individual. Does the awareness of tears have an influence on us? If so, does it affect not only how we feel when we are crying, but also how we feel afterwards? Does it influence the way that we appraise the situation? Does it make us more stress-resistant and does it help us to cope better with stressful situations? Can tears be regarded as messengers of our subconscious, or maybe even of our conscience, that bring to our attention the fact that there is something going on that is really important? Or do they just have a very negative effect on our self-esteem?

## Box 6.1 Why do we like watching sad movies?

According to the *hedonistic premise*, people are motivated to seek pleasure and to avoid pain. If this is the case, why do people like to watch sad movies or listen to sad music? Consider the following research findings, which were obtained in three relevant studies (De Wied et al., 1995; Oliver, 1993; Schramm and Wirth, 2010).

A paradoxical relationship was found between the intensity of empathic distress during film watching and the degree of enjoyment reported afterwards. In particular, high empathizers and women experienced more empathic distress during the film, and afterwards indicated that they enjoyed the film as a whole more, compared with low empathizers and men. Thus those who experienced greater hedonic lows while watching tragic situations reported greater hedonic highs after the resolution of tragic drama.

Why does this happen? One possible reason is that people want to compare themselves with those who are worse off, and as a consequence feel better. Others argue that perhaps what we call negative emotions are not, by definition, aversive. Perhaps we can enjoy sadness or fear if these feelings are not connected to real negative and aversive situations, in which case we experience them more as bodily arousal than as specific negative feelings. Still another explanation is that it might be reinforcing for us to experience empathy—for example, because it makes us aware that we are really human and are able to form social bonds. Catharsis is another proposed mechanism, whereby individuals re-experience their own sadness in a safe context that helps them to overcome it. Finally, people may feel that watching such films may teach them how to cope with adverse situations, or that such movies cause them to reflect on what is important and meaningful in human life. These are some interesting hypotheses that await evaluation.

What do we experience when we are watching an emotional movie or listening to a song, and suddenly tears rise up in our eyes? How do the tears affect us? In this chapter I shall address these issues and review the insights that research has yielded with regard to these questions (see also Box 6.1).

## Sentimental tears

As explained in the previous chapter, I use the term “sentimental tears” to refer in particular to those tears that well up quite unexpectedly, especially when one is watching or witnessing “positive” events, which are often the counterparts of the well-known negative situations that evoke tears. In addition, I would like to consider empathic tears as such—in other words, tears that are not shed because of self-involvement, but rather because of the suffering of others.

In Chapter 5, I discussed the typical themes that evoke these sentimental tears, namely belonging, harmony, reunion, justice, self-sacrifice, empathy and compassion, altruism, and awe. These are predominantly themes connected with prosocial behavior and morality. They all concern really major issues for humanity, and they also represent the building blocks of human society that have been instrumental in the evolution of mankind to an ultra-social species.

As outlined by, among others, the primatologist Frans de Waal (2008), processes such as imitation, empathy, prosocial motives, collaboration, and morality have all played a major role in the unique evolution of humans. There is currently increasing evidence that morality is not “pure reason,” as was the dominant view for a long time, but rather that it is neurobiologically



anchored in our brain, and can best be described as a “gut feeling” (Hauser, 2006). It is tempting to speculate that sentimental tears have also co-evolved during this development, or perhaps have even contributed significantly to this process.

Until now there has been hardly any systematic research addressing the effects of sentimental tears on the person who is crying. It has been demonstrated (see Box 6.2) that individuals who experienced more empathic distress when watching a sad movie subsequently reported having

### Box 6.2 Crying and relief: a persistent myth

The belief that crying has positive effects on our well-being is of ancient origin, and has been a recurring theme throughout the ages.

Some examples of advocates of this idea. More than 2000 years ago, Aristotle asserted that crying at a drama “cleanses the mind” of suppressed emotions by a process called catharsis, which involves the reduction of distress by releasing the emotions. According to the then prevailing “four humors theory,” this positive effect resulted from the removal of bad humors from the brain by, among other processes, the shedding of tears.

The Roman poet Ovid also addressed all kinds of beneficial effects of crying. He seemed to be aware of the two possible main functions of tears, namely the effects on others and the effects on the crying individual him- or herself. For example, Ovid advised young lovers to use tears for the purposes of seduction, and he further suggested to women who had difficulty in shedding tears that they should learn to fake tears. Ovid also believed that crying was beneficial for the crier, as evidenced by his statement that “It is some relief to weep; grief is satisfied and carried off by tears.”

St Augustine, in the fourth century, also paid considerable attention to crying. In his opus magnum, the *Summa Theologica*, he addressed the question of whether crying brings relief and reduces suffering. His conclusion was that tears assuage suffering because they provide pleasure. He suggested that this was achieved by two processes. First, when the soul’s intention can escape and disperse, inward sorrow is lessened, and, secondly, there is the more general principle that every action that fits the situation will automatically provide pleasure.

Over time, several explanations have been formulated to explain why crying is beneficial. For example, sighs were expected to drive out the soot that had been accumulated around the seat of the heart by the sorrow. According to another explanation, the serum that had accumulated, because it had been heated in the blood by the increased compression, was believed to be evacuated via the eyes, resulting in the body becoming lighter and more full of breath. Consequently, the parts of the body that had been compressed by sorrow were able to regain their former state of balance.

The sixteenth-century Italian anatomist Julius Casserius also held this view. He suggested that when the body, which has first been compressed and almost suffocated by the sadness, subsequently relaxes, this results in the greatest pleasure. He made a comparison with the elimination of feces and urination, which also bring great joy and relief when the urgency is great.

Other scholars suggested that when we are very sad, every movement of the body acts as a distraction. Since weeping is also a movement of the body, namely the secretion of “humor,” this explains why we like to indulge in it.

A contemporary and compatriot of Casserius, Lorenzo Giacomini, presented in his major work *On Purgation in Tragedy* probably the most thorough classical attempt to find a psychological explanation for pleasure due to “catharsis.” He emphasized the importance of the interaction of body and mind, explaining pleasure in terms of the relief from “perturbation.” In his view, negative emotions are exhausted and can be discharged in lamentations and tears. In addition, “whence to the afflicted there is a certain delight from lamenting, secretly discharging by means of tears that which grieves them.” This is done by drawing off excessive vapors from the mind, and thus lightening its burdens.

In the seventeenth-century work, *Tableau des Passions Humains*, by Nicolas Coeffeteau, tears are also regarded as helpful for dissipating sadness. This comforting effect of tears was attributed primarily to the fact that they provide an outlet for pernicious feelings. Moreover, a close correspondence between one’s inner state and one’s overt actions by definition produces a positive feeling in humans, which implies that, for a miserable person, nothing is more appropriate than weeping, which thus induces a happy feeling.

The notion that crying brings relief is therefore rather old and has been very persistent over time. However, the explanations for this effect have varied considerably over time.

enjoyed the film more than those who did not feel empathic distress (De Wied et al., 1995). In addition, it has been shown that films which induce such reactions also stimulate generosity (Barraza and Zak, 2009). A final intriguing recent research finding is that watching a sentimental movie—compared with a comedy—not only stimulated lactation in new mothers, but also resulted in more hugging and caregiving behaviors (Silvers and Haidt, 2008). Such findings suggest that increased oxytocin levels (and possibly the associated increase in production of tears) might play a role and link sentimental tears to morality and prosocial behavior. Remarkably, as early as classical times the belief prevailed that good or virtuous men in particular cry easily (see also Chapter 13). In the near future, our understanding of and insights into these intriguing relationships are likely to increase.

Recent research suggests that such relationships are not necessarily limited to sentimental crying. A study among American college football players revealed that those who think it is appropriate to cry after having lost an important game have higher self-esteem than their “tougher” counterparts who control their tears (Wong et al., 2011).

However, the current emphasis is predominantly on crying in relation to distress and negative emotions. What about the effects of such “negative” tears? Do they indeed bring relief? If so, why is this? And what are the possible underlying mechanisms?

## Crying and coping

If we consider crying as a mechanism for coping with stress, it becomes clear how fascinating and well designed a behavior it is. Stress theory (Lazarus, 1993) makes a distinction between two global methods of coping with stress, namely emotion-focussed coping and problem-focussed coping. Emotion-focussed coping refers to all efforts to regulate the emotions induced by exposure to the stressful event (e.g. physical exercise, use of drugs or alcohol, relaxing activities, etc.), whereas problem-focussed coping includes all cognitive and behavioral efforts to neutralize or eliminate the stressor (e.g. seeking advice, removing the source of stress, applying a

different appraisal, etc). Assuming that crying indeed unites problem-focussed coping mechanisms (e.g. manipulation, reducing aggression) and emotion-focussed coping functions (e.g. self-soothing, bringing relief), it seems to be the ideal stress reaction. How could it further contribute to dealing with stressors more effectively?

Maarten Wubben and I have developed an admittedly highly speculative model of how crying might affect our functioning (Wubben and Vingerhoets, 2008). Given that humans cry particularly in response to physical and emotional pain, which to a great extent share the same brain structures (see Chapter 3), we wondered how crying could influence such pain experiences.

In the physical pain literature (Rollman, 1979) a distinction is made between the concepts of *pain threshold* and *pain tolerance*. We propose a similar model for emotional pain, defining the term *emotional pain threshold* as the minimum required intensity for a stimulus to induce emotional pain, and *emotional pain tolerance* as the maximum intensity of a negative emotion at which normal conscious deliberation is still possible. Beyond this limit, emotional pain can no longer fulfill its normal signal function, as its intensity is too high to allow adequate conscious processing and interpretation (e.g. distress that is experienced as uncontrollable, blind panic).

People are unlikely to be overwhelmed by the negative emotional consequences of daily hassles, so their self-concept and daily functioning remain relatively unaffected. To prevent emotional pain from exceeding one's tolerance level after exposure to relatively mild stressors, people normally use various cognitive defense mechanisms, ranging from reappraisal to self-deception and denial. However, if a dramatic event occurs, such as the death of someone close to them, their normal cognitive defense mechanisms may fail to prevent their emotional pain from exceeding their tolerance limits. We therefore postulated that crying in some way assists the coping response to such events by temporarily increasing the emotional pain tolerance limit, allowing the experienced emotions to fulfill their signal function and be fully interpreted. It is not yet clear how this is done and what the underlying mechanisms are, but we can speculate about the involvement of opioids, which have a dampening effect on both physical and emotional pain. Also, the stress- and anxiety-reducing effects of oxytocin fit within this model, which raises the intriguing possibility that there is a recursive relationship between crying and the release of oxytocin. This would imply not only that the perception of crying stimulates the release of oxytocin, but also that this release in turn lowers the threshold for becoming tearful.

The attractiveness of this model is that it explains the possible intrapersonal adaptive effects of crying and, by bringing together physical and emotional pain, it provides a relatively simple and parsimonious explanation for a complex phenomenon. The obvious test (i.e. examination of whether the effects of crying increase emotional and physical pain tolerance) has not yet been undertaken in a methodologically sound way. A major problem is the precise definition of crying and the amount of tears that must be shed in order to obtain this effect. Are merely moist eyes sufficient to induce these positive effects? Is there a dose–response relationship, so that the greater the number of tears that are shed, the greater the effect on the pain threshold? Or is it important not only that tears are shed, but also that one sobs or wails? In other words, is a certain intensity or specific way of crying required? If this is important, ethical issues will present a major problem for research. Is it possible to induce intense crying in the laboratory in an ethically acceptable way? Here we have another example of some of the major problems that are encountered by crying researchers—the possibilities for making volunteers cry in an ethically acceptable way in an experimental setting are rather limited.

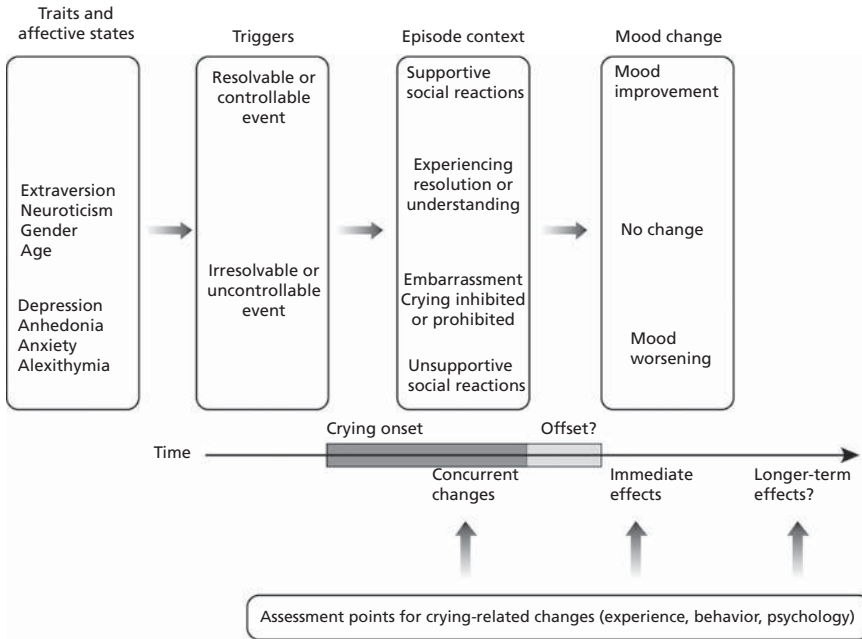
## Crying and catharsis

What do we know about the effects of crying on mood? As already mentioned, western folk psychology leaves little doubt about the positive effects of crying on one's well-being. In the above-mentioned analysis (Cornelius, 1986) covering 140 years of popular articles about crying, as many as 94% of the identified articles depicted crying as beneficial, and warned readers that suppressing tears could be deleterious to both mind and body. This idea is widespread among laypeople. The average survey respondent confirms that crying generally improves mood and brings relief. In our ISAC study, which included respondents from 37 countries, there was a high degree of consensus (over 70%) that crying generally helps us to feel better. Psychotherapists and counsellors from nearly every tradition or background (with behavioral therapists probably being a notable exception) also regard crying during the process of therapy as constructive rather than destructive ('t Lam, 2011). In one study, over 70% of them reported actively encouraging client crying (Trezza et al., 1988). According to therapists, patients who cried during therapeutic sessions while addressing topics of great emotional importance to them often spontaneously told the therapist how much better they felt, or commented in a subsequent session that they had been upset at the time when they were crying, but felt much better afterwards.

Does this positive effect of crying also explain why people are even willing to pay to cry? "Tear-jerker" movies attract millions of people and gross millions of dollars worldwide every year. Many people attend movies, music performances, and plays that they know beforehand will make them cry. Books, films, and TV series that evoke strong emotions—not just sadness and compassion, but also tender feelings—currently enjoy great popularity. In some way, crying in response to such symbolic stimuli seems to be a very positive and enjoyable experience. A most impressive illustration of this is the "crying bar," a new phenomenon in Japan, which has a culture that we associate with great restraint and emotional inhibition. Middle-aged women, teenagers, and even stressed businessmen rent a private room in which to watch emotional movies. In addition, there are special clubs where people come together to watch tear-jerker movies and to share their feelings afterwards. Can the popularity of these phenomena, as well as of tear-inducing novels and TV shows, in Japan be explained by the relief and/or new outlook on life that crying is supposed to cause?

Some formal psychological and psychiatric theories about crying also affirm the idea that this behavior is beneficial. However, the explanations and putative mechanisms involved vary considerably. According to psychodynamic theories, crying prevents the build-up of emotional energy, which, when blocked, may result in psychological and physiological tension, with possibly damaging effects on one's health (Kottler, 1996). On the other hand, a very popular biochemical theory (Frey, 1985) views tears as a means of ridding the body of harmful toxins. Very different mechanisms are involved, but the final result is the same—the crying individual experiences subjective relief. It is not surprising that crying has been described as Mother Nature's way of preventing our bodily system from becoming too aroused and agitated. This all suggests that we probably do not cry because we are emotionally upset, but rather because we are attempting to cope with and recover from being upset.

What can the findings of scientific research tell us? In the past few decades, several studies have been conducted in which self-reported mood changes after crying were analyzed (Cornelius, 1997, 2001; Rottenberg et al., 2008a). However, the results of these studies failed to yield a clear and consistent picture. Although several studies reported considerable mood benefits, others failed to demonstrate positive effects on well-being. How can we make sense of these apparently conflicting findings? My American colleagues, Jon Rottenberg and Lauren Bylsma, and I



**Fig 6.1** Model summarizing the role of person and context factors as determinants of how individuals feel after having cried. Reproduced from Rottenberg, J., Bylsma, L M., and Vingerhoets, A.J.J.M. Is crying beneficial? *Current Directions in Psychological Science*, 17, 400–4. © 2008 Sage Publications. Reprinted by permission of Sage Publications.

have developed a theoretical framework that may help to provide a better understanding of the psychological consequences of crying in adulthood, and to explain these paradoxical findings (Rottenberg et al., 2008a).

The results of our analysis are shown schematically in Figure 6.1. This model explains the discrepancies in the findings of different studies on the basis of the following:

- ◆ how, where, and when the effects of crying were measured
- ◆ the crier’s personality features and his or her specific affective state
- ◆ the nature of the specific situation that elicits the crying
- ◆ the response of the crier’s social environment to the tears.

In other words, rather than questioning whether crying has a positive effect on one’s well-being, we feel that it is better to ask *for whom and under what conditions crying is likely to be beneficial*. Rephrasing the question in this way is more likely to do justice to the fact that the psychological consequences of crying behavior are more heterogeneous, and more context- and person-dependent, than is generally assumed.

Our model reveals that there are several recurring features that make it possible to predict who, and under what conditions, will benefit from this behavioral response, and for whom and under what conditions tears are less likely to have any positive effects. What first became clearly apparent to us related to the remarkable, but consistent, differences in findings, depending on the characteristics of the study and the methodology that was applied. More precisely, when people are asked how they generally feel after crying, the great majority (70–80%) report that

crying has positive effects. In retrospective studies, in which respondents are asked to report on their most recent crying episode, psychological benefits (e.g. release of tension, feelings of relief) are reported for approximately 50–70% of the crying episodes. In diary studies, in which the respondents described crying episodes that had occurred on the same day, the percentage of participants who reported feelings of relief ranged from 30% to 50%. Finally, when crying was induced in a laboratory setting (e.g. by showing participants a clip from a sad film, or by asking bereaved individuals to think about their deceased partner), the participants almost without exception reported that they experienced no mood improvement after their crying episode. In fact the individuals who cried when watching a sad movie or when thinking about their deceased partner in a research setting reported feeling more sad and distressed than the participants who did not shed tears. In addition, criers are physiologically more activated than non-criers (e.g. as evidenced by a faster heart rate). In other words, laboratory studies consistently demonstrated that crying *increased* distress and physiological arousal, whereas a considerable majority of surveys reported mood improvement. How can these paradoxical findings be reconciled?

These seemingly contradictory findings raise the question of how specifically these studies differ from each other, and what the distinctive determining factors responsible for the answers of the participants may be. The first issue is that of timing. The different kinds of studies vary with regard to *when* the effects of crying are measured. When a researcher asks “Did you feel better after your most recent crying episode?”, it is not specified when exactly after the crying episode they are referring to. The respondents have the freedom to decide for themselves whether “after your most recent crying episode” means 10 minutes after the episode or 2 hours after it. In contrast, in laboratory studies the assessment of mood generally takes place after a fixed interval, fairly soon after the crying episode. If one supposes that people typically first experience a dip in their mood in the first 15–30 minutes after their crying episode, but that this dip is consistently followed by an improvement in mood, the apparently conflicting findings can be explained. Thus it might be possible that in the laboratory studies the time interval between the crying and the mood reports is simply too short, and that different results would be obtained if the post-crying measurements were delayed for some time, or that a certain pattern would become visible if repeated measures were taken at regular intervals for a longer period of time after a crying episode.

However, there might be a very different explanation for the conflicting findings. For example, generally speaking, the *social context* of the crying and the specific eliciting factors varies considerably. More specifically, laboratory settings are typically devoid of social support (e.g. research participants are watching a movie in isolation), whereas in real life very often another person is present, who may react to the crying with sympathy and understanding. In other words, the fact that crying is frequently effective in eliciting emotional support may also account for the discrepancies in the effects of naturalistic and laboratory studies. The comfort and succor that are often forthcoming in the aftermath of a real-life crying episode may, among other things, explain why criers report feeling better after crying at home, but not in the controlled environment of a laboratory. Conversely, those who are exposed to another person’s crying may feel worse in a real-life situation than in a laboratory setting, because of the demand placed on them to act to alleviate another person’s distress.

There is yet another explanation. Film scenes, by definition, concern situations that one cannot remedy. Therefore the study participant is always helpless, because they have no control over the film situation, whereas in real life crying may have an impact on the course of events. Furthermore, films or film clips that are used to induce crying are generally specifically selected because they induce sadness. However, in real life, although sadness is certainly important,

there is wide variation in the nature of the emotions and feelings that accompany crying (see Chapter 5). Real-life situations include conflicts, losses, and failures, as well positive events. In addition, one might assume that crying in a laboratory in response to a movie is, on average, less intense than crying in response to a real-life situation.

A laboratory setting also often implies that one is being recorded on video or watched by strangers—conditions that may easily evoke negative social feelings, such as embarrassment, which might nullify any possible crying-related benefits. However, since in the retrospective studies a considerable minority of the participants did not report having experienced a positive benefit in terms of mood, the specific characteristics of laboratory studies cannot be the whole story.

It is a well-known fact that retrospective self-reports can be rather unreliable and subject to bias, and that respondents tend to report *what they believe should have happened* and how they should have felt, rather than how they did in fact feel. This effect might be stronger if one does not remember one's real feeling very well. In other words, because we learn from the popular media that crying brings relief, we may be more likely to report that our most recent crying episode did indeed improve our mood. Thus the very nature of the research method might well be responsible for the conflicting findings—the more specific and well described the situation is, the less mood improvement is reported.

In an attempt to obtain more insight into which situations and what kind of people predominantly report mood improvement, we analyzed approximately 3000 detailed reports of crying episodes (and over 1000 additional crying episodes for which respondents described several details of the social context and the experienced effects of crying) (Bylsma et al., 2008, 2011). In yet another study, the focus was on the characteristics of the crying individual (Rottenberg et al., 2008b). This was helpful in identifying factors that could predict the post-crying state. More precisely, we found that there are certain personal factors that facilitate or prevent mood improvement after crying, which implies that individuals with specific personality or clinical characteristics may benefit more or less from crying than others. For example, alexithymia, which is characterized by difficulties in experiencing, understanding, and expressing emotions, was associated both with fewer crying episodes and with a lack of mood benefits from crying. Individuals with alexithymic features are therefore more likely to report worsened mood after crying. Depressed patients are another group who show no mood improvement after crying. Others who describe little or no mood improvement after crying include highly anxious individuals and those with anhedonia (a reported inability to experience pleasure, frequently observed in depression). Finally, there is some evidence that attachment style (i.e. the way that we relate to others in the context of intimate relationships) also shows some consistent relationships with crying and its possible benefits. Supposedly securely attached individuals, who are characterized by high self-esteem and a high degree of confidence in others, are more likely to report mood improvement than individuals with insecure attachment styles.

In real life, the specific nature of the eliciting situation also plays a part. Mood improvement is more often experienced when the tears have been evoked either by a positive situation or when experiencing personal inadequacy. In the case of positive situations, tears seem to reinforce the experience of positive emotions, and the same is true when an individual is painfully confronted with their own limitations. In other situations, such as loss (a typical situation of helplessness) or conflict, mood improvement is less likely to occur. When the eliciting events of a crying episode have been resolved or neutralized, mood benefits are more likely to occur than when the triggering events are left unresolved.

The perceived emotional support during the crying episode is also linked to the reported mood benefits. More precisely, the presence of another individual and the way that they reacted to the

tears emerged as an important determinant of self-reported mood improvement. The presence of just one other person seemed to facilitate positive effects. In the great majority of cases, this was a partner, family member, or close friend, who often responded with understanding and comforting behavior. Finally, those who experience negative social emotions when crying, such as shame and embarrassment, are less likely to report mood benefits from crying.

In conclusion, there is little support for the notion that crying, by definition, brings relief and improves mood. Rather, the effects of crying are heterogeneous, but there may be some systematic patterns in the relationships. More precisely, beneficial effects of crying are more likely to be expected:

- ◆ in naturalistic settings than in laboratory settings
- ◆ when the crying individual is not suffering from depression, anxiety, or other psychological problems
- ◆ when the tear-eliciting situation is a positive event or a resolvable problem
- ◆ in the presence of not too many familiar people, and preferably just one individual, who will react by offering emotional support.

Unfortunately, a major limitation of this model is that it still fails to answer satisfactorily the basic question of whether the mere act of crying brings relief. There are two more theoretical possibilities:

- ◆ Crying itself normally brings relief, but a negative context may prevent the experience of this relief.
- ◆ Crying itself does not normally bring relief, and the experience of an improvement in mood is always the result of positive contextual factors and/or expectancy biases.

In order to shed more light on this question, it is helpful to have insight into possible physiological mechanisms whereby crying could conceivably result in mood improvement.

## Why could crying bring relief?

Assuming that, in normal circumstances, crying brings relief, the next logical question concerns the possible underlying mechanisms involved. What happens in the brain or the rest of the body when we are crying that may induce a state of relief and relaxation? At present a very popular idea is that tears help to remove stress hormones and other toxic substances that may have an adverse effect on one's mood (Frey, 1985). This would explain why people often feel refreshed after having "a good cry." This is known as the blood clearance hypothesis, according to which emotional tears help to clear and purify the blood. One of the earliest advocates of this theory was the sixteenth-century Italian anatomist Julius Casserius, who suggested that tears work like a purgative, draining off and purifying the entire organism. In the early 1970s, it was the Spanish physician Nicolas Retana who re-introduced this idea by pointing out that tears contain several toxic substances, resulting from emotional tensions, which need to be drained off (see Murube, 2009). The production of tears was thus considered to be a natural and healthy method of detoxification. However, William Frey is responsible for the wide popularity of this idea (Frey, 1985). In the popular media, mere speculation has been transformed into facts. There is little empirical support for the idea that tears actually drain off toxic substances. Tears do indeed contain stress hormones, but so do other body fluids, such as saliva and urine, the production of which has never been associated with mood improvement. Moreover, chopping onions when one feels distressed, although it results in increased tear production, has never been reported to have a positive effect on one's mood.



I am only aware of two studies that have addressed this issue. Together with the German psychoneuroendocrinologist Clemens Kirschbaum, I measured mood and salivary cortisol levels in women before and after they had watched an emotional movie (Vingerhoets and Kirschbaum, 1997). There were moderate associations between self-reported crying intensity and a decrease in levels of the stress hormone cortisol. In other words, the more the women had cried, the greater was the reduction in salivary cortisol levels. This finding seems to fit Frey's ideas nicely. However, an animal study on the reactions of juvenile monkeys to separation from their mothers also revealed a negative association between their plasma cortisol levels and "crying"—the more distress calls the offspring produced, the lower their cortisol levels were (Bayart et al., 1990). However, the main problem with this latter result is that these animals do not shed tears, so the observed decrease in cortisol levels cannot be attributed to the removal of cortisol by tears. Therefore other mechanisms must be involved.

As I discussed in Chapter 3, crying is associated with several bodily changes. In addition to the shedding of tears and the appearance of specific facial expressions, the parasympathetic nervous system is activated, and there is a possible connection with the release of endogenous opioids and substances such as oxytocin. Are these physiological mechanisms responsible for the observed effects on cortisol levels?

I postulate that crying stimulates the release of oxytocin (and maybe also prolactin), not only directly in response to the act of crying (as is the case in lactating women), but also indirectly in response to possible physical comforting behaviors. The latter notion has received ample empirical support. Physical contact, such as massage, petting, and hugging, stimulates the release of this hormone, which is known to dampen the biological stress response, in particular the production of cortisol, and to facilitate feelings of calmness and relaxation (Heinrichs and Domes, 2008). Since there is also some evidence that sadness is associated with relatively low oxytocin levels (Turner et al., 1999), this raises the intriguing question of whether such a bodily imbalance may stimulate behaviors (such as crying) that are helpful in re-establishing homeostasis, and, more specifically, which increase the levels of this hormone. Interestingly, Huron (2011) has recently suggested a very similar role for prolactin.

In Chapter 2, I briefly mentioned the results of animal studies which demonstrate that the release of endogenous opioids may be stimulated by certain stereotypical behaviors. This is sufficient reason for speculating as to whether crying (or perhaps, in particular, "rhythmic" sobbing) might also stimulate the production of these substances with their well-known soothing effects.

However, there are also some alternative mechanisms that might be involved, such as the parasympathetic nervous system. Could crying perhaps stimulate the parasympathetic nervous system to help the unbalanced autonomic nervous system to return to "normal baseline functioning"? As outlined in Chapter 3, the activity of the parasympathetic nervous system has traditionally been associated with relaxation and recovery. I have pointed out that scientists have more recently become aware that sadness and other negative states in which passivity prevails, such as helplessness and despair, are also linked with increased activity of the parasympathetic nervous system. If crying does indeed stimulate activity of this parasympathetic nervous system, it could be regarded as a kind of self-calming mechanism, which is activated when the situation is experienced as helpless and hopeless (Benson, 1982). From this perspective, a link between crying and the activation of this system is not implausible. There is also some empirical support for this idea.

A study that measured the cardiovascular reactions of depressed patients and healthy controls to a sad movie showed that healthy individuals who had cried during the film were in

a physiologically more relaxed state than those who had not cried (Rottenberg et al., 2003). However, in the depressed patients no such difference between criers and non-criers was observed. Physiological relaxation was measured on the basis of coherence between heart rate and respiration, reflecting parasympathetic activation. This finding thus supports the idea that crying stimulates the parasympathetic nervous system in healthy individuals, but not in depressed patients. Note that this finding confirms the observations among depressed patients, who generally do not report relief or mood improvement after crying.

So far we have discussed the possible role of oxytocin, prolactin, opioids, and the parasympathetic system, but other factors may also be involved. According to the vascular theory of emotional efference (Zajonc et al., 1989), the specific facial muscle activity associated with emotional expressions helps to compensate for the changes in cerebral blood supply that are linked to affective disturbances. According to this theory, this mechanism maintains stability in the blood circulation, which is important for cerebral thermoregulation and mood. In particular, nasal inhalation of cool air (resulting in the cooling of the brain) is experienced as pleasurable, whereas inhalation of warm air is experienced as aversive. This is because even minimal changes in cerebral temperature influence the activity of emotion-linked neurotransmitters (Van Boxtel, 1997). Thus, according to this theory, sobbing—rather than tears—might perhaps be responsible for the improvement in mood. This hypothesis has yet to be critically evaluated.

There is also a completely opposing theory. This is the facial feedback hypothesis, according to which facial expressions *facilitate* the experience of negative mood, rather than dampening it. This idea has its origin both in the work of Darwin (1872), who claimed that expression intensifies emotion, whereas suppression softens it, and in that of the American psychologist and philosopher William James (1884), who asserted that it is the mere perception of physiological changes that causes the emotional experience. More specifically, in the case of crying, it is the perception of the flowing tears and the specific facial expressions that makes us feel sad. In other words, if one looks happy or laughs, one will feel happy, and if one looks sad or cries, one will feel sad.

Is there any evidence that the awareness of flowing tears does indeed have an effect on how we feel? In a Japanese study, researchers simulated flowing tears by dropping some lukewarm water on the cheeks near the lacrimal ducts of both eyes of each participant (Mori and Mori, 2007). In a control condition, the same procedure was performed, but the “artificial tears” were now dropped on the temples. Subsequently, it was determined whether this had any effect on mood. In support of the hypothesis, it appeared that more of the participants in the simulated-tear condition reported sadness. The perception of “tears” on one’s face may indeed induce feelings of sadness. However, other studies have failed to provide support for this idea. For example, contrary to what one would expect, no systematic pain-increasing effects of voluntary facial pain expressions have been found (e.g. Prkachin, 2005).

The few available research findings thus seem to support the idea that tears may promote or enhance the experience of feelings, rather than being attempts to neutralize negative feelings.

## Other intrapersonal effects

Although there is a relatively large literature on the supposedly cathartic effects of tears, some authors (e.g. Barbalet, 2005; Katz, 1999) have focussed more on other possible intrapersonal effects of crying. Barbalet has postulated that weeping is a form of internal communication in which the self is engaged when registering transformations or changes (both positive and negative) within the self. Tearful distress registers a felt experience of loss that is significant to the

self, whereas tearful joy, in contrast, is postulated to register a felt experience of enhancement or augmentation of self.

For an adequate understanding of this notion, it is important to be aware of two major assumptions made by Barbalet (2005)—first, that weeping does not express the emotions associated with it in the way that certain facial changes express, for example, fear or anger, and secondly, that crying does not merely arise out of emotional experience, but rather that it determines how emotions are understood and resolved by the individual who is experiencing them. Thus the shedding of emotional tears should best be regarded as reflecting a return to a new stasis subsequent to systemic change. Barbalet also considers the link between crying and increased parasympathetic activation as evidence in support of his hypothesis, because the parasympathetic nervous system also returns the body to normal once the need for readiness has passed.

## Conclusion

Although folk psychology and the popular media portray crying as having a major impact on the well-being of those who shed tears, the scientific evidence for this notion is weak at best. Rather, it seems that the effects of crying, whether or not the latter results in catharsis or improved mood, are dependent on the psychological state of the crying individual and the specific conditions. In addition, the crying person's awareness of their tears may have an effect on the evaluation of the situation and on their mood.

In addition, the sensation of tears may clearly and unambiguously signal that what is currently going on is important for the crying individual. This is the case not only for negative situations, but also in particular for positive ones. Note that these sentimental tears typically surprise and overwhelm us and incite us to appraise the situation, and to ask why this is happening to us. This notion is further supported by the finding that people who cry while watching an emotional film are better able to remember the details of what they have seen (Kraemer et al., 1989).

Since classical times, tears have been associated with almost magical powers, most notably in the realms of self-help and healing. However, the contrast with what science has taught us could hardly be greater. For the time being, there is little reason for attributing more positive effects to the shedding of tears than to blushing, or putting on a facial expression of anger or any other emotion, the functions of which are almost exclusively looked for in the interpersonal rather than the intrapersonal domain. Is crying really so special and unique? Does self-soothing result from the release of certain neurochemical substances, from enhanced parasympathetic nervous system activity, or merely from the physically comforting behaviors of others? There is a clear need for well-designed studies to address this issue and carefully map out the resulting psychobiological changes.

In the next chapter the focus will be on the interpersonal functions of crying. These reactions certainly need to be taken into account, given the strong evidence that receiving physical comfort and helpful advice may have a strong effect on an individual's well-being (Burlinson and Goldsmith, 1998; Coan et al., 2006; Hendriks et al., 2008).

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## Chapter 7

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# The social effects of tears

Psychogenic weeping serves no physiological purpose whatever. Its value is wholly psychological and economic—as every woman knows.

(Gordon Lynn Walls, 1942)

When the British soccer star, David Beckham, announced his decision to quit his position as national team captain in 2006, after being eliminated from the World Cup by Portugal, the media did not fail to report that he was tearful, but they did not in any way condemn him. This was in strong contrast to what happened to his former colleague, Paul Gascoigne, who burst into tears after being given a yellow card in the 1990 World Cup semi-final against West Germany. These tears caused Gascoigne to become a household name in the UK, and the term “Gazzamania” was born.

A second example concerns the tears of Máxima Zorreguieta, shed during her wedding ceremony with Dutch Crown Prince Willem-Alexander when listening to the Argentine Piazzolla tango *Adios Nonino*. These tears immediately silenced all of her critics, and effectively stole the hearts of the entire Dutch nation. Not surprisingly, this scene ranks high in the Netherlands as the TV moment of the past decade.

A final example, probably the best documented and most discussed in the media, is that of Hillary Clinton (Falk, 2009; Manusov and Harvey, 2011), who made headlines worldwide after tears welled up in an interview during her pre-election campaign. The reactions in this case were very mixed. Headlines such as “Hillary’s Crying Campaign: the Tears of a Clown” and “Hillary Clinton’s Crocodile Tears” suggest that, for many people, these tears disqualified her as a good president. Her tears were regarded as a sign of weakness, emotional lability, and irrationality, and also perhaps as a manipulative weapon and a form of emotional blackmail. However, many others appreciated her tears as a genuine expression of emotion that revealed her truly human and vulnerable side. The subsequent unexpected win in New Hampshire was even, probably incorrectly, attributed by the media to the effects of these tears, particularly on female voters.

Adult tears, and certainly those of celebrities, rarely go unnoticed. Tears signal that something is at stake, but there is often a lack of clarity about the precise nature of the message that they convey. Their ambiguity thus leaves room for the observer’s own biases. Precisely because the

perception and appraisal of the tears may vary widely, reactions to crying individuals may also vary greatly. Even Sigmund Freud felt uncertain about the effects of tears, and wondered whether he could permit himself to weep and whether it would be manly to do so.

In Chapter 2, I introduced my dual-phase model of crying, to clarify that the effects of tears in particular become relevant once others have been attracted by the acoustical crying. During the second phase, depending on whose attention has been attracted, the tears result in caregiving, social bonding, or a reduction in aggression. However, this is certainly not the whole story. Crying and tears do not guarantee positive reactions from others.

Negative reactions to crying and tears have not only been described for babies, but also for older children and adults, as the above examples demonstrate. Crying has been identified as the chief trigger of physical infant abuse (Lee et al., 2007; Reijneveld et al., 2004). Boys who shed tears may become a laughing stock among their peer group, and may be more likely to be bullied (Von Salisch, 2001). Crying adolescents and adults alike will not always be met with empathy and understanding—tears may have a damaging influence on their image and reputation. For celebrities in particular, public tears may make them or break them. They may be regarded as a form of blackmail, or as a sign of weakness and emotional lability. As one respondent in a crying study stated, “Not crying is a good way to show how tough you are” (Fox, 2004).

In this chapter I shall discuss the effects of tears on others, and I shall address both fundamental and more applied research. The effects of crying and tears have been assessed at different levels. What happens in the brain and in the body (e.g. the heart rate, hormone levels, etc.) of observers? What do people feel and think when they see someone in tears? Last, but not least, what do others do? How do they respond behaviorally?

As the above examples demonstrate, the answer to the question about the effects of tears on others must be “it depends.” But on what precisely does it depend? What are the crucial determinants of the responses of others? Apparently very subtle factors are key to this process. What information has relevant research yielded to date? In the remainder of this chapter I shall try to create some clarity with regard to these questions.

## **How the brain and the body respond to crying and tears**

As every new mother knows and has experienced, hearing a baby cry immediately results in the let-down reflex, resulting in the flow of breast milk. Thus the crying of the baby not only attracts the attention of the mother, but also prepares her for feeding. Since this special maternal reflex is mediated via oxytocin, which is produced in the brain, crying simultaneously reinforces the bond between the mother and her child, but what exactly happens in the brains of mothers and others? How are they able to respond with their bodies? Research in this area has been limited, but some studies have yielded interesting results. I shall now give a brief overview of animal research and studies on the effects of baby crying, and summarize some findings of experiments on the biological effects of tears in humans.

Animal studies (cf. Newman, 2007) have shown increased activity in certain brain centers of parents when they are exposed to the distress calls of their offspring. For example, in both cats and squirrel monkeys it has been found that specific brain cells are responsive to the separation calls of their offspring, but not to other auditory stimuli.

With regard to the neurochemical reactions to the perception of distress calls, there is some evidence for the involvement of the opioid system and, as might be expected, oxytocin. Animal

research does indeed confirm a strong reaction of hormones associated with parturition and lactation, especially prolactin and oxytocin (Newman, 2007; Panksepp, 1998).

Studies on the brain reactions of humans to human crying have revealed the involvement of the amygdala (especially in the right hemisphere), the auditory cortex, and the insula (cf. Swain and Lorberbaum, 2008). This activation of the amygdala occurs even when there is no explicit aware attention to the specific sounds, which demonstrates that these sounds seldom go unnoticed, and that they will automatically elicit a (hopefully adequate) reaction of the receiver of this signal. The effects on other brain structures (e.g. anterior cingulate gyrus, medial pre-optic area) in humans have until now been less clear.

Hearing a baby crying also has an effect on the heart rate of those exposed to it, depending on their behavioral tendencies (Crowe and Zeskind, 1992). More specifically, a strong increase in heart rate might be an indication that the perceiver will react aggressively, and this tendency to respond with aggression seems to be dependent on the type of crying. The high-pitched cries of a premature or sick infant generally elicit greater bodily arousal than the cries of a healthy full-term infant (cf. Out et al., 2010). The cries of the former are also perceived as more aversive, being a sign of weakness and low fitness. This crying further promotes harsh caregiving responses. The more abnormal the infant's crying, the more likely it is to result in the reduction or withdrawal of parental care, and an increase in hostile behavior, which places the infant at serious risk of neglect and abuse. This risk is particularly high in parents who are distressed, lack flexibility, and, more generally, tend to be in conflict with others (Seng and Prinz, 2008).

So far we have discussed the effects of the acoustical component of crying. The empirical record of the effects of (adult) tears on brain responses is much more limited. Michelle Hendriks and co-workers compared brain responses to pictures of crying individuals with responses to pictures of individuals with other facial expressions (Hendriks and Vingerhoets, 2006). However, the strong differential behavioral and emotional responses to pictures of crying faces were not reflected in distinctive brain reactions that could be detected with electrodes in the very early phases of information processing.

In contrast, the previously described study from Israel (Gelstein et al., 2011), which showed that sniffing female tears resulted in lower testosterone levels in male saliva, also revealed a decrease in activation of brain structures associated with sexuality in men. To date, this is the only study that has examined the effects of tears (rather than of crying sounds) on brain structures and hormones. Note, however, that this study was not concerned with the effects of seeing tears, but rather with the effects of "smelling" them.

In summary, there is evidence that specific brain structures are activated or inhibited by crying sounds and by the "smell" of tears. To date there have been no studies that have demonstrated differential brain reactions, dependent on the acoustical properties of the crying, although the magnitude of the increase in heart rate appears to depend on crying characteristics and subsequently to be linked to behavioral intentions. The relationship between appraisals of crying sounds and tears, on the one hand, and neurobiological reactions, on the other, requires further exploration.

In the next section, the focus is on the perception of crying individuals. How does crying influence the way that a person is perceived?

## The signal value of tears

There have been numerous studies, using very different methodologies, that have examined the effects of crying and tears. As described earlier, whereas the acoustic component of crying has



a strong capacity to evoke the attention of the social environment, tears are primarily important for the easy identification of sadness and the need for succor and support (Provine et al., 2009). When study participants are shown photos of crying individuals from which the tears have been digitally removed, it is very difficult for them to decode the facial expression as sadness. Digital tear removal not only produces faces that are rated as less sad, but often results in confusion about the emotional value of the expressions. For example, awe, concern, and puzzlement are often reported (Provine et al., 2009). Zeifman and Brown (2011) reported similar findings, but the effects were dependent on the age of the person depicted. Tears conveyed sadness best and elicited sympathy most strongly with pictures of adults, whereas images of tearful children and infants resulted in less strong reactions. Thus the signal value of tears seems to vary with the age of the person who is crying.

In a related study, we did exactly the opposite (Balsters, 2011). Volunteers were exposed very briefly (for 50 milliseconds) to pictures of faces that were neutral, sad, or neutral and sad with tears. When tears were added, it was much easier for the study participants to determine that a face was sad, linked with a greater willingness to provide emotional support. Study participants also reported that they were more willing to provide support and assistance for the neutral but tearful individuals than for those who had neutral faces without tears. It thus seems that tears help us to decode facial expressions accurately. They resolve ambiguity, and they more clearly signal sadness and the need for support. In fact this effect is so strong that even tears on neutral faces stimulate the provision of social support. During our evolution it appears to have been advantageous that this clarity existed, in order to maximize the likelihood of receiving an adequate and supportive response, or the inhibition of aggressive impulses. However, this reduction in the ambiguity of the signal apparently does not necessarily imply that others will always react in a similar, positive way. Additional information about the individual and the context seems to determine the ultimate responses of others.

## Perception and feelings of observers

Some studies have focussed on how crying individuals are perceived, and what observers feel that the tears reveal about the personality and behavioral intentions of the person who is crying (Hendriks and Vingerhoets, 2006; Hendriks et al., 2008). A crying individual is generally regarded as someone who needs sympathy and help. However, as the examples at the beginning of this chapter demonstrated, that is not the whole story. Crying individuals may also be regarded very negatively, as passive, emotionally unstable, manipulative, and weak (Fox, 2004).

Overall, independent of the specific context, crying individuals generally are judged less positively than their non-crying counterparts (Hendriks and Vingerhoets, 2008). This once again suggests that the specific context is very important—crying is a powerful response for eliciting aid and succor, but only if there is a valid reason for showing this reaction. It is not acceptable for crying, which is assumed to be an honest signal, to be misused. Individuals who “fake” tears in order to achieve some aim may expect very negative reactions and disapproval. Observers may perceive “pseudo” tears as a kind of emotional blackmail. Since laboratory studies often lack ecological validity, they have only very limited value. In many laboratory studies the emotional faces have no context. Study participants are asked to rate crying and non-crying individuals without knowing *why* the depicted individuals are crying. When information about the antecedents and context is missing, it is likely that the judgments of the participants will mainly reflect existing prejudices or social desirability, or result from strong, virtually automatic, perhaps unconscious reactions, evoked by the exposure to tears.

Some studies have investigated the effects of tears on credibility judgments. One of the specific powers of tears, among others, is that we believe that they do not lie! Support for this notion has been found in some studies that focussed on the effects of the crying of rape victims on credibility judgments (Bollingmo et al., 2008; Calhoun et al., 1981, Hacklett et al., 2008). The emotions displayed by the rape victims did indeed influence police officers' judgments of their credibility. Victims were judged as most credible when they were crying and showing despair, and as less credible when they appeared neutral or expressed more positive emotions. This seems to be the case at least for a subgroup of observers who have a strong expectation of emotional expressiveness in rape victims. Similar results were found in a study of undergraduate students. The victims to be judged in this study were again presented as emotionally expressive or emotionally controlled, on the basis either of written descriptions of the victim, or of video presentations. In both conditions, the emotionally expressive victims were rated as more credible. In the video presentations, the emotionally controlled victims were also perceived as having less aversion to the rape, and they were liked less than the emotionally more expressive women.

The negative depictions of crying individuals, such as being emotionally unstable, weak, manipulative, and, especially in the work setting, not fit for the job also explain the popularity of using crying to disqualify people. Depicting enemies as “cry-babies” is an often applied and sometimes effective way of damaging their reputation. In the USA, a picture of a crying President Obama is currently being circulated, having been introduced by his political opponents. During World War Two, in occupied countries flyers were distributed depicting Hitler and his fellow aggressors as a bunch of cry-babies (see Figure 7.1). In books about the horrors of World War One (e.g. Barthas, 1997; Genevoix, 1949), which were actually intended as indictments against war, only the German characters shed tears. Thus even anti-war authors used crying to degrade the enemy. This dates back to ancient Greek and Roman times, when enemies were occasionally also portrayed as cowards who “cried like women.”

## The work setting

Of particular interest is how male and female crying in a professional work setting may affect the perceptions and behavior of their colleagues and superiors. Unfortunately, this topic has not received much attention from researchers (Hoover-Dempsey et al., 1986). Marketing consultant Alexandra Levit personally experienced how crying on the job can have a devastating effect on a career (Collier, 2004). Her two crying episodes in front of a critical boss resulted in her being passed over for promotion. She has now created her own business, based on crying in the workplace, that teaches women strategies for avoiding shedding tears at work, because, from her own experience, she knows that repeated crying on the job may affect one's credibility and reputation.

American professor Kimberly Elsbach and her student Beth Bechky interviewed female managers about the effects of crying in the workplace (Goudreau, 2011). Their study confirmed that tears can have serious consequences for a woman's career. When women shed tears during performance evaluations (especially negative ones), in one-to-one sessions with their managers, or at meetings when they are feeling stressed about getting their point across, it may cost them prime assignments and promotions, as well as their co-workers' respect and credibility, whereas typical male expressions of emotion, such as shouting or banging on the desk, are generally accepted without any adverse consequences. Surprisingly, female managers definitely did not appear to be more understanding than male managers towards women who cry.



**Fig 7.1** Two examples of cartoons that depict enemies as “cry-babies.” Copyright holder not traced. If contacted by the copyright holder, the publisher will be pleased to include a suitable acknowledgement in subsequent reprints.

Although, in some social contexts, weeping is regarded as an acceptable and appropriate reaction, Elsbach’s study clearly demonstrates that there still seems to be a strong social taboo against crying in the workplace. The researchers are quite certain in their conclusion that managers who regard crying as weak and unprofessional may be underusing good female employees because their tears are likely be misinterpreted as a sign of emotional instability or not being fit for their job. Men who cry for work-related reasons run the serious risk of being considered less competent and more emotional than women who cry for very similar reasons, which suggests that gender and context are important determinants of how crying is perceived.

A special work setting is that encountered in healthcare. How are the tears of nurses and doctors evaluated? How do they react to the tears of patients? In a study of doctors, nurses, and medical students, it was found that they primarily try to soothe crying patients with words, holding the patient's hand, and/or becoming personally affected (Wagner et al., 1997). When asked how colleagues responded to their tears at work, it appeared that health professionals were for the most part either comforted or left alone. However, a significant minority (approximately 20%) of the medical students reported that they were ridiculed, shouted at, or viewed with contempt. Occasionally, medical students who had cried were told that they were not fit for the job.

Doctors who cry do not generally receive much sympathy and understanding from their colleagues, particularly male colleagues. Crying in front of patients and colleagues is considered unprofessional by the majority of medical students (Sung et al., 2009). Most doctors do not regard it as their duty to be emotional and/or cry with their patients. The two main reasons given for this belief are that it is not therapeutic for the patient, and that it may cause “emotional burnout” in the doctor him- or herself (Lerner, 2008). In addition, it is considered most important that the tears do not impair the ability of the doctor or other healthcare provider to provide adequate professional assistance. Therefore the challenge for physicians and nurses is to express their feelings and to show empathy, while at the same time being an objective advocate for the patient (Majhail and Warlick, 2011). Box 7.1 provides a brief explanation of the concept of empathy and related concepts.

