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## The Riddle of Human Emotional Crying: A Challenge for Emotion Researchers

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### Abstract

Until now, adult crying has received relatively little interest from investigators, whereas in the popular media there are many strong claims about crying (e.g., crying brings relief) of which the scientific basis is not clear. In this review, we provide an overview of the current state of the scientific literature with respect to crying. We identify gaps in knowledge and propose questions for future research. The following topics receive special attention: Ontogenetic development, antecedents, individual and gender differences, and the intra- and interindividual effects of crying. We conclude that the study of crying may help us obtain better insight into human nature, that is, not only our emotional, but also social, and moral functioning.

### Keywords

Crying; developmental psychology; emotion; evolution; individual differences; interpersonal effects; intrapersonal effects; tears; weeping

### Introduction

Emotional crying has been described as the shedding of tears from the lacrimal apparatus, in the absence of any irritation of the eyes. It is further often accompanied by alterations in some facial muscles, vocalizations, and sobbing (Patel, 1993). Only humans cry with tears in response to emotional events (Provine, 2012; Trimble, 2012; Vingerhoets, 2013). This conviction is rather old