### Box 7.1 Empathy and related concepts

Many different definitions of empathy can be found in the literature, but the problem with many of them is that they do not always make a clear distinction between empathy and related concepts such as emotional contagion and sympathy. The French neuroscientists Frederique de Vignemont and Tania Singer therefore came up with the following definition (de Vignemont and Singer, 2006). There is empathy if:

- ◆ one is in an emotional state
- ◆ the state is similar to the affective state of another individual
- ◆ the state is induced by observing or imagining another's person emotional state
- ◆ one is aware that the other individual's affective state has induced one's own emotional state.

Note the difference by comparison with related concepts. What is called *cognitive perspective taking* does not meet the first requirement (“I can see that you feel angry in that situation”). In the case of *sympathy*, the second requirement does not need to be fulfilled (“I understand that you are sad, but I do not feel the sadness myself”). Finally, *emotional contagion* does not necessarily involve the self–other distinction, and one is not necessarily aware that the other is the source of one's own emotional state (de Vignemont and Singer, 2006)

The American psychologist Douglas F. Watt analyzed what kinds of situations and individual characteristics determine whether or not we experience empathy in a given situation (Watt, 2007). His research identified the following factors.

(Continued)

## Box 7.1 (Continued)

### Native talent and developed ability

This has until now been a poorly understood and understudied issue, but supposed factors include genetic influences and, among others, primary attachment experiences.

### The degree of attachment to the object

Even the animal literature has shown that “familiarity” with the suffering other is an important variable. In addition to the huge amount of anecdotal data, the research finding that intimates are more likely to respond by offering understanding and comfort, and the observation that holding one’s partner’s hand has a stronger effect than holding the hand of a stranger, nicely fit and support this notion. Last but not least, it also corresponds to attachment theory, which emphasizes that the relationship with specific attachment figures may be considered special (See also section entitled ‘Why do we comfort crying people?’ later in this chapter).

### The degree of “cuteness” of the object, and the degree of felt potential vulnerability or helplessness of the object

This highlights the fact that we are much more likely to be empathically mobilized by the suffering of small helpless creatures with a rounded face and large eyes than by the suffering of a dominant, aggressive, and powerful individual. Indeed, recent brain imaging studies have demonstrated that what is known as the *baby schema* in ethological literature applies not only to human infants, but also to the offspring of all kinds of animal species, such as ducklings, puppies, and even baby elephants.

### The affective state of the empathizer

Perceived injustice, anger, and emotional hurt in relation to the other are examples of psychological states that can strongly inhibit empathy. Rage prevents and transiently turns off empathic responsiveness almost completely. Apparently a basically positive emotional stance towards the other party is a *sine qua non* for the eliciting of empathy. In addition, Watt explicitly mentions negative moral judgment as another factor that potentially inhibits empathy (e.g. brutal and violent criminals are less likely to elicit empathy), as well as physical status (the likelihood that we will react with empathy is considerably decreased when we are tired and sleep deprived, hungry, or in pain, as any new parent may know from experience). There is further evidence that health professionals have the ability to detach themselves emotionally when they see others suffering. This is a very helpful skill, because otherwise their empathic reactions might interfere too much with their capacity to provide adequate professional help (Prkachin et al., 2007). One step further is the possibility that people may be able to “dehumanize” certain conspecifics (e.g. those who are homeless, mentally retarded, etc.), thus allowing them to treat those individuals as non-human outcasts (Fiske, 2009).

Among psychotherapists, too, there is much disagreement about whether it is professional and acceptable to shed tears in a therapeutic setting. A Dutch survey of over 800 therapists revealed that over 50% of them regarded crying by the therapist during therapy as unprofessional, and around 70% described such shedding of tears as unethical (‘t Lam, 2011).

However, patients may have quite different ideas and may in fact appreciate the tears of their doctors. For example, a female cancer patient declared that she particularly appreciated doctors who felt comfortable with outward displays of emotion. “If that means tears,” she said, “bring them on.” The US gastroenterologist Patricia Raymond broke with the tradition of controlling her emotions when giving bad news to her patients. She was convinced that a few tears of sympathy did not diminish her authority as a physician. She even felt that her tears made her a more sought-after doctor (Collier, 2004).

A final example concerns the effects of crying on the image of sportsmen and women, in this case soccer players. How do the general public appreciate them? When the Dutch national soccer team was eliminated in the semi-final of the World Cup by Brazil in 1998, many of the Dutch players were unable to hold back their tears. A survey designed by us to assess the evaluations of the crying of the soccer players revealed that these tears were considered to be most appropriate by the Dutch population. The tears were regarded as evidence that these professionals were not just in their job for the money. Many respondents admitted that they themselves would also have shed tears if they had been in a similar situation, so crying may facilitate identification. Weeping by sports professionals apparently puts a human spin on sport and emphasizes that there is a real human being behind the extraordinary performance (or failure). The public seems to appreciate being able to see that these “supermen” and “superwomen” are still in touch with their humanity.

In a study that examined the appropriateness of crying among American football players (Wong et al., 2011), two factors were demonstrated to be important. First, it made a difference whether the players shed tears after a victory or after a defeat. Secondly, *how* the players cried proved to be a decisive factor. Merely shedding tears was evaluated more positively than sobbing, particularly after a victory. The respondents (150 college football players) further rated tears as slightly more appropriate after a match that had been won than after a lost match.

The subtlety of several factors is illustrated by the public tears of General Schwarzkopf (see also Chapter 5). As he himself pointed out in a TV interview, when tears were welling up in his eyes, it was not a problem, but in fact most appropriate, even for a commander in chief, to shed tears in certain situations, such as when he and the soldiers were together on Christmas Eve, far away from home and all missing their families, because tears stimulate the mutual social bond. However, on the battlefield or when briefing the last war acts, the tears of a general would certainly have a damaging effect both on the man himself and on the morale of his troops (cf. Loez, 2004).

The cultural context also plays an important role, especially with regard to public tears. Japan offers some impressive examples of chief executives who openly allow their tears to flow at public press meetings in order to reinforce their sincere display of remorse. Recent cases include Toyota’s President Akio Toyoda and, in 1997, Shohei Nozawa, president of Yamaichi Securities, when announcing his company’s bankruptcy (see Figure 7.2).

In contrast to western countries, the Japanese public are swayed by emotions because, in Japan, empathy for a weak person is valued as an honorable trait. It is regarded as a virtue to acknowledge one’s mistakes and to mend one’s ways, while shedding tears. Japanese athletes and other male celebrities seem to gain extra marks from public weeping. In the appropriate context, tears can thus have very strong positive effects.

So much for perceptions about crying individuals, but how do others react to tears behaviorally? As only a very limited number of laboratory and real-life studies have addressed this issue, it is again necessary to resort to relevant anecdotes from real life.



**Fig 7.2** Shohei Nozawa, president of the Japanese firm Yamaichi Securities, in tears as he announces his company's bankruptcy during a press meeting. Reproduced with permission of Shizuo Kambayashi/AP/Press Association Images.

## Behavioral reactions to tears and crying

When volunteers in laboratory studies are shown pictures of individuals displaying different emotions, it is reported that they are more likely to provide emotional support and less likely to avoid a crying person than individuals displaying other emotional expressions (e.g. neutral expression, anger, and fear) (Hendriks and Vingerhoets, 2006). Similar findings have been obtained in studies where the participants read descriptions of situations in which the main character was crying or not crying (Hendriks et al., 2008). The respondents generally indicated that they were more inclined to provide social support and assistance for, and to express a less negative attitude toward, a person who was crying than one who was not crying. In addition, in an experimental study it was found that female confederates who acted as if they were crying elicited more sympathy and more crying from the participants (all women) than did non-crying confederates (Hill and Martin, 1997).

Surprisingly, the results of the former self-report study suggested that the specific relationship with the main character (whether they were a stranger, a friend, or an acquaintance) would not matter, and that the gender of the crying person also would not make any difference. These results thus suggest that people who are crying may always expect attention and support from other people, independent of their mutual relationship. However, this latter idea had already been challenged by the results of some laboratory studies which demonstrated that men and women differ in their reactions to crying (Cretser et al., 1982; Jessor, 1982; 1989; Labott et al., 1991). For example, a crying man was more likely to be helped by female than by male respondents. Furthermore, he was more likely to be looked down on by male than by female respondents.

The different reactions of men and women may be explained by the difference in awkwardness that is experienced in the presence of a crying person. Because women are more comfortable with intimacy and a nurturing role, they are generally more likely to react with sympathy and support, whereas men are more likely to experience irritation and confusion in the presence of a crying person.

In conclusion, the majority of the studies that have examined social reactions to crying support the attachment perspective on adult crying. However, many of these studies have their limitations. As I have already discussed in previous chapters, one serious problem is the lack of reliability of self-report measures. People are often not accurate in predicting how they will really behave in a particular situation. An additional serious problem, which has also already been mentioned, is that laboratory studies in which the study participants are shown pictures of crying and non-crying individuals typically lack a social context. In real life we are not often confronted with people who just cry—it is much more likely that we know these individuals, their background, and what has happened to them. In the case of a partner, family member, friend, or acquaintance, we are probably familiar with their life history and character. There is a context that we take into account. Furthermore, the “one-off” laboratory exposure to the tears of an actor or depicted model generally does not require any action or effort on the part of the observer. In contrast, the tears of a child, partner, friend, or co-worker with whom one has an ongoing relationship may necessitate some caregiving intervention, and for that reason might also more easily lead to resentment if perceived as excessive, overused, or inappropriate.

The question is therefore to what extent the self-report data and sometimes rather artificial laboratory studies adequately reflect real-life reactions. What kind of results do real-life studies yield?

Landreth (1941) also carefully examined the reactions of others (both adults and other children) to the crying of a child. An important determinant of the reaction seemed to be the cause of the crying, which in the great majority of cases (76%) could be classified as conflict with other children. Observed reactions in the nursery-school setting primarily involved consoling or providing care for the crying child, but also censuring the assaulter and taking the role of peacemaker and arbiter. In the home setting, a completely different picture emerged, which is understandable partly because there are other causes of crying (e.g. problems with eating and/or sleeping, conflicts with parents and siblings, injuries and their treatment, etc.). The most common reactions in this setting were ignoring the child, reasoning with them, or spanking them (there were considerable differences between parents in this respect). If anything, these data also show the wide variety of reactions, ranging from very negative (physical punishment) to very positive (comforting).

The British social psychologist Alexa Hepburn analyzed the effects of crying on the responses to callers to a child protection helpline (Hepburn and Potter, 2007). She identified two specific responses of the child protection officers that were rare in non-crying calls. The first was the use of the phrase “Take your time,” which was mainly used when the crying apparently interfered with talking, and the second response consisted of signs of *empathy*, which seemed to occur in particular when the caller failed to react to actions such as advice giving. Crying mainly occurred when reporting abuse, probably also to emphasize the perceived severity and strong impact of the caller’s problems.

Unfortunately this study has some major limitations. For example, it concerns only verbal reactions from a distance, and in addition it is the job of the child protection officers to try to provide adequate support, which means that it is not known whether the same reactions can be expected for people in general.

Therefore the findings of our ISAC study are also important in this respect, because they may provide a more realistic picture of the reactions to crying people in real life. We asked the participants to indicate how others had actually responded to their last crying episode, and we made a distinction between the reactions of strangers and close family and friends (Vingerhoets, unpublished data). This distinction proved to be important. In contrast to what laboratory findings suggest, the specific relationship with the crying individual appeared to be a major determinant of the reactions. Reacting to crying individuals by providing comfort and understanding is, in reality, far less likely in the case of a stranger than when we know the person.



Occasionally, we will also express understanding and say comforting words to strangers, but we will hardly ever physically comfort them, as we would do with family members or friends. In the case of strangers, there is little or no difference in the reaction to men and women. Neither gender is likely to receive comfort from strangers. Women are more likely than men to receive physical contact from family or friends. Men also tend to provide fewer and a less wide range of comforting reactions to others than women (Dolin and Booth-Butterfield, 1993).

These findings again show that caution is needed when interpreting the results of laboratory studies, because they may be strongly influenced by socially desirable responses of the participants. People appear to be unable to take into account or overlook decisive aspects of a hypothetical situation when asked how they would respond to it. Given that we are more likely to cry in the presence of family or friends, the overall picture still seems to support the idea that attachment is a central factor in crying, which makes sense because these intimates (“attachment figures”) are more likely to provide support than strangers. The examples in Boxes 7.2 and 7.3 suggest that comforting behavior is not limited to adult attachment figures.

### Box 7.2 The chimp on the roof

The Russian ethologist Ladygina-Kohts kept a young chimp, Joni, in her house. Occasionally Joni escaped, and when this happened it was not always easy to lure him back into his cage. He could even resist bananas, vegetables, and other favorite food items. Ladygina-Kohts found that the most effective strategy for getting him back into his cage was to pretend that she was crying. When sitting on the roof of her house, the animal immediately responded to her fake sobbing, becoming confused, and starting to explore the environment as if attempting to find the individual responsible for her crying (Ladygina-Kohts, 2002). Custance and Mayer (2012) demonstrated that simulated crying also strongly influences the behavior of dogs.

### Box 7.3 The most caring child

The author and lecturer Leo Buscaglia once talked about a contest he was asked to judge, the purpose of which was to give an award to “the most caring child.” The winner was a 4-year-old child, whose next-door neighbor was an elderly man whose wife had recently died. Upon seeing the man cry, the little boy went into the old man’s yard, climbed onto his lap and just sat there. When his mother asked him what he had said to the neighbor, the little boy said “Nothing, I just helped him cry.”

Children as young as 1 year offer comfort when they see another child crying. Whereas initially they can only comfort in the way that they themselves like to be comforted, with increasing age (around 3 years) they become aware of the individuality of others, and may alert the parents of the sad child.

At preschool age, the most conspicuous characteristics of the “nurturing” behavior typically consist of a hand-on-the-back gesture, bending down, and gentle talking with the head on one side.

Observations in a day-care center revealed that children with a history of abuse did not comfort other crying children. Instead these children were more likely to display aggression towards the crying child (Main and George, 1985).

The effects of social support and desired physical comfort on the well-being of crying individuals must not be underestimated. Social support is very important for our mental and physical well-being, because it buffers the negative effects of exposure to stressful conditions (Uchino, 2006). A recent brain imaging study revealed that the brain responses of married women who were subjected to the threat of an electric shock were attenuated when they merely held their husband's hand (Coan et al., 2006). A more limited effect was observed when they held the hand of the unfamiliar experimenter. Most strikingly, the effects of spousal handholding on neural threat responses varied as a function of the quality of the marital relationship, with higher marital quality predicting the least threat-related neural activation.

Intense physical contact, such as hugging and massage, has been shown to facilitate the release of oxytocin, which is the hormonal key player in social relationships and attachment (Campbell, 2008). As has already been mentioned, this hormone is known for its powerful dampening effect on the stress response, which may explain why people feel better after being comforted. The experienced relief and mood improvement might perhaps be the result of the intimate physical contact, rather than being brought about by the crying itself. In addition, the value of good advice and instrumental support must not be underestimated.

### Why do we comfort crying people?

The perception of tears, in particular those of family and friends, generally seems to stimulate us to provide comfort and emotional support, but why is this? Is it a matter of altruism and social involvement that we have a tendency to provide support for those in tears? This is the subject of hot debate between those who adhere to the view that we are basically social and good-natured, and those who consider our empathy and altruism to be merely the result of civilization. Advocates of the latter notion emphasize that providing succor and comfort also has a positive effect on ourselves, because the perception of the suffering of others makes us feel uncomfortable (e.g., Batson, 1990). Therefore relieving the suffering of others can in some sense be regarded as being motivated by the anticipated decrease in our own feelings of distress. In other words, altruism is basically just egoism.

The next obvious question is, of course, why people feel uncomfortable when they see others in distress. Recent neuroscientific discoveries have yielded new insights that are helpful in answering this question. This research demonstrated that our brains are equipped with "mirror neurons" (Pfeifer and Dapretto, 2009). These are neurons that become active when we observe others making a specific movement or expressing a specific feeling or emotion. For example, when we see someone grasping an apple, we in some way also "experience" ourselves grasping an apple. When we see someone inhaling a disgusting odor, that observation also evokes aversion in us, and when we see someone with a distorted face and in tears, we also feel their pain to some extent, because our brain "imitates" these behaviors and expressions. Of course, this has its limits. It would not be adaptive if observers *really* experienced the same distress as the suffering individual, because that might prevent an adequate helping reaction. This neural system thus seems to be responsible for our empathic reactions to others in distress. However, if that is true, how can we explain the fact that occasionally people display strong negative and even aggressive reactions to the tears of others?

### Tears and aggression

Descriptions of the effectiveness of crying as an anti-aggression mechanism can be found in some legends dating back to the early days of Rome (Sterbenc Erker, 2009). For example, when Romulus, the founder of Rome, and his companions were unable to acquire wives by peaceful means, they abducted women from neighboring tribes, in particular of the Sabines, which

resulted in war. However, this war was successfully stopped when the Sabine women intervened on the battlefield wearing mourning garments, with their hair loose, and weeping excessively. The Roman poet Ovid explicitly wrote that they ended the war with their tears. Similarly, the siege of Rome by the Volsci was supposedly stopped when the mother of Coriolanus (the leader of the aggressors), together with his wife, pleaded with him to desist from his attacks, employing *supplicationes* accompanied by superfluous tears (Sterbenc Erker, 2009).

As already mentioned, the evolutionary biologist Oren Hasson has specifically emphasized the aggression-reducing effects of tears (Hasson, 2009). Central to his explanation is the handicap hypothesis, according to which the blurring of one's vision by tears signals to others that one does not have any aggressive tendencies oneself, and so has the effect of making them less aggressive. Such a mechanism exists in most, if not all, social animal species. For example, dogs bare their throats when being attacked by a stronger opponent. Such *submission cues* quickly result in the inhibition of the aggressive behavior of the assaulter.

The British neuroscientist James Blair has proposed a functionally analogous mechanism in humans, namely the *violence inhibition mechanism (VIM)*, which is hypothetically activated specifically by non-verbal communications of distress (Blair, 1995). Crying, of course, might be considered the prototype.

In conflicts, tears may indeed serve as a symbolic “white flag”—a sign of surrender—to communicate that the other person has to stop being aggressive. There is some evidence to suggest that female crying during simulated conflict with a male is an efficient way to make clear to the male that the conflict has gone too far (Lane, 2006). Study participants read several scenarios representing conflict between a man and a woman. Some conflicts ended with the female character crying and others ended with the female character apologizing excessively without crying. Crying was found to convey the message that the conflict should stop before it escalated and could not be resolved. The weakness of this study is, again, the possible (if not probable) inaccuracy of the self-reports. However, there is also some anecdotal, real-life evidence in support of this idea. For example, Jeffrey Kottler in his book *The Language of Tears* (Kottler, 1996) describes how the perception of just one tear in the eye of a woman almost immediately resulted in a dramatic reduction in the aggression and rudeness of an attacker. It is also worth recalling once more the Israeli tear-sniffing study (Gelstein et al., 2011). Although the focus was on the male sex drive, the fact that testosterone levels were lowered merely by sniffing tears makes it plausible that aggressive tendencies, which unfortunately were not measured in that study, might also have been reduced.

However attractive and plausible the hypothesis that tears inhibit aggression might be, the fact is that there is also strong evidence demonstrating just the opposite—that crying stimulates aggression in others. In a recent study from the Netherlands, 4.2–7.0% of the parents of 6-month-old infants reported having smothered, slapped, or shaken their baby at least once because of its crying (Reijneveld et al., 2004). The risk of such behavior was particularly high when the infant's crying was perceived as being excessive.

This is also true for adults. For example, an analysis of police and court reports of rape cases demonstrated that crying during an attack led to a significant increase, rather than a decrease, in the amount of physical violence used, resulting in more physical injuries (Ullman and Knight, 1993; Zoucha-Jensen and Coyne, 1993). In addition, it was found that not only women who pleaded or reasoned with their attacker, but also those who cried, were at higher risk of sexual abuse, again showing the ineffectiveness of this strategy in this respect. Of course, one might wonder whether these examples concern individuals with psychopathic traits who, by definition, do not respond in a “normal” way to the distress of others. Perhaps the VIM of Blair (1995) described earlier does not function well in these assaulters.

There is also evidence that victims of chronic physical abuse (both women and children) often show remarkable inhibition of emotional expression, including crying. Their emotionally flat responses probably result from their learning experience that the display of any emotion, and especially crying, was a powerful trigger for violence (for a discussion of the loss of crying in severely abused individuals, see Chapter 9).

A major problem with real-life studies such as those described here is that no distinction can be made between acoustic crying and mere tears. In studies involving infants, there can be little doubt that the aggression is not induced by the tears, but rather by the acoustical crying, but whether that also is the case for the rape situations is not clear.

## Crying to manipulate others

Since crying can have such major effects on others, it might come as no surprise that it can be used not only to inhibit aggression, but also to influence purposefully or even manipulate others (see Box 7.4). The American evolutionary psychologist David Buss demonstrated the link between the use of tears as a strategy for manipulating a partner in a close relationship and personality (Buss et al., 1987). In particular, women who were highly neurotic seemed to apply this manipulation tactic in order to achieve a specific objective.

### Box 7.4 Tactics of manipulation

The American evolutionary psychologist David Buss and co-workers (Buss et al., 1987) identified 11 tactics of manipulation for getting something done by others:

1. *charm*: I compliment them so that they will do it
2. *coercion*: I demand that they should do it
3. *silent treatment*: I ignore them until they do it
4. *reason*: I explain why I want them to do it
5. *regression*: I cry until they do it
6. *self-abasement*: I act humbly so that they will do it
7. *responsibility invocation*: I get them to make a commitment to doing it
8. *hardball*: I become aggressive so that they will do it
9. *pleasure induction*: I show them how much fun it will be to do it
10. *social comparison*: I tell them that everyone else is doing it
11. *monetary reward*: I offer them money so that they will do it.

There was almost no difference between men and women in the use of these tactics, with just one exception. Women reported using the regression tactic (including crying, pouting, whining, and sulking) more frequently than did the men. In addition, an association was found with the personality trait “neuroticism.” Women who scored high on this characteristic were more likely to apply this tactic.

This insight is an extremely old one, and there are many examples in history of the use of tears for selfish gain. Examples of this can be found in very different settings and contexts, ranging from religious practices (e.g. praying) and intimate relationships to more business-like relationships (e.g. that with a lawyer, etc.).

The Roman poet Ovid proposed that male lovers should overtly display their tears to women to convince them of the sincerity of their feelings of love (for some comments on the relationship between tears and sex, see Box 7.5).

### Box 7.5 Tears and sex

Ovid and other Roman poets such as Propertius and Tibullus emphasized the role of tears in love. They recommended that young men should weep in order to convince the women of the genuineness of their love. Subsequently, many more poets have praised male tears for their erotic or aphrodisiac power. However, the effect of this strategy is currently less certain, at least according to the results of an American study (Verbeck, 1996). Female students watched three videotapes that showed the same man—not crying, crying because of empathy when talking about a sad event that had happened to someone else, or crying because he felt disappointed after a particular event. The study participants were asked to rate the man on 19 different dimensions, and also to indicate whether they would like to date him, or to work with him, and whether they thought they would get along with him. There appeared to be differences on only three dimensions. In the empathy condition, the man was considered to be more sympathetic and more similar to the study participants, but was also considered to be more irritating. No effects were found for wanting to date or work with him, or for getting along with him.

In addition, the previously described Israeli study (Gelstein et al., 2011) demonstrated that sniffing female tears, if anything, had a negative effect on the male sex drive.

For mice, the situation might be completely different. Japanese research has shown that a non-volatile mouse pheromone, called ESP-1 (exocrine gland-secreting peptide), is released from the tear glands of the male mouse after face-to-face contact with a female (Haga et al., 2010). This substance activates brain regions that are important for reproductive and mating behavior. More specifically, it enhances female sexual receptive behavior upon male mounting (lordosis), allowing successful copulation.

Lawyers are known for encouraging clients or witnesses to shed tears in court, in order to evoke pity and positively influence jury members. Interestingly, in the American state of Ohio, prosecutors recently requested that defense attorneys should be forbidden to use emotional appeals—specifically involving the shedding of tears—to a jury during the trial and sentencing phase of a death penalty case. However, this again is nothing new. In classical Greece and Rome it was not uncommon for lawyers to use the expression of strong emotion, including tears, to reinforce their pleas.

The strong manipulative power of tears is also known to swindlers, who occasionally apply this strategy successfully. Several years ago a Dutch swindler made headlines with his very effective crying strategy. Weeping profusely, he would approach strangers with a sad story and ask for money. His success was impressive—within a few years he collected approximately \$125 000. More recently, the same trick was applied by a young Californian woman, known as the

“Crying Girl.” While weeping copiously, she would accost strangers and tell them about her abusive boyfriend. Subsequently, she often successfully begged for \$37 for a train ticket. Many could not resist her tears and gave her the money she asked for.

However, it is not only fellow adult humans who can be impressed by tears. Animals, children, and even God do not seem to be able to resist the powerful influence of tears. The Old and New Testaments contain many descriptions of the use of tears when praying, in an attempt to convince God of the seriousness of one’s problems and to facilitate the answering of the prayers. Such praying with tears was not always necessarily a private issue. Before decisive battles, people gathered together and wept collectively in an attempt to secure fortune and luck in times of war and adversity (see also Chapter 13).

It is not difficult to add many other examples that demonstrate people’s belief in the powerful effect of tears. There are many instances of individuals who have tried to turn tears to their advantage during public confessions or when asking for forgiveness. For example, Jim Bakker and Jimmy Swaggart, the fraudulent and adulterous American TV evangelists, wept copiously when making their confessions. It is doubtful whether such “fake” performances indeed have the desired effect, although some people might be impressed by them.

Even in the clinical setting, the tears of clients do not always give rise to a feeling of empathy in the therapist. The crying of certain patients, especially those with personality disorders such as narcissistic or borderline personality disorder, can induce very negative feelings in therapists, including feelings of irritation and repulsion, or of being manipulated, controlled, and exploited (Alexander, 2003). This is the kind of crying that is perceived not as genuine, but rather as insincere, exploitative, and an “act.” Needless to say, this type of crying prevents the development of the empathy that is necessary for an optimal therapist–patient relationship. It may even result in a strong desire of the therapist to withdraw from the patient. These manipulative patients are generally experienced as very demanding, and the therapist will require considerable patience and endurance. Often much work is needed before a fruitful therapeutic relationship can be established. Making these patients aware of the strong negative reactions that their crying evokes is an important first objective of the therapy.

This all raises the often posed question of whether people can fake tears, and if so, how. In addition, one may wonder how these pseudo-tears can be recognized. There are no easy answers to these questions. I am even not sure whether people really can fake tears, although I know that some actors assert that they can. However, what can be done relatively easily is to induce a certain feeling that readily results in tears. If people use such a “trick,” this would mean that the tears are seldom if ever false, but rather that the induced feelings are not appropriate to the context. The tears themselves are “real.”

## Different kinds of crying

In Chapter 2, I distinguished between different kinds of crying based on attachment theory, and noted that sad tears are more likely to evoke positive reactions than protest crying. More or less in the same vein, the American psychologists Leah Warner and Stephanie Shields demonstrated that the kind of crying might be an additional important determinant of the type of reaction to crying, especially in men (Warner and Shields, 2007). More precisely, men who merely well up with tears were perceived more positively than those who actually shed tears and sobbed when they cried. Comparable findings were obtained in the study among football players described earlier, where just being tearful was viewed much more positively than a more extreme reaction (Wong et al., 2011). In men, moistening of the eyes is probably evaluated so positively because

it signals that they have intense feelings, while at the same time still being in control. No such differences in reactions to moistening of the eyes compared with shedding tears and sobbing were found for women.

At least part of the “moist-eye male advantage” may be due to stereotypical suspicions about women’s tears. Because male crying is exceptional, it is probably perceived as more genuine. In contrast, women are regarded as having more control over their tears, and are therefore also considered to be more capable of crying in order to manipulate.

Male emotional displays are thus generally more strongly associated with emotional intelligence, sensitivity, and adequate social skills, whereas in women they are more often linked to lack of control, vulnerability, manipulation, and not being fit to do one’s job. Although sadness is generally considered to be a weak emotion and anger a strong one, the typical female tears of anger are perceived as very negative, whereas male tears of sadness are generally evaluated very positively. However, Warner and Shields (2007) emphasize that specific emotions in themselves are not inherently strong or weak, but rather it is important who displays them, with what intensity, and in what conditions. They point out that the context is at least as important as the emotion per se.

## Tears and social bonding

As was described in Chapter 3, because our ancestors lived outside the safety of the jungle, there was an increasing need for them to form social bonds and communicate with each other, thereby increasing the potential for mutual protection and collaboration. This may have served as a driving force for the development of language—both body language (including tears) and normal language, both of which facilitate mutual understanding and collaboration. Anthropological studies (see also Chapter 8) also suggest that ritual weeping may, among other things, stimulate social bonding and coherence. What is the evidence, if any, that this social bonding is a specific effect of tears and not of any other very intense emotional expression? The Belgian social psychologist Bernard Rimé and his research group demonstrated that, in general, the greater the intensity of the emotions that are shared with others, the greater the emotional intimacy that is experienced (Rimé et al., 2011). This does not seem to be a really unique feature of tears, but the special power of crying is probably that, more than any other kind of emotional expression, it is regarded as an *honest* display of very intense emotion. In addition, it is interesting that crying and the sight of tears may stimulate the release of oxytocin in observers, which promotes nurturing and prosocial behavior.

Little empirical evidence in support of this idea is currently available, but there are a few interesting observations. The neuroeconomist Paul Zak has recently conducted a study which suggests that, probably mediated by oxytocin, watching a sad movie may stimulate generosity (Barraza and Zak, 2009). The same researcher also assessed oxytocin levels in a couple during their wedding and in some of their guests (Geddes, 2010). Oxytocin levels were markedly elevated in guests who were very close to the couple. This of course raises the question of whether it is individuals with high oxytocin levels who are more likely to shed tears during such events.

Finally, watching “moral” video clips was found to stimulate the release of oxytocin in a study of new mothers, who showed more breast milk leakage and more caregiving behavior after watching a “moral” video than after watching a comedy (Silvers and Haidt, 2008).

Does this mean that being exposed to crying or tears stimulates people to behave more prosocially and to feel more strongly connected with others? This would partly explain why ritual weeping is such a widespread phenomenon, occurring in many non-western cultures and

in many different forms, not only during funerals, but also during a number of other significant events when it is important that people feel connected with each other (Dissanayake, 2008).

As we shall see in the next chapter, the effect of tears may fit the notion that, in many cultural groups, there exist symbolic variants of crying (in particular lamenting and singing) that are also used to stimulate feelings of social bonding.

## Factors that determine the reactions of others

The conclusion so far is that the reactions of people to crying and tears can vary considerably. Does integrating all of the research findings and insights presented here make it possible to predict how people will respond to the tears of others? What are the decisive factors?

To come to a better understanding of which factors play what roles, it might be helpful to make use of existing models that have been designed for related purposes. More specifically, in my opinion the following two models that were developed in order to study the reactions of observers to pain expressions, and a third model that was developed to examine the reactions to emotional music, can yield useful insights.

Canadian psychologists (Craig, 2009; Prkachin and Craig, 1995) have developed a model of pain expression, making explicit the factors that influence the process of decoding of pain expressions, and the reactions of others to these expressions. The relevance of the effects of pain perception by others for crying is supported by the finding that if an observer is shown someone in pain, it is not the sensory components of the pain network in his or her brain that are activated, but rather the affective components. This demonstrates that being shown others in pain elicits affective distress, which subsequently may serve to motivate the observer to provide comfort or succor. With some minor adaptations, this model may also be useful for the identification of factors that are relevant in the process of decoding and interpreting emotional distress and crying. Prkachin and Craig explicitly mention the skills and sensitivities of the observers and their dispositions, which may result in certain cognitive biases. For example, they describe how suspicions of malingering may upset and even enrage health professionals. Chief among the observer variables are previous personal experiences or shared knowledge about emotional experiences, and one's ideas about the specific nature and background of the pain. Also of major importance is the ability of the observer to differentiate between his or her personal affective responses and the experiences of the other person. If this distinction cannot be made, the observer may run the risk of easily becoming overwhelmed by the distress, resulting in helplessness, which may prevent an adequate professional response.

Of further interest is an empathy model, also developed by pain researchers (Goubert et al., 2005), which makes a distinction between bottom-up processes (i.e. information derived from the person in distress and the context) and top-down processes (i.e. observer characteristics, relationship with the person in distress, attitudes, etc.).

A final helpful model is the so-called “commotion” model that was introduced by Klaus Scherer (Scherer, 1998). This model nicely illustrates how an observer of an individual in an emotional situation can be emotionally moved because of three possible influences—the emotional event, the moved individual (*empathy*), and the specific emotional expressions of that person (*contagion*).

Each of these three models places emphasis on certain specific factors. Merging these models seems to yield a very valuable model, with the following factors as decisive elements:

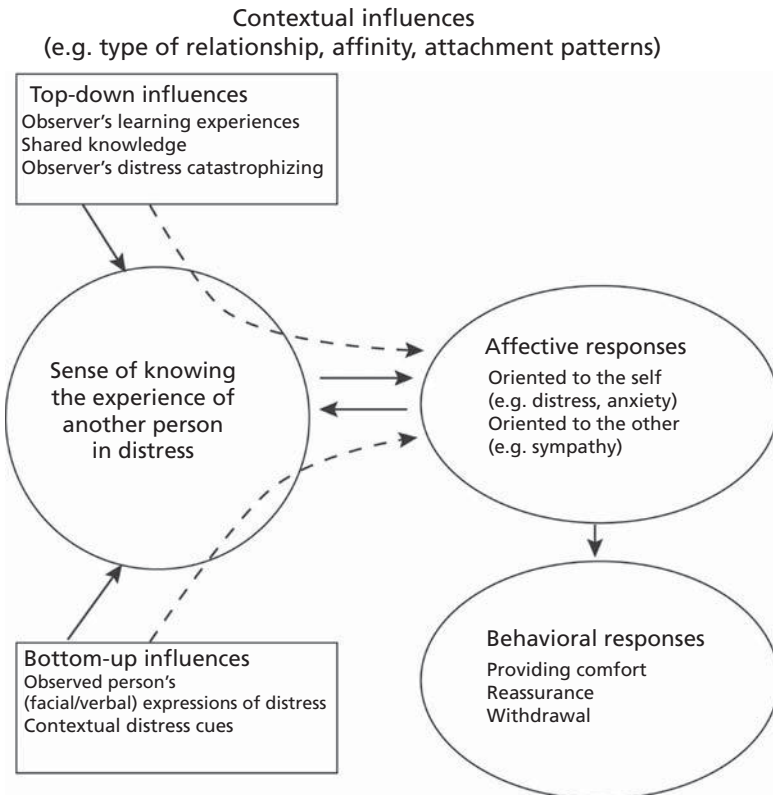
- ◆ *the situation*: this concerns not only its objective characteristics, but also whether the observer is participating in the situation. In addition, at a different level, the more broad



cultural setting should be taken into account. A crucial element is whether or not it is felt appropriate to cry in such situations, probably with the observer him- or herself as a reference

- ◆ *the characteristics of the crying person*: age, gender, personality, status, whether they are a patient or someone asking for help, etc.
- ◆ *the characteristics of the crying*: protest crying, sad crying, mere tearfulness, etc.
- ◆ *the characteristics of the observer*: age, gender, personality, professional status, etc.
- ◆ *the characteristics of the relationship between the observer and the crying person*: for example, whether it concerns a communal relationship (e.g. friendship, intimate relationship), exchange (e.g. business relationship), or professional help provision (e.g. physician, psychotherapist, etc.) (Clark et al., 1996).

In the future a more refined model needs to be developed that can yield testable hypotheses, to help to advance our understanding of the varying reactions to crying and their determinants. Figure 7.3 shows the outline of such a model (an elaborated version of Goubert et al., 2005).



**Fig 7.3** Model schematically representing the specific factors that may influence the perception of a crying individual and the resultant responses. Adapted from/Based on Goubert, L., Craig, KD., Vervoort, T., Morley, S., Sullivan, MJL., Williams, AC de C., et al. Facing others in pain: The effects of empathy. *PAIN (R)* 2005 Dec 118 (3), pp. 285–88, figure 1. This figure has been reproduced with permission of the International Association for the Study of Pain (R) (ISAP(R)). The figure may not be reproduced for any other purpose without permission.

## Conclusion

The general picture that emerges from the limited scientific research and real-life anecdotal evidence is that tears generally may induce empathy and positive feelings in others, and stimulate the provision of emotional support, while at the same time inhibiting aggressive impulses. However, this is dependent on the considerations and evaluations of the observers, who must first be convinced of the appropriateness and genuine nature of the tears.

The bottom line of such considerations will probably be whether the crying is appropriate. A related question is whether the observer him- or herself would also cry in a similar situation. If the answer is “yes,” the crier may expect positive reactions. However, if the answer is “no,” negative reactions are more likely. Tears seem likely to be more acceptable and viewed as more appropriate in situations which are beyond the crying person’s control and are not caused by the crying individual him- or herself.

The reason why tears have such a strong power to influence others is that they are regarded as an honest signal. Probably this is also the very reason why perceived “misuse” of tears can elicit such extremely negative reactions.

One of the factors that plays a role in the appraisal of (the appropriateness of) tears and the crying individual is culture. In the following chapter, the focus will be on the similarities and differences in crying among different cultures.

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## Chapter 8

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# Culture and crying

To be human is to weep. The human species is the only one in the whole world of animate nature that sheds tears. The trained inability of any human being to weep is a lessening of his capacity to be human—a defect that usually goes deeper than the mere inability to cry. And this, among other things, is what American parents—with the best intentions in the world—have achieved for the American male.

(Ashley Montagu, 1967)

When, in 1542, Native Americans in Texas welcomed shipwrecked Spaniards, they cried for over half an hour. Initially, this was interpreted by the Spaniards as an expression of sympathy and understanding. However, after having stayed with this tribe for quite a while, the Spaniards came to realize that, for this people, crying was part of their normal greeting custom. Furthermore, when it concerned acquaintances who met occasionally, they wept for about half an hour before speaking to each other (Harbsmeier, 1987; Surralles, 2003).

Similar greeting ceremonies have been described for the Tupinambá Indians of the Brazilian East Coast in the sixteenth and seventeenth century (see Box 8.1). The traveller—whether he is a tribe member returning after a long journey, or a foreigner—is first led to the hut where he is to live. Subsequently, the women gather round the hammock in which the traveller has been laid, cover their faces with their hands and engage in an impressive act of tearful crying. They lament their deaths and all the tragedies that they and their community have been struck with, but also the many dangers that the traveller has undergone in order to reach his destination. After a while the crying and lamenting stop, and the traveller has the opportunity to relate his experiences to those gathered around him.

Travellers, missionaries, soldiers, and anthropologists since the sixteenth century have reported the remarkable custom of tearful greeting (Harbsmeier, 1987; Surralles, 2003). It has been described among a great number of South American Indian tribes, but also in North America, Australia, India, and the Andaman Islands (in the Bay of Bengal). In addition, some

### Box 8.1 Welcome of tears

As soon as the traveller has arrived at the Moussacat house (Moussacat means “the household head who feeds the visitor”) which he had chosen to be his host, the traveller must sit down in a cotton bed [hammock] hanging in the air and wait quietly for a while. Soon afterwards women appear, surround the hammock, squat on the ground and, covering their eyes with their hands, cry. With their tears they welcome the visitor whom they profusely praise (de Léry, 1578).

When a visitor of the Tupinambá tribe enters their home, they honour him by crying. As soon as he arrives, the visitor is seated in a hammock; and without speaking, the wife, her daughters, and friends sit around him, with lowered heads, touching him with their hands; they begin to cry loudly and with an abundance of tears (Cardim, 1665).

An earlier description of the Tupinambá also paid attention to these welcome rituals. When any of them or their foreign friends arrives, they immediately offer him a cotton hammock. The women gather around the visitor and with their hands covering their eyes and grasping him by the legs, they begin to cry with shrieks and marvellous exclamations. This is one of the strongest signs of courtesy they can show their friends (d’Abbeville, 1614).

commentators on the book of Genesis have described crying as part of a greeting ritual of some tribes, although in most of these cases it may be more likely to concern the display of emotions related to reunion.

There is some disagreement among anthropologists about how these tears should be interpreted. Initially, these greeting ceremonies were regarded as simply the Native Americans’ way of welcoming travellers. However, more recently, several other explanations have been put forward. For example, is the crying a certain way of begging? Or is it the expression of sincere happiness? Or did it in some cases reflect remorse for possible former crimes against the conquistadors? Or does it just reflect sympathy? It was further suggested that, in the case of crying to greet foreigners, the latter might have been regarded as spirits of recently deceased tribe members. Finally, some have speculated that this tearful greeting ceremony might be related to what the Native Americans do with their dead.

The prevailing concept of crying is that it is a uniquely and specifically human behavior, which is deeply rooted in our nature and has a biological basis. In our western culture it is regarded as an involuntary and honest behavior. However, this conceptualization is difficult to reconcile with the following observation. When asked to demonstrate their welcome tears, the tribe members sat down and effortlessly started to weep real tears. Occasionally their weeping was discontinued—for example, so that they could prepare food—but when they had returned and joined the others, the crying immediately started again.

Such observations have fuelled the debate on this issue, and led the British social anthropologist Sir James George Frazer to conclude that every instance of ritual-weeping-as-greeting of “primitives” is nothing more than “a simple formality attended with hardly more emotion than our custom of shaking hands or raising the hat,” comparable to our social smile, which also lacks any connection with real feelings (Frazer, 1919). Apart from that, it can nevertheless be concluded that weeping-as-greeting is a quite remarkable phenomenon that is not known in most western cultures.

## Universalism versus relativism

Among cross-cultural psychologists, anthropologists, and historians there is disagreement about the extent to which observations collected in different cultures can be compared meaningfully. Two major perspectives on the relationship between culture and human behavior are *relativism* and *universalism* (for historians the equivalent term is *presentism*) (Rosenwein, 2010). Universalism and presentism share the idea that our present-day western-world emotions are the same emotions as those of the past and of other cultures, and they will also remain those of the future. In contrast, in relativistic approaches, human behavior, including the experience and display of emotions, is seen as the product of the culture in which it is found, and its major claim is that a specific behavior can only be understood within the context of a certain culture. Advocates of relativism speak of emotions (both the experience of them and how they are expressed) as *social constructs*, to indicate that those found in one society are not necessarily present in others. According to this view, rather than being a unitary and universal phenomenon, emotions are predominantly shaped by culture, which implies a large degree of plasticity, and consequently variation in human emotional nature.

For crying, this implies that it also has no inherent meaning, and cannot be understood or explained outside its direct social context. Studying it as a universal human phenomenon makes little or no sense, according to this view. Thus if we see a crying individual depicted in a fifteenth-century painting, or we read about welcome tears, we need to be very careful about interpreting that behavior with reference to our own culture and current norms.

In contrast, the *universalistic* approach emphasizes that all humans, all over the world, in all time periods basically share the same range of feelings. Emotions are seen as part of human nature—universal, internal states that result from our common evolutionary development. Cultural influence and variation are moderate at best, and mainly concern occasional differences in overt behavior (e.g. the way that people behave in specific social situations), not the underlying emotions.

The best-known advocate of the latter position is the American psychologist Paul Ekman, who in the late 1960s demonstrated that members of preliterate New Guinea tribes recognized emotional facial expressions on photographs of white people nearly as well as participants from Brazil, Japan, and the USA, and vice versa (Ekman, 1973). These and other findings led Ekman to conclude that people all over the world share at least a set of innate “basic” emotions (sadness, happiness, anger, disgust, fear, and surprise). He further postulated that these feelings are experienced and expressed in a very similar way in different cultures. Although several of Ekman’s colleagues have challenged the applied methodology and the interpretation of his findings (e.g. Barrett, 2006; Russell, 1995), this work is still considered to form the empirical basis of universalism and presentism. However, there is currently room for a less extreme form of universalism, in which the existence of certain “dialects” is accepted, to acknowledge that emotions expressed by members of one’s own cultural group are better recognized than those expressed by members of other cultural groups.

Most readers will probably agree that the above-mentioned greeting rituals with abundant crying leave little doubt that there exist remarkable cultural differences in crying, supporting the relativist view. However, I feel that one important aspect is often overlooked, which prevents me from simply concluding that there are important cross-cultural differences in crying. The reason for my reluctance is as follows. In Chapter 5, I demonstrated that we mainly cry in private settings, with no strangers present. Crying in public settings is, generally speaking, rather exceptional. The point I want to make is that differences in crying among cultures mainly concern crying in



the public context, whereas the cultural differences in crying in intimate settings, which are by far the most frequent occurrences, may be minimal or even non-existent.

## Private and public crying

What exactly is meant by the statement that major cultural differences in crying exist? Does this concern the frequency of crying, whether people in one culture cry more or less often than those in another culture, or whether they cry for different reasons, as the above examples suggest? Do people from different cultural backgrounds also differ in the extent to which they have control over their tears? Do tears in different cultures convey different messages, or are there very different attitudes and beliefs about tears, and how and when to use them?

The answer to the last question is an unqualified “yes.” Throughout the many boxes in this book I have illustrated how, in other cultures and at various times in the past, people may have had very different opinions about and attitudes towards crying to those we currently hold in the western world. The mere fact that, in our culture, we never shed tears when we welcome travellers or when we meet acquaintances (unless this happens during a reunion, when we have not seen each other for a long time), and that chief executives of large companies in our culture, unlike those in Japan, will never shed tears at press meetings in front of many cameras when asking for forgiveness because of their company’s serious failures, leaves little doubt about the existence of cross-cultural differences (for another Japanese example, see Box 8.2). However, what all of these situations have in common is that they concern *public* situations. We know little if anything about the crying of nations and of exotic tribes in *intimate* settings—in the privacy of one’s own hut, igloo, or house, alone or only in the company of close family, with no strangers present. It is my conviction that cultural differences in crying (in terms of frequency and antecedents) will be far less extreme in such situations.

There is also another significant fact. In no culture have tears been formally declared taboo, and in several cultures there are intriguing examples of links between tears and special powers (Lutz, 1999). When compared with other body fluids, such as saliva, blood, urine, sweat, bile, mucus, and pus, the only ones not regarded as impure, dirty, threatening, or evoking disgust are tears (and occasionally semen) (Douglas, 1966).

Anthropological research has mainly or even exclusively demonstrated major differences in public crying as compared with our western standards (e.g. Ebersole, 2000; Lutz, C., 1988;

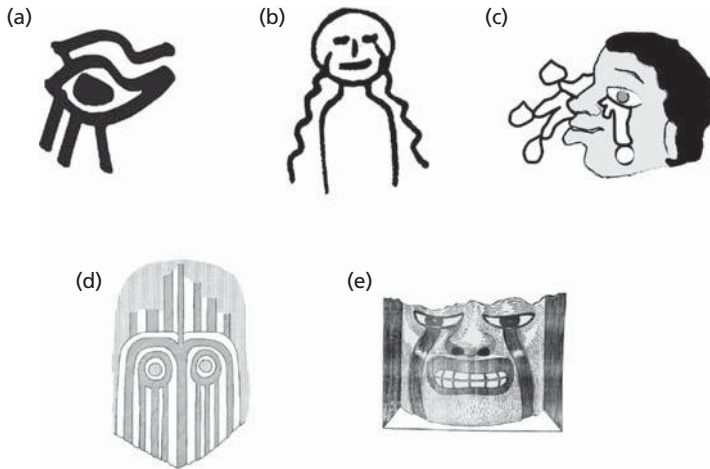
### Box 8.2 Crying bars in Japan

Japan is regarded as the prototypical example of a culture of emotional restraint. However, this typical Japanese attitude now seems to be getting progressively weaker, to the extent that crying has been embraced by this country of inhibited emotions. It is called the “crying boom.” The Japanese nowadays are eagerly looking for some sadness in their lives. Instead of going to a karaoke bar after work to wind down, business people watch sad films at “crying bars.” Afterwards they feel refreshed and emotionally cleansed. Some prefer to watch tear-jerkers in the company of others, so that they can share their feelings afterwards. Special “crying clubs” have even been formed, such as the Minnade Nako Kai in Kyoto and the Lachrymal Gland Club in Sendai. After having participated in their meetings, the attendees typically report a great sense of well-being. There is currently also huge demand in Japan for sad TV dramas and books, each graded by its ability to induce tears.

### Box 8.3 Crying in the Aztec culture

Among the Aztecs, tears always accompanied requests of any kind, and were very effective in achieving goals. This was not limited to a particular class. People with status and power also reinforced and supported their requests with tears. To cite some examples, a provincial ruler would shed tears in front of the emperor when requesting his aid, and suspects would cry in front of a judge in a trial or tribunal. In the sixteenth century, Aztecs also cried profusely before Spanish priests when asking for baptism.

In addition, the shedding of tears was closely linked with thanksgiving and other social exchanges. Furthermore, when the nation was under threat or when the army had to admit defeat, the communal weeping reportedly reached levels of almost mass hysteria. Tears shed by children also played a significant role in rain rituals. Their crying and tears, when offered to the rain god Tlaloc, were considered to have an important role in preventing drought in the next harvest season (according to Ian Mursell/Mexicolore). Finally, weeping gods were worshipped in several South American cultures (see also Figure 8.1).



**Fig 8.1** The pictorial representation of crying (humans or gods) in different cultures. (a) Egyptian hieroglyph. (b) North-American Sioux Indian symbol. (c) Mexica/Aztec culture. (d) Easter Island culture. (e) Pre-Inca culture (Peru).

Lutz, T., 1999; Wellenkamp, 1995) (for a description of weeping in the Aztec culture, see Box 8.3). In one culture, the public display of tears may be abundant, whereas in other cultures crying in public is strictly forbidden, except in very specific circumstances. How one cries may also vary considerably, from silent, expressionless tears to loud weeping and wailing, or continuous or convulsive sobbing. Ritual crying, weeping processions, and excessive crying during prayer by saints and mystics demonstrate substantial variation in both the quality and quantity of crying (Lutz, 1999). In some cultures, people also use other behaviors (e.g. special ways of singing) as a substitute for crying to express their sadness and distress in public. Culture thus appears to dictate these crying styles, and when they should or can be used.

## Cultural differences in infant crying

The study of crying in infants and babies with different cultural backgrounds may help to provide more insight into the possible role of socialization processes. Studies that have addressed this issue have not yielded a very clear and consistent pattern of findings, although caregiving practices may influence the amount of crying (e.g. Barr, 1990; Camras et al., 2003). European American infants have been found to express more distress than Japanese children, but later studies failed to replicate these findings. In one of the most recent and methodologically rigorous studies, the crying of European American, Japanese, and Chinese 11-month-old infants was compared (Camras et al., 1998). The applied arm-restraint procedure, which involved a female experimenter holding the infant's wrists immobile for up to 3 minutes, elicited crying more quickly in girls than in boys. More relevant to the current chapter was the observation that the American infants cried significantly sooner than the Chinese infants, with the Japanese babies falling in between. In addition, the procedure was discontinued for five American infants, four Japanese infants, and just one Chinese infant.

However, even studies such as these do not completely rule out the possible influences of early mother–child interaction. When observing differences in crying among infants, one should not be too quick to conclude that these differences provide evidence of the existence of genetic differences. For example, the differences in crying might perhaps be related to differences in health status, the safety of the environment, the availability of food, and/or the availability of an experienced caregiver or parent, and how they interact with their children. To illustrate this point, a study of the crying of babies of the Bofi farmers and foragers of Central Africa demonstrated that Bofi farmers' children exhibited high levels of fussing and crying when abruptly weaned, whereas Bofi foragers' children did not display such marked signs of distress (Fouts et al., 2005). These differences can probably be explained from an evolutionary perspective, on the basis that the reproductive interests of parents and children may conflict when the parents want to have more children, whereas the existing child is benefiting from a lack of competitors, and wants continued parental attention and resources for itself alone. This same conflict can explain the use of temper tantrums and other psychological weapons by infants in an attempt to ascertain parental investment. However, in this specific case, broader differences in cultural schemas and social relationships probably play a role, such as child-rearing practices, gender inequality, and communalism (i.e. placing the expectations of clan and extended family above individual interests).

The literature contains plentiful examples of large differences in the reactions of parents to infant crying (cf. Lutz, 1999). In some cultures, parents discourage infants from crying by punishing them at the first sight of a tear. In contrast, the Kogi people of Colombia ignore the crying of their babies (Reichel-Dolmatoff, 1950). Even if their babies cry desperately, no action is taken by the caregivers to comfort them in any way or to satisfy their needs for food, warmth, or physical contact. There are also examples of cultures in which the crying of children is dealt with rather inconsistently and unpredictably, depending upon the adult's whim. Even beating and slapping children for crying has been described in other cultures (e.g. Gladwin and Sarason, 1953). To what extent this influences adult crying and attitudes towards crying is unclear. However, in the case of the Kogi it seems to result in a strong decrease in crying, which at a more advanced age is replaced by a rather stoical endurance of all these hardships.

Some researchers consider crying to be a kind of learned language—an extension of a culture's native tongue. In fact the American researchers Sara Harkness and Charles Super, who have investigated crying in East Africa, believe that learning when and how to cry shows many

parallels with the learning of a language (Harkness and Super, 1996). There is an underlying biological basis of emotional expression (the lexicon) upon which the social rules and norms (the grammar) of crying are imposed.

The way that infants cry may also be dependent on the culture, or more specifically on language characteristics. As already mentioned in Chapter 4, this close link was demonstrated in a German study that showed remarkable differences in the crying of babies of German- and French-speaking mothers (Mampe et al., 2009). This is caused by the different intonation patterns in the two languages, which are perceived while still in the uterus and are later reproduced. Within just a few days after birth, babies thus have already adapted their linguistic production to their target mother tongue, guided by the acoustic input that they perceived in the uterus. The melody of the German babies' screams usually began loudly and at a high pitch, followed by a downward inflection, while the French babies more often screamed a rising melody. In both cases they reproduced precisely the intonation patterns that are typical of their respective mother tongues.

## Grief and crying

Even in the case of the strongest antecedent of crying worldwide, namely the loss of one's partner, culture occasionally seems to overrule the natural grief reaction (Rosenblatt et al., 1976). For example, the normal behavior for a Japanese widow on learning that her husband has died in combat is to smile, because this is considered to be an honorable death. In addition, crying might increase the risk of being perceived as a weak individual, which may result in being ignored or even socially rejected.

Grief ceremonies, such as the "tangi" among the Maoris of New Zealand or the tearful enactments by the Bosavi of New Guinea, are intended to communicate heartfelt feelings (Kottler and Montgomery, 2001). A Maori tribe member once explained that it would be rude to simply tell someone that one feels sorry for his or her loss at a funeral. "If you truly feel their pain," he said, "then show it with your tears." Anything less would appear rude and insensitive. Thus the sharing of tears in this setting communicates and strengthens the solidarity of the community. However, careful observation of the grief ceremony revealed a more complex picture. The people who attended these ceremonies appeared to cry in two global ways, depending on their relationship with the deceased. The family members and other intimates did indeed cry rather excessively, but those less close to the deceased tribe member wept in a way that could best be described as contrived and little more than the equivalent of our "polite words."

Paul Rosenblatt and his co-workers have investigated grief and mourning in 60 societies (Rosenblatt et al., 1976). In 32 societies, men and women were found to cry with the same frequency in this situation, whereas in the remaining 28 societies women shed more tears. Note, however, that this concerns crying in a very extreme situation—if not the most extreme one can imagine. This research group further demonstrated that, with few exceptions, funeral rites in all cultures include openly crying. Only the inhabitants of Bali rarely cry, even when bereaved or in pain. However, public crying involves much more than just grief.

## Ritual weeping

Ritual weeping occurs on widely differing occasions. The social anthropologist Alfred R. Radcliffe-Brown distinguished the following categories of "ceremonial" weeping, in addition

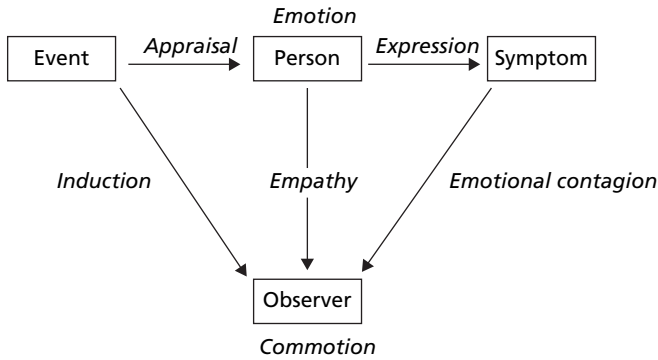
to crying as a spontaneous reaction to sadness (Radcliffe-Brown, 1922). Tears are not only shed at the end of the period of mourning after a death, immediately after the death of a friend, or when bones are exhumed for a second burial, but also when friends or relatives meet again after a period of separation, at the conclusion of a peace treaty between former enemies, at weddings, and at initiation rites. What these situations all have in common is that the people involved are always together with relatives, tribe members, or (new) friends. Thus this crying is clearly a social act that is performed as the occasion requires. Rather than being an involuntarily behavior that is difficult to control, shedding tears is part of the behavioral repertoire of these people that is postulated to express feelings of social bonding and solidarity between individuals. Crying therefore forms an integral part of a social system.

Anthropologists generally agree that this ritual weeping is best regarded as a sign that the people involved feel united and experience a social bond with each other. As stated by Radcliffe-Brown (1922), the function of these public tears is “to affirm the existence of a social bond between two or more persons.” In the same vein, it has been suggested by Greg Urban that wailing is a communicative stylized expression that is not primarily intended to signal feelings of loss, but rather the desire for sociability (Urban, 1988). One wants to communicate to others that one has the socially correct feelings at the socially prescribed times. It is interesting that this ritual weeping is not necessarily a predominantly female behavior. In most cases there is equal involvement of both sexes. However, it is not always easy to make a clear distinction between real and ritual weeping. Probably both kinds of tears may be shed during funeral and wedding rituals, representing real sadness, and the bride’s reflection on her past and future, respectively (see Box 8.4). The historian Gary Ebersole describes ritualized weeping as “a culturally choreographed act, a stylized, not spontaneous, expression of an emotion,” having no connection with real feeling (Ebersole, 2000). Rituals meet cultural requirements and rules in public settings. Ritual weeping is never a private act, but it typically assumes an audience. Others’ appraisal of lamenting emphasizes that it concerns an authentic channelling of intellectual, physical, and emotional responses to losses that helps the mourners involved to cope better with their experiences. The collective weeping aims to achieve certain common goals that go far beyond what private subjective emotion can fuel.

However, before too hastily concluding that this weeping has no connection with real feelings, it might be useful to briefly mention here the “commotion model” of Scherer and Zentner (2001)

### Box 8.4 Bridal tears

Crying during wedding ceremonies has been documented in many cultures at many points in history worldwide, as described by, among others, the well-known Finnish anthropologist Edward Westermarck (Westermarck, 1925). In ancient Hindu cultures, crying was an essential part of the marriage ritual, and in classical Sparta and ancient Rome the bride was expected to shed tears. Even today, proverbs in many cultures refer to the necessity or importance of these tears. For example, in Germany there is a prevailing belief that the bride’s weeping is auspicious, and that tears shed during the ceremony will bring luck during the marriage. Similar views have been expressed in other cultures—for example, “She who cries not before, must cry afterwards” and “Laughing bride, weeping wife; weeping bride, laughing wife.” In the former Soviet Union, much value was attached to the bride having a good cry, and the more tears that were shed, the greater was the admiration of the bride’s friends. In many cases the ceremonial tears of the bride were associated with former practices that involved the capturing of brides, forcing them to leave their parent’s house very abruptly.



**Fig 8.2** The model of Scherer and Zentner (2001), which represents both “normal” emotion induction via appraisal (upper part), and “commotion” induced by emotional communication processes such as empathy and emotional contagion (lower part). Similar processes may be at work during ritual weeping. Reproduced from Scherer, K.R. and Zentner, M.R. Emotional effects of music: production rules. In: P.N. Juslin and J.A. Sloboda (eds) *Music and Emotion: theory and research*. pp. 361–92. © Oxford University Press, 2001, with permission.

(see Figure 8.2). Although this model was originally developed to aid understanding of emotions in response to music, it might also help to explain ritual weeping. The model emphasizes that there are in fact three different kinds of stimuli that may induce tears in individuals who are participating in rituals:

- ◆ there is something happening that has some connection with emotions and specific feelings
- ◆ the participants can also feel empathy for the other people involved
- ◆ when some people are already crying, the observer can also be subject to emotional contagion (Hatfield et al., 1994).

These three factors together may explain why people, in particular in small communities where they all know each other, may cry in situations that from a more objective viewpoint would not appear to have much, if any, emotional impact on them. Finally, for the sake of completeness, one could further argue that there is at least some evidence for the previously discussed Jamesian notion (see Chapter 6) that the expression of emotions (and certainly crying) may induce or facilitate the experience of feelings. These arguments all challenge the idea that ritual weeping has no connection with real feelings.

This might be an appropriate place to clarify my ideas about pseudo-tears. I seriously doubt whether it makes sense to distinguish between “real” tears and “pseudo”-tears. I do not deny that some actors can produce pseudo-tears, but it is my belief that most often pseudo-tears are elicited by a specific emotional memory that induces “real emotional” tears, but that emotion often does not have any connection with the situation in which the individual finds him or herself at that particular moment. In other words, if I am right, all tears are *real* tears, but they are not necessarily *sincere* tears.

## The multiple functions of ritual weeping

In order to understand ritual crying, one also needs to have insight into the cultural aspects and meanings of specific events. For example, crying during funerary rites should not always be regarded only as the expression of sadness—it may also serve a number of other important

functions. For example, it may be proof of the popularity of the deceased, and people's appreciation of them. It might even be a sign of the status of the deceased and their family, which may be reflected in the number of mourners and the intensity of the lamentations. In classical Athens, for example, the rule was that the more crying and lamenting there was, the better loved and appreciated was the deceased (Van Wees, 1998). Tears of lamenting women were thus a kind of yardstick displaying one's status. The consequent strongly competing mourning rituals eventually took such excessive forms that the lawmaker Solon felt obliged to abolish excessive emotional display in an attempt to prevent funerals from degenerating into fights, inciting feuds between rival families.

However, the crying and tears of the mourners might also be interpreted in other ways, being beneficial for the well-being of the deceased. For example, in some times and places the tears were considered to be helpful in effecting the spiritual rebirth of the deceased. In addition, in some cultures tears were believed to help the dead on their journey through the dry underworld, whereas in other cultures it was thought that tears might prevent the souls of children from entering heaven.

In modern Greek laments (Patton and Hawley, 2005), mourners are still incited to weep sufficient tears, as follows:

Why do you stand there ... like strangers?  
 Why do your eyes not run like a river?  
 So that tears become a lake and make a cool spring  
 For the unwashed to be washed, for the thirsty ones to drink.

Thus there seems to be a gradual transition between real emotional expression and more ritual wailing or lamenting. How each relates to the other depends on the specific culture and the goals of the laments. For example, in traditional Yemenite–Israeli communities a major function of wailing is merely to release emotional inhibitions (Gamliel, 2007). When mourners are exposed to the professional wailers, their sadness is released. This is important, because weeping is generally believed to result in happiness, calmness, and “cooling off.” Wailing can be described here as speech set to “music” that causes tears to flow. In addition, because the bereaved join the audience of a ritual performance, there is also a social aspect, which facilitates social adjustment.

From an ethological perspective (Dissanayake, 2008) it can be understood how, through a process of *ritualization*, separation calls and typical baby talk of mothers, as voiced when interacting with their infants, can undergo major developments. Characteristic of the process of ritualization is that existing signals are made maximally effective for unambiguous communication, which results in attention, sustained interest, and emotions. In this way these behaviors foster bonding of couples as well as cooperation and coordination among group members.

According to Dissanayake (2008), “proto-music” thus evolved to facilitate our human way of life in relationship with others. This explains why music currently engenders emotional states, sometimes accompanied by tears—such as fellow feeling, comfort during personal loss and pain, affirmation of common humanity, and intimations of transcendence—that are not easily reducible to mere self-gratifying pleasure. This fits the general idea that, in many animal species, elements of infant and/or parental behavior have served as sources for ritualized affiliative and appeasement behaviors in adults (e.g. courtship feeding, infantile cries in courting male hamsters, licking of the dominant animal's mouth, etc.).

What is also important is that, during human evolution, hominid brain organization eventually enabled what evolutionary psychologists refer to as *decoupling* and *metarepresentation* (Dissanayake, 2008). This means that, instead of reacting to events as they occurred or following

the promptings of instinct, ancestral humans at some point could remember past events that were desirable or undesirable, and then attempted to control (i.e. recreate or avoid) them in the future. One result of this metarepresentative ability was the invention of religious ceremonies (rituals), which were typically intended to influence supernatural agents to act in beneficial ways—ensuring success in endeavors such as hunting and warfare, healing the sick, achieving or maintaining prosperity, avoiding evil, securing fertility, successfully passing from one stage to another, and so on. According to Dissayanake, religion, like music, is a universal characteristic of humans, and rituals form the basis of all religions. Even when such rituals failed to achieve the intended goal, at least two other positive effects were always obtained, namely reduction of individual anxiety and unification of the group. Support for this notion is found in the perceived increase in ritual activity at times of environmental stress, such as changing climate, competition with invaders over resources, etc.

Note that the ideas of Chip Walter (discussed in Chapter 2) on the role of tears in the evolution of mankind (Walter, 2006) nicely fit this anthropological conceptualization of tears. This author postulated that tears have contributed to the social development of the human race. However, if this is really the case, one may question how it is possible that there are also many cultures in which no tears are shed on such occasions, but where there is still evidence of mutual affinity and solidarity. It seems that tears represent a very important way to express and stimulate social bonding, but at best they are only one means of doing this. This is a recurring theme in the study of ritual wailing.

For example, ritual wailing of tribes in Brazil in particular is used to express feelings associated with loss and separation, while at the same time representing a strong desire for sociability (Urban, 1988). Here the difference between real crying and wailing is rather subtle. It has been proposed that wailing, because it is not “diluted” by individual differences, is actually a very strong and clear signal, since it is the use of a socially proper means of expression, under the socially appropriate circumstances.

Wailing or laments can be combined with specific gestures and music. This occurs, for example, in eastern Finland and Soviet Karelia, among other areas (Tolbert, 1990). In this culture, only women perform the laments (“crying with words” as opposed to “crying with the eyes”), which have their roots in worship of the ancestors and classical Eurasian shamanism. Typical occasions are funerals and weddings, but occasionally laments are also performed when old friends meet after a long separation, or as a complaint about the hardships of life. Laments are important for the deceased or, in the case of a wedding, for the bride. They serve to ease the transition from deceased to ancestor or from bride to wife. In the case of a loss, the lament further acts as a bridge between the worlds, guiding the soul of the deceased to the land of the dead.

These are again examples of “emotional expressions,” and are not just considered to be a display of one’s feelings. In this case, laments are regarded as the communication between the two worlds, which serves to restore social and individual equilibrium. It is notable that these laments have great power to make others—even the most hard-hearted person—weep. By provoking these strong grief reactions, solidarity and social connectedness are promoted. From lamenting to real singing is just a small step. Indeed, crying, lamenting, and singing seem to lie on one single dimension. There are several examples of cultures where people sing rather than cry when exposed to sad situations. Note, however, that mass weeping is not a phenomenon that only existed in the past or in exotic cultures (for some examples, see Box 8.5).

## Alternatives to weeping

In cultures where the public display of emotions via tears is not socially acceptable, there are alternative ways of expressing one’s negative feelings, in particular singing. For example, it is



## Box 8.5 Mass weeping

Mass public crying is not a phenomenon of the past or limited to faraway cultures.

One has only to recall the widespread public mourning in England when Princess Diana died. The country had not experienced such extreme displays of grief before. In the USA, the presidential election victory of Barack Obama also evoked strong emotions, often accompanied by tears, especially among black people, ranging from politicians to entertainers and working-class people. Both men and women, young and old, wept and danced in the streets. In December 2011, the whole world witnessed what has been described as a show of mourning in North Korea, during the funeral ceremony of the “Dear Leader” Kim Jong-il. This particular emotional display raised questions about the precise nature and sincerity of the abundant tears.

In addition, on a much smaller scale, similar events occur in western countries. One compelling example is the public weeping of people attending the closing of the Carnival, which can be observed in several cities in the southern Netherlands and in some regions of Germany. The official closing is typically accompanied by the ritual removal of a symbol (usually a kind of puppet representing Carnival) by burning it or tossing it in a river. This final act is often accompanied by excessive weeping among those present, many of whom are under the influence of alcohol. It is probably a combination of a low crying threshold (due to sleep deficiency and alcohol intake), a sense of social connectedness, emotional contagion, and the ending of a period of communal celebration of this feast that causes the flowing of tears.

well documented that the Nepalese Yolmo Sherpa use special songs to express a specific feeling of “sadness,” “abandonment,” and “isolation” (*tsera* in the local language), which is a typical product of the social embeddedness marking Yolmo personhood (Desjarlais, 1991). This emotional state is only confided to one’s closest relatives, whose company provides the best antidote. The major problem is, of course, that the most appropriate people to whom to communicate one’s *tsera* are, by definition, those who are not present.

Yolmo women are more likely to suffer from *tsera* than men. In particular when getting married, which involves moving to an unfamiliar village, they are deprived of the intimacy of their own family, resulting in *tsera*. These songs seldom communicate personal negative experiences in a direct fashion, but rather they focus on communal experiences. Words like “we,” “I,” or “you” are implied, but are never explicitly uttered. Yolmo women not only express their sadness via these songs, but also they indirectly reproach those who inflict it. The communal singing of these songs with other women is considered to facilitate mutual support and create a bond, probably in many respects similar to the ritual mass crying that is observed in other cultures. Even during the Yolmo funerary rites, the open expression of sadness is rare. Tears are reserved for some very specific times during ceremonies with music, dirges, and dances.

The Minangkabu people in Indonesia are also absolutely forbidden to cry or to display any signs of sadness (Navis, 1984, cited in Heider, 1991). Their alternatives are either to take their problems on a private journey or to sing about their troubles. However, in reality such prescriptions or display rules are not always obeyed. The people in this culture also react tearfully to sad events, in the same way that we do.

Social feeling and display rules (Ekman and Rosenberg, 1997; Kotchemidova, 2005) that prohibit or permit crying may vary considerably within a culture, depending on the specific

situation. For example, in some African cultures, boys who are undergoing circumcision are forbidden to cry, because on that occasion they must demonstrate courage and manliness (Lutz, 1999; Mhlahlo, 2009). However, when they experience any other kind of pain in everyday life, they are encouraged by their mothers to wail their lungs out as a call for help.

Among the Toraja, who live in Indonesia, it is also taboo for adults to cry audibly (Wellenkamp, 1992; 1995), except in two very well-defined situations. They are allowed to cry after a death (during the funeral or a secondary ritual burial), and women are allowed to cry when they fail to become pregnant. In the latter case, the affected woman is expected to cry with other women at a special rock that is said to be inhabited by a spirit, as a kind of remedy for infertility. The prohibition against crying in this culture is as important as the ban on adultery and profanity. This does not mean that crying does not occur in private situations, such as marital quarrels or separations. However, in such cases one has to make a sacrificial offering to atone for violating the prohibition.

These examples of display rules suggest that, in several communities, the expression of negative emotion via crying is strongly regulated, especially in comparison with the expression of anger. The background of prohibitions is not always clear, but on the other hand the institutionalization of weeping (or laughing) together or of displaying substitute behaviors, such as singing, indicates that much value and power is attributed to these ritual behaviors.

## Public displays of emotion: practical issues

The previously described examples vividly illustrate the existence of huge cultural differences in predominantly public crying. Such differences are not just of academic interest. Lack of knowledge and respect may prevent an adequate mutual understanding and collaboration among cultures.

The following examples illustrate this point. Dutch medics working in a hospital in Afghanistan noticed that the local people there generally seemed much tougher than the Dutch. Because they almost never cried, it was very difficult for the Dutch health providers to estimate how much pain they were experiencing and whether they needed analgesics.

A second example has been provided by the Dutch transcultural psychiatrist Frank Kortmann, who related how his Ethiopian students reacted to a documentary video report about a Dutch florist who was diagnosed with a very serious type of cancer (Kortmann, 2010). This diagnosis caused much distress to the patient, which he expressed by crying intensely and profusely. Whereas Kortmann was emotionally upset when he saw this film for the first time, to his astonishment the Ethiopian students responded with loud laughter when the florist shed so many tears. The psychiatrist was really shocked, embarrassed, and angry, especially when the students thanked him for the very enjoyable and entertaining evening. When he asked them what they had found so amusing, they explained that, in their view, the florist expressed his emotions in what they considered to be a really hilarious and exaggerated way—not as one should expect from a “real man.”

Yet another example can be found in a survey of an aid organization (Luyendijk, 2006). Palestinians and western expatriates were asked to select pictures that, for them, best symbolized the intifada. This request yielded some notable discrepancies in the responses of both groups. Whereas the western expatriates generally placed an emphasis on sadness, and consequently selected pictures of mourning mothers, crying children, and damaged property, the Palestinians, in contrast, clearly favored pictures of marching martial men with their fists held high. In Palestinian culture, a public display of tears is considered to be a clear sign of weakness, and should therefore be avoided.

The association of shedding of tears with weakness also explains the major differences between Palestinian and Israeli (or western) funerals. Whereas Israeli funerals are characterized by the typical western features of sadness, serenity, and controlled speeches, Palestinian funerals, in the view of western people, can best be described as being characterized by chaos, hysteria, and a complete lack of control, not infrequently accompanied by the expression of anger and aggression. These typical “mourning” behaviors, which western people find difficult to reconcile with sadness, do not benefit the Palestinians in terms of public relations. These are not the behaviors that easily evoke sympathy and understanding in western cultures. However, for Palestinians the shedding of tears in public is inhibited by the cultural assumption that weeping and crying are manifestations of weakness and inferiority. Mourning and crying are activities reserved for the private domain, at home, with no strangers present.

These are just a few examples which demonstrate that different ways of perceiving and dealing with emotions, including crying, may impede a mutual understanding, as well as having the potential to promote prejudice and fuel stereotypes that contribute to the creation of cultural gaps that are not always easy to bridge. Another aspect of this reluctance to express physical and emotional pain by crying is that it may prevent refugees and immigrants from different cultures from receiving adequate professional medical and psychological assistance.

## **Cultural differences in crying: systematic research**

As I emphasized in Chapter 1, researchers in general have not generously and enthusiastically embraced crying as a topic of investigation. This seems to be the case to an even greater extent for cross-cultural psychologists. Although the relationship between culture and crying aroused the interest of crying pioneers such as Charles Darwin (Darwin, 1872) and the American psychologist Alvin Borgquist (Borgquist, 1906), there has subsequently been hardly any interest in comparative studies on crying. Darwin not only directed attention to the psychological and physiological aspects of crying, including the question of which facial muscles are involved, but was also the first to speculate about cross-cultural differences in the prevalence of crying. In his view, in western cultures, and England in particular, crying was far less common than in non-western cultures. To illustrate this, he referred to observations by Sir J. Lubbock, who reported how a New Zealand chief wept like a child because sailors had spoiled his favorite cape by powdering it with flour. He further noted that among the “civilized nations of Europe” there were also great differences in crying. On the other hand, he also observed some remarkable similarities. For example, he concluded that it was considered weak and unmanly by men of both “civilized and barbarous races” to express bodily pain by any outward sign such as weeping, but he added that there could be circumstances in which crying by men was not condemned.

In a similar way to Darwin, Borgquist (1906) also collected observations and descriptions of crying episodes from missionaries and ethnologists in various regions of the world. A comparison of these reports with those obtained from 200 American colleagues led him to conclude that there were remarkably few differences. However, in line with Darwin’s conclusion, he did note some dissimilarity in the crying frequencies among cultures, as witnessed in his statement: “Tears are more frequently shed among the lower races of mankind than among civilized people” (Borgquist, 1906, p. 180). He based this claim on the relatively numerous references to crying in writings about Latin, black, Indian, Japanese, Samoan, Sandwich Island, and Maori people.

Darwin (1872) and Borgquist (1906), together with Sigmund Freud (1930), shared the conviction that the process of civilization was responsible for the increased restraints on the public display of emotions, including crying. However, one may question whether these scholars were

aware of emotional life in western Europe just a few centuries earlier (see Chapter 13). Historical studies involving the analysis of personal accounts, diaries, and letters have revealed major fluctuations in emotional experiences and expression depending on, for example, religious rules and the philosophy of life in a given time period (Bayne, 1981; Lutz, 1999).

In the eighteenth century in particular there was a major shift from melancholy to positive mood. Sentimentalism had its heyday during the Age of Enlightenment, which typically was associated with the publishing of many tear-provoking novels, while paintings and theatre in this period were also more likely to provoke sadness and tears than joy and laughter (Kotchemidova, 2005). Tears were then associated with a noble soul and, even when confronted with injustice, backbiting, and unreasonableness, both the Catholic and the Calvinistic Church preached that one should react with sorrow rather than anger. Thus in France, Germany, and the early modern Anglo-Saxon world, little effort was made to address unfair situations. Rather, passive resignation and sadness prevailed. This culture of sadness waned when the human agency gained value, which was linked to the modernization of society and the increasing importance of individualism. The first signs of this new development were seen in the Age of Enlightenment when, again fuelled by religious developments and ideas from moral philosophy, there was the beginning of a movement towards “good cheer” and mental well-being. Thus it seems as if Darwin, Freud, and Borgquist all lacked historical awareness of the major changes in emotional life that had occurred in previous centuries.

After the pioneering activities of Darwin (1872) and Borgquist (1906), it was more than 80 years before any new initiatives were developed by psychologists to study cultural factors and differences in crying more systematically. Probably the first of these was a study in which American and Hungarian students were asked to keep crying diaries (Szabo and Frey, 1981). It appeared that the Americans reported more frequent crying than the Hungarians. For male students, the frequencies were 1.5 vs. 0.7 times per month for Americans and Hungarians, respectively. American women scored an average of 5.3 crying episodes per month, whereas Hungarian women scored 3.1 episodes. More recently, the crying of British and Israeli students and faculty staff was compared (Williams and Morris, 1996). This study also yielded substantial cultural and gender differences. Female British respondents estimated their annual crying frequency to be 31.7, whereas Israeli women reported a mean estimated frequency of only 17.4. For men these figures were 8.4 and 4.8, respectively. In a previous comparable study, female American students estimated their annual crying frequency to be 47.8 times per year, whereas the men reported a mean frequency of 6.5 episodes per year. Thus Israelis report a remarkably low crying frequency. The investigators wondered whether this infrequent crying in Israelis was related to the fact that everyone in that country receives a military training, which focusses on becoming more stress resistant. In the American army it is also commonplace for men, as part of their training, to be adjured never to shed any tears. Rather, they are trained to steel and numb themselves to repress any feelings of pain and loss. American soldiers suffering from homesickness who cried a lot were, in the past, often ridiculed and perceived as weak (Matt, 2007, 2011). Note that, with this in mind, the tears that were readily shed by General Norman Schwarzkopf (see Chapters 5 and 7) are even more remarkable!

A final example concerns a study that compared Asian and Anglo-American students at a public university in California, which found no systematic differences in crying (Lombardo et al., 2001). How should we interpret these findings? Should we conclude that such differences do not exist? Do immigrants quickly adapt their crying behavior to the host society? Is it possible that only adults with a traditional lifestyle from different cultures differ in their crying? How representative are students? Does it make sense to talk about country averages? What do we know about the role of background factors in terms of urban versus countryside living?

A recent British study (Fox, 2004) did indeed reveal some remarkable regional differences in crying, more specifically in the antecedents. For example, the break-up of a relationship and an argument with a partner both elicit more crying in London than in Scotland (47% vs. 31% and 33% vs. 15% for women and men, respectively). On the other hand, men in Scotland are reported to be more likely to cry at the birth of a baby and at weddings than men in London.

All of the studies that have been undertaken to date have serious limitations, and it is unclear what can be concluded from these findings, because little more is known apart from crying frequency estimates. In addition, all of the studies were severely limited in terms of their theoretical underpinnings. There is merely the observation of a certain difference, but the interpretation and theoretical relevance are often not explained. Nor is it clear why only two specific countries have been compared. The model that I shall introduce in Chapter 9 to help to explain individual differences and gender differences in crying might also be useful in this context. For an adequate understanding of cross-cultural differences in crying, one should take into account factors such as possible differences in exposure to emotional episodes, appraisal processes, and social learning and display rules (Van Hemert et al., 2011). In addition, one should consider possible differences in the crying threshold (e.g. due to genetic variation).

Is there any evidence for cultural differences in the antecedents of crying? These seminal cross-cultural studies by Klaus Scherer and Harald Wallbott (Scherer et al., 1988; Scherer and Wallbott, 1994; Wallbott and Scherer, 1986) demonstrated that the reported frequencies of sadness (not necessarily crying) provoked by empathetic experiences differed considerably among countries, with high frequencies reported in the UK, Israel, Spain, and Italy, and low frequencies in France, Switzerland, and Belgium. Relationship problems reportedly did not elicit sadness in Israel to the same extent as they did in the European countries. The Japanese respondents reported the death of someone close to them in only 5% of all sadness antecedents, whereas for the European and American respondents more than 20% of all sadness was provoked by the death of someone close to them. These examples suggest that substantial differences exist between countries in the amount of exposure to emotional situations, as well as in the appraisals of situations. However, what we do not know is how crying in all of these different cultures is related to sadness and other emotions.

There are also substantial differences in wealth, disease prevalences, and the occurrence of adverse events, such as the death of children, between countries. In addition, considerable differences in the prevalence of depression have been reported in different countries. Even in countries that are in many respects very similar (e.g. the Netherlands and Belgium), surprising differences in depression prevalence rates have been observed. In particular, depression may be differentially expressed in different cultures. In non-western countries, it is often manifested by somatic problems relative to psychological and behavioral symptoms (Goldberg and Bridges, 1988). Moreover, there is evidence which suggests that the way that depression influences crying also depends on prevailing cultural norms with regard to emotional expression (Chentsova-Dutton et al., 2007). Interestingly, in some cultures crying may also be regarded as a specific behavior, linked with a certain personality make-up (see Box 8.6). Finally, in modern western cultures the popular notions that crying is healthy and not always a sign of weakness may have contributed to the more frequent display of tears in these cultures. Similarly, the increasing acceptance of the psychological expression of distress is reinforced by the dissemination via the popular media of expert knowledge about clinical syndromes to non-professionals. Individuals in modernizing countries “learn” the symptoms and start to express these to healthcare professionals (Van Hemert et al., 2011). For example, a Mexican study demonstrated that women who were educated about the premenstrual syndrome subsequently reported more

## Box 8.6. The crying personality

Among the people of Ifaluk, a small coral atoll in the South-West Pacific, individuals are described in terms of personality types. Some of these descriptions pertain to emotion and temperament. In addition to the two most common types, namely *sigsig* (meaning “hot-tempered” or “always angry”) and *garusrus* (which denotes nervousness and anxiety proneness), there is a third type—*tangiteng*—that specifically describes the tendency to cry very easily. It is considered normal for all adults to cry when someone has died or left Ifaluk for a while, but individuals who are *tangiteng* tend to experience many stronger emotions—both positive and negative. This holds in particular for the feelings referred to as *fago* (compassion, love, and sadness) and *ker* (happiness and excitement). The main reason for children being *tangiteng* is the emotional state of their mother. Remarkably, although women are described as *tangiteng* more often than men, when individuals are asked to name a specific example of a person who is *tangiteng*, almost without exception they cite men (Lutz, 1988).

premenstrual symptoms than women who were unaware of the existence of the phenomenon (Marvan and Escobedo, 1999).

In conclusion, finding differences in crying frequencies between two or more countries is one thing, but the meaningful interpretation and explanation of such differences is the real challenge. A wide range of factors can be implicated in the observed differences. Therefore insight can be gained by investigating the relationships between crying and possible relevant country characteristics. This was part of the rationale of our International Study on Adult Crying (ISAC) (Becht and Vingerhoets, 2002; Becht et al., 2001; Van Hemert et al., 2011).

## The International Study on Adult Crying

In the context of the ISAC project, my collaborators and I developed a comprehensive crying questionnaire based on my model of adult crying (see Chapter 1), and subsequently translated it into several languages, including Nepalese, Chinese, and Icelandic. We collected data from student samples from 37 countries all over the world. Data were obtained from 2497 men and 3218 women. In addition, we collected all kinds of information about the participating countries, ranging from mean annual temperature and gross national product (GNP) to personality scores, depression, religiosity, and civil rights (Van Hemert et al., 2011).

We also looked at possible differences in the magnitude of gender differences in crying. One major aim was therefore to explore systematic associations with specific country characteristics, including wealth and freedom of expression. In addition, the focus was on country differences in the extent to which the respondents reported mood improvement after crying (Becht and Vingerhoets, 2002).

We compared crying frequencies between countries from two different perspectives (Van Hemert et al., 2011). The first perspective considered crying as an *expression of distress*. This notion would predict a negative relationship with wealth, because in less affluent countries, generally speaking, people are more deprived in several respects, and therefore may be expected to have more reason to shed tears. According to the alternative view, crying was regarded as a form of expression and communication that is generally under the strong influence of cultural norms

and display rules. In that case, one would expect more crying in modern, western cultures where there is more freedom to express one's emotions.

Finally, we tried to identify country-specific elicitors of crying (Becht et al., 2001). In other words, are there countries or cultures where there may be specific situations or feelings that are strongly linked with crying, while such a relationship is absent in other countries?

## Crying frequency

We found substantial differences in mean male and female crying frequencies (based on the time since the last crying episode). Most male crying was reported by participants from Australia, New Zealand, and the USA, whereas the least male crying was reported by participants in countries like Nigeria, Malaysia, and Bulgaria. Most female crying was reported by women in Sweden, Chile, and the USA, while women in Nigeria, Ghana, and Nepal seemed to be most restrained in their crying.

Generally speaking, countries that are more tolerant of self-disclosure and have less strict rules about "public" behavior appear to tolerate and show more crying behavior. Crying is therefore more common in cultures where there is greater freedom to express individual feelings, thoughts, and emotions (both positive and negative). Thus more tears are shed in the more affluent countries, where, almost paradoxically, people also report more happiness. At the country level there is therefore no link between crying and distress. In addition, moderate positive associations were found with GNP, civil rights, power distance, and extraversion.

A further remarkable finding was the strong negative association between crying frequency and average annual temperature, indicating that more tears are shed in colder climates than in warmer ones. It was found that students in northern countries cried significantly more often than those in African countries. This seems to contradict previous findings that in warmer countries people are more emotionally expressive (Pennebaker et al., 1996).

What makes the interpretation of these findings rather complex is that these countries differ not only in terms of temperature and climate, but also with regard to many other socio-economic factors. As already mentioned, crying is also positively associated with subjective well-being, extraversion, wealth, political freedom, and individualism. If crying is viewed as a mere symptom or a sign of distress, it is difficult to explain why people who live in more affluent countries tend to shed more tears than those who reside in less affluent countries, or why women who live in countries where they have equal rights with men cry more often than women who have less power. Does this reflect the fact that the western lifestyle is so challenging and burdensome, especially to female students, that these relatively high frequencies reflect the price we have to pay for our fast-moving and competitive society? Alternatively, such a pattern of findings is also compatible with the idea that crying is chiefly governed by cultural norms about how much freedom individuals have to express their emotions. Thus modernization does increase exposure to crying-inducing situations, or makes people more tolerant of crying, and has a facilitating rather than an inhibiting influence.

In addition to cultural factors such as freedom to express one's emotions, lifestyle might also be a contributing factor. People in warmer countries generally spend more time together with others, often socializing until late out in the streets and in public places, whereas in cold countries there is a tendency to spend much more time at home, alone or only with intimates. Since people cry predominantly within the privacy of their own home, it is obvious that people in colder countries would cry more often. If one adopts this line of reasoning, one would expect that in a country such as the Netherlands, which has very distinct seasons, people might well cry more often in winter, when they live a more Nordic lifestyle (spending much time at home,

reading, or watching television), than in the summer, when they may spend considerably more time outside in the company of other people, which is more similar to the lifestyle in warmer countries. Such a trend was indeed observed, although it failed to reach statistical significance, which suggests that other factors are probably more important.

## Elicitors of crying

To obtain more insight into the potential of various situations to induce crying, ISAC participants rated how likely it was that each of 54 situations and feelings would make them shed emotional tears. Not surprisingly, tragic events and funerals gained the highest scores for both men and women. Watching sad movies or television programmes received the third highest mean score for women. Making love had the lowest average score of all the listed situations, although women rated hearing a happy song even lower.

There were only a few antecedents that showed reliable differences between cultures, namely being ill, praying and other religious activities, hearing the national anthem, and witnessing memorial events. It is probably not a coincidence that, with the exception of being ill, all of the other items involve public situations. This once again seems to support the notion that it is important to make a distinction between intimate crying in the privacy and safety of one's own home, and crying in public settings with many others present.

## Mood improvement

We also asked about the effects of crying on mood, and, more specifically, how in general the respondent's mood was influenced by crying. This revealed that crying is reportedly more likely to result in self-reported mood improvement in wealthier countries where women have equal rights, and in countries where the average crying frequency is relatively high, and feelings of shame and embarrassment when crying are relatively low. In other words, how one feels after a crying episode depends on how common and socially acceptable crying is in one's culture, and on general feelings of shame about crying. In addition, perceptions of gender role patterns appear to play an important part in the experience of mood change. As I mentioned previously, caution is needed when drawing conclusions, because it is not unlikely that this general mood improvement measure represents implicit theories about crying and mood fueled by the media rather than reflecting actual mood improvement.

## Gender differences in crying frequency

We also focussed on the magnitude of gender differences in crying frequency, and again explored associations with country characteristics. This yielded a consistent pattern worldwide in which women reported crying more frequently and more intensely than men. However, gender differences in crying were not of the same magnitude in all countries. In two African countries (Ghana and Nigeria) and one Asian country (Nepal) the gender differences in crying did not reach the level of statistical significance. In other words, there is no strong evidence in these countries that women cry more often than men, as was found for all of the other countries. The size of this gender difference further seemed to be connected with certain country characteristics. Gender differences were largest in wealthier, more egalitarian, democratic, and individualistic countries. Although one might expect that in modern countries, with the increased liberation of women, gender differences in crying would also become smaller, rather than more marked, exactly the opposite situation was found. With regard to crying, women having equal rights thus seems to increase the differences between the sexes rather than reduce it. This substantial cultural



variation in the magnitude of gender differences in crying once again appears to emphasize the major role of cultural factors in crying.

## Implications of the findings

The findings of the ISAC project support the notion that culture can exert its own effect on personal development, including the experience and expression of emotions. In particular, the fact that humans are not born with a fully developed brain, but rather that the brain continues to develop during the first 20 to 25 years of life (or even longer), makes interplay between our biological equipment and environmental factors a major determinant of the kind of person that we are most likely to become. Recent research that has revealed differences in the brain reactions to stressors (more specifically the amygdala and the cingulate cortex) of individuals living in urban and less urban environments also seems to support this view (Lederbogen et al., 2011).

The special plasticity and flexibility of the human brain certainly contribute to our great capacity to adapt to very different environmental situations. In addition, there are the feelings and expression rules that are an essential part of what can be called an “emotion culture”, in which developing children are shaped and socialized, not just in terms of voluntary behaviors, but also probably at the level of what we regard as involuntary or autonomous physiological stress reactions.

The question about the major determinant of our crying behavior (nature or nurture) is of the same order as the question about what determines the area of a rectangle (its length or its width). Both make an important contribution, and it would be a major omission to dismiss the role of one of them. The fact that newborn girls and boys do not differ in crying frequency (but perhaps do differ in crying threshold) is not a valid argument against the important role of biology as a factor contributing to gender differences in crying. Female and male newborns also do not differ in terms of having menstrual periods and lactation, but no one would cite this fact as evidence that menstruation and lactation are the products of socialization. On the other hand, the (presumed) strong involvement of biological processes in a certain phenomenon does not exclude possible cultural influences. For example, in Japan the prevalence of the post-partum blues (the “weepies”) (Eugster et al., 2001; see also Chapter 10) and of vasomotor symptoms in menopausal women is substantially lower than in other cultures (Melby, 2005). Thus, at the brain and somatic level, several biological developments occur, which may be partly influenced by culture.

## Conclusion

The lesson to be learned from this chapter is that a high degree of plasticity exists in human emotional nature and our emotions and the way they are expressed not only have a firm biological basis, but are also shaped by our culture. Emotional expressions, including crying, have no inherent meaning or explanation outside their direct social context, and therefore studying them as universal human phenomena without taking into account the broader social context would have, at best, limited value.

The production of emotional tears, which seems to be an involuntary and purely physiological emotional response, is also shaped significantly by culture. In particular, the situations that make us shed tears, and the extent to which men and women differ in crying frequency (see also Chapter 10), appear to result from an interaction between culture and physiology.

This is again a good place to point out the considerable similarity between crying and laughter and smiling. More specifically, just as there is “genuine” laughter as an expression of joy, and

social laughter, we should distinguish between “genuine” crying and social crying or singing (Dissanayake, 2008). Both laughter and crying are initially attachment behaviors that maintain their primary function in adults to facilitate social bonding and to reduce aggression.

Finally, our recent findings clearly contradict the views of Darwin (1872), Freud (1930), and Borgquist (1906), who claimed that civilization inhibits the expression of emotions by individuals. Rather, the opposite picture emerges, namely that western culture is associated with more open and more frequent expression of emotions. However, in former times the situation was probably different. Culture is not a fixed entity, but rather it is dynamic, and not only is this very dynamic nature reflected in how society appraises and deals with emotions and their expression, but also it appears to exert a significant influence on the emotional responses of people with different cultural backgrounds.

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## Chapter 9

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# Why some people cry more often than others

The only trick the incapable has, are his tears.

(Arabic proverb)

In his book, *The Language of Tears*, the American psychotherapist Jeffrey Kottler addresses individual as well as group differences in crying (Kottler, 1996). He considers social class, education, and occupation to be more important predictors of crying than cultural and religious background, although it is not clear to what extent his statements are based on solid empirical findings. In his view, higher education, a flexible definition of gender roles, and having a people-oriented job all increase the likelihood of crying. With regard to the issue of occupation, Kottler notes that “Therapists cry. A lot. Engineers don’t. Stockbrokers don’t, although they often feel like it. Truck drivers don’t cry (except in country-and-western songs). Soldiers don’t generally cry unless they reach a place of prominence in which they are permitted to do so on behalf of all the others who would like to weep. Nurses cry. Nurses *have* to cry in order to deal with the pain they get so close to. Doctors, however, rarely cry. They insulate themselves from pain—their own as well as that of their patients” (Kottler, 1996, p. 119).

In addition to differences in crying according to occupation and between genders, there are also notable individual differences. Some examples of well-known frequent male criers are King David, Julius Caesar, Maarten Luther, and Winston Churchill. Among women, it is probably the medieval English mystic, Margery Kempe, who deserves the title of crying champion. Her crying episodes could last for hours, and sometimes even days.

Why do some adults cry more often than others? Do children also show similar individual differences? How can such individual differences be explained? What about fluctuations in an individual’s crying behavior? Can the tendency to cry vary temporarily? If so, what factors play a role in that process? Is it possible to determine the normal range of crying? These are the questions that will be addressed in this chapter. Classic conceptions and explanations of individual differences are presented in Box 9.1.

## Box 9.1 Classic conceptions and explanations of individual differences in crying

Probably the most prevalent classic idea about a link between crying and character was that good men in particular were the ones who shed emotional tears. Bad individuals were thought to be considerably less prone to cry. The explanation was that these good men had “soft flesh” and a “soft heart.” Having a soft heart implied civilization, empathy, compassion, and crying easily. When something happened to such an individual, their heart was supposed to contract more quickly and more forcefully. Laurent Joubert further explains that “it is true that weeping is easier for those who by their constitution and nature, or by reason of their age, sex or culture, are weaker and moister, which is why we see phlegmatic people tear promptly, along with children, elderly people, and women.”

On the other hand, it was recognized that there were exceptions to this general rule. In particular, philosophers—including Socrates, Diogenes, and Heraclitus—reportedly never cried. According to Petit (1661), this related to individuals who in some way did not participate fully in society. As a result of their contemplation and philosophical activities they had lost part of their humanity.

However, Petit was aware that there were also examples of tyrants who had shown a high degree of crying proneness. For instance, the emperor Bassianus from Geta had killed his brother, but nevertheless wept copiously every time he heard his brother’s name. Another example is Alexander Phraeorum, also a notorious tyrant responsible for many killings, who often ran away when exposed to dramatic scenes in the theatre that he could not watch without starting to cry.

Petit concluded that the excessive crying of these men indicated that they were basically good, but were the victims of bad external conditions or bad company that had shaped their malicious characters. Interestingly, it was not only the inability to shed emotional tears that was regarded as evidence of a bad character, but also being unable to laugh, spit, belch, or dream.

The medieval Italian jurist Placentinus asserted that bald men hardly ever cried, probably because they were also dry. However, Petit refuted this claim by providing examples of bald men who were known to cry a lot. His favorite example was Julius Caesar, a dictator (and bald), but also someone who wept very easily. Petit further emphasized that excessive drinking of wine is another factor that affects one’s crying proneness.

The multi-faceted German medieval mystic, composer, and herbal expert Hildegard von Bingen also proposed a theory on individual differences in crying. She postulated that fat people cry and laugh easily because they have greasy vessels and a weak heart. Their antipodes—dry individuals with a stony heart—in contrast have a difficult character and do not shed emotional tears. She also emphasized the role of love, which has the potential to weaken a stony heart.

## The magnitude of individual differences

It was once again William Frey and his co-workers who reported relevant research findings by documenting the crying behavior of 286 women and 45 men ranging in age from 18 to 75 years (Frey et al., 1983). During a 30-day period, the study participants kept records of all their emotional and irritant crying episodes. Additional information on the context was collected, such

as the date, time, and duration of the episode, as well as the thoughts, emotions, and events that were considered to have triggered the shedding of tears. Finally, other physical aspects (e.g. “lump in throat,” “watery eyes versus flowing tears,” etc.) were recorded. An emotional crying episode was defined as “the increased production of tears as a result of emotional stress.” An irritant crying episode was defined as “the increased production of tears as a result of direct eye irritation such as chemical (onions) or physical irritants (foreign objects).”

Frey’s study revealed that women reported a mean emotional crying frequency of 5.3 for the 30-day period, with a range of 0–31, whereas men had a mean frequency of just 1.4. Only 6% of the women had no emotional crying episodes in the 30-day recording period, whereas 45% of the male participants indicated that they had experienced no crying episodes. My greatest concern about this study is the unfortunate definition “tears as a result of emotional stress.” It is unclear whether this means that “positive” tears were excluded.

In a very similar study of 97 Dutch female psychology students, who also kept a mood and crying diary throughout two full menstrual cycles (approximately 2 months), we obtained findings comparable with those reported by Frey and co-workers (Bylsma et al., 2011). We found an average of 10.3 crying episodes, with a range of 1–53. This study thus also clearly demonstrates the existence of considerable individual differences in crying frequency.

Many years ago, it was the developmental psychologist Catherine Landreth who focussed, among others, on individual differences in crying among young children (aged 2.5–5 years), who were observed both in the nursery school and at home. She also found considerable individual differences, which were linked to intelligence quotient (IQ) and sleep behavior (Landreth, 1941). More specifically, children with higher IQ tend to cry less frequently than their counterparts with low IQ, whose verbal skills were also generally less developed. Moreover, positive associations were found with the average number of hours of sleep, which suggests that those children who sleep more also cry more often. Perhaps this relationship can be explained in terms of physical well-being, such that children who are not feeling physically well tend to sleep more and to cry more often. The importance of health status was additionally demonstrated by the finding that children who had minor health ailments, such as slight colds, did indeed cry more often.

To gain further insight into the individual differences in both the frequency of adult crying and what makes adults cry, it is also informative to take a second look at our research findings with the film *Once Were Warriors* (see Chapter 5). Showing women such a movie reveals differences not only in the frequency or intensity of crying, but also in the kinds of situations that trigger tears. It appeared that 66 of the 100 participants (with 66 individuals being administered alcohol, as will be described later) reported that they had cried at least once while watching the film. However, as can be seen in Table 4.1, this film contained as many as 15 different scenes that had evoked tears in at least one person. Most crying was reported when the mother in the film found her daughter after she had committed suicide, and during the scenes of the funeral of the daughter (tears were reported by approximately 30–35% of the study participants). Two other scenes that had a relatively strong crying-evoking effect concerned the rape of the daughter and the physical abuse of the mother by the husband (both were reported to evoke tears by approximately 20% of the participants). Thus a wide range of scenes evoked tears, and one may speculate as to whether each individual has their own specific sensitivities, possibly resulting from their unique personal history and experiences.

I myself became most painfully aware of the strength of these individual differences when I prepared a study in which I wanted to collect tears for biochemical analysis. Confident that the film *Once were Warriors* was capable of evoking tears, I recruited 25 women who described themselves as very sensitive and quick to shed tears when watching films or TV. Their scores on our

questionnaires convinced me that this group consisted of really frequent criers. However, when they were shown *Once Were Warriors*, only one out of the 25 women shed tears. When they were asked why they had failed to cry, they explained that the movie was too violent, that they did not want to watch this kind of film, and therefore they had successfully detached themselves emotionally. The situations that easily moved them to tears were reunions, sick children, and, generally speaking, the typical sentimental issues, such as separation or reunion, justice in jeopardy, and awe-inspiring motives. Although this study was in one sense a complete failure, it made me aware that individual differences in crying are strongly related to the successful use of *emotion regulation strategies* to protect oneself effectively against unwanted emotional stimulation. This is a nice example of what is known as *antecedent-focussed emotion regulation* (Gross and Muñoz, 1995), which refers to behavioral attempts (e.g. actively avoiding situations) or cognitive attempts (e.g. reappraisal) to regulate one's emotions. More specifically, an antecedent-focussed strategy for crying regulation might involve avoiding situations that elicit affective reactions associated with crying (situation selection), trying to change such situations (situation modification), shifting attention away from situations that cause crying (attention deployment), or finding a different interpretation of the ongoing situation (reappraisal). In addition, there is *response-focussed emotion regulation*, which refers to attempts to suppress emotional reactions—in this specific case, strategies that target the crying behavior itself, such as suppressing one's tears, trying to look happy despite feeling bad or sad, and trying to breathe normally.

Box 9.2 lists the factors that have been mentioned in the relevant literature or which, in more systematic research, have been demonstrated to play a possible role as determinants of individual crying behavior. The evidence that these factors play a really significant role is not convincing in all cases. In some, it barely reaches the level of anecdotal evidence, which once again demonstrates how little we know about this intriguing behavior. Some factors (age, gender, culture, and neurological disorders) receive detailed attention in the chapters devoted specifically to these issues. However, I have also included them in Box 9.2 for the sake of completeness. I shall now focus on the factors that underlie stable individual differences, and then I will address those factors that may temporarily affect an individual's crying behavior. However, I will start with a short discussion of different crying measures, followed by a brief explanation of how differences in crying between individuals or groups may result from very different underlying processes. For the sake of completeness, it should be pointed out that individuals may of course also differ in crying in response to a specific situation, because of anticipated negative or positive effects of the crying or of the social environment (Tamir, 2009). For example, some possible anticipated negative effects of withholding one's tears might include prolonged or increased negative mood, elevated autonomic activity, and lack of positive support from the social environment. On the other hand, some possible positive effects of emotional restraint might include avoidance of embarrassment and loss of face, demonstrating strong control over one's emotions, less negative affect, and increased physical and somatic well-being.

## Crying frequency and crying proneness

In Chapter 5, I pointed out the important difference between the concepts of *crying proneness* and *crying frequency*. Here I want to introduce an additional term, namely *crying threshold*. This term is closely related to crying proneness, but makes more sense when addressing more temporary changes in crying proneness (e.g. after sleep deprivation or after having taken a specific medication). Such changes in crying proneness possibly, but not necessarily, result in variations in crying frequency.



## Box 9.2 Factors associated with individual differences and temporary or (semi-)permanent changes in crying

### Individual differences

- ◆ Age
- ◆ Gender
- ◆ Genetic factors
- ◆ Temperament or personality
- ◆ Attitudes towards crying
- ◆ Attachment style
- ◆ Socialization and culture
- ◆ Social setting (e.g. living or work situation)

### Temporary or (semi-)permanent changes

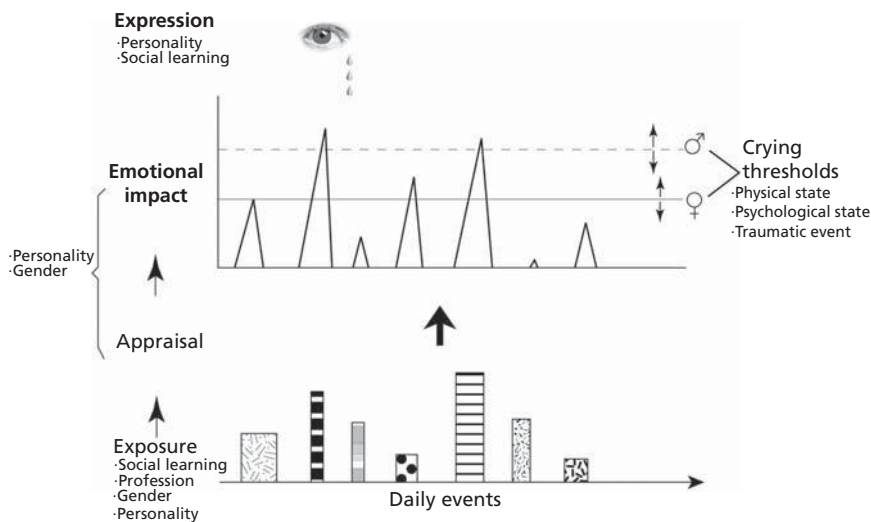
- ◆ Physical state (e.g. hormone levels, sleep deprivation, neurological disease)
- ◆ Psychological state (e.g. depression, anxiety, burnout, homesickness)
- ◆ Substance abuse and medication (e.g. alcohol, cocaine, antidepressants, oral contraceptives)
- ◆ Experiencing stressful or traumatic life events, such as death of a significant other, birth, life threatening disease
- ◆ Being in love/being involved in a romantic relationship

The difference between *crying proneness* and *crying frequency* is, in some sense, very similar to the difference between mood and emotion. The best way to clarify this difference is to make a comparison with the meteorological concepts of climate and weather. The term “climate”—just like mood and crying proneness—refers to a more general, stable condition, whereas the term “weather”—like emotion and crying frequency—refers to the very specific (atmospheric) condition at a particular moment in time. Actual crying is the result of one’s crying proneness/crying threshold and the intensity of some specific stimulation, which may be real (environmental) or imaginary (memories and thoughts). Thus situations that may evoke tears at one moment in time will not necessarily evoke tears at another moment—for example, because the crying threshold is temporarily higher, or because the individual expends more effort on controlling their tears. What are the implications of this for individual differences in crying? Box 9.3 summarizes the classic notions of how emotional expressivity and one’s appearance are mutually related.

## The background of individual and group differences in crying

Figure 9.1 shows that individuals or groups (e.g. men vs. women, depressed patients vs. healthy controls, etc.) may show differences in crying because:

1. they are differentially exposed to emotional stimuli (including memories and thoughts)
2. they appraise (emotional) stimuli in different ways (e.g. due to differences in more stable personality features, or because of previously experiencing certain stressful life events)
3. their crying threshold/crying proneness differs



**Fig 9.1** Schematic model showing the four different factors (exposure, appraisal and resulting emotional impact, crying threshold, and capacity for emotional control) which together determine a person's crying frequency. Individual and group differences can be the result of differences in the influence of any of these factors, and of all possible combinations. Reproduced from Bekker, M.H.J. and Vingerhoets, A.J.J.M. Male and female tears: swallowing versus shedding? The relationship between crying, biological sex and gender. In: A.J.J.M. Vingerhoets and R.R. Cornelius (eds) *Adult Crying: a biopsychosocial approach*. pp. 91–114. © 2001, Taylor and Francis, with permission.

4. they differ in the capacity to control their tears
5. there is any combination of the above.

This model makes it clear that both *more stable* or *trait-like* personal characteristics, such as gender, socio-economic status, social learning practices, education, and personality features, and *less stable, state-like* characteristics, such as physical condition, fatigue, and, for women, the stage of the menstrual cycle and pregnancy, to name just a few, together determine a person's actual crying behavior. In addition, as discussed in Chapter 5, I expect that specific context variables such as time of day, cultural norms and expectations, and the presence of others will be important as facilitating or inhibiting factors for crying in a specific context.

In the following account I shall briefly discuss each of the above-mentioned aspects. First of all it is important to be aware that, to a great extent, humans all create and select their own living environment. Each individual prefers and actively searches for certain situations, while trying to avoid others, thereby influencing the likelihood of exposure to certain emotional stimuli.

This exposure to crying-inducing situations is determined by factors such as gender, profession, and personality. For example, unlike men, many women like to watch tear-jerker films and do not mind crying in response to such movies. In addition, the likelihood of being confronted with sad or otherwise intense emotional situations is relatively high for those in certain occupations (e.g. firemen, policemen, undertakers, and healthcare professionals), who probably all share some specific personality features, whereas those in certain other occupations (e.g. IT specialists, building construction workers, and gardeners) are probably less often exposed to

strong emotional stimuli during working hours. Furthermore, there is evidence that the nature of female friendships differs from that of male friendships in that there is more exchange of intimate information, and more interest in each other's well-being (Dindia and Allen, 1992). Furthermore, women's greater empathic skills might be responsible for their more frequent encounters with emotional events, not only in family contexts, but also in wider social networks and even in society at large (Eisenberg and Lennon, 1983).

In addition to seeking or avoiding emotional situations, other relevant factors include the appraisal of these situations and the ability (or inability) to use certain coping techniques successfully in order to reduce the perceived threat posed by a situation. For example, imagery and distraction may be very helpful in minimizing pain (and preventing consequent crying) in a medical setting.

With regard to the role of personality, following the reasoning of the American emotion psychologist Dachner Keltner, one could argue that in situations involving strong emotions (e.g. the loss of a partner or close family member) the personality factors that inhibit crying are of particular importance and interest, whereas in the case of situations involving weak emotions, the individual difference factors that in some way facilitate the shedding of tears may be of more interest (Keltner, 1996). For instance, let us focus on depression (for an overview, see Vingerhoets et al., 2007). Individuals with this disorder may be more inclined to avoid extrovert people and to seek only the company of peers. They may also prefer to watch sad films and TV documentaries, or listen to sad music, or be more likely to read sad poems or fiction or non-fiction about problematic life situations. In addition, this disorder may make people more likely to appraise situations as more threatening and difficult to cope with than they really are. Finally, these individuals may

### Box 9.3 Facial expression and character

In the early works of the Greek philosopher Aristotle (384–322 BC) and in the writings of Theophrastus (372–287 BC), it was postulated that a person's psychological make-up, character, and intelligence were reflected in their appearance. In the late Middle Ages this idea was taken up again by, among others, the Swiss founder of modern medicine, Paracelsus (1493–1541), who claimed that there was nothing in nature that was not disclosed by external signs. This was also assumed to apply to humans, who were not expected to have any secrets that were not revealed in their appearance, in particular in their face.

What passes in the mind is expressed in the face, and repeated facial expressions were thought to ultimately produce a lasting impression on the flexible parts of the face. Repetition becomes propensity, propensities become habits, and the passions (i.e. momentary responsive emotions) are their offspring.

The best-known advocate of these ideas was Johann Kaspar Lavater (1741–1801), a Swiss theologian and poet, who made a distinction between *pathognomy* (the study of man's passions and his visible but impermanent facial expressions) and *physiognomy* (the study of the correspondence between man's moral character, and his permanent and unalterable facial features).

Pathognomy thus concerns the study of facial expression, as the reflections of emotions through the mobile features—the eyes, the mouth, blushing, cringing, etc. Because these are the features over which people more or less have control, they can be misused by deceitful individuals. Tears were thought to leave traces that could be read like hieroglyphics. The face was thus viewed as a display of one's life history, including all of the tears that one had ever shed.

have a low threshold for showing typical depressive reactions, including crying. Indeed, a subgroup of depressed patients may cry over every minor matter. However, as was demonstrated in the studies by Frey et al. (1983) and Bylsma et al. (2011), “normal” healthy individuals also show wide variation in crying. The following factors can be considered responsible for this variation in crying in the healthy population.

## Determinants of differences in crying

### Genetics

It was again William Frey who first investigated the possible role of genetics in crying. In a study of identical and fraternal twins, he demonstrated that the crying frequencies of the monozygotic twins were not more similar than those of the dizygotic twins, which led him to conclude that factors other than genes determine a person’s individual crying frequency (Frey, 1985). However, results obtained by Gertie Lensvelt and myself suggest that this conclusion requires some scrutiny. Just like Frey, we gathered self-reported crying data for monozygotic and dizygotic female twins. However, a major difference compared with Frey’s study was that we measured both crying proneness and actual crying frequency (in the past month). Consistent with Frey’s results, we also found no evidence in support of a genetic basis for crying frequency, confirming that one’s actual crying behavior is mainly externally or environmentally determined. More specifically, as much as 50–75% of the actual crying behavior was accounted for by external factors, rather than by genetic predisposition (which only accounted for 25–50%). However, crying proneness was found to be strongly genetically determined. These findings thus once again highlight the validity and importance of the distinction between crying proneness and crying frequency.

### Ageing

With increasing age, our lacrimal system undergoes a number of changes, including morphological changes, a reduction in the secretion of proteins, a decrease in the density of innervation, and an increase in the number of inflammatory cells in the lacrimal glands (Sullivan et al., 1990). In addition, the quality and quantity of tear fluid decrease with advancing age, and dry eye syndrome is one of the most common problems in elderly patients who consult ophthalmologists. However, what is currently known about emotional crying in the elderly? Box 9.4 presents some classic ideas about the relationship between crying and ageing, but these may be considered as obsolete.

Does crying behaviour show any systematic changes with increasing age? It has been asserted that the gender difference in crying only, or predominantly, exists during the reproductive years—that is, between the menarche (onset of menstruation) and the menopause. In addition, socio-emotional selectivity theory predicts that, as people get older and are more frequently confronted with their own mortality due to illness or accidents, they focus more on emotion-related issues, emphasizing social bonds and close personal relationships (Carstensen and Mikels, 2005; Carstensen et al., 1999). There is indeed some preliminary evidence that older adults react more strongly to sad films, both in terms of reported sadness and with greater physiological responses, but not with behavioral expressions of sadness (Seider et al., 2011). Furthermore, Sze et al. (2012) have demonstrated age-related linear increases in emotional empathy, physiological responses, and self-reported distress in response to emotional films. Finally, in a study on the meanings of television watching in older adults (Van der Goot et al., 2012), respondents reported an increased emotional sensitivity that occasionally prevented them from watching certain programs which

### Box 9.4 Crying and old age

Old people have long been known for their greater crying proneness, although most philosophers and physicians agreed that old age is typically characterized by coldness and dryness. Galen dealt with this paradox by explaining that old people are dry because of the substance of their body parts, but at the same time they are also humid because of the abundance of excrements, which are accumulated throughout their body because of a lack of natural heat. This is why old people often cough, spit, and shed tears. René Descartes (1649) also noted that both children and old people are more inclined to cry than individuals of intermediate age, although for different reasons. Old people often cry as a result of affection and joy, for these two passions when joined together send much blood to their heart and many vapours from there to the eyes. The agitation of these vapours is hindered by the coldness of their constitution in such a way that they easily turn into tears, although no sadness may have preceded this. When some old people cry extremely easily as a result of being upset, it is not so much the temperament of their body as that of their mind that disposes them to do so. This only happens to those who are so weak that they let themselves be completely overcome by a little pain, fear, or pity. The same thing happens to children, who cry very little from joy, but much more from sadness, even when it is not accompanied by love. For they always have enough blood to produce a great many vapours, which turn into tears as their motion is hindered by sadness. A different view was expressed by the British seventeenth-century physician Walter Charleton, who felt that age plays a decisive role in determining which emotion is linked with crying, because the quality of blood varies with age (an idea that dated back to the humoral emotion theories).

had a high potential to make them emotional. This again highlights the complex relationship between crying proneness and actual crying. Compared with younger people, older adults indeed show stronger emotional reactions to films depicting themes that are especially important to their age group (e.g. the loss of loved ones) (Kunzmann and Grünh, 2005).

Unfortunately, definitive answers with regard to crying cannot yet be provided. Although data on crying in childhood are scarce, there are even fewer data on crying in the elderly. To the best of my knowledge, to date no systematic studies of the development of crying behavior with increasing age have been conducted. Only our research group has collected some cross-sectional self-report data in order to obtain some initial insights into the stability or instability of crying in late adulthood (Vingerhoets, unpublished data). The results of these preliminary studies, however, were not consistent. In an initial study in which nearly 2000 respondents were asked how frequently they had cried in the past 4 weeks, we found no systematic relationships with age in men, whereas women seem to show a reduction in crying proneness with increasing age. There might thus be a kernel of truth in the statement that gender differences in crying mainly exist during the reproductive years; the differences during that fertile period seem to be larger than those at both younger and older ages.

In a second study of an elderly sample, we asked the respondents whether they felt that their crying behavior had changed significantly compared with when they were 20–30 years of age. This yielded some different results for men and women: the majority (65–70%) of both men and women reported that they had not noticed any significant change in their crying behavior. However, it was more remarkable that 4.2% of the men compared with 15.5% of the women reported that they

currently cried less than before, whereas 26.6% of the men compared with 19.0% of the women admitted that they now cried more. In other words, in apparent contrast with the findings described earlier, these results suggest that, compared with women, who report mainly stability or an increase or decrease in crying at advanced age, men also mainly report stability, or an increase, but seldom a decrease in crying. Men who report to cry less as they get older are rather exceptional.

In a final preliminary study of over 4000 respondents, we found systematic increases in self-reported crying proneness between the ages of 20 and 80 years for both men and women, and in response to negative and positive situations. In summary, for the great majority of men and women, with increasing age their crying remains fairly stable at the same level. If there is a change in crying behavior, in women a decrease is more likely than an increase, whereas for men the reverse is true.

However, important limitations of these findings are that they concern retrospective self-reports (raising the question of the extent to which the decrease in self-reported crying is due to increasing memory problems) and that they do not involve longitudinal data, which suggests that the differences may reflect cohort effects that already existed, rather than real developmental changes. In other words, possibly the elderly groups already differed when they were of the same age as the currently younger age groups. Alternatively, the findings may be due to the greater emotional instability on the one hand, and the successful use of certain emotion regulation strategies on the other. As I mentioned earlier, in order to answer the question about the effect of ageing on crying, what is urgently needed is a study in which a large group is followed for several years, repeatedly applying adequate measures to assess their crying, preferably in terms of both frequency and antecedents.

However, even in case of such a longitudinal study, the interpretation of observed changes is not straightforward. It is complicated by the fact that the elderly are of course also subject to cultural influences, just as younger people are. It currently seems to be more acceptable for men to shed tears, and we are more frequently exposed to emotional stimuli via the media than ever before. Therefore if older people report that they cry more often than previously, this does not necessarily reflect a developmental change in crying proneness, but rather it may be the result of cultural changes, including greater exposure to emotional stimuli (via the media) and a greater acceptance of (male) tears.

Some support for this idea was found in a large British survey (Fox, 2004). The results demonstrated that among the respondents aged over 50 years, as many as 63% reported never having seen their father cry, while this percentage decreased to 48% for the respondents aged 30–50 years and 44% for those aged 18–29 years. Of course, caution is needed when interpreting these findings, given the possible effects of memory and the possible greater tendency of parents to hide their tears from their children. However, they are compatible with the notion that a few decades ago men were more inclined to hold back their tears because of the cultural climate in which they were raised (Montagu, 1967).

In addition to establishing the precise changes in crying behavior that may occur with increasing age, it would also be important to learn more about the determinants of these changes. What factors determine whether an individual's crying behavior undergoes a significant change, and if so, what the direction of that change is? Why do some people show an increase in crying, while in others sometimes even chronic inhibition of their tears can be observed?

## **Temperament and personality**

To what extent can or do temperament and personality traits explain inter-individual differences in crying? Since personality reflects, among others things, specific tendencies to experience

and express emotions, it seems plausible that personality at least partly explains individual differences in the shedding of tears. Specific emotional reaction tendencies can be related to personality features in several ways. First, personality may be defined in habitual emotional terms (hostile, sombre, gay). In addition, there is a relationship with how one looks at the world (as either an optimist or a pessimist) and the extent to which one feels connected to others (empathy, social connectedness). These traits are all in turn related to emotion regulation (i.e. exposure to emotional situations, appraisal, willingness and ability to control one's tears, etc.).

William Frey also addressed this issue, but he failed to find any clear systematic links between personality features and crying frequency (Frey, 1985). His extensive set of measures included well-being, social potency, achievement, social closeness, stress, alienation, aggression, impulsiveness, danger seeking, authoritarianism, and absorption (in fantasy), but for none of these variables was a clear relationship with crying frequency found. Since previous findings suggest that crying frequency is to a large extent determined by environmental factors, this may not come as a real surprise. It seems more likely that associations would be found between personality and crying proneness, rather than with crying frequency.

Indeed, investigators have found several meaningful connections between personality and crying proneness (for an overview, see Vingerhoets et al., 2001). Among women they have found significant negative associations between crying proneness and temperament factors, which are more neurophysiologically based person characteristics. This finding thus suggests that crying might be influenced by certain central nervous system properties. Of further interest was the emergence of self-esteem as a significant positive predictor of crying proneness, such that the higher the individual's self-esteem, the greater their propensity for crying. A recent study among American football players replicated this association between self-esteem and crying (Wong et al., 2011). As this research was all based on self-reported data, it remains to be established whether individuals with high self-esteem actually cry more often, or whether they are less reluctant to admit that they sometimes cry than individuals with low self-esteem.

Occasionally, personality concepts have been examined that are more directly related to emotion processing and regulation. For example, we found a negative association between alexithymia and crying (Vingerhoets et al., 1992). People who are alexithymic (from the Greek for "not being able to read one's mind state") typically lack the ability to recognize and experience emotions, and therefore to express them. Their "emotional" experiences are diffuse and undifferentiated, rather unpleasant arousal states, which are sometimes accompanied by sudden crying spells, but overall they cry considerably less frequently than normal healthy people.

The most consistent findings have been obtained for neuroticism or negative affectivity, and hardiness, a concept that reflects stress resistance, which seems in important respects to be the opposite of neuroticism (e.g. de Fruyt, 1997; Peter et al., 2001; Williams, 1982). This relationship with neuroticism concerns not only crying in general, but also very specific crying, such as increased tearfulness in the days after delivery (the "post-partum blues") (Kendell et al., 1984), and the manipulative crying that is used in particular by women (Buss, 1992). Neurotic women thus tend to employ manipulative strategies—such as pouting, sulking, or whining until their partner responds in the desired way—to a greater extent than more emotionally stable individuals.

Furthermore, substantial positive relationships have been found with empathy (e.g. Choti et al., 1987; Williams, 1982; for an overview, see Vingerhoets et al., 2001), which can be explained by the fact that these individuals in particular will tend to cry more often when exposed, either in real life or in fiction (e.g. novels, movies), to the suffering of others. There is also an association between crying and repression, which is another psychological concept that refers to a

maladaptive emotional regulation strategy. Repressors typically deny and do not report distress when they are exposed to stressful situations, although their physiological reactions, such as heart rate or skin conductance, strongly suggest the opposite. No differences in crying were found between male repressive and non-repressive groups, but repressive women scored significantly lower on crying proneness than their non-repressive counterparts. In other words, women who tend to use repressive emotion regulation strategies also tend to suppress crying, perhaps in an attempt to maintain their self-image of emotional control, and to minimize the expression of negative affect. Alternatively, it may be simply their reluctance to admit that they cry that in fact accounts for the difference.

All of the above-mentioned studies were based on self-reported crying proneness, which may not always be as reliable as we would like, due to factors such as poor memory and social desirability. However, there are also some examples of research in which the shedding of tears was assessed directly and thus probably more reliably in a laboratory setting. In one study, personality attributes were assessed and possible crying behavior was carefully recorded while the participants were exposed in pairs to sad films. Among other personality attributes, empathy was positively associated with crying while watching the films (e.g. Choti et al., 1987). In addition, positive associations were observed between film-induced crying and pre-film levels of tension and depression. However, in another study in which depressed patients and healthy control participants were asked to watch a sad film, it was found that the depressed patients were no more likely to shed tears when watching the movie than the healthy controls (Rottenberg et al., 2003).

Facial emotional expressions have been measured during a 6-minute fragment of a bereavement interview about the participant's deceased spouse (Keltner, 1996). Neuroticism was found to be associated with increased facial expression of negative emotion, whereas the researcher anticipated that extroverts would show less negative, sad reactions. This did not seem to be the case. The researcher therefore suggested that extroverts may also show more negative emotions, if doing so promotes positive social contact.

Establishing an association between crying and personality is all very well, but it is of more interest to try to understand *why* such relationships exist. The reasons why people do or do not express certain emotions, and do or do not hold back emotional tears vary widely. Some do not cry because they are not aware of their feelings. Others do not shed tears because they do not want others to see them doing so. Finally, there might be some individuals who do not weep because they actively avoid or filter out emotional stimulation. Thus people who differ with regard to a certain personality feature may also, for very different reasons, differ in crying behavior. In order to gain a better understanding of all these possible explanations, it may be helpful to look at crying in a more systematic way and to make a distinction between the different process components, as outlined in the model described previously.

Personality can be easily linked to the degree of exposure to emotional stimuli, as well as to the appraisal of situations (Bolger and Zuckerman, 1995). Personality features such as optimism, self-esteem, and negative affectivity (including neuroticism, depression, trait anxiety, etc.) probably also affect the appraisal process.

In addition, individuals may differ in the degree to which they experience pressure to control their emotions and their tears, especially in public settings. However, crying has its own dynamics, and is certainly not influenced by all the same factors that determine other emotional expressions. This is best illustrated by the finding that people who live in warmer countries (i.e. those nearer the equator) are more emotionally expressive (Pennebaker et al., 1996) but cry less than people who live in colder regions (Van Hemert et al., 2011; see also Chapter 8). A



second informative illustration is that so-called “type D” individuals (Denollet, 2005), who are characterized by high levels of distress and social inhibition (i.e. a reluctance to express their distress and to share their problems with others), reportedly cry *more* often than those who are not socially inhibited.

Another example of a personality concept, the “type C” personality, which is also characterized in particular by the inhibition of negative emotions, has been associated with a higher risk of cancer (although the evidence for this is weak at best). The main feature of this personality type is the willingness to strive to rise above pain and despair, and to spend much effort in putting on a happy face for the outside world (Temoshok and Dreher, 1992). People with a type C personality thus generally do not allow themselves to indulge in tears. It has been suggested that many of these individuals lost their ability to cry during childhood, because their parents prohibited, ignored, punished, and/or disapproved of this behavior. Although I am not aware of studies that have systematically evaluated the crying of people with this personality type, one would expect that they cry less often than their non-type C counterparts.

Another example, from the mental health domain, is the characteristic behavior of individuals with personality disorders, such as borderline or histrionic personality disorders, who are known for their theatrical and manipulative behavior, which is often accompanied by crying (Alexander, 2003). Personality concepts can thus be linked to the expression (or non-expression) of emotions in general, and crying in particular. However, as has already been stated, it would be unwise to generalize from the general expression of positive or negative emotions to crying in particular.

## Attachment style

As I outlined in Chapter 2, the American social worker Judith Nelson has clarified some meaningful relationships between attachment and crying. In her view, infant and adult tears also carry an attachment message and are meant to trigger caregiving and comforting responses (Nelson, 2005). This author considers crying to be an attachment behavior that maintains its function (i.e. to promote the proximity of the primary attachment figure and to solicit attention or aid) throughout adulthood. In other words, the way that individuals have experienced the bonding process with their early attachment figures (especially their mother) has a continuous impact on how they deal with relationships and stressful conditions.

Psychologists Cindy Hazan and Phillip Shaver distinguished the following four styles of attachment in adults: secure, anxious-preoccupied, dismissive-avoidant and fearful-avoidant (Hazan and Shaver, 1987). Securely attached adults have positive views of themselves, their partners and their relationships and feel comfortable with intimacy and independence. Anxious-preoccupied adults, in contrast, are typically overly dependent and are continuously striving for high levels of intimacy, approval and responsiveness from their partners. They also have less positive views about themselves and their partners and demonstrate high levels of emotional expressiveness, worry and impulsiveness in their relationships. The second group of insecurely attached individuals, the dismissive-avoidant adults, are characterized by a strong need for independence, associated with the tendency to avoid intimacy. They regard themselves as self-sufficient, invulnerable to attachment feelings and not needing close relationships. A further feature is their tendency to suppress their feelings, and distancing themselves from their partners of whom they often have a poor opinion. The fourth group, consisting of fearful-avoidant adults, has mixed feelings about close relationships, both desiring and feeling uncomfortable with emotional closeness. They tend to mistrust their partners and view themselves as unworthy.

Seen from this adult attachment perspective, one thus may expect associations between crying and these attachment styles. Partial support for this idea has been provided by three studies. The first of these compared the crying frequencies of groups with different attachment styles, and found that secure and dismissive individuals reported the least crying, whereas the most frequent crying was reported in the preoccupied group (Bartholomew and Horowitz, 1991). These findings were substantiated by two further studies (Laan et al., 2012) in which similar associations were demonstrated between attachment style and both general crying behavior, and crying specifically in response to music. Preoccupied individuals reported a higher level of more general crying proneness, and longer and more intense crying episodes than the secure and dismissive participants. Interestingly, securely attached individuals also reported more mood improvement after crying compared with the other groups. They also tended to cry more often in relation to positive emotions. Most notable, however, were the low crying frequencies in the dismissive group. An individual's crying behavior is thus related to their attachment style. Very early experiences therefore co-determine how a person will respond emotionally to demanding and taxing situations throughout their life.

### **Attitudes towards crying**

In social and health psychology in particular, the relationship between attitudes and behavior is emphasized (Ajzen and Fishbein, 2000). Although the models in general typically focus on voluntary behaviors, such as health and/or economic behaviors, given the postulated role of automatic processes in the activation of attitudes and behavior, one may nevertheless also speculate about a link between attitudes towards crying and crying behavior. We asked Dutch volunteers in a test panel about their crying frequency and their attitudes, normative beliefs, and perceived control in relation to shedding emotional tears (Vingerhoets, unpublished data). The questions concerned their appraisals of crying ("Do you like crying?" and "Does it make you feel ashamed?"), and addressed their ideas about the consequences of crying for the person shedding tears ("Does it improve mood?" and "Does it facilitate coping?"). Finally, the perceived appropriateness of crying when experiencing different emotions was assessed.

The analysis of the relationship between these attitudes and the participants' crying behavior revealed that these factors were more relevant for women than for men, and were more strongly associated with crying proneness than with actual crying frequency. More specifically, factors such as dislike and feelings of shame were both negatively correlated with female crying tendency in particular, mood improvement was positively correlated with crying tendency in women rather than in men. These results therefore suggest that actual crying behavior, certainly in men, has little to do with attitudes, whereas the crying proneness that is experienced does.

### **Temporary changes in crying**

Until now the focus has been on factors that may be important as determinants of habitual crying behavior. However, our crying behavior is not a stable, fixed feature. It can temporarily be severely affected by a variety of factors. In some circumstances it seems as if our crying threshold is very low, whereas at other times we can hold back tears in situations that, in normal circumstances, would cause us to weep profusely. What is known about the factors that may temporarily influence our crying behavior? I shall now briefly review what I consider to be the most important factors.

### **Sleep deprivation and physical state**

As any mother knows, infants and children cry more readily when they are tired or have not had sufficient sleep, but this probably does not only apply to infants. Many adolescents and

adults also know from their own experience that just one night of poor sleep may be sufficient to make them more emotionally labile and to reduce their control over their tears (Dahl, 1999). In our ISAC project, the female respondents in particular were reportedly aware of the role of their physical state (and especially hormone levels). Does this influence also partly explain why approximately 40% of all adult crying occurs between 07.00 pm and 11.00 pm? This is the time when we are most likely to be feeling tired and worn out after a hard day's work, resulting in a lowered crying threshold.

Several studies have yielded data which suggest that a chronic lack of sleep is associated with the development of mood disorders, and perhaps also vice versa (Holsboer-Trachsler and Seifritz, 2000). Moreover, animal studies have demonstrated that sleep deprivation induces emotional lability and increases stress reactivity. In particular, the role of the amygdala—the brain structure involved in emotional responses—has been emphasized. In Chapter 3, I explained that the prefrontal cortex in particular has an inhibitory effect on the activity of some parts of our emotional brain, including the amygdala. A recent human functional neuroimaging study, in which the activity of the brain was monitored, has revealed that sleep deprivation weakens these inhibitory influences of the medial prefrontal cortex (Yoo et al., 2007). This decrease in inhibitory impulses may subsequently lead to increased and uncontrolled activity of the brain structures that are involved in emotional responses, resulting in increased emotionality. Since destruction of the amygdala in animals leads to a flattened affect and fewer distress vocalizations (Newman, 2007), it is plausible that this brain structure is involved in the increased emotionality and crying that occur after sleep deprivation. Whether the amygdala is also involved in the tearfulness that is caused by tender feelings is a very interesting but as yet unanswered question.

In women in particular, it has been suggested that “raging” hormones play a major role in emotionality. Crying episodes and tearfulness are mentioned as the most characteristic symptoms of both premenstrual syndrome and menopausal problems, both of which are conditions associated with major changes in the female hormonal make-up (Collins and Landgren, 1994). Pregnancy is another condition that may affect emotionality and lower the threshold for crying, and this applies in particular to the “baby blues” that often occur during the first few days after delivery. Men seem to be less aware of the influence of hormones on their emotions, unless they are treated with anti-hormones (e.g. prostate cancer patients). These issues will receive more attention in Chapter 10, which considers gender differences in crying, and Chapter 11, in which the relationship between crying and health is discussed.

Although a distinctive role for hormones is often suggested, especially in the popular literature, there is little or no evidence for it, simply because researchers have failed to investigate this very specific issue (Hibbs, 2008). A hormonal imbalance may affect a person's emotionality and crying proneness, but detailed information is lacking. As we have already seen several times previously, one needs to be extremely cautious when generalizing from increases in emotionality and even crying proneness to real crying.

## **Emotional or traumatic experiences and the transition to parenthood**

Some time ago I was contacted by a woman who approached me as a “crying expert” to ask for advice. Her problem was that she had never wept in the past 23 years since she had experienced a stillbirth. She did not feel particularly unhappy about her lack of tears, but her main concern was that her relatives and friends tended to view her as emotionally cold and indifferent. Even in the saddest situations, when everyone else cried, she was the exception and did not shed any tears. She reported that she did experience emotions, but for some reason lacked the capacity to express them with tears.

Such a loss of the ability to cry after a traumatic experience is a well-known phenomenon, although I am not aware of any systematic studies that have addressed this issue. In two studies we focussed on significant and longer-lasting changes in crying behavior after people had experienced strongly emotional situations (Vingerhoets, unpublished data). In the first study of male and female nurses and police officers, 39% of the participants indicated that their crying proneness had changed (i.e. it had increased or decreased) considerably and more permanently after they had experienced a particular life event. Relatively commonly reported events were the birth of a child, the death of a partner or family member, a disease or major injury affecting the person him- or herself, and divorce or break-up of an intimate relationship. I am further aware of only one study (White-Van Mourik et al., 1992), which reports that two years after women had experienced a second-trimester termination of pregnancy due to fetal abnormality, about 20% of them still complained of regular bouts of crying, sadness, and irritability.

In our second study, conducted among an elderly population, we asked whether their crying behavior had ever shown a notable change. Among the women, 6.7% reported that they had noticed a reduction in their crying, compared with only 1.9% of the men. However, the percentage of respondents who reported having experienced an increase in their crying was similar for both genders (10.9% for women and 11.0% for men). We also asked whether they attributed these changes to any particular occurrence. Two events emerged clearly, namely losses (most commonly of the respondent's partner, but also to a lesser extent of a child) and health problems (more specifically, heart problems).

Individuals who are severely depressed (Rottenberg, 2005) or traumatized (Litz, 1992) sometimes report that they feel as if they have lost their emotions altogether, which they regard as one of the most distressing symptoms. They feel numb, emotionally empty and "detached," and cannot produce tears. It is as if they are indifferent and do not experience any affection for or do not care about other people, even those very close to them, such as their partner or children. They occasionally state that they feel as if there are no tears left in them.

In particular, physical and/or sexual abuse may result in the chronic inhibition and repression of emotions and crying (Litz, 1992; Pennebaker and Beall, 1986). These patients generally have a strong desire to regain their lost capacity to cry. Two examples have been described in detail by the psychiatrist Eugene Watermann (undated). The first is the case of Billy, a victim who survived the serial killer Jeffrey Dahmer. Billy told how Dahmer had beaten him harder when he cried during the physical and sexual abuse that was inflicted on him, so forcing him to gain control over his tears, until he reached the point where he had completely lost the ability to cry. He was no longer able to shed any tears. A second client of Watermann who had also "learned" not to cry was a woman who, as a child, had suffered severe sexual and physical abuse. Like Billy, she confirmed that she had never cried since the abuse, although she had wanted to do so. In this case it is likely that the loss of tears is related to the fact that the display of any emotion (whether negative or positive, but it certainly held for crying) could trigger an aggressive reaction by the violent father (see Box 9.5). Feeling socially excluded may also result in a kind of reduced pain sensitivity and emotional numbness, both of which may be advantageous in the short term, because they may act as a kind of protection, but are not very adaptive in the long term, given the strong power of emotions to stimulate social interaction (Baumeister et al., 2009). This numbness and loss of tears, which may serve to blunt the sensations of intense emotions and pain during an injury, is probably mediated via the opioid system, which, as explained in Chapter 3, plays a major role in both physical and emotional pain.

However, as has already been shown by the above-mentioned studies, there also seems to be another side to the coin. After having experienced a dramatic event, people may show the

### Box 9.5 Regaining the lost ability to cry

The psychiatrist Eugene Watermann has described how he induced a hypnotic trance and suggested arm levitation in a woman with a history of severe sexual and physical abuse. He started with the suggestion that the arm would lift on its own without the client deciding to lift her arm. He subsequently suggested that, when her hand reached her eye, “the dam would break.” However, this did not seem to work well at first. A second arm levitation with the other arm also failed to yield the anticipated effects. However, when the therapist repeated that the dam would break when the woman’s two hands touched each other, she started crying in a way that the therapist had never experienced before or since, and never wanted to encounter again. From that moment on, the patient was able to cry appropriately.

opposite reaction and become more emotional. The Dutch cardiologist Pim van Lommel, who followed up cardiac patients who had had a near-death experience, has reported that a considerable number of them had undergone remarkable personality changes, and also typically showed increased emotionality and tearfulness (van Lommel, 2010). Although systematic data are lacking, very similar changes are reported by cancer survivors. Typically they also consider themselves to have a different personality and to be more capable of enjoying life. After their disease and the close confrontation with death they seem to be able to enjoy the simplest and most mundane aspects of life, and these feelings are often accompanied by a more general increase in emotionality and tearfulness. Similar findings have been reported for patients with spinal cord lesions (Hohmann, 1966) and for cardiac patients (Bennett et al., 2000) who had not had a near-death experience. In particular, the prototypical sentimental stimuli, such as music, films, ceremonies, and the expression of feelings of tenderness and gratitude, seemed to make them cry most easily.

In addition, especially for women, but also for men, strong anecdotal evidence suggests that the transition to parenthood may have a major effect on crying proneness. Several years ago, two new mothers asked me whether I could explain their extreme tearfulness after having given birth, and also advise them about treatment for this. Nearly 2 years after the delivery they were still unable to read a newspaper or watch the news on television without becoming tearful. To a lesser degree, a substantial number of new mothers seem to recognize this phenomenon, and report how films or documentaries about sick or neglected children in particular readily give rise to tears. Note that in the above-mentioned study that we conducted among police officers and nurses, becoming a parent was often spontaneously mentioned as the life event that had significantly changed their crying behavior. However, to date no systematic research has been conducted on this issue.

Such changes may not only occur in women who have given birth. In an interview with the lesbian Dutch singer Suzanne Kleman, whose partner gave birth to a baby, she declared that her new status of parent had had a major impact on her emotionality. Although she was not a “biological” mother, she also became more easily emotionally affected and moved to tears. Similar experiences have been reported by women who have adopted children, thus dismissing the necessary involvement of the birth process. New fathers may also undergo some remarkable changes in their emotionality. This might be related to a reduction in testosterone levels, which may lower aggressive impulses and lead to the “mollifying” of these men, occasionally accompanied by increased crying proneness (Storey et al., 2000).

When attempting to explain these kinds of phenomena, biological factors do not appear to be sufficient. Perhaps psychological factors are also involved. One example of a psychological framework that may contribute to an understanding of such changes in emotionality is “terror management theory,” which focusses on how people deal with fear of their mortality and how that fear affects their cognitions and behavior. Of particular interest is an experimental study by the social psychologist Jamie Goldenberg and her co-workers (Goldenberg et al, 1999), who examined whether reminding study participants of their mortality would increase their liking for and emotional responses to a tragic excerpt from a novel. After being asked open-ended questions about either their own death or a neutral topic, the participants were then requested to read two excerpts from Ernest Hemingway novels, one of which was tragic and the other non-tragic in content. In support of the terror management hypothesis, participants in the mortality salience condition responded more emotionally to and were more emotionally affected by the tragic excerpt than the control group. They also reported that the non-tragic excerpt was less enjoyable, and they cared less about the female character in the non-tragic extract than did the control participants. It would be interesting to design a similar study with a specific focus on tearfulness. It seems plausible to assume that patients who are confronted with the diagnosis of a life-threatening disease, and new mothers, are both confronted in the most extreme way with their own mortality and their infants’ vulnerability, respectively. It would be interesting to establish whether it is indeed this awareness that causes the increased sensitivity to emotional events.

### **The presence and absence of attachment figures**

When discussing the antecedents of crying (see Chapter 5), I outlined how conditions such as grief, relationship breakdown, separation anxiety, and homesickness are the prototypical situations that induce crying. Although there is a paucity of systematic data, the literature indeed suggests that crying, in addition to sleeping and eating problems, stands out as a symptom of homesickness, which might be regarded as a special kind of reactive depression. These prototypical crying conditions have in common the permanent or temporary separation from significant others (“attachment figures”), and the linked appeal to attachment behaviors. These observations are consistent with the ideas of Matthew Keller and Randolph Nesse, who reported evidence for a link between the etiological factors that contribute to the development of the depression and depression-like states, and the way that these manifest themselves (Keller and Nesse, 2005). According to this view, crying is one of the most characteristic reactions to a loss, whereas other typical symptoms of depression, such as fatigue, may prevail when the depression has other causes, such as a high workload or chronic stress.

Thus crying seems to be particularly important in psychological states that are caused by the permanent or temporary loss of valued social bonds or its opposites, bonding and love. The prototypical situation is that in which the baby is removed from its primary caregiver, where crying serves the role of the “acoustical umbilical cord”, facilitating the mother–child connection. Attachment and love, however, have sadness and grief as unavoidable and logical companion states. These states cannot exist without each other, and these are pre-eminent conditions that make people shed tears.

This may explain why the study of romantic involvement and crying might also be of interest. As was described in Chapter 5, the association between love and crying dates back to classical times, and currently has its modern equivalents. It is not difficult to find examples of poems or prose from all periods of history that illustrate the strong link between love and tears. In classical times the love poems of poets such as Ovid and Propertius emphasized the close connection

between love and crying, and in the twelfth century it was the German mystic Hildegard von Bingen who noted that love was able to make stony hearts weak, resulting in the flow of tears. In *The Twelve Properties or Conditions of a Lover*, the fifteenth-century Italian Renaissance philosopher Pico della Mirandola (1463–1494) wrote:

And whether his love be with him, or elsewhere,  
Oft from his eyes there falleth many a tear,  
For very joy, when they together be;  
When they be sundered, for adversity.

Some centuries later, the Irish poet Thomas Moore (1779–1852) penned the following verses in his poem *Love Analysed*:

To sigh, yet feel no pain,  
To weep, yet scarce know why.

The seventeenth-century philosopher René Descartes (1649) was also aware that crying was not just related to sadness, but rather to the combination of love and sadness. Unfortunately, hardly any modern research studies have attempted to substantiate this intriguing relationship between love and crying. On the other hand, there are a handful of studies that have shown an association between romantic involvement and depressive symptoms in adolescents (e.g. Joyner and Udry, 2000), but given the unclear relationship between depression and crying, no conclusions can be drawn about the link between love and crying.

People who are in romantic relationships seem to cry more often than those who are single (Jarrín Hernández, 2011; Sung et al., 2009; Vingerhoets and Van Assen, 2009). In addition, they report a greater crying proneness for positive reasons, while there is no difference in their crying proneness for negative reasons, compared with their single counterparts. Interestingly, the latter finding is exactly the opposite to that documented in depressed patients, who report a greater crying proneness for negative reasons, while their crying proneness for positive reasons does not differ from that of normal controls.

Miranda van Tilburg and co-workers further demonstrated that female students who were using oral contraceptives cried more frequently than non-users of these contraceptives (an average of 7.0 vs. 4.1 crying days over two menstrual cycles) (van Tilburg et al, 2003). The question arises as to whether this is a mere pharmacological effect. The possibility that this difference might be explained by the fact that more oral contraceptive users than non-users were romantically involved has yet to be established.

The point that I want to emphasize with these examples is that conditions such as grief, homesickness, and also love are probably not just antecedents, but rather they seem to have a major impact on the general crying threshold, resulting in increased crying when people are exposed to situations that in normal conditions would be very unlikely to induce tears.

This interesting and unexplored topic is still in need of more systematic investigation. It is tempting to speculate about the precise nature of this relationship. If these results could be substantiated in future studies (e.g. by exposing some participants who are and others who are not in love to emotional stimuli, or, even better, by comparing the reactions to standard stimuli of the same individuals when in love and when not in love), this would enable considerable progress to be made in further developing hypotheses about the precise nature of this link and the possible underlying mechanisms.

How could crying and love be connected? Theoretically, there are at least three possibilities. First, the increased crying and feelings of depression of those who have a romantic partner may

be in some way due to their romantic involvement. Secondly, and conversely, one may speculate as to whether more emotionally unstable or depressed individuals are more likely to become involved in romantic relationships, especially when they are subjected to stressful conditions, due to the fact that their attachment system will be activated in such conditions. Thirdly, both the need for romantic involvement and emotional instability may be associated with a third factor, such as personality. Note, however, that these three possibilities are not necessarily mutually exclusive.

When considering these three options in more detail, several mechanisms can be identified which may explain the finding of lower mood and more frequent crying in people who are in love. First, being in love may interfere with one's daily responsibilities and routines, resulting in conflicts and disagreements with others, such as supervisors, parents, friends, one's partner, etc. For example, there may be issues such as proof of loyalty, disagreements with parents about the choice of partner, or specific behaviors, criticism by same-sex friends, etc. In particular for adolescent girls who have a boyfriend, a more difficult relationship with the parents is not unusual. Romantic relationships in themselves may also be stressful for adolescents, because embarking on such a relationship is associated with a number of "symbolic" transitions, such as a perceived increase in social status, an expression of maturity, an important step in becoming independent from one's parents, and a denial of and breaking with attraction to the same sex (e.g. mother, same-sex idols). As just noted, attachment theory predicts that confrontation with anxious and stressful situations may stimulate bonding (including romantic bonding) with others. One could also argue that the availability of a specific person—an attachment figure, with whom one feels confident—may lower one's crying threshold, and therefore one cries more easily. Then there is the intriguing possibility that neurobiological changes play a role. Being in love also seems to be associated with decreased brain levels of serotonin, a neurotransmitter that is important for the regulation of mood and crying (Marazziti, 2005). Low levels of brain serotonin may indeed decrease the crying threshold and thus promote crying.

A final explanation may be the involvement of a third factor. Although I am not aware of any data on this issue, it may be plausible that individuals with a specific genetic make-up or personality (e.g. those characterized by neuroticism) are not only more prone to low mood and crying, but may also more readily become attached to others, and even fall in love more easily. An extreme example of this might be patients with borderline personality disorder, who are well known for their many stormy romantic attachments—and for their many break-ups.

## Recreational drugs

People in general do not regard alcohol consumption and substance abuse as relevant determinants of crying. On the ISAC list containing 24 factors of possible relevance to crying, alcohol intake received the second lowest rating (before nourishment). On the other hand, even in ancient Greek and Roman texts, references are made to the relationship between excessive consumption of wine and crying. Mhlahlo (2009), in his research report on the concept of manhood in the Xhosa tribe in South Africa, also notes that his respondents often made a spontaneous connection between crying and alcohol consumption. In western cultures, this connection is encapsulated by the well-known expression "crying in one's beer," which suggests that there is a relationship between alcohol intake and a decreased capacity for emotional control, which typically results in increased crying.

Does alcohol indeed have the potential to lower the crying threshold? Compared with the alternatives—for example, that crying in some way induces a craving for alcohol or, alternatively, that the ready shedding of tears and alcohol consumption are associated with a third factor,



such as a certain personality factor, or the experience of negative events and the accompanying frustration—it is more plausible that higher doses of alcohol either lower the threshold for shedding emotional tears or decrease the inhibitory influences on crying. Although this concerns two quite different mechanisms, it will not be easy to determine which of these two explanations is valid, because the net result of both effects (an increase in tearfulness) is the same. One possible explanation may be that alcohol increases the plasma levels of prolactin, which in turn may lower the threshold for crying (Menella et al., 2005; see also Chapter 10).

In the previously described study in which female students watched the emotional film *Once Were Warriors* (Van Tilburg and Vingerhoets, 2002), 66% of the participants had consumed alcoholic drinks. Interestingly, the alcohol and non-alcohol groups did not differ in their answers to the question about how often the film had emotionally moved them (2.6 vs. 2.8 for the alcohol and non-alcohol groups, respectively), but in the alcohol group there were more crying episodes (1.1 vs. 0.4).

As far as is known, the relationship between crying and substance use has been examined only once, in the context of a study on the utility of tearfulness as a marker for specific factors in the etiology of depression in a psychiatry emergency setting (Zarkowski et al., 2007). In this study, excessive tearfulness was observed mainly in patients who were found to have cocaine in their urine (whereas an endogenous mood disorder was far less likely in these patients).

The neuroscientist Jaak Panksepp has highlighted the remarkable similarities between the effects of opioids and social connectedness (Panksepp, 1998). In his view, individuals may become addicted to opiates because these substances have the potential to artificially evoke a very similar feeling of gratification to that which is normally induced by pleasant social contacts, which facilitate the release of endogenous opioids such as endorphins. He further emphasizes the notable similarities between the symptoms associated with drug withdrawal and key consequences of broken romantic and social bonds, including loss of appetite, sleeplessness, and irritability, but in particular depression and, very specifically, crying. This again suggests that distress vocalizations and crying actually stimulate the release of these substances, and thereby contribute to self-soothing.

Other pharmaceutical agents that need to be considered briefly are those that are used as prescription medication, such as antidepressants, but also oral contraceptives and anti-hormones. These will be discussed in more detail in Chapter 11.

In conclusion, there is a significant lack of studies on the effects of recreational drugs on crying. However, observations in patients and in animals, as well as Panksepp's interesting ideas about the relationship between separation or distress calls and opioids, are sufficient grounds to justify more research in this area.

## Conclusion

In this chapter I have demonstrated that there are considerable individual differences in how often people cry and, to a lesser extent, in what makes them cry. These differences may be partially genetically determined, and there may be a link with personality, attachment style, and life experiences. However, culture, social environment, and biological processes may also be involved. I have also explained that an individual's crying behavior may show dramatic temporary or more permanent changes, caused by a wide variety of factors, ranging from sleep deprivation to becoming a mother, and from being involved in a romantic relationship to having a near-death experience.

A most interesting question, but one that is not easy to answer, is of course what the consequences of these observations are for our understanding of the role of tears and crying. Is it in

some way adaptive for neurotics to cry more often, or for those who have experienced a traumatic event to cry less frequently? What, if any, are the benefits of the increased (or decreased) crying in severely depressed patients and the greater tearfulness of several somatic patient groups? Do these tears aid the coping process and do they in some way facilitate adaptive processes? It would represent a huge step forward if scientists could provide some testable hypotheses about the functions of changes in crying in different conditions, that at least may have some face value and that can be evaluated in future research.

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## Chapter 10

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### **Male and female tears**

... touch me with noble anger,  
And let not women's weapons, water drops  
Stain my man's cheeks!

(William Shakespeare, 1608)

One of the most pervasive stereotypes of gender differences in the modern western world is that of the emotional, labile, and tearful woman versus the rational, strong man who is always in control of his emotions. The Greek philosopher Aristotle (384–322 BC) already noted that “woman is more compassionate than man, more easily moved to tears, at the same time is more jealous, more querulous, more apt to scold or strike” (for additional classic notions about female weeping, see Box 10.1). Charles Darwin was also in little doubt that crying is mainly a female activity: “especially in the male sex, weeping soon ceases to be caused by, or to express, bodily pain. This may be accounted for by its being thought weak and unmanly by men, both of civilized and barbarous races, to exhibit bodily pain by any outward sign” (Darwin, 1872).

However, does this stereotype receive support from relevant research? Do women really cry more often than men? If so, why is this? Do biological factors play a role or is it more a matter of socialization? And to what extent do the typical female issues such as “raging” hormones, menstruation, and pregnancy play a role? Are there also other crying-related issues that differ between the sexes?

### **The gender differential in crying frequency**

Research leaves us in little doubt. The persistent cultural stereotype that crying is a predominantly female activity seems to be supported by the current scientific literature. Nearly 20 studies, which applied very different research methods, have all yielded evidence that women cry more frequently and more intensely than men (Vingerhoets and Scheirs, 2000). We also found this in our ISAC project. In all of the 37 countries, women reportedly cry more often than men, although there were some (mainly African) countries where the difference failed to

### Box 10.1 Classic notions about female weeping

In Greek and Roman antiquity there was little disagreement that women cried more often than men. The cause of this increased crying proneness in women could be found on the one hand in their temperament, and on the other hand in the accompanying physical state—women were considered to be more cool and moist than men. This fact alone put them at greater risk of fluid imbalance that resulted in melancholia and explained their copious production of tears. In addition, women's bodies were viewed as more permeable than those of men, which implied not only that they had greater empathic skills, but also that they were more susceptible to the whims of the passions.

Furthermore, it was noted that women were less able to tolerate inconveniences and difficulties, and were therefore less able to resist sorrow, more despondent, and more inclined to show despair.

In addition, Hippocrates pointed out that women more often experience absurd fears, and are more likely to have their bodies invaded by hostile demons, perhaps resulting in tears.

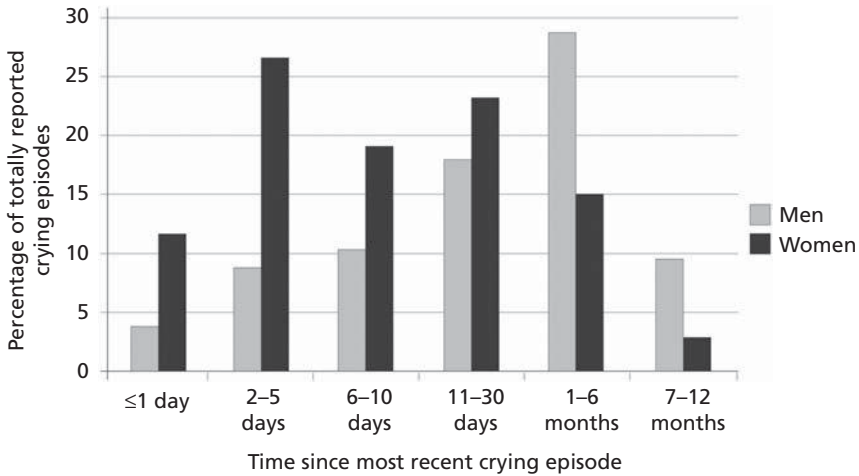
Finally, the form of a woman's head was considered to be another major factor. As women have fewer sutures than men, it was thought that the vapors contained in their heads were more easily turned into serum, which was considered to be the material from which tears originate. It was also felt that women were more adept at producing fake tears. Such tears were also sometimes seen in cowardly, mendacious, and unreliable men, but they were primarily observed in women, whose eternal effort was thought to be to deceive men. Ovid warned that one should never trust female tears!

reach statistical significance (Van Hemert et al., 2011). This gender difference in crying is a global, worldwide phenomenon, although its magnitude seems to depend on culture and country characteristics.

To give the reader an impression of the magnitude of this difference in the Netherlands, Figure 10.1 shows the responses of adult men and women when they were asked how long ago their last crying episode had occurred (Vingerhoets, unpublished data). It can be seen that men reported crying episodes that had occurred longer ago than those reported by women. In other words, whereas the great majority of men reported not having cried in the last month, women showed the opposite pattern—most of them had cried in the last month.

It is currently unclear, given the inconsistent findings in infants, whether this difference exists as early as the first years of life (see also Chapter 4). The relatively high frequency of crying in young boys can be the result of a higher prevalence of certain childhood diseases in boys, and the higher risk of injuries and hurting themselves due to involvement in rough play, rather than reflecting the same or higher crying proneness as girls of the same age. The Landreth (1941) study among 2.5- to 5-year-old children revealed a higher crying frequency for the boys than for the girls. A more detailed analysis of the antecedents also demonstrated some remarkable differences. Girls cried relatively more often because of injury and pain, whereas much more important antecedents for boys were conflicts with adults and frustration resulting from dealing and playing with inanimate objects.

The preponderance of female crying thus seems to develop later, probably from the age of 8–11 years, and the gap widens in subsequent years (see Chapter 4). In particular, it appears that boys' crying frequency drops sharply in early adolescence, whereas the crying frequency in girls remains at similar levels.



**Fig 10.1** Differences in self-reported crying frequency between men and women. When answering the question “How long ago did you your last crying episode occur?”, men indicated that their most recent crying episode had occurred less recently than the women’s most recent crying episode (Vingerhoets, unpublished data).

How can this pattern of findings be explained? At least two alternative interpretations are possible. It may be determined by socialization processes, by biological maturation, or by both kinds of processes. Specific gender-typing processes that may be relevant are, among others, dating and struggles with parents involving conflicting views about autonomy and independence. Crying, being part of a more feminine sex role pattern, might thus from that age onward become more integrated into the girls’ behavioral repertoire, and more excluded from that of the boys (Aldrich and Tenenbaum, 2006; Bekker and Vingerhoets, 1999). Moreover, teenage girls may have more reasons to cry than boys of the same age, because of cultural ambivalence about the mature female body and the role of sexuality in women’s lives, which causes more conflict in puberty for girls than for boys. Concerning the role of hormones, in the popular literature the role of female sex hormones is often emphasized, but probably the role of the male sex hormone testosterone is at least as important. In the remainder of this chapter I shall discuss these issues in more detail.

## Explaining gender differences in crying frequency

Basically, the question about the origin of the gender difference in crying concerns the issue of nature versus nurture. However, this dichotomy is too simple a representation of reality, as it does not take into account the interactions between biology and culture that, as shown in Chapter 8, seem to be most important for crying. Perhaps a better question is why evolution has ultimately resulted in these gender differences. The Spanish ophthalmologist Juan Murube came up with an intriguing but basically untestable evolutionary hypothesis about the nature of gender differences in crying. According to this hypothesis, our male ancestors took up the role of defending the tribe against aggressors and predators. Since tears might have interfered too much with fighting and protection capacities, the reduced ability to provide protection may have made men who often cried less attractive as sexual partners (and would probably also have decreased their likelihood of survival). This process of sexual selection would eventually have resulted in modern males who less readily shed emotional tears (Murube, 1997).



However, others have suggested that it is not the male who has lost his capacity to shed tears, but rather it is the female who has developed tearful crying, because of its benefits. For example, it has been suggested that female crying acts as a signal to alert males during a conflict that they have overstepped boundaries, and it thus prevents conflict escalation and reduces aggression (Lane, 2006). Tears also act as a catalyst for bonding between females, thus strengthening their social networks and increasing their level of protection from males and predators. In this sense, its function seems to be closely related to the tend-and-befriend stress reaction (Taylor, 2006; see also Chapter 3), which is postulated to serve the same purpose. Thus, according to this notion, female tear production increased over evolutionary history, as a “weapon of the weak.” Furthermore, it is important to bear in mind the close female connection between crying, feeding and nurturing, and bonding and attachment in mammals, with the hormones oxytocin and prolactin as the core elements.

However, it is clear that biological factors are only part of the story. Empirical findings strongly suggest that social processes are also an important factor. The remarkably wide variations in the gender differences in crying between cultures and during different historical time periods suggest that biological (i.e. hormonal) influences are of limited importance, at best, in crying. The major influence of culture on the crying behavior of men and women cannot be underestimated.

Yet another way of looking at gender differences in crying is to assume that they are a “by-product” of gender differences in personality (Peter et al., 2001). More specifically, one may speculate whether differences in crying disappear or at least are significantly reduced when taking into account the fact that men and women also differ in terms of empathy, neuroticism, depression, and distress. In that case, crying should be considered as part of a more general difference in psychological make-up between the two genders. As was shown in the previous chapter, differences in empathy and neuroticism in particular may be at least partly responsible for gender differences in crying. The gender difference can thus be looked at and studied from very different perspectives. My approach is to apply the individual differences model that I described in the previous chapter (see also Bekker and Vingerhoets, 2001; Vingerhoets and Scheirs, 2000) (see Figure 8.2) to investigate gender differences in crying.

## The systematic study of gender differences in crying

Taking the individual and group differences model as a point of departure, the following issues require systematic investigation:

- whether, and to what extent, men and women differ with regard to frequency of exposure to crying-inducing situations
- whether, and to what extent, there are gender differences in the appraisal of situations
- whether there is evidence of a gender difference in crying threshold
- whether, and to what extent, men and women differ in their capacity to control their tears.

Let us briefly discuss each of these issues in turn.

### Are women more often exposed to crying-inducing situations and feelings?

Men and women differ in the extent to which they are exposed to daily life situations and life events that have crying-evoking potential. Despite women’s liberation, there are still differences between male and female occupations. Men more frequently have technical or IT-related jobs

that are rather devoid of emotional content or that require some level of aggression towards transgressors of rules, whereas women more often tend to have jobs that demand nurturing, tenderness, sensitivity, and intuition. However, these differences in exposure to emotional situations are not limited to occupational activities, but also extend to leisure pursuits. In western culture, watching soap operas and movies that have high potential to elicit tears is a predominantly female practice. The same holds for programmes on sick children, or tracing and reuniting missing people with their family, adopted children with their biological mother, and so on. Men are less likely to watch tear-jerker films and these kinds of TV programmes. There are also many other gender differences in lifestyle and interests. Women seem to form stronger and more intimate bonds with other women (including their mothers and daughters), which increase the likelihood of crying for empathic reasons.

Thus the fact that men cry less frequently than women may, to some extent, simply be explained by the difference in exposure to emotional situations. Men's preventive behavior with regard to crying might even include the avoidance of situations that they know are likely to make them cry. A notable example would be a man who did not want to visit his terminally ill brother because he anticipated that he would not be able to deal adequately with the situation, and that such a confrontation would upset him too much. It is hard to imagine that a woman would act in the same way. Men are thus more likely than women to prevent themselves from being exposed to emotional situations.

Other examples of situations that might promote increased emotionality and the crying tendency of women include combining work and family life, relationship problems, sexual and physical abuse, pain syndromes, depression, and losses (Bekker and Vingerhoets, 1999; 2001; Fillingim et al., 2009) (see also Chapter 9). Women not only experience more pain, but are also more likely to suffer from diseases and health problems in which pain and low mood are a major problem, such as premenstrual syndrome, rheumatoid arthritis, depression, fibromyalgia, and several other chronic pain syndromes. Furthermore, because women live longer than men, older women are more likely than older men to be faced with the loss of their partner. It is obvious that these kinds of events may have a major impact on one's emotional life, although the specific lasting effects on crying have yet to be established.

### **Are there gender differences in the appraisal of situations?**

Another reason why women cry more than men is that they tend to appraise situations differently. The psychologist Richard Lazarus has unequivocally demonstrated that the appraisal process is very important in determining whether and which emotions will occur (Lazarus and Folkman, 1984). Denial and intellectualization, among other factors, change the way that participants evaluate the meaning of film events, lowering or raising the level of stress. The tendency to apply specific appraisals may to some extent be linked to the above-mentioned personality differences.

One study specifically explored the links between gender, appraisal of situations, and crying (Fischer and Manstead, 2000; Fischer et al., 2004). Respondents were asked to rate their appraisals of powerlessness in response to emotional events that had recently made them cry, and to six vignettes describing situations that may induce crying (the death of a loved one, the end of an intimate relationship, conflict with a partner or family member, burglary, a computer crash, and unjust treatment). It appeared that men and women did not differ in the appraisal of the situation that had made them cry. With regard to the vignettes, there were also no gender differences in the appraisal of the "strongly emotional" situations (i.e. the death of a loved one, the

end of an intimate relationship, and conflict with a partner or family member), but in the case of the “weaker emotional” situations, women felt significantly more powerless than men. Apart from that, in all cases the women reported a greater crying tendency. A statistical analysis subsequently showed that, in addition to gender, appraisals of powerlessness had predictive power with regard to crying. In summary, although the evidence is less convincing than that for the differential exposure to emotional situations, gender differences in appraisal—especially when it concerns less strongly emotional situations—certainly need to be taken into account.

## Do women have a lower crying threshold than men?

There are some good reasons for assuming that women have greater crying proneness, or a lower threshold for crying, although the evidence is not particularly strong. Nevertheless, the following observations and facts make this hypothesis plausible. First, simply asking adult respondents to indicate their crying proneness in response to a number of different emotional situations consistently yields clear gender differences, with the exception of strongly emotional situations such as losses or relationship breakdown. Secondly, there is evidence that the morphology and functioning of the tear glands of men and women differ due to the influence of sex hormones, although I can hardly imagine that this better equipment for the production of tears also has any influence on the frequency of crying (Sullivan, 2004; Sullivan et al., 1998). In addition, neurophysiological studies have yielded converging evidence that men and women differ in several ways with regard to the processing of emotional stimuli at the level of the brain (Haman and Canli, 2004; Wager et al., 2003). For example, a positron emission tomography (PET) brain study revealed that, during the experience of pain, women showed greater activation of a number of emotional brain regions, including the ventromedial prefrontal cortex, right anterior cingulate cortex, and left amygdala, whereas men showed greater activation of the right dorsolateral prefrontal cortex, insula, and dorsal pons/periaqueductal gray. This appears to suggest that pain is more strongly linked to emotion in women than in men.

Functional neuroimaging studies have also identified gender differences in the neural processing of emotions in several other domains, including responses to emotionally arousing stimuli, responses to emotional facial expressions, and emotional memory (Wager et al., 2003). Brains of adult men and women thus differ considerably in the processing of emotional and painful stimuli. To what extent these differences have anything to do with crying has yet to be established.

Finally, in addition to differences in brain activity, men and women differ significantly in the secretion and regulation of several hormones (Collaer and Hines, 1995). It is not surprising that, in folklore and the popular media, there seems to be a strong bias towards focussing on the role of female sex hormones, which are connected with the greater emotional instability and crying propensity of women. There is preliminary evidence that prolactin in particular may facilitate crying, whereas testosterone may inhibit it. I shall briefly review this evidence below.

## Prolactin

It was the biochemist William Frey who first suggested that the female sex hormone prolactin lowers the threshold for crying (Frey, 1985). As I explained in Chapter 3, prolactin is best known for its role in menstruation, fertility and, in particular, lactation and (at least in some animal species) parenting behavior. Frey’s hypothesis was based on the following ideas and observations. First, he felt that the role of prolactin in crying was consistent with his incorrect assumption that the gender difference in crying first appears at around 13 years of age, with the development of the secondary sex characteristics, in particular the onset of menstruation, which is linked

with a greater gender difference in sex hormones, including prolactin. Frey also pointed out that dry eye symptoms occur in particular at times when prolactin levels are low, such as after the menopause or as a side-effect of drugs that inhibit prolactin secretion. In addition, he referred to studies and anecdotal evidence which suggest that administering drugs to reduce prolactin secretion can be effective in the treatment of excessive crying. His final argument concerned the observation that administering prolactin to eider ducks, which live along sea coasts, increases the secretory activity of their salt glands, which are similar in location and innervation to the human lacrimal gland.

There is further evidence to support the link between prolactin and crying (for an overview, see Eugster et al., 2001). The highest levels of prolactin are found in women just after childbirth, when they start breastfeeding. At about the same time, many women experience the maternity blues or baby blues, the main characteristics of which are crying and increased tearfulness. It is also of interest that this hormone has been associated with passivity and feelings of powerlessness in crisis situations (Theorell, 1992), which are the prototypical conditions for evoking crying. In addition, marked increases in prolactin levels have been found during stressful interviews focussing on separation anxiety and depression with individuals who had lost their partner or were threatened with a loss. Prolactin may also be involved in the development of mood disorders (e.g. depression and premenstrual tension). Interestingly, high prolactin levels may also explain the increased crying proneness that occurs in some more pleasurable circumstances, such as when making love and experiencing an orgasm (the “love cry”). Finally, there is evidence that excessive alcohol intake, which seems to lower the crying threshold (“crying over one’s beer”), does increase prolactin levels. Lactating mothers who drank two glasses of wine showed increases in prolactin levels of up to 336% (Mennella et al., 2005).

Taken together, these observations suggest that there is an association between prolactin and crying proneness, although there are no methodologically sound studies that have measured both prolactin levels and crying proneness directly. A comparison of the crying proneness of 13 endocrinologically established hyperprolactinemic women and healthy controls failed to find a difference in crying behavior between these groups (Vingerhoets et al., 1992). However, the prolactin levels in these patients, although sufficiently elevated to cause menstrual cycle disturbances, were quite low compared with the levels found in pregnancy and after delivery. It might be that the less dramatic (but perhaps more chronic) increases in prolactin levels are sufficient to cause disruption of the menstrual cycle, whereas higher (more temporary) increases are needed in order to influence tearfulness and crying proneness. Frey’s prolactin hypothesis thus still warrants consideration.

The possible role of other female hormones in crying has not yet received any systematic attention from researchers, although mood changes during the post-partum period, the premenstrual phase, and the menopause have been associated with changes in other female sex hormones, including estrogen and progesterone (e.g. Steiner et al., 2003).

## Testosterone

If female hormones and social pressures or other psychosocial factors cannot fully explain gender differences in crying, then perhaps there might be other biological factors that contribute to the low crying frequency in males. Given the substantial decrease in crying at around the age of 13 years, there is obviously a need to focus on those male hormones that shape the developing adolescent brain and which play a major role in several aspects of behavior, cognition, and mood (Andersson et al., 1997).

Male hormones, in particular testosterone, seem to have a crying threshold-heightening effect, as is suggested by animal data (Panksepp, 1998). Studies on the effects of testosterone on separation distress calls of chickens and guinea-pigs show that the hormone reduces this behavior in young animals, whereas the removal of the male sexual glands delays the characteristic age-related decline in crying. Other, mainly anecdotal, but very impressive information has been obtained from transsexuals undergoing hormonal treatment and men with prostate cancer, whose testosterone levels are chemically lowered (see also Chapter 11 on the effects of medical treatment on crying). Does this indicate that biological maturation contributes substantially to the decline in crying frequency in boys? The answer is that it probably does, because increased testosterone levels produce two important effects. There is not only a direct effect on mood and well-being, but another relevant influence might be the reduction in empathy, which indirectly may also result in a decrease in crying (Hermans et al., 2006). In psychopaths, who typically lack empathic skills, there is some evidence of relatively high levels of testosterone (Moir and Jessel, 1995). This is sufficient reason to look more systematically at the precise effects of hormones such as testosterone on mood and crying. Until then we have to content ourselves with these hypotheses.

### **Do men control their tears more than women do? The role of socialization**

There are many examples of statements which suggest that men expend more effort in controlling their tears, because of the current cultural stereotypes of masculinity, as illustrated by Charles Darwin's comment cited earlier in this chapter. Even Sigmund Freud is reported to have wrestled with the question of whether he should permit himself to weep and whether it would be manly to do so. In addition, Ashley Montagu has described how male crying was perceived in the USA in the 1950s, and the high value that was attached to controlling one's tears. Surprisingly, however, there is limited research evidence that this is indeed the case!

I found considerable gender differences in the self-reported amount of control over tears by both genders. Dutch men reported a higher degree of perceived behavioral control over crying than women. It is plausible to assume that this is linked to the more negative appraisal of crying by men, which in turn might be connected with the possibly greater social pressure experienced by them (Vingerhoets, unpublished data).

Assuming that men experience strong social pressure to suppress their tears, might that indeed have an effect on their crying behavior? Like any other behavior, crying is subject to the laws of operant conditioning (Hart et al., 1964). More precisely, reward and punishment of crying behavior, even in the most subtle forms, such as attention or lack of it, will affect the likelihood that those behaviors will be displayed in future. This perspective may thus also contribute to the development of gender differences in crying. If current stereotypes of masculinity are not compatible with behaving dependently and crying, which are considered child-like and "weak," crying is unlikely to elicit positive reactions from peers, kin, and possibly also parents. The strength of the effects of subtle reward and punishment can best be illustrated by their effects on (other) pain behaviors, which can dramatically increase even with simple verbal encouragement (Jellesma and Vingerhoets, 2012; Sanders, 2002).

As already discussed in Chapter 4, one can thus make a distinction between crying that is elicited as an involuntary reaction to an emotional situation, and crying that occurs in anticipation of a positive reaction (attention, comfort) or a diminished negative reaction (a reduction in anger). The tears shed by a child when confessing that he has helped himself to a piece of cake or stolen a cookie are examples of the latter type of crying.

However, there is also some evidence to suggest that women anticipate that crying will have not only more positive interpersonal effects, but also more cathartic effects (Timmers et al., 1998).

## Some further gender differences with regard to crying

So far the focus has been on crying frequency, and the question has been whether women cry more often than men. However, this is not the whole story. It is also useful to know more about differences in the types of situations that induce tears, and attitudes towards crying and how it is perceived. Women generally seem to cry more intensely (Fox, 2004), and they also report a higher crying proneness, have more positive attitudes towards crying, reportedly experience more mood improvement as a result of crying, and are more willing than men to provide support to crying individuals. Why is this? Why is crying a predominantly female activity?

Sadness, happiness, powerlessness, and sympathy are the most important tear-inducing emotions. This is true for both men and women. However, women to some extent cry for different reasons to men, particularly with regard to conflicts. Powerless anger is an important elicitor of female crying, whereas it is only quite exceptionally an elicitor of crying in men. Women also more often cite feeling rejected or insulted as a reason for crying than do men. Furthermore, men cry relatively more often for positive reasons. Thus whereas in women powerlessness might be the predominant feeling behind tears, in men it is perhaps also to some extent powerlessness, but more in the sense of being overwhelmed by positive situations or emotions.

How do men and women appraise tears in different situations? I conducted a study of a representative sample of the Dutch population which revealed that men and women do not differ very much in how they perceive crying individuals. Both genders perceive male crying as less appropriate than female crying, which is consistent with the notion of crying as a sign of “felt” powerlessness, which better fits the traditional female social role than the male one. Men dislike crying more than women, they experience more shame while crying, and they are less likely to regard crying as a coping skill that may result in mood improvement.

There is also strong agreement between men and women about which kinds of situations and emotions justify crying. Sadness, happiness, physical pain, and social rejection were cited as the most acceptable reasons for crying.

However, there are some interesting exceptions to this general picture. For example, female managers have been found to have a less positive attitude towards female tears in the workplace than male managers (Goudreau, 2011), and the same has been found with regard to crying during therapy, which was considered more acceptable by male than by female therapists (‘t Lam, 2011).

Thus not only do women and men show remarkable differences in crying, but also they show great similarities with regard to several aspects of crying. For example, when asked to rank situations in terms of their crying-inducing potential, a remarkable similarity was observed between the sexes. In addition, both men and women reported that they prefer to cry alone or with only their mother or a close female friend present. They were least likely to cry in the presence of strangers (see also Fox, 2004). In addition, they used the same adjectives (especially “relieved”) to describe their post-crying state, although women were more likely to report feelings of being “tired” and “weak” (Lombardo et al., 2001). Unfortunately, to date there have been no studies in which a distinction has been made between “positive” and “negative” tears. Given the relatively greater importance of positive tears for men, the question arises if this implies that they also have a more positive attitude to positive tears than to negative ones.

Three biological factors in women, all related to fertility and reproduction, will now be discussed. In the popular media, the menstrual cycle, pregnancy, and the post-partum period are

all strongly associated with crying. Since little research on these topics has specifically addressed crying, I shall occasionally also refer to the relationship between these factors and negative mood or depression, being aware that it cannot be taken for granted that these issues have relevance for crying as well. At best, they can be regarded as states that make crying more likely. What is the current state of knowledge with regard to crying and female reproductive biology?

## Crying and reproduction

### The menstrual cycle, mood, and crying

Not many women, or men either, in countries with a western culture would disagree with the statement that the menstrual cycle has a strong influence on the physical and psychological well-being of women. The physical effects include edema, lower abdominal pain, breast tenderness, headache, abdominal bloating, and fatigue, whereas the most characteristic psychological symptoms are depressed mood, irritability, tension, and anxiety. During their fertile years, women generally notice these emotional, physical, and behavioral symptoms in the week before menstruation. This is referred to as premenstrual syndrome (PMS). In about 3–5% of women the symptoms are so severe that they seriously interfere with work or interpersonal relationships (Endicott, 2000).

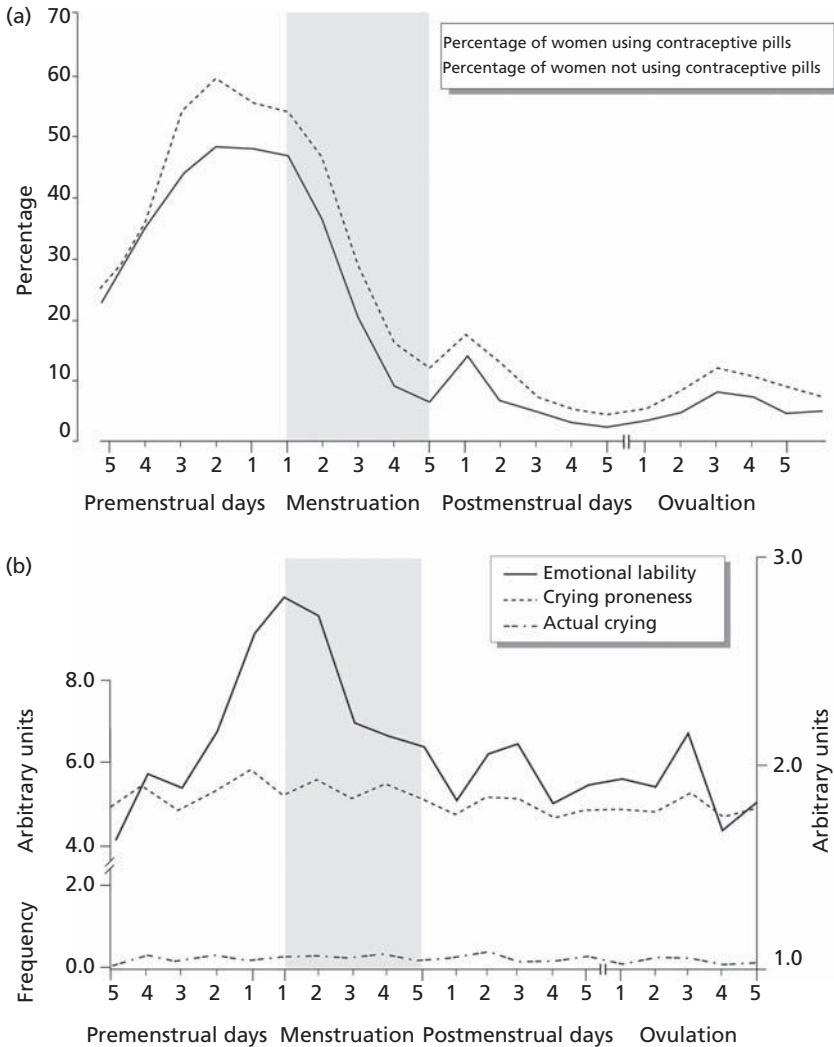
One would therefore expect that crying would occur more often during the premenstrual period, either as a symptom of PMS, as a reaction to the pain and discomfort, or as a result of the interference with normal social and work activities. It would therefore be important to know not only *whether* women cry more often during certain stages of their menstrual cycle, but also, if they do so, *why* they cry during that specific stage.

William Frey undertook a study in which data on actual crying behavior were collected from 85 women who kept a crying diary (Frey, 1985; see also Eugster et al., 2001). Increased crying was observed 4 to 6 days *before* the onset of the menstrual period, 3 to 5 days *after* the onset of menstruation, and around the time of ovulation. However, these peaks of crying did not show a clear association with fluctuating levels of any sex hormone. Remarkably, crying was quite infrequent during the 3 days before the onset of menstruation—days that are generally considered to be the most problematic stage of the cycle.

Van Tilburg et al. (2003) analyzed self-reports of 2018 female participants in the ISAC project. They asked the respondents whether they felt that there was a relationship between a particular phase of their menstrual cycle and their crying proneness, and if so, to indicate on which days of the menstrual cycle they felt more likely to cry. In total, 45% of the participants felt that their crying proneness fluctuated as a function of the phase of their cycle. Surprisingly, striking differences were found between the participants from different countries. For example, in countries such as China, Peru, and Romania, only 15–20% of the participants confirmed such a relationship, whereas in countries such as Australia, Chile, Finland, Kenya, the Netherlands, Spain, and Turkey, 60–70% of the participants reported such a relationship. A significant increase in self-reported crying proneness was reported from the seventh day before menstruation until the second day of menstruation. In addition, slight elevations were reported on the first day after menstruation and around ovulation. As well as the remarkable cultural differences in the percentage of women who reported such an association, a further finding that cast doubt on both the accuracy of these self-reports, and the idea that biological factors are the basis of fluctuations in crying associated with the menstrual cycle, is that users of oral contraceptives indicated a very similar pattern of days with increased crying proneness to non-users of such contraceptives. As oral contraception effectively mimics a pregnancy, abolishing the normal major fluctuations in

the female sex hormones, one would not expect a similar pattern. One may therefore question to what extent these findings represent culturally determined implicit theories about the suggested relationships, rather than the real state of affairs.

One can also question whether it is justified to equate self-reported crying proneness with actual crying behavior. In the same article (Van Tilburg et al., 2003; see also Figure 10.2), findings on mood, crying proneness, and actual crying that were obtained for female students, using a diary method over two complete menstrual cycles, were reported. Although significant



**Fig 10.2** Self-reported crying propensity during the menstrual cycle, based on data collected in two studies that used different methodologies. (a) Women retrospectively indicated during which days of their menstrual cycle they felt more prone to cry. (b) Data from a diary study of emotions and menstrual cycle (Van Tilburg et al., 2003). With the latter method, no changes in actual crying behavior and crying proneness as a function of the stage of the menstrual cycle were observed. However, emotional lability showed a remarkable increase that more or less paralleled the self-reported crying propensity in the retrospective study.



mood changes were detected, in particular during menstruation, no accompanying differences in actual crying behavior were observed. It seems as if it is difficult for respondents in retrospective designs to differentiate between crying proneness, or feeling like crying, and real crying.

In a previous study, Van Tilburg and co-workers investigated the possible role of menstruation in crying by adopting a different approach (Van Tilburg et al., 2002). Crying proneness and crying frequency were examined in girls aged 12–14 years. No significant differences on the crying measures were found between age-matched menstruating girls and non-menstruating girls, suggesting that menarche does not have a strong influence on crying behavior.

In conclusion, the widespread belief that women are more tearful and cry more often during the days before menstruation is not supported by research. No systematic and consistent changes in crying have been detected for any phase of the menstrual cycle. Of course this does not exclude the possibility that, in individual cases, such a relationship may exist, although one should not be too quick to assume the existence of such a relationship. If anything can be gleaned from studies on the relationship between symptoms and the menstrual cycle, it is that there appears to be a strong bias in the memory of women, and a great willingness to attribute mood variations and related phenomena to menstruation. However, for a full understanding of such phenomena (in individual cases as well as in general), one needs to take into account the possible influence of all the other changes associated with the menstrual cycle (e.g. the experience of pain and discomfort, decreased work performance, interpersonal conflict, being sexually unavailable, etc.).

In addition, it is likely that education and the focus of the popular media (e.g. women's magazines) on phenomena such as premenstrual syndrome may influence women in such a way that they tend to experience and report an association between specific stages of the menstrual cycle and crying (Marvan and Escobedo, 1999).

## Pregnancy, mood, and crying

In much the same way as for menstruation, it has long been common knowledge that women who are pregnant not only undergo physical changes, but also experience mental changes, including an increase in crying proneness. For example, accounts such as the following can be found on the Internet:

You may find yourself crying much more easily when you are pregnant, and for a variety of unexplained reasons. You may also find that you cry more easily when angry, frustrated, sad, or even when moved by something beautiful. For women who are not “criers” by nature, this may be a bit disconcerting. All sorts of suggestions are made about the reasons why this happens, largely relating to your hormones, psychological state, attitude towards pregnancy, etc., which may help a little.

[www.flickr.com/photos/duchesslala/2295628067/](http://www.flickr.com/photos/duchesslala/2295628067/)

How common is this increased crying during pregnancy? Some researchers in this area have emphasized that the reactions to pregnancy are so highly individual that no generalizations can be made (for a review, see Eugster et al., 2001). More systematic research has shown that feelings of tension in pregnant women are greatest in the second half of the third trimester, whereas emotional stability is greatest in the middle phase of pregnancy. However, as with the findings described above with regard to the menstrual cycle, the question is to what extent such findings can be generalized to all or at least the majority of pregnant women, and if there is any relationship with crying. Does increased “tension” or “emotional lability” mean an increase in crying?

To illustrate the complexity of this issue, note again the need to take into account self-exposure and the reasons why women cry. One study demonstrated differences in pregnant women's preferences for TV programmes during different stages of their pregnancy (Helregel and Weaver, 1989). During some stages there was an increased preference for comedy, whereas during others

they preferred programmes with a different kind of emotional content. This finding once again highlights the complex relationships between mood, emotion regulation strategies (including self-exposure), and “distress behavior,” including crying.

When women were asked after their delivery whether they had cried more than usual during their pregnancy, slightly more than 50% of the study participants confirmed that they had cried more often during their pregnancy than they had done previously. In addition, nearly two-thirds of them reported greater crying proneness during pregnancy than before (Lutjens, 1998). It was noteworthy that crying frequency and crying proneness reportedly differed over the months of the pregnancy. In retrospect, the women reported least crying during the second trimester, corroborating the U-shaped pattern that has been found in studies on mood and pregnancy, but how reliable are these retrospective self-reports?

In a second study, we analyzed two crying-related items (“lump in throat” and “prone to cry”) from a general symptom checklist during the first, second, and third trimesters of pregnant women who were participating in a longitudinal study and 275 age-matched non-pregnant controls (Eugster et al., 2001). The pregnant women reported a higher level of crying proneness than the controls, but this research method did not reveal systematic changes in their crying propensity over the course of their pregnancy.

Again, one of the best studies has been conducted by William Frey, who collected diary data from pregnant women and healthy controls (Eugster et al., 2001). Using this methodologically sound research method, no significant differences in crying frequency or average duration of crying episodes could be found between pregnant and non-pregnant women. In addition, no significant variations in crying frequency as a function of stage of pregnancy were demonstrated. Thus, in a very similar way to findings with regard to menstrual cycle influences on crying, pregnant women too may experience certain changes in their mood state, but these do not necessarily imply that their actual crying behavior is modified.

As already mentioned, some authors have emphasized the individuality of the reactions to pregnancy, which may be readily understood in view of the huge impact of pregnancy and approaching parenthood on both men and women (Pape-Cowan and Cowan, 2000). Pregnancy is a complex life event, often associated with many other major or minor life changes, as well as changes in roles and responsibilities. As stated previously, in order to gain an adequate understanding of emotional experience and emotional expression in such complex biopsychosocial conditions, it is important to pay adequate attention to all of these dimensions. In addition, the more or less successful application of mood management strategies to search for distractions or to stimulate mood makes the situation even more complex. Ideally, women at different stages of pregnancy would be exposed to standard emotional stimuli, and possible fluctuations in real crying would be measured. One reason why pregnant women would be expected to cry more often is that their blood prolactin levels increase considerably from the fifth week in pregnancy until delivery (and especially thereafter when lactating). However, it is certainly not the case that there is a corresponding increase in crying. As yet there is little evidence to suggest that systematic changes in crying occur during pregnancy.

Interestingly, several changes in hormone concentrations have been observed in men who are expectant or new fathers (Berg and Wynne-Edwards, 2001; for a review, see Storey and Walsh, 2011). More specifically, increased levels of estradiol, a hormone that is crucial for the priming of caregiving behavior, were found in expectant fathers. In addition, testosterone levels appear to be considerably lower in new fathers of a range of different species—from gerbils to humans—that provide extensive parental care. This decrease in testosterone levels in new fathers is accompanied by an increase in the levels of oxytocin, which is known to be strongly associated with parental and attachment behavior. At the behavioral level, these hormonal changes reduce the risk of aggression

towards infants and mothers, decrease the motivation for courtship and mating, and may promote paternal care and bonding with the infant (Fleming et al., 2002). The occasionally reported increase in tearfulness of new fathers may also be partly explained by these specific hormonal changes.

### **Postpartum period, mood, and crying**

Immediately after childbirth, three broad categories of emotional “disturbances” may occur (Gale and Harlow, 2003). The most common of these is the postpartum blues (also known as the maternity or baby blues). In addition, there are two more serious conditions, namely postpartum depression and postpartum psychosis. Postpartum psychosis is a very rare but severe illness that commonly requires admission of the mother to hospital. Postpartum depression is less severe, although it may last for several months and is characterized by, among other symptoms, anxiety, despair, and feelings of helplessness. In addition, the interaction with the baby is severely affected.

In the present context, only the maternity or baby blues is relevant. This is a transitory phenomenon in which there is emotional lability that typically begins within the first few days after delivery and lasts for 1 to 10 days postpartum, although it sometimes persists for longer. It is characterized by mood swings, depressed mood, anxiety, irritability, and headache, but above all by symptoms of tearfulness or crying (“the weepies”; the Dutch term for maternity blues, “kraamtranen”, also literally refers to tears). Not surprisingly, questionnaires designed to assess the maternity blues (Iles et al., 1989; Stein, 1980) mainly consist of items that refer specifically to increased crying or tearfulness. Crying thus has a prominent place in this condition.

The estimated incidence of the maternity blues typically ranges from 40% to 75% of all newly delivered mothers (Eugster et al., 2001). The condition is so common that healthcare providers consider it to be a normal variant of maternal behavior, rather than a true psychiatric problem. The large variations in reported incidence may be partly explained by differences in the definition of maternity blues, but there is a consistent finding that the most frequently identified period is from days 3 to 5 postpartum. There is evidence that the maternity blues occur in most cultures with the same frequency (except for Japan, where a considerably lower incidence, of around 15–20%, has been reported). It is not yet entirely clear whether differences in the severity of the symptoms are systematically associated with either personality characteristics or social and cultural factors.

In an American study, 39 pregnant women were studied for 1 to 3 weeks before and 10 days after delivery (in order to assess the severity of postpartum depression) (Hamburg et al., 1968). In the first 10 days after delivery, just over two-thirds of the women reported episodes of crying that lasted for at least 5 minutes, and more than 25% cried for longer than 1 hour. From the interviews it became apparent that although crying was mostly associated with sadness, some women cried for emotional reasons other than sadness, and other women were experiencing sadness and hopelessness but did not show this by crying. In addition to crying, insufficient sleep, restlessness, and undue concern about the health of the newborn were noted during the 10 days postpartum. For comparison, during a 10-day period late in the third trimester of pregnancy, only 20% of the women had cried, and none of these episodes had lasted for more than 60 minutes. At 8 months postpartum, again 20% of the women had cried in the previous days, with no episodes lasting for more than 30 minutes.

Attempts to link increased crying with specific stressors and with changes in levels of hormones (especially progesterone and prolactin) and neurotransmitters have not yielded consistent results. Some investigators have challenged the idea that the maternity blues are peculiar to the postpartum period, or have suggested the possibility that they may occur after any stressful experience or after hospitalization for other reasons, such as surgery (Iles et al., 1989). No strong

support for this idea has been found, and research designed to evaluate it has yielded conflicting findings. In one study, some post-operative dysphoric symptoms peaked in a similar way to those in the maternity group, but another study failed to find the characteristic “day 5” phenomenon after gynecological surgery (see Eugster et al., 2001). In other words, this increased crying seems to be specifically linked to a delivery or to the transition to parenthood. In this respect it would be interesting to ascertain whether or not similar effects are also observed in women after adoption of a child, but this has not been investigated to date.

Women suffering from this condition can in general easily provide an explanation for their tears, but they also recognize the inadequacy of their explanations. Most of the reported problems concern the baby (e.g. feeding difficulties, jaundice), minor conflicts with the woman’s partner or the nursing staff, and, when there are other children, the need of these siblings for care and attention. These women have a strong need to rationalize their tears (e.g. by relating them to physical discomfort, their physical condition, and the impact of the baby on their personal freedom). In addition, many of the new mothers emphasize the role of lack of sleep and fatigue as a possible underlying reason for feeling depressed and irritable.

Since women with premenstrual irritability in particular report significantly higher rates of depression and more tiredness during pregnancy and after delivery, one may speculate as to whether premenstrual mood change and postpartum mood instability share some common underlying neurobiological or psychological mechanisms (Sugawara et al., 1997).

Recent research suggests that a significant percentage of new fathers also experience depression-like symptoms post-partum (Paulson and Bazemore, 2010). Many of them feel frustrated by their inability to help their partner to cope with the new baby, or experience feelings of helplessness and being overwhelmed by their new situation with the focus on caring for the baby. Interestingly, the feelings that these fathers typically describe, such as helplessness and perceived incapacity to deal with the new situation, are the typical feelings that are strongly associated with crying. Unfortunately, this study did not specifically assess crying and tearfulness.

## After the fertile years

There is uncertainty not only about when the gender differences first become manifest, but also about whether they persist into older adulthood. It has been suggested that gender differences in crying only exist during the reproductive years, which would be expected to lead to a decrease in crying in women and/or an increase in crying in men. Is this claim supported by empirical data? As far as is known, to date no longitudinal studies of the development of crying behavior with increasing age have been undertaken (see also Chapter 9). We have conducted some preliminary studies in an elderly sample in order to obtain some initial insights into the relative stability or instability of crying in late adulthood (Vingerhoets, unpublished data).

In two studies in a representative sample of the Dutch population, we asked the participants how often they had cried in the past 4 weeks. As expected, women reported a significantly higher crying frequency than men, but what is more important in the present context is the differential development of crying frequency with increasing age. No systematic changes in crying frequency were found in men, whereas the women showed a remarkable decrease in the shedding of emotional tears. These findings suggest that the gender difference does indeed appear to be greater during the reproductive years than at either younger or older ages. However, there are insufficient grounds to conclude that the gender difference is only manifested during that period.

In a second study involving an elderly sample, we asked the respondents whether they felt that their crying behavior had changed significantly compared with that when they were 20–30 years

of age. Similar responses were obtained for men and women, with the majority (approximately two-thirds of the respondents) indicating that they had not experienced such a change. However, what is more remarkable is that more women than men (15% vs. 4%) indicated that they currently cried less than before, whereas more men than women (27% vs. 19%) reported an increase in crying. In other words, in apparent contrast to the findings just described, these results suggest that crying remains stable or shows a relative increase in men, and remains stable, increases, or decreases in women. These seemingly conflicting findings once again highlight the need for further longitudinal research. In addition to establishing the precise changes that occur, it would also be important to learn more about the possible determinants of these changes. How could tears ever have had any evolutionary advantage for women? Are these changes in crying the result of growing older? Are they more strongly related to the experience of specific stressful conditions (see Chapter 9)? Or do they merely reflect the changes in how we currently perceive crying, compared with several decades ago, when there was more cultural pressure to hold back one's tears? The question of what determines whether an individual's crying behavior remains stable, decreases, or increases is still an intriguing one that warrants the attention of researchers.

## Conclusions

Women cry more often than men. This stereotype of gender differences has been amply confirmed by research. In addition, there are differences in the reasons why men and women cry, and in their attitudes towards and perceptions of crying. These differences are most probably a result of the interaction of biological (partly reproduction related) and cultural factors.

The lack of adequate pertinent research prevents any definitive conclusions from being drawn, but there is a challenge for researchers to design studies that will lead to a better understanding of the nature and background of gender differences in crying.

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## Chapter 11

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# Crying and health

It opens the lungs, washes the countenance, exercises the eyes,  
and softens down the temper. So cry away!

(Charles Dickens, 1839)

Crying not only brings relief—it is also healthy. There is indeed a great consensus in the popular literature that crying is beneficial for one’s health, whereas withholding one’s tears or suppressing one’s emotions is said to have damaging health effects. Headaches, ulcers, hypertension, and insomnia are all considered to be examples of disorders that might result from holding back tears.

In her article entitled *Tears Can Provide Powerful Pain Relief*, Bonnie Boots, who herself recovered from chronic pain, promotes crying as a “fast route to temporary relief” when suffering from a range of chronic pain ailments (Boots, 2008). She also explains the mechanism of this wonderful effect:

Crying is one of the systems nature gives us for reducing pain, and the way it does it is so multifaceted as to seem almost magical.

Crying is one of the signals that tell the brain it’s time to begin releasing chemical compounds. And the compounds it chooses to release actually depend on the reason you are crying!

([www.articleslash.com/Health-and-Fitness/Pain-Management/431570\\_\\_Tears-Can-Provide-Powerful-Pain-Relief.html](http://www.articleslash.com/Health-and-Fitness/Pain-Management/431570__Tears-Can-Provide-Powerful-Pain-Relief.html))

Another very strong statement was issued by Frits Zorn (the pseudonym for a Swiss cancer patient, cited in Dantzer, 1993), who felt that all of the tears that he had never wept—or had never wished to weep—during his life had accumulated in his neck and had created his tumor, because their true function (i.e. to be shed) had not been attained.

Many similar opinions have been voiced on the Internet. On the Primalworks website ([www.primalworks.com](http://www.primalworks.com)) one can read that “Crying is essential to human health. Just as sweating is necessary for heat regulation, crying is necessary for emotional regulation” and “With proper non-judgmental support, crying will lead to an inner emotional movement towards balance and health. Healing is not always immediate, but will occur with time.” In addition, the concern is expressed that “Unfortunately, our natural ability to cry, and thus to heal, has been suppressed.



Crying is part of our emotional immune system, and we desperately need to get it back.” These and countless other quotes leave little doubt about the options—cry or die!

Not only lay people, but also clinicians with different backgrounds are eager to share their knowledge of the “results of recent scientific research” that have clearly demonstrated the positive effects of crying on health. To quote Barry M. Bernfeld, PhD, Director of the Primal Institute in Los Angeles, “Crying is natural, healthy and curative” ([www.primalinstitute.com/newsletter/bernfeld1.html](http://www.primalinstitute.com/newsletter/bernfeld1.html)). Dr. Kevin Keough writes that “Scientific research supports the accuracy of ancient folk wisdom that crying is good for our health” (Keough, 2007). He goes on to state that “scientific studies provide strong and consistent evidence that crying is linked to significant health benefits.” What is more:

recent biological studies offer strong clues to how and why crying is related to health benefits. There is general agreement that there is a significant increase in the number, type and amount of stress hormones released in our bodies prior to crying. Consistently, researchers find that tears contain stress hormones. Thus, crying is a natural and essential biological function that results in the elimination of stress hormones connected to every imaginable stress-related health problem. The 21st century has started by removing any doubt about the positive health effects of crying.

([http://open.salon.com/blog/irishrover7/2010/10/21/identifiable\\_health\\_benefits\\_of\\_crying](http://open.salon.com/blog/irishrover7/2010/10/21/identifiable_health_benefits_of_crying))

As a final example, the clinicians Mills and Wooster (1987) described crying as a “vital part of a healing or growing process that should not be hindered.” These popular ideas are not new, but have a long tradition (see Box 11.1).

In this chapter I shall review and summarize the scientific literature on the relationship between crying and health. I shall immediately give the game away—my conclusion does not concur with the above-cited quotes describing the benefits of tears. If these strong statements really were true, would there not be worldwide campaigns that incited us to cry on a regular basis, just as they try to motivate us to stop smoking, to exercise, and to engage in safe sex? Should we not be advised to cry, for example, once a week, or at least when there is a significant reason for doing so?

If the removal of stress hormones by tears is so important, why is there no onion or tear gas therapy? Finally, why would the removal of these “toxic” substances specifically by tears be so important, when we have urine, saliva, and sweat which also contain these stress hormones? Wouldn’t it be unethical of the health authorities if such a simple and effective therapy was kept hidden from severely stressed individuals? Is the answer perhaps because there is currently—in contrast to what the popular media want us to believe—little if any scientific evidence that crying has positive effects on health?

The truth is that the lack of adequately designed, methodologically sound studies means that no definitive conclusions can be reached about this issue. However, we could also question whether it makes sense to invest large amounts of money in such studies. Are there any good reasons for anticipating a positive result? I shall return to this issue later.

It is remarkable that the issue of crying and health, almost without exception, boils down to the very specific question of whether crying has any positive effects on health. However interesting and important this issue may be, there are also other health-related perspectives with regard to crying that deserve our attention. Everyone who is interested in the issue of crying and health should be aware that these other aspects are also not without practical and clinical relevance. If one aims to cover the topic of crying and health more extensively, all of the following issues need to be addressed:

- crying or not crying as a *symptom* of disease
- crying as a *sign* of disease or pain
- crying or not crying as a *consequence* of disease

- crying or not crying as a *result of treatment* of disease
- crying as an adequate or inadequate *coping behavior* in the face of health problems
- crying or not crying as a *risk factor* for the development of health problems
- crying as a *therapy*—the effects of crying on mental and physical disorders.

### Box 11.1 Classic conceptions about crying and health

Tears clean the head, the glands of the eyes and the small piece of flesh that is affixed to the corner of the eye and also the rest of the body, because in daily weeping serous fluid is continually brought to the eyes, of which the body is then freed.

That weeping is a remedy for sorrow was, according to Petit (1661), proved by the fact that some of the people who did not dare to cry, due to shame or fear, became seriously ill, and others suddenly suffocated. When grief was bottled up, it could also lead to premature grayness. It concerned in particular these kinds of health problems that could be prevented by sighing, tears, and fasting.

On the other hand, weeping also, among other effects, was thought to cause headache. Petit mentions a number of possible causes: sharp vapors may “pinch” the membranes of the head, or this may happen because of serous humor made liquid by heat, or the contraction of sadness fills the membranes and distends them, or too much worry inflames the *spiritus*.

It thus would be wrong to assume that crying has been regarded as beneficial for one’s health throughout history. In the Old Testament the notion prevailed that crying makes one weak. Tears may not only affect the eyes, but also result from the breakdown of the firm substance of the heart, which becomes weak and turns into water. As such they represent the outflow of vital fluid that will only be restored when one is comforted. Aristotle also felt that people could lose “the stuff of life” as sweat or tears which were thought to be the same liquid.

Some sources also emphasize that the eyesight might be taken away by too much weeping. Petit believed that this might occur when some of the serum that streams towards the head has streamed into the “optic nerves,” which then become obstructed. He thought that this was more probable than an alternative explanation which suggested that the eyesight was taken away by thinking too hard.

It was also emphasized that the body is made colder and weaker by immoderate weeping, and that sometimes fevers ascend and that the voice may be affected, because it is made rough and hoarse, when the throat and other parts are moistened by the weeping. This may subsequently result in colds and coughing.

An eighteenth-century German thesis by Christian Ludwig Horst (Müller, 2008) was devoted entirely to the benefits and disadvantages of crying. Whereas his list of benefits was very limited, Horst mentioned many rather severe negative consequences of weeping. The shedding of tears was said to result in drying out of the body or a thickening of the humors, which could lead to obstructions in organs such as the lungs, the brain, and the senses, causing a loss of their functions (e.g. blindness, deafness, epileptic insults). In addition, sleepiness, inflammations, ulcers, and life-threatening tumors could ensue. Weeping could also have a negative influence on morality, facilitating the development of perversions. On the other hand, this author admitted that the brain could also get rid of potentially damaging humors. For post-partum women, crying was considered helpful in reducing the post-birth vaginal discharge, and patients with heart problems were thought to benefit considerably from crying.

## Box 11.2 Tears as medicine

In the movie *Borat*, starring the British comedian Sacha Baron Cohen, the main character is trying to collect gypsy tears because of his conviction that these tears will protect him from contracting AIDS. On the Internet one also comes across suggestions that the tears of specific individuals (e.g. the tough-guy actor and martial arts expert Chuck Norris) may cure cancer and other health problems, including impotence.

Peter van Oosterum's book *Tears: a key to a remedy* (Oosterum, 1997) describes a simple method for harvesting tears and processing them to produce an inexpensive homeopathic remedy that serves not only to release tension and achieve a peaceful mind, but also even to treat emotional and physical ailments. This author recommends drinking a solution containing one's own tears in order to cure whatever it is that makes one cry. Since undiluted tears would be too powerful (with serious associated consequences). Apparently the author is not aware that most of our tears pass back into our gastrointestinal system, it is recommended that 200 times diluted tears are used without any negative health effects.

It is certainly true that tears contain several substances that neutralize certain pathogenic micro-organisms and that stimulate wound healing. However, this does not justify the belief that tears are an effective medicine against diseases.

These issues will be discussed in the remainder of this chapter. For the sake of completeness, there are also individuals who attribute special healing powers to tears (see Box 11.2), but these ideas cannot be taken seriously.

## Crying or not crying as a *symptom* of disease

Are there any medical conditions that are primarily characterized by the inability to cry or, alternatively, by excessive crying? Probably the best-known physical disorder in this respect is dry eye syndrome. This is a common problem among the elderly, particularly in women. Reduced production of tears by the tear glands may be a result of age, hormonal changes, or various autoimmune diseases, including Sjögren's syndrome, rheumatoid arthritis, and systemic lupus erythematosus (e.g. Carsons, 2001). Such patients experience chronic dryness of the eyes and mouth, as well as other parts of the body, and therefore their ability to cry is impaired. Does this also affect their ability to express their emotions, and does it have any consequences for their interpersonal functioning and well-being? These patients may experience difficulty in crying, cry less frequently, and have a higher crying frustration, but these problems do not seem to have a major impact on their well-being (Van Leeuwen et al., 2011).

Another much less frequent and far less well-known disorder that has a major impact on crying is Riley–Day syndrome. This is a very rare congenital disorder of the autonomic nervous system that occurs almost exclusively in Jewish children of Eastern European descent (e.g. Forster and Tyndel, 1956). In addition to the inability to produce tears, symptoms include emotional instability, strong reactions to mild anxiety, relative indifference to pain, and exhibiting several extreme physical reactions when stressed (e.g. excessive sweating, salivation to the point of drooling, and the development of red spots on the skin). Some authors suggest that, since the distress in these children cannot be expressed by tears, the resulting tension may damage the physiological system.

However, not only the absence of tears but also excessive tear production or crying may be a symptom of disease. It is well known that neurological disorders such as stroke, multiple sclerosis, and Parkinson's disease may be accompanied by "pathological crying" (Cummings et al., 2006; Nieuwenhuis-Mark et al., 2008). This is a relatively common phenomenon that often remains unrecognized both by the social environment and by health professionals. Similar effects can be observed in individuals who are exposed to certain toxins that affect the central nervous system. For example, heavy metals such as mercury and manganese, as well as solvents and organophosphates, are all known to be associated with emotional lability, including mood swings and uncontrolled crying (Brown, 2007). The next chapter will be devoted entirely to the latter topic.

Some less common examples of health conditions associated with increased weeping include the following. A paradoxical gustatory lacrimal reflex, called "crocodile tears," may occur in patients who are recovering from a facial palsy (Seckersen, 1979). This condition has also been observed in association with neurosyphilis, acute neuroma, and vascular diseases. These patients typically lacrimate while eating, or in response to stimuli that normally elicit salivation. This is probably due to a special kind of stimulation of nerve endings in the main lacrimal gland, or to misdirection of the regenerating nerve fibers so that some destined for the salivary glands actually end at the main lacrimal gland. The labelling of this condition is based on the widespread belief that crocodiles shed tears when digesting their prey.

Crying is also a relatively frequent symptom in endocrine disorders (Reus, 1985). These are disorders that result from disturbances in the hormonal system, generally due to the production of either insufficient or excess amounts of hormones. Increased levels of thyroid hormones, prolactin, and insulin are most commonly associated with crying. Raised insulin levels result in a decrease in blood glucose concentration, which may lead to a state called hypoglycemia. Hypoglycemia can produce a variety of symptoms and effects, but the main problems arise from an inadequate supply of glucose as fuel to the brain, resulting in impairment of function (neuroglycopenia). The symptoms are very diverse and, in addition to crying spells and moodiness, they may include blurred vision, insomnia, and uncontrollable cravings, among others.

Patients who have suffered from transient ischemia or who have undergone cardiovascular bypass surgery may occasionally also be vulnerable to excessive crying (Bronstein and Mendez, 1999). In the case of a transient ischemic attack, the crying spells may resolve completely within a few hours. However, to the best of my knowledge, no systematic data have been collected for these patients. From my own personal experience I know of two men who reported an increase in emotionality after their heart problems. One of these individuals told me that, ever since that event, he had been unable to listen to his daughter playing the harp without moistening of his eyes. In an extreme example described by the other patient, he burst into tears while having dinner in a restaurant, because he enjoyed the sauce so much.

In a pilot study that my colleagues and I conducted among 1790 elderly people, we asked them whether they had experienced a major change in crying and whether they attributed that change to a particular event (Vingerhoets, unpublished data). Two attributed causes clearly emerged, namely the loss of relationships (due to death, divorce, etc.) and health problems (predominantly cardiac problems). Finally, a colleague who specializes in cardiovascular disease (Dr. Ad Appels) sent me data showing that approximately 3 weeks after percutaneous transluminal coronary angioplasty to open narrowed or blocked blood vessels of the heart, as many as 867 out of a total of 3623 patients (24%) reported experiencing crying spells and uncontrolled crying. Apparently there is some as yet unexplored link between cardiovascular disease (or its treatment) and crying.

Unfortunately, it is not clear how these findings can be explained. Is the problem of a physiological nature, indicating that the brain is in some way affected by, for example, the temporary lack of oxygen, or is there any particular substance involved? Or is this solely a psychological problem, possibly in reaction to the diagnosis (see also Chapter 9 for a psychological explanation)? Later on I shall present some examples of cancer patients who became very upset after receiving the diagnosis (see also Chapter 2), but who also in the longer term experienced difficulties in controlling their emotions.

These are some examples of somatic and neurological diseases which may be associated with changes in crying behavior. In addition, some psychiatric disorders may be characterized by atypical crying. The first disorder that comes to mind is probably depression, the most prominent features of which are a sad (or flat) state and low mood. As early as the sixteenth century, superfluous weeping was described as one of the most characteristic features of this condition, which at that time was referred to as melancholia. To quote Timothy Bright, the most important student of melancholy in this Elizabethan period, “Of all the actions of melancholie . . . none is so manifolde and diverse in partes, as that of weeping” (Bright, 1586). Charles Darwin (1872) also regarded crying as an important and characteristic sign of depressed mood:

The insane notoriously give way to all their emotions with little or no restraint; and I am informed by Dr. J. Crichton Browne, that nothing is more characteristic of simple melancholia, even in the male sex, than a tendency to weep on the slightest occasions, or from no cause. They also weep disproportionately on the occurrence of any real cause of grief. The length of time during which some patients weep is astonishing, as well as the amount of tears they shed.

More recently, Andrew Solomon, in his book *The Noonday Demon*, also described his many crying episodes while he was depressed. For example, he burst into tears because he had used up the cake of soap in the shower, and he wept because one of the keys of his computer keyboard became jammed for a second (Solomon, 2001).

However, these examples appear to be in sharp contrast with the fact that crying is not currently acknowledged as a symptom of depression (Vingerhoets et al., 2007). An analysis of the current psychiatric instruments used to diagnose depression reveals that little value is attached to crying. Although many depression questionnaires contain an item on crying, receiving a higher score for more frequent crying, the widely applied Beck Depression Inventory (Beck et al., 1996) differs in a remarkable way. In this instrument, it is the inability to cry that obtains the highest score and which is considered to be most characteristic of severe depression, rather than increased crying.

A critical examination of the different editions of the *Diagnostic and Statistical Manual of Mental Disorders (DSM)* of the American Psychiatric Association (see Patel, 1993, 2001) also reveals that crying or tearfulness has not been consistently regarded as a diagnostic criterion for various mood disorders (e.g. dysthymia adjustment disorder with depressed mood, and major depressive disorder). In DSM-III, crying proneness and fits of crying were listed among 13 symptoms, three of which must be present for the diagnosis of dysthymia, whereas in all later editions the shedding of tears is no longer mentioned as a symptom of dysthymia. Furthermore, crying is not a necessary symptom for the diagnosis of adjustment disorder. However, the latter diagnosis appears with the qualifier “with depressed mood” in the last four editions of DSM by virtue of increased tearfulness or other manifestations of depressed mood, such as reports of depressed mood or feelings of hopelessness.

Older versions of DSM also failed to consider crying or tearfulness as a symptom of major depressive disorder (MDD), whereas in the more recent versions, depressed mood is one of the two symptoms of which at least one should be present for a diagnosis of MDD. This condition

can be derived from a list of symptoms that contains the item “feeling or appearing ‘tearful’” based on subjective reports or observations made by others.

Whereas crying has in the past been regarded as a sign of mood disorder, current official diagnostic methods show an inconsistent picture, with crying being neither a necessary nor a sufficient criterion for diagnosis of any of the mood disorders. Other official diagnostic methods, such as the International Classification of Disease or the Composite International Diagnostic Interview, show a similar picture (Vingerhoets et al., 2007).

What do research findings suggest about the relationship between clinical depression and crying? Although William Frey and his co-workers found higher self-reported crying frequencies among women with clinical depression ( $8.0 \pm 1.5$  times per month) than among healthy controls ( $5.3 \pm 0.3$  per month) (Frey et al., 1983), the range of the distributions of both groups overlapped to such a large extent (0–31 times per month for the depressed patients and 0–19 times per month for the controls) that it seems to have little distinctive power. Focussing on crying as a sign of depression would imply that, on the one hand, many patients with depression may go unnoticed by healthcare professionals, while on the other hand others may be labelled incorrectly as depressed.

Table 11.1 lists the scores on the above-mentioned Beck Depression Inventory (Item 10) for different patient groups. These findings reveal some interesting patterns. First, they suggest that the psychiatrically depressed include the highest percentage of individuals who report having lost the ability to cry. However, this is also the group with the highest percentage of individuals who report crying over every little thing. In contrast, patients with burnout in particular, and, to a lesser extent, those with subthreshold depression and addicts, report a somewhat elevated level of crying.

The situation is made even more complex by the role of gender and culture. Men generally tend to avoid expressing “weak” emotions and may therefore often display other symptoms, such as aggression and irritability, when they are depressed. This is also why there has been some opposition to the inclusion of crying items in depression inventories. Such items may lead to higher scores for women, implying that the average woman with “normal” female crying runs a higher risk of being diagnosed as depressed (Romans and Clarkson, 2008).

In addition, there is the effect of culture. An analysis of the visits to psychiatrists in the first eight decades of the twentieth century revealed a systematic increase in psychological symptoms and a corresponding decrease in somatic symptoms reported by patients on their first visit to a psychiatrist (Hutschemaekers, 1990). These findings suggest that the expression of psychological symptoms (i.e. how patients present to mental health professionals) fluctuates considerably over time, either because of increased acceptance or due to changed insights in psychiatry.

**Table 11.1** Depression and crying: distributions of the answers of different samples to Beck Depression Inventory (BDI) item 10 (crying) (Vingerhoets, unpublished data)

	As much as before	More than before	Over every little thing	Feel like crying, but can't
General population	83.3%	8.5%	0.6%	7.6%
Subthreshold depression	45.0%	34.7%	5.0%	15.3%
Major depression	26.5%	28.6%	14.3%	30.6%
Addicts	54.5%	26.7%	5.3%	13.5%
Burnout/surmenage	37.6%	48.0%	7.3%	7.1%

Thus depression may alter crying, but the effect is not consistent between the sexes and across cultures.

Study of the relevant literature further reveals different theoretical views on the relationship between depression and crying (Vingerhoets et al., 2007). In fact four different theoretical views of the depression–crying relationship can be identified from the clinical literature. The first view is that there is a simple linear relationship between the severity of depressive symptoms and crying frequency. Thus the more people cry, the more likely it is that they are depressed, and the more severe their depressed state. This is the view that is implicitly embraced by most depression questionnaires—more crying implies more depression. In contrast, the second major view of crying and depression is that the relationship between these phenomena is more like an inverted U-curve. In other words, the idea is that only the milder forms of depression are accompanied by more frequent crying, whereas severe depression is typically characterized by the inability to shed emotional tears. Occasionally one may encounter statements such as “I felt dried up” or “I have shed all my tears.” Remember also that deep sadness and extremely traumatic experiences may occasionally result in loss of the ability to shed emotional tears (as mentioned in Chapter 9).

In two American studies in which depressed patients watched a sad film, it was observed that those who had been depressed for a longer period of time cried less frequently than those with a more recent onset of their disease (Rottenberg et al., 2002, 2003). It is not clear why the chronically depressed cry less than individuals with a “fresh” depression. Is it linked to the severity of the depression, to the use of antidepressant medication, or to related problems in their social functioning? Do depressed patients stop crying after a while because the shedding of tears has lost its power to induce emotional support from others? Is there a relationship with the causes of the depression? These are all possible explanations, which will need to be examined in future research.

Thirdly, one may speculate as to whether other factors determine how one’s crying changes when one becomes depressed. Judith Nelson, who has advanced the interesting idea that adult attachment style determines one’s typical crying behavior, postulates that attachment style also influences the amount of crying in depressed individuals (Nelson, 2005). More specifically, patients who are characterized by an insecure attachment style known as the “preoccupied” style of attachment are expected to typically *hyperactivate* their attachment behavior, including crying, which leads to more frequent and more prolonged crying episodes, whereas patients with “dismissing” attachment styles tend to *deactivate* their attachment behavior, such as crying, resulting in a greater risk of tearless detached depression. The crying pattern of securely attached adults is not expected to change systematically when they become depressed, but rather their crying frequency during depression would be expected to reflect their crying tendencies when they are not depressed.

Finally, the evolutionary psychiatrists Mathew Keller and Randolph Nesse postulated that the specific symptoms reported by depressed patients depend on the very specific nature of the cause of their depression (Keller and Nesse, 2005). In their view, symptoms are not mere useless features that characterize a certain pathological condition, but rather they are regarded as useful coping mechanisms. The authors described how each of the 11 most frequently reported depressive symptoms may help the patient to cope better with their depression-eliciting situation. These authors view crying as a behavior that serves to support and strengthen social bonds. Crying in particular characterizes depression that is linked to threatened, absent, or lost social bonds.

The specific manifestation of depression to a great extent depends on its causal factors (depression due to stress, the winter season, or failure to reach a goal would be more strongly associated with symptoms such as fatigue and pessimism). This idea is not only supported by systematic research,

but also has strong face validity, because broken relationships and losses (e.g. bereavement, romantic break-ups, separation anxiety, homesickness) might be the strongest elicitors of crying.

Nonetheless, the evidence for an association between crying and homesickness is mainly anecdotal. As described elsewhere, in the Old Testament and Homer's *Odyssey* the connection between homesickness and crying was evident. In her interesting work on homesickness in US history, the historian Susan Matt provides several quotes from diaries and letters written by colonists in the earliest days of European settlement in North America (Matt, 2007, 2011). These nicely illustrate the connection between this state and crying. To give some examples, 13-year-old Sidney Roby wrote in a letter to his aunt that "the tears come down so fast that I can hardly write." Adult men and women both described how missing their family made them cry. For example, Joel Brown, a California miner, wrote "I expect that you will think . . . that I am crying to see my wife. Well suppose I am and what then? I am not the only one that is crying to see his wife and baby." Catharine Haun, on the second day of her family's journey from Iowa to California, "broke completely down with genuine homesickness and burst out into a flood of tears."

Among the slaves in the USA, who, understandably experienced a mixture of emotions that included anger, despair, and fear, together with feelings of homesickness and missing their much loved original home environment, a great deal of crying was reported. Matt (2007) quotes Solomon Northrup, a free man carried into slavery who described missing his family in the following words: "When sleep overpowered me, I dreamed of them—dreamed I was again in Saratoga—that I could see their faces, and hear their voices calling me. Awakening from the pleasant phantasms of sleep to the bitter realities around me, I could but groan and weep."

A final example concerns the Dutch baker Jochum Velstra, who moved to Australia in 1951 (Draaisma, 2008). He suffered from severe homesickness, and his physician could only advise him to go back to the Netherlands on a regular basis. His sons complained that they mainly worked to pay for their father's trips to the Netherlands, but they added that his presence in the bakery was of no use because all he did was literally soak the dough with his tears.

In the crying diary study of Walter Frey and his colleagues (Frey et al., 1983), no differences in crying frequency were found between female participants who indicated that they were under some unusual stress during the month of data collection and those who reported that they were not under any unusual stress. Crying may thus not be regarded as an indicator of general distress.

In conclusion, there are several examples of conditions and diseases for which crying, or the inability to shed emotional tears, may be considered to be an essential symptom. However, crying and disease may also be linked with each other for different reasons. For example, crying may result from the pain or distress caused by the disease. When attempting to gain an understanding of why patient groups differ in terms of crying, one could again apply the model described in Chapter 9 for individual and group differences. One thus has to consider to what extent it may be concerned with differences in exposure to emotional stimuli, or differences in appraisal or emotional control, or whether there is a potential biological factor that modulates the crying threshold.

In what follows, I shall demonstrate that sick individuals may have more reason to cry than healthy people, although the shedding of tears is not necessarily a symptom of disease.

## **Crying as a sign of disease or pain**

The difference between crying as a sign of disease and crying as a consequence of disease may in some cases be rather subtle, but I believe that for a good understanding it makes sense to distinguish between them. Crying as a sign of disease or pain is probably the most easy to understand. Both adults and children who are suffering from ill health and pain may cry in response to the



pain, the discomfort, their distress, and the loss of their health, which sometimes results in many more losses in the social domain, such as loss of work, income, relationships, and so on.

Let me start with the case of crying when one is experiencing physical pain. Crying, especially in infants, is regarded as an important pain behavior. This means that when an infant is crying and shedding tears, one should always consider the possibility that it is experiencing pain or other discomfort. It is not surprising that crying is one of the items in frequently used observational measures of pain in children (e.g. Von Baeyer and Spagrud, 2007). However, not only pain, but also the general discomfort and malaise associated with many diseases, may make children as well as adults cry. I mentioned in Chapter 4 that the crying of sick babies differs significantly from the crying of healthy ones. Most notable is the fact that babies with a compromised health status, including those with neurological disorders, disturbed metabolism, and infectious diseases cry at a higher pitch than normal crying, which is experienced as more aversive (Furlow, 1997). This crying is not a specific symptom, but rather it is a more general indication that the infant is physically unwell.

## **Crying or not crying as a consequence of disease**

How common is it for adults to respond with increased emotionality and crying to the diagnosis of a severe, invalidating, and/or life-threatening disease? Cancer patients may respond to their diagnosis by crying, as I described in Chapter 2 when discussing the different possible kinds of crying (Rydé et al., 2007). However, there are good reasons for assuming that, more generally, coping with serious illnesses and the related losses is a painful process that is often associated with long periods of crying.

An impressive example concerns a female physician who was 37 years old, married, with two nice daughters aged 4 and 6 years (Remie, 2001). She had metastases of a melanoma, and a poor prognosis. She was very often angry, oppositional, and very critical of the doctors and nurses. Whatever they did or decided, nothing could meet with her approval. When her two daughters came to visit her, she had a very hard time and afterwards she reproached herself for not being kind to them. Finally, when asked by a psychologist why she was so upset, she started to cry uncontrollably and made it clear that it was the anticipated loss of her little daughters that she could not cope with. She said that she wanted to tell them so much, but all they wanted to do was climb into her bed and play. This made her feel desperate and powerless. The psychologist then suggested that she could make a “memory box” for each of them. Into it she put pictures of herself as a child and as a mother. She wrote letters to her daughters and recorded herself talking to them on tape. In addition, she placed in the box some objects to which she was very much attached. Filling the box was tiring for her and caused her to shed many tears, but at the same time it also brought her feelings of peace and satisfaction, and improved her relationship with her husband and the health professionals.

This example demonstrates that the loss of one’s health status is seldom a stressor on its own, but rather it is linked to a wide variety of significant changes and losses that may often result in much distress, which is typically accompanied by the shedding of many tears. However, in some cases there might be good reasons for a patient not shedding but rather holding back their tears.

In the older psychosomatic literature, the idea prevailed that asthmatic patients were emotionally inhibited and that this inhibition was causally related to the development of their disease (French, 1939). In other words, the inability to express one’s emotions was regarded a potential risk factor for the development of asthma. However, more recently it has become clear that laughing and crying may trigger the onset of exacerbations of asthma (Lehrer et al., 1993; Miller

and Wood, 1997). This means that, rather than asthma being the *result* of emotional inhibition, the reluctance to express emotions may be the *consequence* of the disease, as it represents an attempt to gain control over one's health status. Asthmatic patients thus learn to avoid laughing and crying, because these behaviors may trigger the onset of their asthmatic attacks.

The display of emotional reactions by patients may also be controlled for other reasons—for example, because one does not want to upset one's partner or family, especially young children or, in the case of children, the parents. Parents generally will attempt to control their emotions and do their best not to expose their children to their tears, but this may also hold for children. For example, a 10-year-old cancer patient explained that he did not dare to cry, because he was aware that his crying could also make his parents cry, and he did not want that to happen.

A final example that may be relevant concerns specific problems with pain perception—either the inability to feel physical pain, or its opposite, namely hypersensitivity. Individuals with *congenital insensitivity to pain* have a pain threshold high enough to make a serious accident feel more like a pillow fight, which is why these patients seldom shed physical pain tears (Nagasako et al., 2003).

At the other end of the continuum there are patients with a pathological hypersensitivity. An impressive example has been described by the neurosurgeon Frank Vertosick. This concerned a woman suffering from severe facial pain caused by trigeminal neuralgia. This pain could be triggered by even very weak stimuli, such as tears rolling down her cheek (Vertosick, 2000). Crying in such patients may thus result in more pain, so these individuals are likely to do their utmost to control their tears.

I am aware that the distinctions that I have made here are in some ways artificial and have their limitations. For example, it is not easy to decide where the results of an Austrian study that compared crying behavior in eating-disordered females and healthy controls should be discussed (Mangweth et al., 1999). The patient group did not differ from the controls with regard to general crying proneness and the effects of crying on mood, but their crying frequencies were significantly higher. Moreover, on some specific crying proneness items, particularly those linked to features of their psychiatric diagnosis, such as feeling humiliated or insulted, and having low self-esteem and traumatic memories, they also obtained higher scores which reflected greater crying proneness. It has to be questioned whether this is a cause or a consequence of their condition.

There might also be an association between crying and several types of psychopathology. For example, it seems obvious that people such as psychopaths may cry less often than normal people because they lack any empathic abilities (Soderstrom, 2003), whereas patients with personality disorders such as borderline personality disorder may be expected to cry more often (Alexander, 2003), and the same is probably true for patients with anxiety disorders. However, generally speaking it is not easy to establish whether, in these examples, the specific crying behavior should be regarded as a symptom or a consequence of the disorder.

## **Crying or not crying as a result of treatment of disease**

A person's crying behavior may be influenced not only by the disease or its direct consequences, but also by the treatment that is administered. Probably the best example of this concerns the effects of antidepressants, which even in fairly low doses are quite effective in reducing crying (Oleshansky and Labbate, 1996; Opbroek et al., 2002; Van der Veen et al., 2012). The following is a quote from a patient who was taking an antidepressant:

I still can't cry either. Since I've been on paroxetine, I became a super happy person within a month, and have loved life ever since. However, one of my obsessive fears all my life was that my mother would die. She did die of cancer (very suddenly after diagnosis) and guess what, I still haven't cried. I

feel really guilty and I'm worried that if I go off the paroxetine, the grief will flood in and overwhelm me.

([www.paxilprogress.org/forums/showthread.php?p=397857](http://www.paxilprogress.org/forums/showthread.php?p=397857))

In contrast, there are other medical treatments that facilitate crying. For example, hormonal treatment may have a dramatic impact on the emotionality of several patient groups, although again there is an astounding lack of systematic studies on this topic. In particular, the lowering of testosterone levels is accompanied by increased tearfulness and emotionality that are difficult to control (Wassersug, 2007, 2009). Probably the best-known anecdotal evidence relates to prostate cancer patients, voluntary eunuchs, and male-to-female transsexuals (Wassersug et al., 2004). For example, prostate cancer patients who are being treated with androgen deprivation therapy (also known as hormone blockade or testosterone-inactivating pharmaceuticals) may experience these problems.

To illustrate how these people feel:

I don't recall crying much as an adult, but since my castration I'll weep while watching *Mothers Against Drunk Driving* commercials. At first I feared that my tears would be perceived as maudlin self-pity. But the truth is that I've become more sensitive to the trials and tribulations of others. My tears thus no longer embarrass me. I consider them humanizing, just as they are for angels. The link to my chemical castration is obvious; testosterone fuels aggression but suppresses empathy and the ability to cry

(Prostate cancer patient, cited by Wassersug, 2007)

Male-to-female transsexuals reportedly experience more depression, tiredness, tension, and labile mood, as well as negative emotions such as powerlessness, disappointment, and sadness, than their female-to-male counterparts. It is plausible to expect that the crying behavior of these individuals probably also changes significantly. However, in the case of such high-impact interventions, it is not easy to disentangle mere biological effects from the psychosocial impact of treatment. For example, the start of gender reassignment, initiating the long-wished-for physical changes, may also partly explain the increased emotionality.

Female-to-male transsexuals have to deal with the opposite experiences. This is the story of one such individual:

I don't cry any more. I used to find myself getting tearful in stressful situations, and I couldn't always stop myself. This would happen about once a month. Since starting on testosterone five years ago I haven't cried once. Even at funerals. I felt upset but I expressed it in a different way. I don't think that this is a social effect because I noticed it the day I started hormone treatment. I also find myself getting more tearful when I'm low on testosterone. Not actually crying, but getting more tearful.

(<http://doctorz.wordpress.com/2006/11/page/2/>)

There are also some limited research data on men who undergo voluntary castration. These men also report a number of significant changes in mood and emotions. One might expect that these effects would not be entangled with the potential negative effects of having a serious disease, and would therefore provide a clearer picture of the relationship between hormones and crying. Not surprisingly, again no studies have addressed the specific issue of crying in this particular group. It is quite remarkable that, in this group, there appears to be less depression and negative mood after the castration, which suggests once again that mere biological changes are often not sufficient to explain changes in well-being after treatment (Wassersug et al., 2004). Furthermore, women to whom these hormones are administered in order to treat endometriosis or when undergoing infertility treatments occasionally report irritable mood, mania, and crying spells.

So far I have provided some examples that demonstrate how administering hormones for medical reasons may have a strong impact on mood and emotionality, and probably also on crying. I must again highlight the fact that it is unfortunate that investigators and clinicians have so far failed to pay systematic attention to the issue of increased emotionality and tearfulness. Typically, when psychological issues in relation to hormones are addressed, there is a much greater focus on cognitive than on emotional issues.

Possible side-effects of contraceptive pills include low mood and jealousy in a significant minority of women (Sanders et al., 2001). This is consistent with our observations that pill users cried more often than non-pill users (Van Tilburg et al., 2003). However, this requires more detailed study. In addition, other medications such as antihistamines and beta-blockers may affect tear production in individual cases. Moreover, exposure to chemical substances such as interferon- $\alpha$  (Gleason and Yates, 1999) and barbiturates ([www.ombudmhd.state.mn.us/alerts/bul95\\_3.htm](http://www.ombudmhd.state.mn.us/alerts/bul95_3.htm)) may facilitate the development of emotional lability. Finally, patients with Parkinson's disease who were treated with deep brain stimulation (during which the subthalamic nuclei are electrically stimulated) may report increased emotionality and tearfulness as side-effects (Schüpbach et al., 2005).

All of these examples clearly demonstrate that, when observing changes in crying behavior in patients or interpreting differences in crying frequencies between different patient groups, it is important to take into account the effects of treatment, which may have a significant impact on these changes.

## **Crying as an adequate or inadequate coping behavior**

Crying typically occurs in response to emotional events such as losses. As such, one may obviously speculate about the effects of crying on one's well-being. As I have outlined previously, crying may have both inter- and intra-individual effects. Given these effects, crying may be a very interesting coping response as viewed from a stress-theoretical perspective. Suppose that crying can bring about the following effects:

- bringing relief
- facilitation of physiological recovery
- possible stimulation of the provision of social support
- manipulation of others
- reduction of aggression.

In that case, crying seems to be the ideal coping response to many stressful encounters.

The concept of crying as a very effective coping response yields some interesting insights, but the ultimate test of the validity of this idea requires observations that confirm a positive effect of crying on (long-term) mental and physical well-being. This widely accepted claim is the topic of the final part of this chapter. In other words, is crying actually healthy and, going one step further, is there reason to regard crying as an effective intervention or therapy for mental distress and psychosomatic disturbances?

## **Crying or not crying as a risk factor for the development of health problems**

I started this chapter with several quotes expressing the conviction that crying is an essential and necessary human activity, because it is viewed as an important natural healing mechanism. But

is there any scientific evidence that substantiates this claim? Are individuals who hardly ever or never cry at increased risk for the development of health problems? As said before, if the answer to this question is “yes,” it would be a serious neglect of health authorities if they failed to promote crying in their health campaigns. However, the short (and probably, for many, unsatisfying) answer to this question is that we do not know. In order to be able to answer this question satisfactorily, we need data that have been collected in longitudinal, preferably experimental studies in which healthy people are randomly assigned to “crying” and “non-crying” conditions, and are subsequently followed for many years in order to carefully evaluate their health status. If non-crying participants (assuming that both groups comply with this intervention) have more health problems than the crying group, one would have good reason to consider crying to be relevant for one’s health, if other potentially relevant factors, including smoking, diet, exercise, and genetic predisposition, to mention just a few, have been taken into account. However, such ideal studies do not exist. This means that there is currently no convincing scientific evidence in support of the idea that the inhibition of crying may promote the development of health problems.

Some studies have looked more broadly at emotional expression (Nyklíček et al., 2002). For example, they tried to establish the effects of emotional inhibition (or expression) on the course of disease or of the grief process. The most impressive results have been reported with cardiac patients, and the increased risk of recidivism in type D individuals, who are distressed but are also socially inhibited and thus do not display their emotions. These individuals had an increased risk of a new cardiac event, even after controlling for several other cardiological risk factors (Denollet et al., 1996). However, since type D individuals also cry more frequently than non-type D individuals, crying does not seem to provide these patients with any protection.

There are also some studies that have examined the crying of specific patient groups, but these cross-sectional studies are of limited scientific value, because it is not possible to determine whether differences in crying found occasionally are the *result* rather than the *cause* of the disease.

Frey and co-workers in their diary study also included some patient categories (e.g. individuals with allergies and hypertension). Their crying behavior did not differ from that of the healthy controls (Frey et al., 1983). Earlier, the psychiatrist Robert Sadoff investigated the attitudes towards crying of two patient groups (“psychosomatic” patients from allergy and dermatology clinics, and hospitalized schizophrenic or depressed psychotic patients) and healthy students (Sadoff, 1965). The psychiatric patients indicated that they cried more easily than the other two groups, but no differences in the meaning attributed to crying or the attitudes towards crying were found between the groups. The nurse Margaret Crepeau compared ulcer and colitis patients with healthy controls, and concluded that healthy individuals cry more and have a more positive attitude towards tears than either of these patient groups (Crepeau, 1981).

One could argue that there is no point in crying for no reason if the importance of crying first becomes evident when individuals are exposed to emotionally taxing situations. In other words, crying is thus only beneficial when we are in difficulties.

One study compared the well-being of individuals in relation to their exposure to stressors and recorded their crying behavior (Labott and Martin, 1987). Individuals who were exposed to a high number of stressors and who cried frequently did not feel better, and in fact felt worse, compared with people in similar conditions who failed to cry. This finding can be interpreted in several ways, but it certainly demonstrates that the situation is not as simple as the popular media often suggests. Crying is certainly not the magic wand that solves all misery and health problems.

As I have already emphasized, at present we lack the data that are necessary to provide a definitive and valid answer to the question of whether the inhibition of crying may have

negative effects on health. We can, of course, look at what relevant data we do have to answer this question. For example, it might be helpful if we had insight into the direct effects of crying on our physiological functioning, in order to obtain an understanding of the underlying mechanisms.

In Chapter 6, I discussed the possible role of the parasympathetic nervous system, oxytocin, and endogenous opioids in explaining the relief brought by tears. What would be the mechanism for health improvement? Certainly more stable improvements of respiratory sinus arrhythmia might be beneficial for one's health. But what else could bring about positive effects on health?

In addition to the autonomic nervous system and the endocrine system, the immune system has an important role in maintaining our health. Does crying influence the immune system? Three studies (Martin et al., 1993; Labott et al., 1990; Labott and Teleha, 1996) have focussed on the effects of crying on immunoglobulin A in saliva (S-IgA), which is considered to be an important first line of defense against invasion by pathogenic micro-organisms. The results of these studies yielded evidence of a negative effect of crying on this immunological parameter, and suggested, if anything, a *reduced* protection against pathogens, whereas in the study by Labott et al. (1990) the inhibition of crying when exposed to the same sad stimulus did not result in suppression of immune activity. Since decreases in S-IgA levels were not found in participants who only felt sad, it seems as if it is not the mere feeling of sadness, but rather the specific act of crying that has a negative effect on the body's defense mechanisms.

However, it should be emphasized that our immune system is a very complex network of cells and processes that work together to defend us against aggressive intruders. It seems to dispose of many compensatory mechanisms, if one's defense system is compromised. It is therefore too naive to conclude that the decrease in S-IgA levels implies an actual reduction in resistance and increased vulnerability to disease. Here we urgently need studies in which more attention is paid to other indices of the effectiveness of our immune system in protecting us against pathogens. There is one animal study from Russia which suggests that facilitation of wound healing occurs after stimulation of the lacrimal system in rats (Ilínskii et al., 1985). Unfortunately, this study has been seriously criticized on methodological grounds, but it is nevertheless an intriguing result that certainly warrants replication with more rigorous research methods.

What about the other possible side of the coin? Can crying perhaps also have a damaging effect on an individual's health? There are examples of saints who cried so excessively that their health status was affected. Among these individuals were John the Baptist, Saint Francis, and Ignace of Loyola, who all developed eye problems, to the extent that they experienced shrinking of their eyelids, which was attributed to their excessive crying. The more recent literature includes a report about female professional singers in whom excessive crying caused vocal fold hemorrhages (Murry and Rosen, 2000). Thus crying might have a traumatic effect on the larynx and vocal folds due to its intensity, the hard glottal onset, the strained voice, and the irregular breathing pattern. These singers were at particularly increased risk just before the onset of their periods, because of the accompanying cardiovascular changes, such as enlarged blood vessels, increased blood vessel fragility, and possible vocal fold edema.

What can we conclude from all of this? Crying does indeed have some effects on the cardiovascular system, the hormonal system, and immune function. However, there must be serious doubt as to whether the observed changes (which occasionally are the exact opposite of those expected) also have any clinical relevance. Our hormonal and immune systems both show considerable daily momentary variations in their functioning in reaction to all kinds of psychological and physical stressors, which have no impact on our health.

## Crying as a therapy: effects on mental and physical disorders

In the previous section, the focus was mainly on the relationship between crying and the development of health problems. One can also speculate about the effects of crying on existing mental and physical disease states. Again, in the popular media one frequently comes across “therapies” in which crying is a very essential component. Probably the best known of these is *primal therapy*, which was developed by Arthur Janov (1970). This therapy became widely publicized when the Beatle John Lennon went to Janov and his wife for treatment. Primal therapy evolved from the screaming therapy of the early 1970s, and developed into a kind of crying and “rebirth” therapy. It is claimed that the therapy is able to reduce or eliminate a host of physical and psychiatric ailments within a relatively short period of time, with lasting results. The testimonies of former patients are impressive:

If it weren't for Primal Therapy, I would be dead from drinking and smoking too much and driving too fast. Even if this had not killed me physically, I still would have been dead emotionally.

(A.N., USA)

There's no way of describing it, it all sounds so straight just talking about it, what actually you do is cry. Instead of pent up emotion, or pain, feel it rather than putting it away for some rainy day. ... I think everybody's blocked; I haven't met anybody that isn't a complete blockage of pain from childhood, from birth on. ... It's like somewhere along the line we were switched off not to feel things, like for instance, crying, men crying and women being very girlish or whatever it is, somewhere you have to switch into a role and this therapy gives you back the switch, locate it and switch back into feeling just as a human being, not as a male or a female or as a famous person or not famous person, they switch you back to being a baby and therefore you feel as a child does, but it's something we forget because there's so much pressure and pain and whatever it is that is life, everyday life, that we gradually switch off over the years. All the generation gap crap is that the older people are more dead, as the years go by the pain doesn't go away, the pain of living, you have to kill yourself to survive. This allows you to live and survive without killing yourself.

(John Lennon, interview with Howard Smith Radio, 1970)

A second, less well-known therapy, but one whose claims are just as impressive, is the *cure by crying* intervention that was launched by Tom Stone. His book (Stone, 1995) is promoted with the following slogans:

How to cure depression at home, for free, without a psychiatrist.

Learn why crying in movies can heal your brain.

Learn why the genetic chemical imbalance theory of depression is a partial truth.

This book documents an amazing breakthrough discovery, how to permanently cure depression without a psychiatrist and without Prozac. Not a quick fix! Not full of psycho-babble about self-esteem and assertiveness. *Cure By Crying* is a hard-working process that physically repairs the brain.

Stone's method challenging the genetic chemical imbalance theory of mental illness, is simple:

Remember your childhood traumas, the day your father died, or the day your mother left you, and cry about it until you're done crying. Written by America's foremost expert on repressed memory, *Cure By Crying* is both a revealing personal story of abuse, and a step-by-step do-it-yourself manual.

Although there might be some important differences, both primal scream therapy and cure by crying therapy consider traumatic childhood experiences to be a major etiological factor in the development of many mental and psychosomatic disorders. Reliving these experiences and expressing repressed emotions are key elements of both therapies. The claims of the two therapies are equally impressive. Both claim to cure headaches, nervousness, insomnia, violent temper, addictions, and relationship difficulties. However, there is one serious problem. These claims have not

been substantiated by independent research. Consequently, both therapies have fallen out of favor in academic and psychotherapeutic circles. Primal therapy is even included on the blacklist of discredited psychological treatments (Norcross et al., 2006). Thus there is no evidence to support the view that crying is a kind of panacea that has benefits for all kinds of health problems. Does this mean that there is no research that has evaluated the effects of crying on disease states? Well, there is some, but it mainly concerns case studies, which have only very limited value as scientific evidence.

The following observations are relevant to this issue. Over 60 years ago, psychosomatically oriented clinicians reported intriguing reciprocal relationships between crying and the course of urticaria (hives) (Saul and Bernstein, 1941) and asthma (French, 1939), respectively. When the patient cried she did not have urticaria, and the attacks were usually terminated as a result of weeping. Conversely, when she suppressed her tears she developed urticaria. In another study, a relationship was demonstrated between crying and exudation into the sites of cantharides blisters in the skin (Kepecs et al., 1951). After an emotional state had been induced through hypnosis, the subsequent inhibition of crying was followed by an initial decrease in the exudation rate, which was later followed by an increase if the inhibition continued.

More recently, a Swedish case report of a 26-year-old woman who had difficulty in expressing emotions, particularly sadness and crying, has been published (Linton, 1985). The patient was offered a comprehensive behavioral treatment, including assertion training oriented towards emotional behavior, modelling, and systematic shaping of crying. This approach resulted in a major improvement in her ability to express emotions, and she started crying, whereas she had not experienced a single crying episode for several years previously. Importantly, she also reported feeling better. In particular, her problems with anxiety and insomnia decreased considerably, and these improvements were confirmed by her relatives. The problem with such a case study is that not only the crying has changed, but also several other aspects of the patient's behavior. This makes it difficult to attribute the changes in the patient's well-being to the increased crying.

Scientifically more relevant are two Japanese studies on the effects of crying in clinical samples. The first study (Ishii et al., 2003), which was conducted among patients with rheumatoid arthritis, suggested that, when individuals are exposed to an emotional stimulus, the shedding of emotional tears reduces the negative effects of stress on the neuroendocrine and immune responses in peripheral blood. As a result, patients who were moved to tears had more easily controllable rheumatoid arthritis compared with those who were emotionally affected but did not produce tears. The second study (Kimata, 2006) demonstrated that the allergic reactions of patients suffering from latex allergy were significantly reduced after they had cried while watching an emotional movie. In contrast, no reduction in allergic symptoms was observed in the group who watched the same emotional film but who failed to shed tears, or for either of the groups after they had watched a non-emotional video. To the best of my knowledge, these two studies are the only ones to date that provide support for the idea that crying may indeed have positive effects on health.

In conclusion, this chapter has clearly demonstrated that the relationship between crying and health includes more than just the question of whether or not crying has a positive (or negative) effect on a person's health status. Alternative relationships also require serious consideration. Although there can be no doubt that some of the studies reported here have yielded intriguing findings that warrant further research, there is currently no convincing scientific evidence to justify the major claims that still dominate the popular media, stating that crying has a powerful effect on one's health.



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## Chapter 12

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### Too many tears . . .

I was always rather weepy,  
but now I have turned into a real cry-baby.

Sir Winston Churchill (after suffering a stroke)

(Brenda Haugen, 2006)

In his autobiography, *Memoir of a Thinking Radish*, the immunologist and 1960 Nobel Prize winner Sir Peter Medawar describes his experiences after suffering a right-sided cerebral hemorrhage (Medawar, 1986). The blood clot had the usual consequences—left-sided paralysis and disturbed vision in the left half of each eye. In addition, it caused extreme tiredness. However, what he felt was the most embarrassing and disagreeable long-term effect was his extreme tearfulness and sobbing, which in his view were not signs of misery or depression, but just uncontrollable expressions that did not reflect his real mood state.

The problems encountered by patients who have this uncontrollable condition had previously been described very eloquently by Frances McGill, a patient with amyotrophic lateral sclerosis (ALS) who kept a diary over a 2-year period, in her book entitled *Go Not Gently: letters from a patient with amyotrophic lateral sclerosis* (McGill, 1980). Like Medawar, she also felt that her laughing and crying episodes bore no relation to how she actually felt. She described her experiences as being in “a wild storm,” and qualified them as emotionally horrible, debilitating, and very frightening. In her case, the consequent anger, frustration, and embarrassment made the fight to regain control over her emotions and their expression her first priority. Similar feelings are expressed by the patient described below (Manzo et al., 1998):

*Interviewer:* Do you notice any changes in the way you feel about yourself?

*Patient:* Yes, lower self-esteem (crying).

*Interviewer:* That's okay. Can you try and tell me about it, or is it too painful to talk about?

*Patient:* I hate it that I cry too much. I hate it.

*Interviewer:* Did you usually not to cry?

*Patient:* Very little. Oh, I thought I was pretty even-tempered and a fairly happy person. So this bothers me.

*Interviewer:* So you don't think you're as happy a person now as you were before?

*Patient:* Not when I cry too easily. That upsets me. I would like not to do that.

As demonstrated in the previous chapters, adults typically cry in emotionally charged settings, often related to separation and loss, but also linked to positive events such as reunions, weddings, or winning a sports game. The prevailing emotions are sadness, powerlessness, and frustration, but also tender feelings, admiration, and “elation.” However, in clinical practice, both excessive crying and (to a lesser extent) excessive laughing are observed, particularly in patients with neurological disorders (Cummings et al., 2006; Nieuwenhuis-Mark et al., 2008; Parvizi et al., 2009; Wortzel et al., 2008).

Charles Darwin was already aware that certain neurological conditions had a major effect on crying (Darwin, 1872):

... for certain brain-diseases, as hemiplegia, brain-wasting, and senile decay, have a special tendency to induce weeping. Weeping is common in the insane, even after a complete state of fatuity has been reached and the power of speech lost.

Unfortunately, many of these patients remain undiagnosed and untreated, despite the fact that the majority of them would benefit enormously from treatment. It is therefore important that clinicians in particular, but also the broader public, become more familiar with this problem, its background, the conditions under which it typically occurs, and—last but not least—with what can be done to bring relief for these patients. Box 12.1 addresses the issue of how excessive weeping in the past was considered in particular to be an activity of saints and mystics, and later was viewed as a symptom of a “nervous” disorder.

### Box 12.1 Historical explanations of excessive crying

In previous times, abundant crying was an activity that was particularly associated with religious activities. It is no wonder that many saints and mystics were famous for their excessive tears (see also Chapter 13). The medieval mystic Margery Kempe (1373–1440) may be considered to be the real weeping champion. Her crying episodes could last for hours or even days. English church officials in the fifteenth century placed her under surveillance and conducted several tests in an attempt to determine whether her excessive weeping should be regarded as a divine gift, the result of demonic possession, or just a way to attract attention. For example, every year on Good Friday, for the 10 years that her gift of tears consumed her, she wept and sobbed for 5 or 6 hours. She reportedly wept for the souls in purgatory, for those in poverty or suffering from diseases, and for Jews and all other “heathens” who needed to be converted. Recently, several scholars have suggested alternative explanations for her excessive crying, such as an illness (possibly epilepsy) and excessive wine consumption (Bhattacharji, 2005).

In the seventeenth and eighteenth centuries, excessive crying and, in particular, uncontrolled laughter that gradually developed into tears were considered to be a sign of nervous disorders, generally referred to as “the vapors.” Alternative terms that were used were “fever on the spirits,” a “nervous fever,” and “hysterics.” The term “vapors” referred to the mental state of low spirits or melancholy, which was thought to originate in the stomach or spleen in men, or in the uterus in women.

However, the philosopher Jean Jacques Rousseau called the vapors “the malady of the happy people” (Damrosch, 2005). Some wondered whether there was a causal connection between his genius and humanity on the one hand, and his sensibility and his extreme propensity to weep on the other.

It is not yet clear whether the crying of these patients is in all cases only quantitatively or also qualitatively different from normal crying. As the cases described above suggest, there is typically no connection with feelings, but rather the crying is considered to be a solely motoric problem, but is this always really the case? Is such crying indeed always involuntary, inappropriate, and uncontrollable, and often independent of any possible antecedents? Or are there perhaps, as suggested by Poeck (1969), two distinct conditions—one that is solely motoric (“pathological crying”) and another that is characterized by a very low threshold and/or low level of inhibition for the production of tears (“emotional lability”)? Pathological crying is then defined as a response to non-specific, often non-emotional stimuli (e.g. the noise in a room), which has no direct relationship with mood or affect, and that also exhibits the absence of voluntary control. Emotional instability, on the other hand, has been characterized as being more appropriate to the situation and more congruent with sometimes minor mood changes, but also—like pathological crying—having relatively limited controllability.

Clinicians are very creative in introducing new diagnostic labels for this condition. As can be seen in Box 12.2, at least 15 different terms are currently used, and authors still feel the need to introduce new ones. The most recent term is “involuntary emotional expression disorder (IEED)” (Cummings et al., 2006). As the main reason for introducing this new term, the authors emphasize that, in the ideal case, terminology assists in recognition, diagnosis, and management. Moreover, the term should be medically accurate, phenomenologically descriptive, and not pejorative to the patient. According to these authors, IEED meets these requirements.

I am not convinced that this is actually the case. I do not see how this term resolves the disagreement about the nature of this disorder, and whether or to what extent it matches affective sensations.

I also strongly feel that neurologists currently lack the necessary skills to make a more refined and detailed diagnosis, and are a little too eager to label all “excessive crying” in a similar “pathological” way, probably overlooking some essential differences between individual patients, in particular how they cope with the losses linked with their disorder. The point that I want to make here is that the qualification “disorder” should be used with caution by health professionals, such as neurologists, who do not have the slightest notion about normal crying. I therefore argue for the use of the much more neutral and purely descriptive term “excessive crying,” which is also used for babies (see Chapter 4), rather than the patient-unfriendly and stigmatizing terms such as “emotional incontinence” or “pathological crying.”

### **A closer look at “pathological” crying**

Until now, only two studies have examined pathological crying episodes in stroke patients in more detail (Allman et al., 1992; Grinblat et al., 2004; see also Nieuwenhuis-Mark et al., 2008), allowing a comparison with normal crying. Allman and co-workers demonstrated that, quite remarkably, there were no gender differences in crying frequency in the patient groups and, of more relevance to the current discussion, in only 17% of the crying episodes was no precipitating factor identified, whereas none of the respondents reportedly cried in response to non-emotive stimuli. This finding therefore seriously challenges the view that there is no relationship with eliciting emotional factors, however weak they might be. Grinblat and colleagues analyzed over 1000 examples of “uncontrolled crying” and compared their findings with data on normal crying. They concluded that uncontrolled crying differs from normal crying both quantitatively and qualitatively. However, I question the validity of this conclusion, because this study nicely illustrates how a lack of adequate insight into the study of

## Box 12.2 Synonyms for EC in the literature

- Affective incontinence
- Emotionalism
- Emotional discontrol
- Emotional incontinence
- Excessive emotionality
- Emotional dysregulation
- Emotional lability
- Forced crying or laughing
- Involuntary crying or laughing
- Organic emotionalism
- Pseudobulbar affect
- Pseudobulbar palsy
- Pathological emotionalism
- Pathological emotionality
- Pathological expression of affect
- Pathological laughing and crying

normal crying results in the application of an inappropriate research methodology. What then are the problems with this study?

First, they used a measure that contains a list of situations that are not representative of the kinds of situations that are responsible for the production of everyday tears. In other words, the comparison that they made was not adequate, because they compared results obtained with two methods that basically differ from each other. More precisely, in the patient group they sampled antecedents of real crying episodes, but they compared their findings with the results obtained with crying proneness measures (rather than real crying episodes) in healthy individuals. An adequate comparison would probably have revealed that the situations which elicit tears in healthy individuals and in stroke patients are much more similar than is suggested by these researchers. Observing patients and healthy controls while watching an emotional film would be an excellent way to compare crying proneness in the two groups. However, to date no such studies have been conducted.

In addition, as I pointed out in Chapter 8, one should not forget that crying in normal “healthy” individuals also shows wide variation, and can show strong fluctuations even in response to extreme emotional events. For example, “normal” adult women report monthly crying frequencies of between 0 and just over 25 times per month.

Finally, it must be emphasized that the great majority of these neurological disorders (see Box 12.3) are serious and disabling diseases that have a strong impact on the patient’s life. These patients have often experienced many losses and thus in fact have a lot to cry about. Much similar to other patients with severely disabling diseases (e.g. heart disease, cancer) these patients also may cry a lot in an attempt to cope with their condition. For example, there is ample anecdotal evidence that patients with cancer or heart disease may also become more emotional and cry a lot after their diagnosis. To quote a female breast cancer patient: “I feel like such an idiot; I get

### Box 12.3 Neurological disorders in which EC has been observed

- Amyotrophic lateral sclerosis (ALS)
- Multiple sclerosis (MS)
- Cerebral vascular stroke
- Cerebral tumors
- Parkinson's disease and Alzheimer's disease
- Wilson's disease
- Migraine
- Traumatic brain lesion
- "Locked-in syndrome" (a condition in which the patient is aware and awake, but cannot move or communicate due to complete paralysis of almost all the voluntary muscles in the body)
- Epilepsy
- Corticobasal degeneration (CBD)
- Psychiatric disorders (e.g. schizophrenia)

all weepy for *no reason*." What I want to make clear is that the increased crying in patients with neurological disorders may thus not necessarily result from the brain pathology, but rather be related to the dramatic changes in that person's life perspective. The fact that the crying often decreases in the months following the attacks may reflect either recovery processes or adaptation to the new situation. Therefore clinicians should be cautious about labelling the crying of these patients as pathological and a direct result of brain pathology.

### Neurological sources

Since different kinds of neurological patients have been observed to exhibit episodes of EC, apparently it cannot be attributed to any one specific area, lesion, or hemisphere (see Box 12.4). On the one hand, there is currently much debate about which brain areas or structures may play a key role in the pathophysiology of this phenomenon. On the other hand, this lack of a clear and well-defined pathology might also be an indication that the excessive crying has less to do with specific neurological damage, and more to do with its serious social implications and the coping efforts of the patient. Remarkably, there is also evidence that crying is a relatively common and specific clinical feature of pseudoepileptic seizures (i.e. seizures of emotional or stress-related origin) (Bergen and Ristanovic, 1993). Since elevated levels of plasma prolactin have been reported in both conditions (Chen et al., 2005), one may speculate about the extent to which this hormone plays a decisive role in this effect.

Analysis of the relevant literature has revealed three possible anatomical levels that might cause disturbances in emotional expression. First, the root of the problem may be located in the brainstem motor nuclei or the primary effectors of facio-respiratory musculature. If these nuclei lose their cortical inhibitory control, this may result in uncontrolled activity of facial, vocal, and respiratory muscles, and the well-known visceral components such as dilation of facial vessels, resulting in affect-independent or pseudo-laughing and pseudo-crying. A second source may be the cortical control centers of (facial) emotional expression, in particular the basal forebrain. A final possible explanation emphasizes the relevance of neurochemical substances, especially



## Box 12.4 Cerebral structures that may be implicated in EC structures

### Limbic areas

- Thalamocingulate division of the limbic system
- Amygdala and hippocampal formation
- Medial thalamus, hypothalamus, and subthalamus
- Bilateral lesions, including the internal capsule, substantia nigra, thalamus, and pyramidal tracts
- Bilateral pontine, basal ganglia, and periventricular lesions (may lead to more severe EC episodes)
- Mammillary bodies (mainly implicated in pathological laughter)
- Junction of corpus callosum and cingulate gyrus (all implicated in pathological laughter)

### Frontal areas

- Prefrontal cortex (PFC), especially the medial PFC
- Midline/medial frontolimbic cortex and adjoining frontal neocortex
- Medial orbitofrontal area (if stimulated)

### Brainstem and other diverse regions

- Brainstem raphe nuclei and lower brainstem (faciovocal mechanisms)
- EC due to interruption of control system at the base of the brainstem
- Descending pyramidal or extrapyramidal tracts to bulbar nuclei
- Mesencephalon, caudal pons, and medulla
- Lesions of the anterior limb of the internal capsule
- Occipitotemporoparietal cortex (Brodmann's areas 19, 21, 22, and 37)
- Lateral cerebellum

### Diffuse pathology

- Multiple lesions of the cerebrum (as found, for example, in multiple sclerosis)
- Unilateral lesions, especially focal left anterior hemispheric lesions or right frontal opercula when the lesion is combined with an existing major depressive disorder

serotonin. The idea is that destruction and dysfunction of some important serotonergic neurotransmission pathways may also result in the loss of control over emotional expression. However, as I shall demonstrate below, very different mechanisms may underlie the excessive crying in these patients.

## Alternative mechanisms

A substantial proportion of patients with EC also suffer from symptoms of depression, although they are not necessarily depressed in a strict clinical sense. The main differences between EC and depression are as follows. First, whereas EC typically occurs in short-lived bursts, lasting from seconds to minutes, depressive symptoms typically last for weeks to months. Secondly, EC is said to be mood independent, although, as discussed above, this does not always appear to be the case. Thirdly, in the case of EC, most other behaviors are not affected, whereas depression

is characterized by a broader range of symptoms, such as apathy, fatigue, general lack of interest, and sometimes agitation. Finally, depressed patients may suffer from low self-esteem and a negatively distorted view of themselves, others, and their own future. In the case of EC, such problems occur only occasionally.

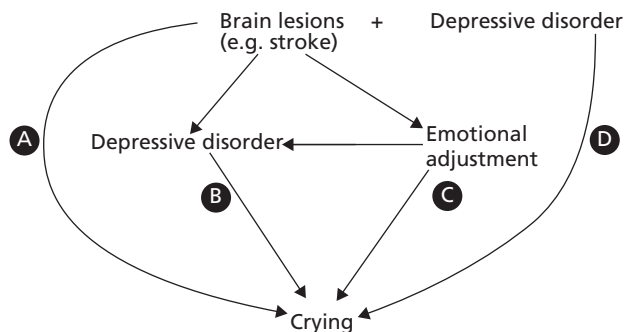
In summary, EC seems to be more directly related to the *expression* of emotion, whereas mood disorders are linked to the *experience* of emotion. However, the fact that EC and depression are different phenomena does not exclude the possibility of their coexistence. Thus there are several possible pathways whereby brain damage and increased crying can be connected. These are summarized schematically in Figure 12.1 (Patel, 2001).

Neurological disorders and EC can thus be related in many different ways. Pathways A and B are the first ones that need consideration. Pathway A represents the increased crying behavior as a direct result of brain lesions, whereas pathway B represents the possible (weak) relationship between crying and post-lesion depressive symptoms. Pathway C depicts crying as a reaction to the life-threatening and disabling nature of the disease, and to the associated severe limitations and losses.

Occasionally, such adjustment reactions may induce depression, but again, as with pathway B, the link with crying is more likely to be due to pathway C. EC has been found to be associated with mood and post-stroke depression, as well as with lesion size, but not with lesion location, gender, age, history of stroke or depression, predisposing disease, or social distress before the stroke incident (Andersen et al., 1995).

Finally, pathway D might result from unilateral lesions of the right frontal opercula when combined with an already existing major depressive disorder (Ross and Stewart, 1987). These authors have provided evidence that EC can result from the interaction between neurological and psychiatric disorders, as shown by some clinical characteristics, such as the precipitous onset of the crying behavior (as opposed to the gradual onset in patients who become depressed following brain lesions). For the sake of completeness, in all cases it must be established that there is a real increase in crying. Some patients may already have suffered from a high level of crying proneness premorbidly.

When applying my model to explain individual differences in crying, as described in Chapter 9, it can be seen that stroke patients and other neurological patients not only show differences



**Fig 12.1** Schematic diagram representing the different possible links between organic brain disorders and crying. Reproduced from Patel, V. (2001). Crying and psychiatric disorder. In: A.J.J.M. Vingerhoets and R.R. Cornelius (eds) *Adult Crying: a biopsychosocial approach*. Hove, UK: Brunner–Routledge. pp. 247–64.

in crying threshold, which may be caused by damage to brain structures that are important for normal emotional functioning, but may also show differences in terms of exposure to emotional stimuli (including thoughts about their lost premorbid state and the many other losses with which they are confronted daily), and differences in the appraisal of situations. Finally, neurological patients may differ from other patients in terms of their level of control over their tears.

## Diagnosis of excessive crying

Simply asking patients whether they experience periods of uncontrollable crying and/or laughter is not sufficient to diagnose EC. Further questions must address the frequency, the change in crying compared with the premorbid state, the link with eliciting factors and emotions (however weak), and the extent to which this state affects the patient's daily life. This information is not only important for clarifying the diagnosis, but may also be helpful when trying to evaluate the effects of treatments.

Three questionnaires are currently available for assessing this condition, namely the Pathological Laughter and Crying Scale (PLACS) (Robinson et al., 1993), the Emotional Lability Questionnaire (ELQ) (Newsom-Davis et al. 1999), and the Center for Neurology Study-Lability Scale (CNS-LS) (Smith et al., 2004). The PLACS and the CNS-LS are most often applied both in clinical practice and in research, but little is known about their validity, and they fail to address some of the important issues that have been described here. Nevertheless, their content may be useful for making doctors, nurses, and paramedical professionals more aware of these problems. The condition is too often overlooked, because many patients do not spontaneously discuss the crying attacks, either because of embarrassment, or because they think that doctors are not interested in their inappropriate emotional outbursts, or cannot do anything about this problem. A reliable and valid method of assessing the emotional state of these patients is urgently needed. Based on the (admittedly often contradictory) literature, the list of general diagnostic characteristics in Box 12.5 may be helpful when designing such an instrument. However, to determine to what extent each of the factors detailed in Figure 12.1 play a role, a more detailed diagnostic method is needed.

## The consequences of excessive crying

Mood problems and cognitive dysfunction are often interwoven. Patients suffering from EC may have more intellectual limitations and more extensive brain damage than patients with similar lesions who do not have EC, but it is often difficult to separate cause and effect.

More is known about the impact of EC on everyday life (Judd, 1999). First, as is the case for many poorly understood deviations from standard cultural norms, this condition may result in strongly negative reactions from the patient's social environment. This in turn may lead to

### Box 12.5. Diagnostic characteristics of EC

- Attacks are frequent and immediate
- The patient is more likely to burst into tears or laughter than was previously the case
- Emotional reactions can be linked with specific or (in some cases) non-specific stimuli
- The intensity of the emotional reaction is out of proportion to what people would expect from the stimulus or context
- The patient is unable to control their behavior in social situations

social withdrawal and impairment of all aspects of everyday functioning. Simple conversation is almost impossible, participation in rehabilitation programmes causes problems, and work performance may be severely affected. There are also some real dangers associated with this condition—for example, when it interrupts swallowing and puts the patient at risk of choking or aspiration, especially if they also suffer from dysphagia. It is no wonder that these patients complain of social embarrassment or even find the condition socially disabling, which may occasionally result in the development of social phobias.

## Coping with EC

An analysis of the effects of EC on interpersonal interactions and the way that these patients and their social environment deal with the disorder revealed four main strategies (Manzo et al., 1998). The first strategy is the expression of empathy (e.g. crying with the patient). Such empathic responses emphasize that crying is normal and explicable and is not necessary pathological. The patient is given the explanation that they have plenty of reasons to cry, and that they should not worry too much about it.

The patient may stress that they are not crying because they are sad, but rather it is the other way around—they are sad because they suffer from this uncontrollable condition. This strategy may help patients to distance themselves from their crying behavior. By labelling it as intrusive and unwanted, the crying may paradoxically be normalized in some sense. An alternative way to deal with it, initiated by the patient him- or herself, is with derision.

A third strategy is to search for explanation or excuses. For example, the crying may be explained by referring to emotional or medical (non-stroke-related) problems, such as sinus congestion or allergy. In this way the crying may become normalized and more acceptable.

Finally, the crying can be attributed to certain premorbid characteristics of the patient—for example, it may be argued that they have always been a sensitive, emotional person who cried quite easily.

The drawback of the successful application of such coping strategies is that they may prevent others, including health professionals, from becoming aware that the patient is really suffering from EC. As a result, the patient is unlikely to receive adequate treatment for the disorder.

Surprisingly, although EC is annoying both for patients and for their family members, the patients themselves rarely complain about it. This may be due to the fact that many of them do not realize that treatment is available, or they may feel too ashamed to talk about it, or worried that just talking about it will bring on an attack.

For the sake of completeness it should be pointed out that occasionally these patients may also benefit from this condition. For example, a multiple sclerosis patient with this condition reported that he had greater success in relationships because of his strong tendency to cry at the slightest poignant moment. His relatives found him “more sensitive and appealing” (Counter, 2011).

## Treatment of EC

As has already been mentioned, health professionals often fail to recognize EC because they simply do not ask the right questions (Robinson-Smith and Grill, 2007). In addition, they are not always aware of the many possible problems which can be caused by EC, and appear to have little or no insight into the treatments that are available. Given the major impact of EC on the lives of these patients, it is important that it is recognized and treated adequately in order to alleviate their suffering and ultimately to improve their quality of life. The lack of knowledge and understanding of some healthcare providers is well illustrated by the astonishing advice of a

psychologist to a patient to “enjoy your new dramatic personality.” Thus many patients remain not just undiagnosed, but also untreated or inadequately treated, even if they are diagnosed correctly.

## Treatment options

Although I earlier emphasized the differences between EC and depression, EC nevertheless responds very well to the pharmacological treatments that are used for mood disorders. Both tricyclic antidepressants and selective serotonin reuptake inhibitors (SSRIs) are very effective (Hackett et al., 2010; Horrocks et al., 2004). In addition, there are some reports which suggest that positive effects can be obtained with thyrotropin-releasing hormone and dopamine agonists such as levodopa. However, these substances have not yet been evaluated in well-designed studies.

The direct and positive effect of SSRIs on EC suggests that serotonin receptors are involved in the pathology of this disorder. Remarkably, the location of the brain damage has little if any influence on the amount of time that is required for the antidepressants to have an effect. The clinical response of EC to antidepressants differs in two respects from the response of low mood to these drugs. First, the response occurs very soon (often within hours) after starting treatment (in contrast to the lag period that occurs before any effects on low mood can be observed), and secondly, it occurs at much lower doses than are needed to alleviate depression. This suggests that antidepressants may act independently or concurrently on mood-mediating areas and on the neural pathways for crying. The anticholinergic effects of some antidepressants would fit with this hypothesis, as crying is a parasympathetic function. However, discontinuation of antidepressant treatment can result in a recurrence of EC, and the symptoms will disappear again if the patient resumes their medication (see Nieuwenhuis-Mark et al., 2008).

It has occasionally been reported that pathological crying turned into pathological laughter after SSRI treatment, but there are also cases where pathological crying naturally and spontaneously develops into pathological laughter with time. Age might be an important factor in determining how patients react to medication, since there is evidence that younger patients react more quickly than older ones, but other individual differences may play a role as well. For example, the effect of the treatment is influenced by the patient’s tolerance level and any other medications that they may be taking (see Nieuwenhuis-Mark et al., 2008).

Although the doses required are relatively low, one should nevertheless be aware of possible side-effects, contraindications, and problems with the long-term use of the medication, although these will be limited. Thus pharmacological treatment is often very effective, but not everyone reacts positively to it (Hackett et al., 2010).

## Alternative treatments

Once the diagnosis has been made, the patient and their family should be educated about the disorder and taught self-management skills (Robinson-Smith and Grill, 2007). Education is essential when trying to manage the disorder, because telling the patient that EC is distinct from depression and other psychiatric disorders, and providing additional information about the symptoms of EC, can greatly reduce the distress of both the patient and their family members (Judd, 1999). Learning coping strategies (e.g. avoiding excessive stress), practical suggestions on how to react in social situations, and identifying embarrassment and the risk of subsequent social withdrawal, which can result in social isolation, are all useful for helping the patient and their family to deal with this disorder.

There is also some evidence that cognitive–behavioral interventions can be effective in the treatment of pathological crying (Brookshire, 1970; Kasprisin, 2004). For example, it was observed that each time a patient with multiple sclerosis was about to start to cry, he made a specific head movement. The therapist successfully modified this head movement and eventually eliminated it via verbal reinforcement of incompatible behavior. As a consequence, the crying attacks also stopped. EC patients occasionally describe specific thoughts that occur immediately before their attacks, which can be of vital importance to cognitive–behavioral interventions with these patients.

Recently, an alternative cognitive therapy for EC has been developed with the aim of compensating for deficits resulting from structural lesions by strengthening undamaged pathways (Kasprisin, 2004). This was achieved by superimposing volitional movement on muscles affected during an EC episode. Treatment of 17 patients showed significant reductions in EC severity and occurrence, and in contrast to drug treatments, the effect was sustained at a 3- and 6-month follow-up.

## Conclusion

There are huge inter-individual variations in crying among healthy individuals, and it is by no means unusual for individuals to show a temporary increase in crying—for example, after a major loss or after being diagnosed with a serious disease. However, in the case of neurological disorders, increased crying may be a symptom of the condition, rather than a reaction to it. Nevertheless, in many cases neurological patients shed tears for very similar reasons to those that cause healthy people or patients with other serious diseases to cry. Given the lack of insight into and knowledge about normal crying, it is not unlikely that clinicians may label normal emotional adjustment responses as pathological. I am also of the opinion that EC, with the exception of clearly affect-independent, solely motoric crying, only differs from normal crying quantitatively (i.e. a lower threshold and less inhibition), rather than qualitatively. The solely motor expression that is devoid of any emotional tone may be a second and qualitatively separate condition, with specific and distinct brain pathology. Given the wide variation in crying in normal adults and individuals suffering from depression, and the possible major stigmatizing consequences of the labelling of this condition, health professionals should be very wary about using terms like “emotional incontinence” and “pathological crying.”

There may be too little recognition by healthcare providers that these patients experience and have to cope with considerable losses. Careful diagnosis is therefore recommended. In addition to providing education and explanation, offering understanding and support may be helpful for these patients. As a last resort, medications can be given, which are very effective, although they may need to be continued indefinitely and can have side-effects.

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## Chapter 13

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# A cultural historical perspective of tears

The soul would have no rainbow if the eyes had no tears.

(Native American Proverb)

Emotional tears have fascinated humans for centuries. They have an air of mystery, not to say even magic, and have played a major role in numerous legends and myths from the past, but also in more recent tales tears are attributed special powers. They have been connected in particular with purity, fertility, (new) life, and even the creation of mankind.

Thus it is not surprising that not only religious people, but also artists including poets, writers, musicians, and painters, have embraced tears as a topic for their reflections and a source of inspiration for their creative work. In this chapter I aim to provide a very global impression not only of how tears throughout history have permeated daily life, but also how crying has been depicted in legends, literature, music, and visual art. In addition, the role of tears in religion needs at least some brief discussion. I do not pretend to give a systematic and exhaustive review, but rather I shall limit myself to providing some selected examples that illustrate the representation of tears and crying in the arts, to make it clear that cultural context really matters and to emphasize, once again, how culture permeates the evaluation of tears and crying.

### Tears in legends and myths

The oldest written references to tears are the Ras Shamra texts found on Syrian clay tablets, near the city of Ugarit, dating from about 1400 BC (Lutz, 1999). Among the texts is a poem about the death of Ba'al, one of the major gods worshipped in many ancient Middle Eastern cultures, and his sister's response to the news. The story tells that the news caused her to weep, and that her tears brought her satiety and even a kind of intoxication. It is particularly significant, however, that her tears also brought the dead god back to life.

This idea of tears giving a life new force is a recurring theme in many ancient myths. For example, the ancient Egyptians believed that the Nile flooded and delivered the fertile sediments every year because of Isis's tears of sorrow for her dead husband, Osiris. This association is also notable in the praying accompanied by excessive crying for rain in times of drought, which occurred in many cultures from old Aztecs in Mexico, to medieval Spain and modern Tunisia. In addition, in several old Eastern cultures there were special weeping festivals to appease the gods of fertility.



The connection between tears and (new) life even extended to humans, in particular their creation and resurrection. For example, according to ancient Egyptian texts, creator gods formed other gods through their divine sweat, whereas humans were produced through their tears. Similarly, in ancient Greece, it was believed that the clay that Prometheus had used when he fashioned man was not mixed with water, but with tears. The ancient Greeks were further known to regard tears as representing a form of life. Living flesh was thought to contain a liquid or liquefiable element, as in the “melting of the flesh” in tears, which explains why tears were associated not only with grief and suffering, but also with sexual longing and romantic relationships (Onians, 1951).

In several legends and folk tales, the tears of the main characters often mark a crucial psychological turning point. For example, Gilgamesh, the hero of the ancient Mesopotamian epic, wept when he accepted the futility of his quest for immortality and surrendered to an existential acceptance of his humanity. Interestingly, as I shall discuss later, in more modern fairy tales, too, such as *The Snow Queen* by Hans Christian Andersen, Lewis Carroll’s *Alice’s Adventures in Wonderland*, and, most recently, in J.K. Rowling’s *Harry Potter* books, tears occasionally play a remarkable role or are attributed magical powers.

Although there is always uncertainty about the extent to which the descriptions of tears in ancient and more modern writings can be regarded as a reliable representation of attitudes and prevailing real-life conceptions in a particular period in history, they nevertheless may allow the reader to gain some insight into the prevailing ideas about the appropriateness of the crying of men and women in certain contexts, and beliefs about the nature and functions of tears. In the remainder of this chapter I shall provide a brief, selective overview of the representation of tears in the literature of different time periods, in both “fiction” and “non-fiction.” It appears that, throughout human history, tears have been regarded as good and honoring human nature, but also others have been regarded as debasing human nature and have met with strong disapproval. An analysis of the main topics yielded the following recurring weeping themes: tears of mourning and ritual tears; weeping heroes; religious weeping; love and tears; sentimental tears; and “intellectual” tears (tears not shed for personal reasons, but rather when the individual is “transcended”). Of course, each historical time period has its most prominent and important themes. For example, the last two themes became especially important in the seventeenth and eighteenth centuries, whereas weeping heroes dominated the classic and early medieval literature.

## Tears in the Bible

In both the Old and New Testaments there are several descriptions of weeping (of people, angels, and Christ himself) (see Collins, 1971; Frazer, 1919; Lange, 1996; Lutz, 1999). The term “tears” occurs approximately 90 times, and there are a further 30 references to crying or weeping. The tears are predominantly linked to sadness, homesickness, grief, and repentance. In addition, in the Old Testament the prophets are reported to cry because of the behavior of the people who do not want to listen to them and fail to comply with God’s prescriptions and rules. For example, the prophet Jeremiah cried over the sins of God’s people so often that he is now known as “the Weeping Prophet.”

The Bible also contains many examples of people crying in groups in order to achieve some objective. People gathered and wept together before decisive battles, in an attempt to bring fortune and luck in times of war and adversity. Judas and his followers reportedly prepared for the war against the Syrians by fasting, kneeling, and weeping for three days. In the Old Testament there are also references to ritual weeping, such as that performed at autumnal festivals, probably devoted to the dead god Ba’al. Furthermore, weeping has long been an important part of penitential

festivals, which were organized in particular when the population was struck by disasters such as drought, failure of crops, diseases, swarms of locusts, or defeat in wars (Ebersole, 2000). In addition, there are accounts of women assembling in Jerusalem to weep over an early West Semitic vegetation god, Tammuz, who was said to disappear underground during winter, leaving burnt-up fields, mown corn, and sown grain behind. This kind of mass weeping was common until the late Middle Ages. Later, common weeping developed from an ancient agricultural custom into a kind of self-humiliation, with the aim of invoking the mercy of Yahweh, the Hebrew name for God.

The Bible also contains several descriptions of individuals using tears to reinforce their prayers and their requests for assistance. For example, in the Old Testament, when Hezekiah developed a lethal disease, he reminded Yahweh of his blameless conduct and his good works as he wept many tears. This proved to be quite effective, because he later received a message through the prophet Isaiah that Yahweh had heard his prayer, seen his tears, and promised to heal him. This positive view of tears and their use to gain God's support may partly explain why so many saints and mystics are known for their prolonged weeping.

Jesus himself has also occasionally been depicted as crying. For example, when he heard that his friend Lazarus had died, Jesus wept, and for the bystanders this crying signified that he loved Lazarus very much. An individual who deserves special mention is Mary Magdalene, a woman with a bad reputation, who wet Jesus' feet with her tears, wiped them with her hair, and then kissed them. This behavior—without any word being spoken—led Christ to tell her that her sins were forgiven. This notable event has obviously reinforced the widespread idea that tears can be very helpful when seeking forgiveness, and for one's salvation.

Readers of the Bible are repeatedly reassured by God, who wants to ease the tears of his people. For instance, in the final book of the New Testament, the Apocalypse, there is a description of what good people may expect from the future:

They will never hunger or thirst again,  
and they won't be troubled by the sun or any scorching heat.  
The Lamb in the center of the throne will be their shepherd.  
He will lead them to streams of life-giving water,  
and God will wipe all tears from their eyes.

Sinners, in contrast, “will be thrown out into the dark, where they will cry and grit their teeth in pain.”

A final interesting quote comes from Psalm 56: 8, where it is suggested that God keeps track of our weeping: “You have kept record of my days of wandering. You have stored my tears in your bottle and counted each of them.” The collection of tears in bottles is thought to have had a long tradition in several cultures (see also Box 13.1). Biblical scenes have long been a favorite theme, especially of classical painters. Notable examples of weeping Biblical figures include, first of all, the suffering Jesus (e.g. Dieric Bouts), his mourning relatives, in particular his mother Mary (e.g. Rogier van der Weyden), but also Saint Peter (e.g. El Greco) and Mary Magdalene (e.g. Titian).

Later I shall expand on the representation of mourning individuals in paintings, but first I will continue the discussion of tears and crying in literature, in particular providing examples from Greco-Latin, medieval, and seventeenth- and eighteenth-century literature.

## **Greek and Roman antiquity**

Several scholars have studied and described the role of tears during this time period, both in literature and in daily life. My main sources are Lutz (1999), Van Wees (1998) and, in particular,

### Box 13.1 Tear bottles

Tear bottles or lachrymatories have been found in ancient Egyptian, Greek, and several Middle Eastern societies, as well as in ancient Rome. However, the oldest reference to them probably dates back to the Old Testament, when David prays to God, “Thou tellest my wanderings, put thou my tears in Thy bottle; are they not in Thy Book?” This seems to refer to the collection of tears in a bottle. However, it did not refer to a mourning individual, but rather to God keeping track of how much each individual cries.

According to some sources, in ancient Roman times, mourners filled small glass vials with tears and placed them in burial tombs as symbols of love and respect. Sometimes women reportedly were even paid to cry into these vessels as they walked along the mourning procession. Those who cried the loudest and produced the most tears received the most compensation, according to the legend. The more sadness and tears that were produced, the more important and valued the deceased person was perceived to be. However, it is more likely that these vessels contained ritual oils and perfumes.

Tear bottles containing the tears of the beloved are also reported to have been used by sailors and soldiers when they were separated from their loved ones for a long time.

The bottles are referred to again in the nineteenth century, when those mourning the loss of loved ones collected their tears in bottles that were often ornately decorated with silver and pewter. The mourning period would end when the tears had evaporated from the bottle.

the insightful contributions by Fögen (2009a). Tears played a significant role in many classic epic poems, such as Homer’s *Iliad* and *Odyssey* (c. eighth to ninth century BC) (Föllinger, 2009). It is remarkable that although the concept of tears as a sign of male weakness was certainly known in these classical times, this does not seem to have dominated the literature of that period. The warrior Odysseus is a great weeper, who cries in every book of the *Odyssey*, and Achilles, the best-known Greek hero, is also portrayed as a real cry-baby in Homer’s *Iliad*. Interestingly, Homer never suggested that women cry more often and more intensely than men, and in some specific situations, such as the loss of a son on the battlefield, the emotions expressed by the men appeared to be even more intense than those expressed by women. There are no examples of crying warriors being negatively judged as weak or effeminate. On the contrary, crying was considered to be an essential part of the behavioral repertoire of heroes.

An analysis of the different crying situations in Greco-Latin literature (e.g. Suter, 2009) has yielded tears of rage, despair, or fear in reaction to personal loss, joyful events, yearning (especially for one’s partner), or defeat (not only on the battlefield, but also in sporting events). In addition, there are ritual tears, with their strict prescriptions (Sterbenc Erker, 2009; Van Wees, 1998). Even during battle, when heroes were being wounded or confronted with the sight of wounded significant others, they allowed their tears to flow abundantly. Thus there seems to be a remarkable similarity between the kinds of situations that evoked tears in those times and those that make modern men cry.

Heroes were not depicted as mere “killing machines,” but rather they were portrayed as having the courage to face death and to express their distress and emotional suffering. In many respects the weeping of heroes shows similarities with their fighting—they also weep intensely, vigorously, and actively. Thus the two sides of war—glory and pain—were linked to the main characters. Indeed, during this period, war was the most appropriate setting where even the Gods were allowed—if not socially obliged—to weep.

Thus Homer's heroes readily express their emotions, and often weep more copiously and more frequently than was generally considered normal and appropriate for men. On the other hand, there were also occasions when a certain degree of emotional self-control was described—for example, when the Trojans were collecting their dead from the battlefield (probably in order to avoid giving their enemies the pleasure of witnessing their tears and sorrow).

In contrast to the unrestrained expression of emotion by Homer's heroes, in the more recent tragedies, such as those written by Sophocles and Euripides (c. fifth century BC), some notable changes in the display of emotion can be observed. In these works, the shedding of tears by men is much more often accompanied by feelings of shame and embarrassment and associated restraint, because there is a wish to avoid being seen as weak and effeminate. In some of Aesop's fables (c. 600 BC), excessive male crying is even explicitly ridiculed. This change in the perception of tears suggests a search for a balance between sensitivity and emotional self-control in men, while for women the reverse development occurred. In these tragedies the shedding of tears was mainly a female activity.

However, during this period in history the question of whether to cry or not to cry was not just a matter of gender. Social class was important, too. Plato (424/423 BC–348/347 BC), who was convinced that the gods never wept, felt that crying should be left to women and lower-class, effeminate men, whereas “men of repute” and “famous men” should control their emotions. This also held for eminent women, whom he considered should show more restraint than lower-class women. Plato was very critical of examples of crying men in the literature. He even suggested deleting the verses in Homer's work that describe the intense emotional reactions of many of the heroes, because he thought that they might have a negative influence on young men by setting a bad example. Plato set high standards for emotional self-control. In his work *Phaedo*, there is a scene that describes Socrates taking poison. When the male bystanders start to cry, Socrates expresses his disappointment by saying “What are you doing? You amaze me. It is precisely for this reason that I sent away women, so that they would not misbehave like this. Be quiet and be strong!”

However, Plato cannot be seen as a typical representative of that period in history. In some contemporary novels, such as those written by Xenophon (c. 430–354 BC), the male characters still show hardly any signs of emotional restraint. In addition, in courts of law and in political speeches of that period, crying was employed to manipulate the audience or the jury in a trial. Not only did the defendants weep, but also their lawyers occasionally shed tears in order to evoke compassion. Plato was thus quite unique in his disapproval of such emotional display, which he considered to be a mere rhetorical trick, and he referred to men who shed crocodile tears as “nothing but women.”

Also in classical Rome, tears were a topic that attracted the attention of both intellectuals and poets, including Pliny the Elder (AD 23–79), Virgil (70–19 BC), Juvenal (c. AD 58–127), and Ovid (43 BC to AD 17 or 18). I have already mentioned in Chapters 5 and 9 that weeping lovers are frequently portrayed in Roman love elegies, of which not only Ovid, but also Propertius and Tibullus are the main representatives. In addition, there are the tears associated with grief-related conditions, such as death and funerals, and those shed during violent quarrels and in reaction to rejection and relationship break-up. Weeping of both the victim and the perpetrator (who is suffering from remorse) is frequently described in this literature. Remarkably, the tears of the physically abused victim are not always regarded as a sign of distress, but may rather be viewed as a sign of surrender to sexual advances, and a signal of submission to lovemaking. Tears of lovers were first of all regarded as positive signs, because of the supposed connection with jealousy, which in turn signifies true love. Going one step further, tears were even associated with lovemaking. In conclusion, one may say that, in this literature, there is not just an association between love and tears, but there is also a stronger notion that tears *are* love.

However, in the writings of both Ovid and Propertius there are several examples of weeping apparently being used merely to induce a comic effect (Fögen, 2009b). In addition, there have been instances of parodies of the excessive use of tears. Examples include, among others, the *Satyricon* of Petronius (AD c. 27–66) and the work of Publius Syrus (c. first century BC), who stated that “behind the mask, the tears of an heir are laughter.”

## The Middle Ages

The literature of the Middle Ages is also full of examples of weeping men and women (Huizinga, 1919; Lange, 1996; Lutz, 1999; Van der Wijden, 2004). For instance, in both *Beowulf* (an Old English heroic epic poem dating back to between the eighth and the early eleventh century) and *The Song of Roland* (the oldest surviving major work of French literature, dating back to the middle of the twelfth century), men as well as women are depicted in many tearful episodes. When the legendary medieval warrior Roland, also a great crier, died while trying to defend Charlemagne’s army, no less than 20 000 knights reportedly fell from their horses weeping. Among the most intense criers in this period were King Arthur, Lancelot, Roland, and Charlemagne. Globally, in this literature, the following categories of tears have been distinguished (Van der Wijden, 2004):

- tears of grief
- tears shed during separations and departures
- prayer tears
- tears of powerlessness and despair
- love tears
- tears of joy
- crocodile tears.

More crying men than weeping women (the ratio is about 2:1) are depicted in medieval texts, but this may be the result of the over-representation of men in medieval literature. There was very little difference between the sexes in terms of the reasons for their tears. Women cried relatively more often in association with love or powerlessness, or everyday situations, whereas in the case of men there are slightly more frequent descriptions of despair, religious activities, repentance, and joy, as well as crocodile tears. Men were also more likely to shed tears in the context of major issues such as war and peace.

As an example of the connection between tears and love, Pico della Mirandola (1463–1494) pointed out this relationship in “*The twelve properties or conditions of a lover*” (see also Chapter 9). And a few centuries earlier, in a French love poem, it was recommended to men that onions should be used to induce tears in order to impress a woman and convince her of one’s genuine warm feelings.

Most tears are shed in a public setting with many others present, rather than alone in a more private setting. There is no evidence that the crying individuals tend to withdraw when overwhelmed by emotion. Rather, tears were shed in the very place where the situation that precipitated them had occurred.

In addition, in these writings, the reader is never left with the impression that crying has a negative effect on the image of the hero, or that tears are associated with weakness or an effeminate character. Only in exceptional cases is a king in tears called to order because crying is considered to be a behavior unworthy of a man of standing.

Is this picture that emerged from this literature an adequate representation of everyday life and attitudes during the medieval period? The answer is probably not. *Aucassin et Nicolette*, a French

*chanteable* (a combination of prose and verse) written by an unknown thirteenth-century author, relates the impossible love and adventures of two lovers—Aucassin, the son of a French count, and Nicolette, a Saracen captive. Although this work was initially regarded as an idyllic romance, more modern critics have viewed it as a parody of courtly love (Harden, 1966).

Notable in this work are the many apparent reversals of roles and activities, which are probably intended to evoke a comic effect. For example, in the bizarre land of Torelore the king is about to give birth, while the queen is commanding troops to a battle, and the war is being fought with cheese and fruit. More relevant to the current discussion, Aucassin's main activity is crying. It is not only his impossible love, but a wide variety of situations that make him shed superfluous emotional tears. In contrast, it is the female character Nicolette who displays bravery and courage. This tale thus has all the characteristics of a parody, suggesting that crying at this time was more typically a female activity than a male one.

## Religious tears

In two respects, religion and tears have been connected since the early Middle Ages (Lange, 1996; Lutz, 1999). First, throughout history there are many examples of prophets, saints, and mystics who seem to have been engaged in excessive crying. Secondly, many theologians paid attention to tears and addressed several religious issues in their writings.

Prophets, saints, and mystics wept copiously as proof of their religious devotion, or because it was felt that tears were necessary to accompany their supplications and to convince God of their sincerity, or in relation to repentance. Tears were generally considered to be crucial for one's purification and to cleanse the soul. Without tears there could be no repentance. The connection between crying and purification is fairly universal, as it has been found in many cultures and throughout history. For example, in twelfth-century Persian texts one comes across recommendations to wash the heart with the "water of regret and grief" in order to achieve the highest level of purification. Tears were considered helpful for achieving not only one's own purification, but also that of others. When Mechthild von Magdeburg, a thirteenth-century German nun, asked God how she could help the suffering souls in purgatory, the answer was "by bathing them in tears, in tears of love."

St Thomas Aquinas, Augustine of Hippo, Bernard of Clairvaux, and Saint Francis, to mention just a few, all devoted a considerable amount of time to weeping. Here tears were regarded as signs of emotional and devotional states. For some of them, crying was a daily activity—a central and fixed part of their religious experiences. St Augustine had the reputation of being a frequent crier when addressing God. "If we could not sob our troubles in your ear, what hope would we have?" he asked God. The sixth-century church leader Gregory the Great referred to crying as *gratia lachrymarum*, which may mean either "tears of grace" or "the gift of tears." Tears were thus also used for private purposes to directly influence God.

Another famous weeper was the Spanish founder of the Jesuits, Ignatius of Loyola (1491–1556), whose copious tears (he boasted of 175 crying episodes) filled the pages of his *Spiritual Diary*. He reportedly wept every day while praying, and recorded all of his crying episodes to provide proof of his religious devotion, as well as to find out the best times to provoke tears. Ignatius viewed tears as a physical sign of sorrow about sin and of devotion to God. He admitted that his weeping was not always a spontaneous act, but that it could be learned and perfected in order to promote religious devotion and love of God. He considered tears to be gifts from God designed to display sorrow and to compel others to have compassion for the crier.

A final medieval example is the German father of Protestantism and church reformer Martin Luther (1483–1546), who was also famous for his copious tears while praying and preaching. In

his own words, “There is need every hour without ceasing to pray everywhere with tears of blood to God, who is so terribly angry with men. And it is true that it has never been more necessary to pray than at this time, and it will be more so from now on to the end of the world.” Almost every day he devoted considerable time to reading the Psalms of David, with which he mingled his own supplications accompanied by sighs and tears. He also frequently declared how indignant he felt about those who performed their devotional exercises hastily due to laziness or the pretence that other occupations were demanding their attention.

## Classifications of tears

Because not all tears were considered to be equal, there have been numerous theoretical attempts to classify them. For instance, Saint John Climacos, a seventh-century Christian monk at the monastery at Mount Sinai, discussed in his work *The Ladder of Divine Ascent* three levels of tears:

- *contra-natural tears*, which arise when the will is thwarted—for example, tears of anger, jealousy, or frustration
- *natural tears*, which arise in response to emotional and physical suffering, whether such suffering is experienced by the crying individuals themselves or by others with whom they feel sympathy. Examples are tears of grief, pain, or compassion. These are the tears that were said to contribute to our healing
- *supra-natural tears*, which are the tears to which mystics are referring when they speak of the *Gift of Tears*.

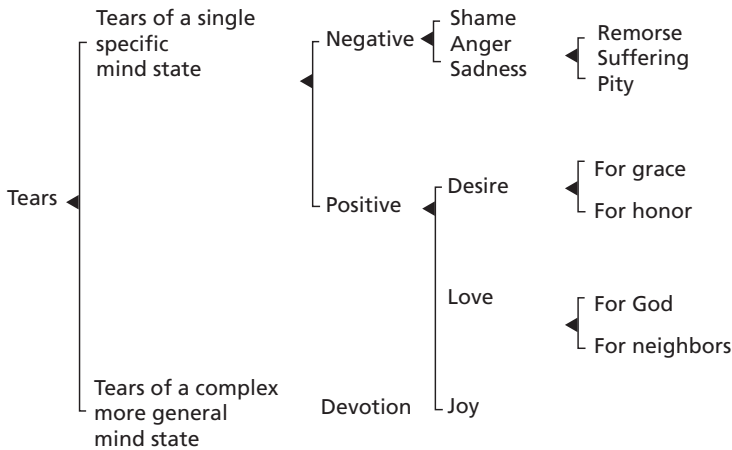
A contemporary of this author, Bishop Isaac of Nineveh, made the following distinction. First, there were tears of repentance, typically accompanied by a “bitterness of the heart” and contrition, which were born in a person as a result of the consciousness of sin. However, there might be a gradual transition from this type of tears to the second kind, namely the sweet tears of compunction. This author considered weeping to be a kind of meditation, which helped one to reach a state of peace of mind. These are just two out of many examples of classifications (e.g. Cioran, 1995; Lutz, 1999; Shenouda, 1990).

A more global distinction concerned the difference between real and fake tears. Throughout history there have been many warnings not to feign tears. According to an eleventh-century prior of an Italian monastery, feigned tears do not originate from “heavenly dew, but had gushed forth from the bilge water of hell.”

The sixteenth-century Spanish humanist Juan Luis Vives (1492–1540) authored a kind of instruction manual specifically for Christian widows on how to weep for their dead husbands, because they could as easily shed too few tears as too many. There were not only religious but also more secular reasons for crying appropriately. Crying widows were often perceived as manipulative, and their tears were regarded as being mainly intended to lure a new husband.

Two Dutch theologians who wrote extensively about crying were Simon Oomius (1630–1706) and Gisbertus Voetius (1589–1676). In his treatise *The Weeping of Turtle-Doves*, Oomius introduced his ideas about weeping, particularly the nature, usefulness, and functions of tears of repentance. Like Vives, he provided his readers with many useful suggestions and practical guidelines about how and when to cry in order to please God and to increase the likelihood of their prayers being answered.

The Orthodox reformed theologian Voetius was well known for his “practical” theology. He paid considerable attention to crying and laughing, and presented what was probably one of the first more sophisticated classifications of tears (see Figure 13.1).



**Fig 13.1** The schematic classification of tears by the Dutch theologian Gisbertus Voetius (Voetius, 1664).

Occasionally, religious writers addressed more secular themes. For example, in his magnum opus *Summa Theologica*, St Thomas Aquinas (1225–1274) addressed the question of whether crying brings relief and reduces suffering. He concluded that tears do indeed assuage suffering, because they provide pleasure.

The uninhibited and abundant display of emotions during this period in history, according to the Dutch historian Huizinga (1919) even qualified as evidence of childish emotional maturity, was not limited to the private setting, but also held for public settings. For example, when listening to preachers the tears flowed freely. The final verdict, the suffering of Jesus, but also infernal punishment and confession of one’s sins provoked the shedding of tears. There was often reference to the examples of individuals weeping in the New Testament, including Christ (about Jerusalem and the death of Lazarus), but also St Peter (after having disowned Christ three times) and Mary Magdalene. The appreciation of crying thus depended on who was involved and why the tears were shed. This trend developed further in later times.

The emotion historian Barbara Rosenwein points out that many of the seemingly opposing views about emotion and its expression can be better understood if one is aware of the existence of what she called “emotional communities” (Rosenwein, 2006). This concept highlights the fact that within every society there may be conflicting values about the expression of emotion, depending on the specific setting (family, monastery, court, etc.). Furthermore, the “gift of tears” was not generally cultivated in all circles. Reactions to pain were also perceived very differently. During childbirth, screams of pain were acceptable, but female saints were expected to bear all kinds of painful diseases and torments without making any complaint.

## The seventeenth and eighteenth centuries

In the seventeenth century, several profound changes in the emotional climate occurred. One such change was the increasing popularity of weeping, which reflected a general increase in sensibility. In France in particular during this time period, crying also attracted the interest of scholars, who introduced the first more modern ideas about the functions of crying (see Box 13.2). In an attempt to explain the change in attitudes towards weeping, Sheila Page Bayne has suggested four intellectual and social developments that might have paved the way for



### Box 13.2 Early scientific interest in tears

In seventeenth-century France, there was also an unprecedented interest among scholars in emotions (or in the jargon of that time, *passions*) and their expression, including weeping and the origin of tears. Tears and weeping were studied from very different perspectives, ranging from the physical and physiological to the spiritual, and with the focus on the scientific/medical or moral aspects. Interestingly, this period in history represented a real turning point. On the one hand, there was still much reliance on the ideas and insights of classical scholars such as Hypocrates, Galen, and others, while on the other hand this was a time of new discoveries which seriously challenged these classical ideas. Two of these scholars, Pierre Petit (1661) and René Descartes (1649), have already been mentioned in previous chapters, but there were others. Approximately 100 years earlier, Laurent Joubert (1529–1582) wrote the first serious work on laughing, but also made some comments on crying (Joubert, 1579). However, weeping in particular was studied by the following scholars.

Nicolas Coeffeteau (1574–1623), a poet and historian, considered emotions to be a kind of tool that helped one to reach prescribed goals. Knowledge alone is not sufficient—emotions have to fuel the motivation to achieve. Coeffeteau (1620) noted that tears help to dissipate sadness. The comforting effect of tears results predominantly from the fact that they provide an outlet for pernicious feelings. In addition, in his view, a close correspondence between one’s inner state and overt actions by definition produces a positive feeling in humans, implying that for a miserable person, nothing is more appropriate than weeping, which induces a happy feeling.

Jean-Francois Senault (1599–1672) criticized the Stoic philosophers who sought a life devoid of passions. Senault’s (1660) treatise attempted to show how one can marshal one’s passions into the service of virtue. This author placed much emphasis on the moral aspects of emotions and tears. In his view, each emotion has a positive and a negative side. He clearly disagreed with stoicism, which he considered to be an unrealistic philosophy, requiring behavior that is not compatible with human nature. He distinguished between the bad and good use of grief. Examples of bad use of pain or grief included in particular the shedding of tears for “worldly” values, such as dishonor and other unjustified causes, or the excessive public display of sadness in order to influence or manipulate others. The best example of good use of grief or pain was crying associated with repentance and compassion, which may be regarded as a sign of virtue for Christians. He believed that since weeping is a way to salvation, the shedding of tears should be encouraged, rather than being repressed as was suggested by the stoics.

Marin Cureau de la Chambre (1594–1669) is another French philosopher and physician who deserves attention because of his interest in tears. He was famous for his ability to judge human character on the basis of physical appearance, but also devoted an entire chapter to the subject of weeping in his book *Les Caractères des Passions* (Cureau de la Chambre, 1663). This author shares important ideas with all of the thinkers described above. He agreed with Coeffeteau that each emotion has a meaning assigned by nature. He further adhered to Descartes’ view about the origin of tears and the physiological aspects. More specifically, he also regarded tears as humors distilled from the moist brain. Like Senault, he discussed the moral pros and cons of the expression of tears, and emphasized the relationship between tears and Christian values. He also argued against the inhibition of tears as promoted by the stoic philosophy.

What is new in Cureau de la Chambre’s (1663) treatise is that he also considered tears to be an important part of nature’s plan in that they served communicative purposes. In classical

times, the communicative function of crying was completely dismissed, as it was felt that humans used language for this, which was perceived as superior to crying for communication purposes. He suggested that the main function of tears is to signal to others that one is in need, and to procure aid for the sufferer by arousing the sympathy of others. This also explained why weeping is more common in women, children, the weak, and the unhappy, and why tears are not compatible with courage and strength. He further described in great detail the physical changes that occur when a person is crying.

Finally, as I have already mentioned, Petrus Petitus (Pierre Petit, 1617–1687) discussed in Book 1 of his 1661 treatise *De Lacrymis* the very nature (*causa materialis*) of tears, Book 2 focussed on the causes of tears and the underlying mechanisms (*causae efficientes–tristitia-gaudium*), and Book 3 addressed several additional questions and issues, including the differences in crying between men and women, why good men cry more often than bad ones, why some people are unable to shed tears, and how crying alleviates pain and sadness. This work is extremely interesting and important for the reconstruction of ancient ideas with regard to tears and weeping.

this change (Bayne, 1981). These include firstly the influence of the early seventeenth-century neo-stoicism, which elicited a reaction. Secondly, there were the expectations of audiences and artistic innovation. Interest in lengthy novels describing adventures and heroic acts was gradually replaced by an increasing focus on the psychology and emotions of the main characters. The resulting strong demand for tears, which was reflected in the literature and performance arts of this time, could be explained by the joy induced by the release of tears (*volupté des larmes*). Consequently, secular poetry, fiction, music, and drama are full of references to the pleasure of tears. This could be experienced both by crying oneself and when watching a weeping character. Tears were thus not only shed in private situations, but also in public settings such as theatres. In much the same way as the aim of comedies was to provoke laughter, tragedies were written to evoke weeping (e.g. Steggle, 2007). The qualities of the actors were evaluated on the basis of their capacity to weep and to induce tears in the audience. On the other hand, playwrights such as Molière in France occasionally ridiculed what they considered to be fake emotions, typically associated with excessive weeping. At the same time, there was a move towards the generalizing of religious tears to secular morality—in other words, there was a shift from mainly spiritual to more earthly issues. Bayne refers to this process as the *emotionalization* of a new area of life, although the specific context and characteristics of the crying individual remained important determinants of how tears were evaluated. Finally, the shedding of tears not only became more frequent, but in fact became a trend, to the point of being fashionable. Several developments thus contributed to the increasingly positive attitudes towards crying. Weeping evolved into a positive sign of sensibility, and tears began to hold a unique, class-infected status, because they were the only bodily fluid that one could talk about with decency in public. However, the role of tears and weeping in literature and daily life remained very diverse.

These positive changes in attitudes in fact occurred for nearly all of the six themes identified earlier in this chapter. Whereas in the first half of the seventeenth century there were several examples of exhortations to mourners to repress their emotions, in later literature weeping freely was encouraged and even glorified. In the context of religion, tears associated with consolation

and repentance were perceived positively and were considered to reflect the individual's piety and God's grace.

Some trends could also be detected in the area of love. The philosopher Jean-Jacques Rousseau (1712–1778) again emphasized that tears were the most effective way for a lover to communicate his feelings (Rousseau, 1782, 1789). A man declaring his love to a woman with his eyes full of tears became a popular theme in literature, which also had its effects on daily life. The way to success in love was considered to be paved with tears, because they were thought to reflect the sincerity of the love. In a very similar way to Ovid's writings, weeping was considered helpful in overcoming the resistance of a mistress, with an emphasis on the erotic power of tears. The tears of some of the heroines in the plays of Racine were deemed *pleurs aphrodisiaques*, and the French philosopher Roland Barthes described the propensity of the main character in Goethe's *The Sorrows of Young Werther* to break down in tears at the slightest emotion as a patently sexual act.

In addition, female tears were considered to enhance the beauty of the *maitresse*, and to incite the lover to provide comfort and remove the cause of her tears, which were perceived as arising from a flaming heart and passing through burning eyes. However, others did not agree, and even asserted that tears have a very negative effect on one's beauty, to the point that weeping makes one ugly.

Whereas initially weeping in particular was described after the loss or desertion of a lover, or in cases where amorous couples faced serious obstacles or the impossibility of love, gradually tears came to be considered increasingly favorably as an aid to seduction, as beautifying the weeping person, and, last but not least, as reflecting the pleasure associated with being in love.

Similar positive changes were observed with regard to the weeping hero, another persistent and recurring theme. Whereas the sixteenth century was dominated by the neostoic view, which implied that the expression of emotions, and especially the shedding of emotional tears, was unacceptable for heroes and those charged with defending a country, in the second half of the seventeenth century the attitudes towards weeping heroes underwent a gradual change. This continued into the eighteenth century, when the emotionless hero became less frequent, and a new type of hero was introduced, whose heroism lay in his sensibility rather than his stoicism. The shedding of tears once again became acceptable as a heroic quality; this is true of the contemporary hero as well, but it also resulted in a re-evaluation of the crying of the heroes of antiquity. Discussions about the weeping of classic heroes such as Aeneas, Achilles, and Odysseus thus had a major impact (Bayne, 1981). Since the king held the uppermost political, social, and spiritual position at this time, weeping kings could be regarded as nothing less than a real breakthrough.

Finally, tears were no longer predominantly linked to religious and spiritual concepts, but also became more closely associated with broader societal and moral issues, such as equality, generosity, and gratitude, to name just a few. In contrast, tears directly associated with one's own well-being and distress were considered to be less important. The positive attitude towards these "moral" tears is nicely illustrated by the quote "The man is to be honored, who can weep for the distress of others" by the eighteenth-century writer and printer Samuel Richardson.

Rousseau (1755) regarded pity as the main human quality and the source of all other virtues. In his view, an individual who cried out of pity or compassion made an important connection between others and him- or herself. This author further emphasized the link between tears and sincerity and other virtues. A good way of crying was even attributed the power of human

improvement, as suggested by an anonymous British eighteenth-century pamphlet “*Man: A Paper for Ennobling the Species*” (Lutz, 1999):

We may properly distinguish weeping into two general kinds, genuine and counterfeit; or into physical crying and moral weeping. Physical crying, while there are no real corresponding ideas in the mind, nor any genuine sentimental feeling of the heart to produce it, depends upon the mechanism of the body: but moral weeping proceeds from, and is always attended with, such real sentiments of the mind, and feeling of the heart, as do honour to human nature; which false crying always debases.

During this time period, therefore, the emotional realm was rather complex and seemingly inconsistent, depending on gender, religion, and social class. It was accepted that lower-class men had little emotional control, whereas gentlemen were expected to be able to control their feelings. The acceptability of tears further depended on their causes. Tears shed in response to the death of a loved one were acceptable, but only if they were shed in moderation. Tears of fear were shameful, and tears of pity and compassion were acceptable only in “ordinary” men. A nice illustration of these principles is provided by the poet Richard Flecknoe (c. 1600–1678), when describing a farmer selling his favorite cow. The man bade the animal farewell with a kiss and the shedding of tears. The poet expressed some understanding of this behavior, because it was displayed by a farmer. However, for a gentleman such conduct would have been unacceptable. The tears of felons at the gallows were also only considered appropriate if they were interpreted as the expression of religious feeling, or if they were shed by genuine lower-class individuals. In contrast, King Charles I approached his execution in 1649 with full tearless self-control. This restrained behavior on the scaffold has probably contributed greatly to the cult of the “martyr king.”

A striking illustration of the changing attitudes towards religious tears is provided by the acceptability of the tears of the British military and political leader Oliver Cromwell (1599–1658), who “was one day seeking the Lord with such ardour of devotion, and such vehemence of spirit, that the tears were forced from him with such abundance as to run under the closet door.” However, in the eighteenth century these same excessive tears were regarded more as a comical anecdote and a demonstration of inappropriate behavior.

In conclusion, I shall briefly discuss two examples of the rapid changes that occurred with regard to attitudes towards tears. Whereas for a very long period of time laments for the dead were encouraged and regarded as helpful for dealing with grief, because they provided an opportunity for emotional release (although the suspicions about the tears of widows should also be recalled here), at around the time of the Reformation these typical Catholic practices were condemned. Tears were then depicted as negative, manipulative, typically female, hypocritical, popish, and contrary to reason. In sermons and preaching it was made clear that “it agreeth not with the rules of the faith, for a Christian man to bewayle the dead”, and this practice was described as “womanish wayling, and childish infirmite.” Tears for the dead were even regarded as excessive and sinful. To put all these different attitudes to crying—ranging from very positive to negative—into perspective, it is useful to be aware that its counterpart—laughing—was also not unanimously viewed very positively. In the seventeenth and eighteenth centuries it was even considered vulgar, and regarded as a sign of lack of self-control and good breeding. To quote the eighteenth-century British moralist Lord Chesterfield, “In my mind there is nothing so illiberal and so ill-bred as audible laughter, especially due to the disagreeable noise that it makes and the shocking distortion of the face that it occasions.” In Germany, the writer and philosopher Gotthold Ephraim Lessing reported that the laughter of his French fellow philosopher Julien Offdroy de La Mettrie filled him with disgust and horror.

## The nineteenth and twentieth centuries

In pre-Victorian England, grief and its expression were firmly constrained, and excessive crying was viewed as a sign of too great an interest in this world and too little faith in the afterlife. A few decades later, in the mid nineteenth century, sentimentalism again flourished, and crying and tears were recurring themes in poetry and novels. Often the connection with sincerity and honesty was emphasized. In the words of Emily Bronte (1818–1848):

Had there been falsehood in my breast  
 No thorns had marred my road,  
 This spirit had not lost its rest,  
 These tears had never flowed.

Some of the other great English writers of this period, including Harriet Beecher Stowe and Charles Dickens, who were all well known for their social criticism, also provided many examples of sincere tears, which were considered to be a pure alternative to the falsehood and corruption of society. In addition, deathbed and funerary rituals were elaborated, and intense and lifelong grieving was encouraged. Hundreds of songs about death were published during this period, often depicting emotion-laden visits to the cemetery—“All night I sat upon her grave, and sorely I did cry” (Stearns and Knapp, 1996). On the other hand, the religious contradictions within this emphasis also re-emerged, and practical objections to the excesses of the Victorian grief culture were raised. This historical period also had its own fierce opponents of melodrama and sentimentalism, Oscar Wilde and Aldous Huxley being the best-known cynics and critics of Victorian sentimental culture. A remarkable example of how sentimentalism in France was stimulated in theatres was the phenomenon of the *claque* (see Box 13.3).

This overview would not be complete without some nineteenth-century examples of tears in fairy tales and more recent fantasy literature. Both in Hans Christian Andersen’s *The Snow Queen* and in the Grimm brothers’ *Rapunzel*, tears are endowed with magical or, more specifically, healing powers. Rapunzel healed her beloved’s eyesight with her tears and, in *The Snow Queen*, tears produce very similar effects. A final example is from Lewis Carroll’s *Alice’s Adventures in Wonderland*, in which the main character is nearly drowned in her own tears.

In conclusion, tears and crying have been a popular theme in literature since classical times. Recurring themes included the connection between tears and love and the crying of heroes. In

### Box 13.3 The claque

It is currently common practice for TV shows and sitcoms to use “canned laughter” to signpost funny moments, based on the insight that laughing is contagious. This is not a new phenomenon. Even in ancient Greece and Rome, a fake audience attended performances with instructions to laugh and applaud at certain moments.

However, the heyday of the claque was in nineteenth-century France. Almost every theatre hired its own claque, and the leaders of the claques were powerful and well respected. They introduced the innovation that each claque worker could specialize. So-called *rieurs* laughed very intensely during comedies. Then there were the *bissuers*, who yelled *bis* at the end of the performance. Other specialists were the *commissaires*, who had to address their neighbors in the audience, saying that this was their favorite play. Finally, there were the *pleureuses*, women who received a great deal of money to cry violently during the sad scenes of a tragedy.

addition, spiritual and moral concepts became more closely associated with tears. The connection with fertility, revitalization, and health is another fairly consistent theme throughout history. However, the acceptability of tears was a complex issue that was dependent on many factors, including the cause of the tears, as well as gender, social class, and religion.

Two more recent examples of tears in literature concern the well-known recent best-sellers of J. K. Rowling about the wizard Harry Potter, and Arnold Lobel's book *Owl at Home*, about an owl who makes tea from tears (Lobel, 1975) by thinking of sad things such as "Mornings nobody saw because everybody was sleeping" or "a pencil, too short to draw with." In the Harry Potter books it is the tears of the phoenix, Fawkes, which possess magical healing powers. These tears are capable of reviving a person from any life-threatening injury, and they are the only known cure for the basilisk venom. When the main character Harry was seriously injured, they not only sealed the wound, but also cleared the poison out of him, thus preventing his death.

Finally, I wish to briefly mention the many popular songs that address crying and tears. As I mentioned in Chapter 8, in all cultures and throughout history there has been a close connection between singing and crying (Cooper, 2004; Dissanayake, 2008; Kramer, 2002). Cooper even presents an impressive discography containing a wide variety of singers and musical styles that address suffering and sentimental themes. The whole palette of emotions, from anger and jealousy to awe and elevation, is covered. Relatively often a connection is made with the heart. It is not the individual but more specifically their heart that produces the tears, to express its sorrow.

Given the omnipresence of tears in legend, myths, literature, fairy tales, and music, one would expect that there are also tears associated with the visual arts. Is this indeed the case? In the next section I shall address the representation of tears and weeping in the visual arts.

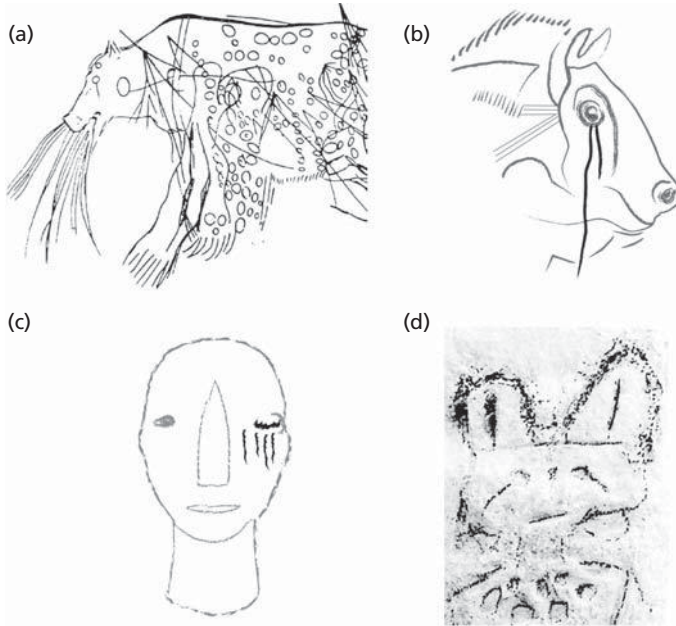
## Tears in the visual arts

When I familiarized myself with the literature on tears and the visual arts and I started to carefully study paintings depicting sad or mourning individuals, I was struck by the absence of visible tears. There are many paintings representing weeping characters, but there are no tears. Why is this? And who would have painted the first visible tears? Because so much early art has been lost over time, the latter question probably cannot be answered, but one can at least attempt to identify the oldest existing visual artwork on which visible tears are represented.

Murube (2006) suggested that some prehistoric cave drawings depict tear-producing animals, specifically a bear and a wild boar (see Figure 13.2 a,b). These drawings date back approximately 10 000 years. However, there could be serious doubt as to whether the lines, which more or less originate from the eyes, do indeed represent tears. In any case, even if they do represent them, they are not clear examples of depicted real tears.

There is a similar problem with a *cycladic figurine* that dates back to approximately 3000–2000 BC (see Figure 13.2 c). This small statue represents a human head, with two vertical lines below the eye, one of which is red and the other blue. Some scholars have argued that these red and blue vertical lines represent, respectively, blood running down the face (perhaps resulting from self-inflicted wounds) and tears, but others suggest that they may be tattoos or face paintings (Donald Lateiner, personal communication).

Pliny the Elder (23–79 AD), in his magnum opus *Natural History*, evaluated several classical Greek and Roman artists in terms of their skill in depicting emotions. Among them was Aristides of Thebes, the painter who discovered how to represent emotions adequately. Pliny described this artist as being able "to paint the soul and give expression to the affections of man



**Fig 13.2** Possible (pre)historic representations of weeping animals and men. (a) Bleeding and possibly weeping bear (Cave of les Trois Frères, France, c. 10 000 BC). (b) Wild boar (Cave of Altamira, Spain; c. 15 000 BC). (c) Cycladic figurine (Aegean Islands, 3000–2000 BC). (d) Fremont culture, Vernal Style rock art (Utah, USA, c. 500–1300 AD) (based on a picture by Bob Cates). In all these cases it is unclear whether the lines originating from the eyes represent tears or, in the case of the humans, tattoos or face paintings.

and his emotions.” Another excellent classical painter was Timanthes of Cyprus, creator of the painting *The Offering of Iphigenia*, which is one of the best-known depictions of sorrow, and has been described as being wet with tears. Unfortunately, the original painting has been lost, and it is currently only known from a mosaic in Pompeii. On this mosaic no real tears are visible. It is uncertain whether the absence of visible tears is due to the limitations of working with mosaic, or whether the original painting also showed no tears. This is not unlikely, because there are no other surviving examples of artwork from this period that display tears.

The art historian Henry Maguire has identified nine ways in which sadness was portrayed in the visual arts up until the fifteenth century (Maguire, 1977). Very commonly, violent gestures are used to represent suffering and mourning. A more restrained version consisted of holding up both arms (or just one), which in many cultures is a posture often used to represent grief and mourning (later a very similar gesture was used to express joy, surprise, or alarm). More violent expressions of sadness sometimes included tearing one’s robe, cutting one’s hair, tearing one’s cheeks, or beating one’s chest. These can be seen on funerary art from ancient Egypt until the Middle Ages.

This excessive form of expression of sadness met with much criticism in classical Rome. These critics included, among others, the philosopher and writer Cicero, and also Christian writers for whom these practices implied both a lack of decorum and a lack of faith, or, more specifically, a lack of belief in resurrection. This is why saints have never been depicted in this

way. In Christian art there was a clear preference for portraying inactive, restrained gestures rather than these uncontrolled expressions of emotion. For example, another frequently used way of depicting sorrow, for individuals in both sitting and standing positions, is with the hands raised to the head. However, this representation did not exclusively depict sadness, but could also portray pensiveness or concentration, meditation, and even sleep. Nevertheless, the association between this posture and sadness was very strong, both in the classical period and in the Middle Ages.

For individuals in a standing position, there was more variety in the precise position of the hand against the face. In addition, standing figures sometimes lifted their garments to their face to wipe away their tears, or they used their hands to cover their face. The head resting on the hand is the gesture most often used to express sorrow, in particular among individuals with great sanctity, such as angels. Only Christ himself has never been painted in this position. The hand-to-the-face gesture may indicate, in particular, the grief of separation, which in Christian paintings was often portrayed in the theme of ascension.

One specific hand-to-the-head gesture, namely one or both hands clasped over the mouth, is very rare in Hellenistic and early Christian art, but started to become more popular after the ninth century. Although this gesture was also used to portray silence or speechlessness, it was more commonly used to denote the stifling of cries of suffering. The use of this gesture in paintings was probably a reaction to the open mouths that were painted in earlier times to emphasize the suffering of the characters.

Clasping the hands together with the fingers intertwined or with one hand clasping the other wrist was another common way of representing mourning and sadness. Christ himself has also been depicted in this way, when crowned with thorns. Given the very restrained nature of the expression, this was probably considered the most appropriate gesture to use for Christ.

When the sorrow was extremely intense, painters often addressed the problem of how to portray this by veiling the head, usually with garments. This could be interpreted as an indication that the painter was unable to adequately represent the basically inexpressible emotions. Maguire further (1977) specifically mentions the embrace as an expression of sadness. The examples that are cited mostly concern the Holy Virgin and her dying or dead son Christ. However, the embrace might alternatively signify that there is a strong bond between the individuals involved and that they share a strong emotion, which may range from very negative to very positive.

Finally, artists attempted to portray emotion by means of carefully painted facial expressions. This was a real challenge for them, and not every artist was successful in these attempts. An analysis of Middle Byzantine wall paintings by Moshe Barasch revealed that they were only able to paint tranquillity and emotional distress, without any additional subtleties (Barasch, 1987). The focus was on the distortion of the face, in particular the eyebrows, or on the eyes, which could be closed. Occasionally, weeping was also suggested by means of streaks of shadow on the cheeks. It thus seems that, before the fifteenth century, tears were rarely if ever used in the visual arts to denote a sad mood.

Probably the oldest surviving work in which tears are visible is the very impressive painting *The Descent from the Cross* by the Flemish fifteenth-century painter Rogier van der Weyden (c. 1430, perhaps in collaboration with Robert Campin) (Barasch, 1987; Ganz, 2008). Interestingly, flowing tears are shown only on the faces of the most sacred individuals (see Figure 13.3a,b), whereas the damned, sinners, and individuals of lower standing were never painted with visible tears. Bartholomeus Facius, historian and secretary of Alfonso of Naples, considered that van der Weyden was able to depict tears in such a realistic way that it was impossible to tell the difference from reality: "... *ita expresso dolore ac lacrimis ut a veris discrepare non existimes.*" According to





**Fig 13.3** The painting *The Descent from the Cross* (or *The Descent from the Cross*) by Rogier van der Weyden (c. 1430, possibly in collaboration with his teacher Robert Campin), which is probably the oldest surviving western European painting on which visible tears are depicted. © Descent from the Cross, Weyden, Rogier van der / Prado, Madrid, Spain / The Bridgeman Art Library. (See color insert)

an anonymous witness, people who were looking at this painting would spontaneously start to cry (Campbell and Van der Stock, 2009).

Although it is of course not known for certain whether Rogier van der Weyden was the very first artist to paint tears, he is certainly among the most skilled of those who have ever done so. Perhaps he was inspired during his visits to Italy, where scholars such as Leon Battista Alberti (1404–1472) and Leonardo da Vinci (1452–1519) provided artists with advice and recommendations on how to paint emotions. And some time earlier, in the early fourteenth century, the

first more realistic sad—although tearless—facial expressions had been painted by Italian artists such as the brothers Ambrogio and Pietro Lorenzetti (e.g. *Deposition of Christ from the Cross*, 1320 AD). Interestingly, some art historians have suggested that the flowing hair of Mary Magdalene, as depicted by Pietro, represents her flowing tears, although others interpret it as indicating that, being a prostitute, she is a sinner, with a rich potential for love (just like Venus or Aphrodite).

The Italian architect Leon Battista Alberti (1435, 1967) was the first to systematically pay theoretical attention to the “movements of the soul” and how they should be conveyed in painting. Since these movements are all accompanied by specific bodily expressions, he highlighted the importance of having a good understanding of them. He also realized that a “historia” will move spectators most when the depicted individuals demonstrate their feelings as clearly as possible. He was aware that we mourn with the mourners, laugh with those who laugh, and grieve with the grief-stricken. His careful observations taught him, among others, that melancholic individuals typically lack all vitality of feeling and action, and that they remain sluggish, with unsteady limbs, and are drained of color. In those who mourn, the brow is weighed down, the neck is bent, and every part of their body droops as if they are weary and past caring.

Leonardo da Vinci also attached much value to the appropriate representation of emotions and to disclosing the intentions of the mind of the depicted individual. In his *Treatise on Painting* (da Vinci, 1802), a somewhat disorganized, selective compilation of his precepts on painting, he made several specific notes for his pupils providing guidelines on how to represent passions such as anger and the facial movements associated with weeping and laughing. In his own words, “That figure is most praiseworthy which best expresses through its actions the passions of its mind. The movement which is depicted must be appropriate to the mental state of the figure.” He even devoted special attention to the differences between weeping and laughing:

Between the expression of laughter and that of weeping, there is no difference in the motion of the features, neither in the eyes, mouth, or cheeks; only in the roughing of the brows, which is added when weeping, but more elevated and extended in laughing. One can represent the figure weeping, as tearing his clothes, or some other expression, as various as the cause of his feeling may be; because some weep for anger, some through fear, others for tenderness and joy, or for suspicion; some for real pain or torment; whilst others weep through compassion, or regret at the loss of some friend and near relation. These different feelings will be expressed by some with marks of despair; by others with moderation, some only shed tears, others cry aloud, while another has turned his face towards heaven, with his hand depressed, and his fingers twisted. Some again will be full of apprehension, with their shoulders raised up to their ears; and so on, according to the above causes. Those who weep, raise the brows, and bring them close together above the nose, forming many wrinkles on the forehead, and the corners of the mouth are turned downwards. Those who laugh have them turned upwards, and the brows open and extended.

Da Vinci himself probably drew illustrations, which unfortunately have been lost, to support these prescriptions, because he refers to drawings that represent, among other things, “weeping in different ways, with their cause.”

In the sixteenth century, the Dutch painter Karel van Mander (1548–1606) published his theoretical work *Het Schilder-Boeck* (*The Painting Book*), which not only provided an historical overview of art, but also included many practical guidelines for painters. In addition, he addressed the issue of the representation of affects, although without providing examples. He suggested three ways of representing a weeping individual, which were similar to the ways in which weeping was represented on stage by actors. This actually concerned three of the methods described by Maguire (1977) that had already been used for several centuries. The first method involves

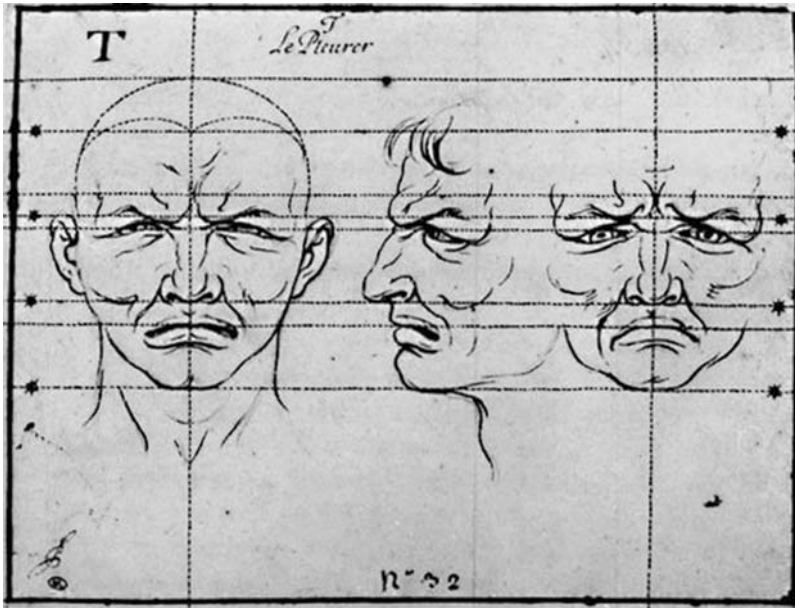
painting the model with one hand supporting the bowed head (which may also express concentration and creative thinking). The second method was to show the model wringing their hands, which seems to be more a symbolic representation of sadness than a real expression. Finally, portraying the wiping of tears (which in most cases were not visible) with a piece of cloth or a handkerchief was recommended.

Apparently the Dutch painters of that time were criticized for their lack of skill in adequately and clearly portraying emotional states. There were complaints that it was not even possible to tell whether a painted individual was laughing or crying. The correct and clear representation of laughing and weeping thus became a real challenge for these Dutch painters. In reaction to this criticism, painters en masse started to depict Democritus and Heraclitus, known as “the Laughing Philosopher” and “the Weeping Philosopher”, respectively, side by side as proof of their skills in representing both expressions. The art historian Albert Blankert analyzed over 100 seventeenth-century images (paintings, drawings, and book illustrations) of these pictures and detected visible tears in just five cases (Blankert, 1967). It would appear that the revolutionary development of painting visible tears, which was perhaps introduced by Van der Weyden, did not last very long.

One may speculate as to why painters were so reluctant to paint visible tears. Was this connected to limitations due to the quality of the paint used? Or was the absence of tears related to the negative attitudes towards the strong expression of emotions at that time? Since earlier painters, such as Van der Weyden, Bouts, Botticelli, and Mantegna, were able to paint tears, the former explanation seems very unlikely. What about the second explanation? As I have pointed out previously, in the sixteenth and seventeenth centuries there were both extreme positive and extreme negative attitudes towards crying and weeping (and also towards laughing). Excessive laughing and weeping were deplored as dehumanizing and as an indication of a loss of rational control. This probably also explains why there are not many images of laughing people. In fact laughing figures painted by Dutch painters (e.g. Jan Steen, Frans Hals), were mainly children, simpletons, or drunkards. Respectful people could not afford to be painted while laughing, except in exceptional cases when the painting was intended for a more private setting. Note the apparent paradox with regard to the tears, which were predominantly painted in portrayals of saints and prestigious individuals (e.g. the Pope) (Ganz, 2008).

Not much later, Charles LeBrun (1619–1690), the first official painter of the French king Louis XIV, and director of the Royal Academy of Painting and Sculpture in France, launched his revolutionary ideas about emotional expression and physiognomy (Montagu, 1994; Ross, 1984). This artist, inspired by the work of his contemporary René Descartes, was convinced that there were clear links between the inner passion and the outer expression. He focussed in particular on the face as the main place where the soul manifests its feelings. In his view, it was also most notably the eyebrows—not the eyes—that were of paramount importance in this respect. In addition, he attached much value to the mouth and the nose, which according to him express the movements of the heart, rather than of the soul. LeBrun left no room for individual variation, which resulted in a number of prototypical expressions that were of practical use for painters. Quite remarkably, in his detailed example of a crying face (see Figure 13.4), there is again no place for tears, but only attention to the muscles involved.

In conclusion, although the visual arts throughout history have shown much interest in the representation of emotions (especially sadness and grief), painters typically used more or less symbolic postures and behaviors to represent sadness, rather than painting tears. It is unclear to what extent this was due to technical or material limitations, the possible negative attitudes towards weeping (and laughing), or the involvement of other factors. Nevertheless, the absence of tears in the visual arts is remarkable. Even after LeBrun, tears are very exceptional. Perhaps it



**Fig 13.4** LeBrun’s prototype of a crying face, which was included in his theoretical work, intended to educate painters how to depict the passions effectively (LeBrun, 1698). (See color insert)

is the twentieth-century artist Pablo Picasso, with his portrayal of weeping women, who in this respect may be regarded as revolutionary.

Note, however, that so far this discussion has been entirely about western art. In other cultures, such as those in the early North and South America and Easter Islands, weeping gods were worshipped and also depicted (see Figure 8.1). In contrast with western art, tears were depicted very prominently as *face rivers*, probably to emphasize the important role of weeping in daily life and religion (Read, 2005).

## Conclusion

Throughout history, tears have played a major role in myths, legends, epics, theological writings, poems, novels, films, and popular music. Of special interest is the relationship with new life, purification, and fertility. In addition, a picture emerges of crying as a regular part of daily life, both in relation to religious activities and also in other, more secular contexts. The acceptability of tears has varied widely over time in relation to gender, antecedents, social class, religion, and possibly other factors (see also Chapter 7). In particular, the importance of the antecedents of crying in determining how that behavior is perceived has also shown some remarkable developments over time and across different cultures.

Surprisingly, in the visual arts, although there are many paintings depicting mourning and sad individuals, only in very exceptional cases are tears visible. Instead, for some reason, painters appeared to prefer to use other symbols to denote sadness and grief.

The aim of this chapter was to provide the reader with further examples of the role of tears in legend, religion, literature, and the visual arts throughout history. If anything, it demonstrates that in order to gain a full understanding of the essence of crying, the broader social and cultural

context cannot be ignored. Furthermore, tears need to be adequately investigated, and their role in present-day society cannot be ignored.

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## Chapter 14

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# Epilogue

If the human body is the best picture of the soul,  
laughing and crying suggest that the soul loves to hide.

(Bernard G. Prusak, 2005)

My ambition with this book was, first of all, to present the state-of-the-art knowledge about crying and tears. Rather than limiting myself to my own area of expertise—psychology—with its different perspectives, such as attachment, stress, or communication theory, I also wanted to approach this topic from different perspectives, including those of anthropology, evolutionary biology, neurology, philosophy, art, theology, and historical literature, hoping that these would yield new and challenging insights. This broad approach also helped me, as a researcher, to identify the important gaps in knowledge and the issues that need to be addressed in future research.

Of course this book inevitably also has its limitations. Its main focus is more on adult than on infant crying, more on emotional than on reflex tears, and more on normal crying rather than on that resulting from brain damage (pathological crying). However, in an attempt to be as exhaustive as possible, I have tried to briefly address all of these issues. In addition, I have considered individual and gender differences in crying, the relationship between crying and health, the role of culture, and the representation of tears and crying in literature and the visual arts.

Reading these other fields of literature familiarized me with a number of quite amusing, sometimes even hilarious classic conceptions about the origin and functions of tears and the explanations of individual differences, but I also learned more about the many different roles of tears in other time periods and other cultures. This certainly gave me some important new insights. In particular, I began to realize that crying must be regarded as a behavior, rather than a more or less reflex-like symptom of sadness, and that to a greater extent than I could have ever imagined, crying is under the strong influence of social and cultural norms. In addition, I was impressed by the major ontogenetic developments that occur with crying. Very briefly, these can be summarized as starting with tearless crying and ending with silent tearfulness. However, that does not by any means do justice to what happens when individuals grow older. The situation is much more complex.

I referred in Chapter 1 to Tom Lutz, who expressed his conviction that the representations of sadness and tears in art have contributed more to the understanding of crying and tears than

have the medical and behavioral sciences (Lutz, 1999). I still cannot entirely agree with this statement, but I am now, more than ever before, aware that research on crying in the “sterile” laboratory setting has major limitations, in particular because it often lacks context and ecological validity. A phenomenon that naturally mainly occurs in a rather private setting, often with no one else present, and certainly not in the presence of strangers, is not easy to study in an artificial setting. However, historical accounts and representations in art typically suffer from the opposite problem—there might be too much cultural context to enable researchers to determine the impact of each of the many influences especially when it concerns crying in public settings. The combination of both approaches, although quite unusual, certainly yields new knowledge and insights. The model that I introduced was helpful in relation to the more systematic discussion of all the different aspects of this issue.

Considering crying from such different perspectives contributed significantly to a better understanding of the antecedents of “negative” and “positive” tears (I have also shown how these might be related), and of the intra- and interpersonal effects, highlighting each of their various possible functions. Knowledge of the old conceptions of crying and, in particular, of the theological and anthropological literature helps to clarify and improve our understanding of the functions of tears.

It was fascinating to see how several apparently independent phenomena that I encountered in the different literatures, when considered in more depth, might be related in interesting ways. For example, on the one hand there is the psychological literature on attachment, and on the other hand, in a very different literature, there are the recurring themes of love and social bonding.

My main conclusions can be summarized as follows:

1. The production of emotional tears is a unique human behavior.
2. Crying is a very dynamic behavior that shows continuous development from birth on to old age. It nicely mirrors important socio-emotional and moral developments.
3. The main causes of adult tears are powerlessness/helplessness, the loss (or threat of the loss) of an important relationship, and, at the opposite end of the spectrum, exceptional performances and the forging of new bonds.
4. There are considerable differences in crying between individuals, depending on age, gender, psychological make-up, culture, and exposure to stressful or traumatic situations. For an adequate understanding of these individual differences, one has to take into account differences in exposure to emotional situations, appraisal of situations, crying threshold, and social learning influences.
5. Crying may have strong positive effects on mood, although this is not a necessary outcome. Personal characteristics, the specific antecedent, and the reaction of the social environment together determine how an individual feels after a crying episode.
6. Emotional tears are a very powerful social signal, which is seldom ignored. However, the reactions to crying (which range from very positive to extremely negative) also strongly depend on the characteristics of the crying person and of the observer, the specific situation, and the perceived appropriateness of the tears.
7. There is little support for the claim that crying is healthy. On the other hand, the shedding of tears is in many ways connected with an individual’s health status (e.g. as a symptom, the consequence of a disease or its treatment, etc.).
8. Culture has a major impact on crying, although this is probably mainly limited to crying in public contexts (e.g. funerals and other rituals, literature, theater, religious activities, etc.). The antecedents of crying in more private situations are probably more universal, and strongly related to attachment issues and feelings of helplessness.



9. Although, throughout history, tears have had a prominent place in legends, myths, fairy tales, more general literature, and popular music, the absence of visible tears on paintings (except for a relatively brief time period during the Renaissance) is striking, and warrants further research.

## Where does all this leave us?

What this book has made clear is that tears can only be fully understood within the broader sociocultural context in which they are shed or held back. As an ultra-social species, humans by definition do not live in a social vacuum. This has consequences not only for how we think and behave, but also for how and what we feel, and how these feelings are expressed. Research findings obtained in a particular culture during a certain time period therefore cannot be generalized to other cultures and other time periods. Feeling rules, display rules, and moral values, as well as the aesthetics and politics of the display of feelings, all contribute to the way that crying is perceived and evaluated.

There were some findings that I found particularly striking. These include the remarkable correspondence between the phylogenetic and ontogenetic development of the different kinds of tears, the fact that crying and music/singing share some significant parallel developments and might be closely related, and finally the insight that, among the recurring themes in all kinds of literature, it is attachment, love, and social bonding that prevail.

With regard to the first issue, ontogenetic development seems to mirror our phylogenetic development to some extent. There might indeed be continuity, but at the same time there are also important changes in crying which occur with increasing age. The first tears are associated with physical pain and discomfort, then the distress tears appear, followed by the empathic tears, and finally, at a relatively late stage, in adulthood we also shed sentimental (or moral) tears. In other words, pain is the central issue, but there is a gradual shift from physical pain to “societal” pain. This is not an isolated development, but rather it seems to be closely linked to other developmental processes. What laughter does in good times, is achieved to a greater extent by tears in bad and stressful times.

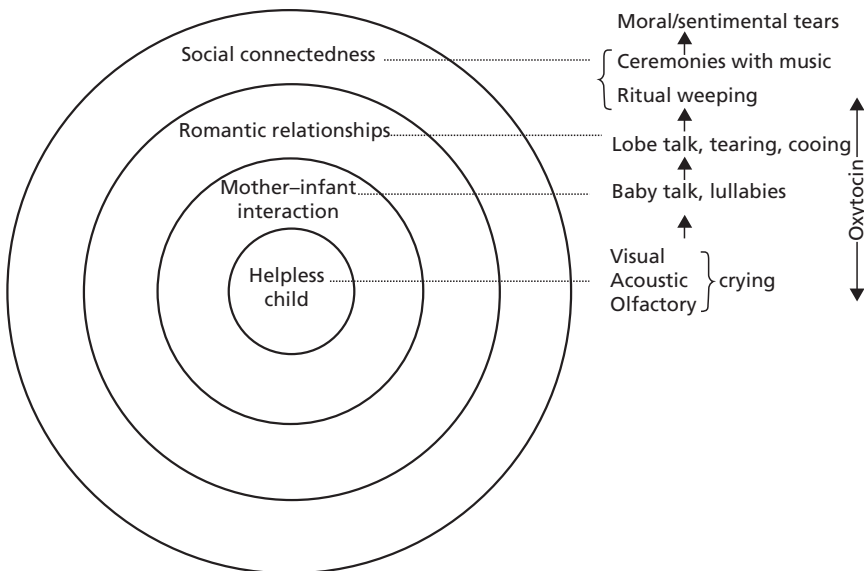
For example, in adolescents the increased interest in romantic and sexual relationships may foster prosocial and moral development by focussing their attention on the value of relationships, and on behaviors that promote both intimacy and social bonding. Feelings of love and sexual interest stimulate helping, caring for, and sharing with a partner, and provide adolescents with the context that is needed to further increase their capacity for sympathy and empathy—both of which are important correlates of prosocial and moral behavior (Eisenberg, 2000). One step further, in the same vein, I propose that the transition to parenthood (and the later transition to grandparenthood) is another factor that boosts this development of an increasing interest in societal issues and what is going on in the world. This process is reflected in the increasing importance of tender feelings that are also often accompanied by tears. As outlined earlier in the book, these positive events typically mirror the well-known negative antecedents (e.g. physical pain vs. orgasm, emotional pain vs. rapture, death vs. birth, parting vs. reunion, etc.). From an evolutionary point of view, this phenomenon can easily be understood in terms of the increasing importance of societal developments for the successful forwarding of one’s genes, when one has children and grandchildren.

Anthropological research has demonstrated that, in several cultures, a combination of crying and singing known as lamenting occurs. Ritual weeping and ritual singing seem to occur in very similar situations (Dissanayake, 2008), particularly when it is important to have an extremely

strong sense of mutual bonding and social connectedness—for example, when preparing for war, or when a tribe had to cope with adverse conditions such as drought, disasters, etc. Furthermore, it should be noted that during interaction with higher powers, both crying and singing have been used across time and in different cultures.

It is also fascinating to notice that, throughout history, not only poets but also philosophers and scholars with other backgrounds have emphasized the connection between tears and love. Attachment, love, and social bonding all share and emphasize the connection with others—the mother, significant others, romantic partners, family, groups that share common interests, one's own tribe, and society at large.

I would like to summarize the importance of crying and its development over time as follows. The primary consistent factor is attachment and social connectedness. Starting with the mother–child symbiosis, this later extends to romantic relationships, and subsequently to society at large. For the helpless infant, feelings of warmth and security prevail, whereas in adolescence, when the process of individualization and separation from the parents takes place, the need to belong to a certain subculture and form a bond with a romantic partner becomes apparent. However, during adulthood and the raising of children and grandchildren there is increasingly more bonding with and concern about society in general. The essential building blocks of our society include empathy, altruism, and a basic sense of justice. Therefore it is not surprising that these are among the most important elicitors of sentimental or moral tears. These tears seem very much like “exclamation marks” that have been placed by our hard-wired unconscious moral system. Solomon (2004) cautions that one should not underestimate the importance of emotions such as pity, sympathy, fondness, adoration, and compassion—which are often accompanied by tears—for morality and ethics. I argue that the role of tears here is



**Fig 14.1** Schematic model representing the lifetime development of crying in relation to the broadening of one's social network and social connectedness. Reproduced from Rottenberg, J. and Vingerhoets, A.J.J.M. Crying: call for a lifespan approach. *Social and Personality Psychology Compass*, 6, 217–27. © John Wiley & Sons, Inc., 2012, with permission.

to make the crying individual aware of this function of emotions, and to remind them that the situation or event to which they are exposed is something that really matters. Tears function to emphasize the importance of specific events, in particular relationships, and they make us aware of the significance of what is happening.

At the physiological level, oxytocin appears to be the driving force behind the effects of tears. This substance also facilitates relationships, starting with the mother and her infant, romantic partners, and people who in some way are or feel united, and it stimulates generosity and other prosocial behaviors (MacDonald and MacDonald, 2010). These ideas are summarized schematically in Figure 14.1.

## Conclusion

I made reference in Chapter 1 to Charles Darwin, who felt that emotional tears were an exception to the rule that all behaviors and physiological processes that served no important function should have disappeared in the course of evolution (Darwin, 1872). I think that there is sufficient reason to conclude that this was a major error on Darwin's part. His evolutionary theory is brilliant, and his ideas about the background of human emotions were innovative and groundbreaking. However, with regard to tears, he overlooked their functional importance and the major role that they played in our evolution.

I hope that this book succeeds in filling the gap that Darwin left, and that it will contribute to a better understanding of and insight into the functions of tears. Each end is at the same time a new beginning. At the very least I hope that this book will demonstrate to its readers, and, in particular, to researchers with different backgrounds, that tears are too interesting and too important to be neglected, and that crying, as a unique human characteristic, fully deserves their appreciation and attention. An understanding of the functions of emotional tears will not only help us to gain a better insight into the more general emotional life of humans, but will also specifically contribute to our understanding of the fascinating interactions between culture and biology and how they influence the experience of emotions and their behavioral and bodily expression.

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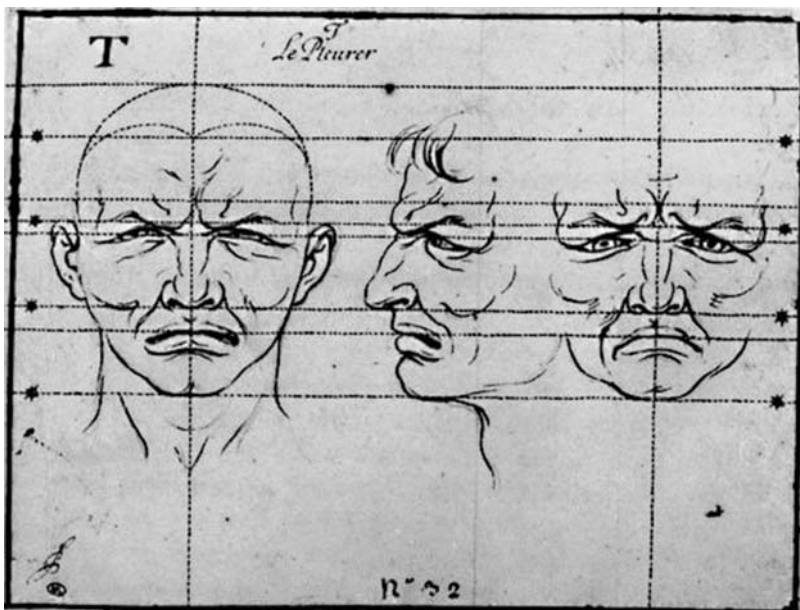


(C)



**Fig 13.3** The painting *The Deposition of Christ* (or *The Descent from the Cross*) by Rogier van der Weyden (c. 1430, possibly in collaboration with his teacher Robert Campin), which is probably the oldest surviving western European painting on which visible tears are depicted. © Descent from the Cross, Weyden, Rogier van der / Prado, Madrid, Spain / The Bridgeman Art Library.





**Fig 13.4** LeBrun's prototype of a crying face, which was included in his theoretical work, intended to help to show painters how to depict the passions effectively (LeBrun, 1698).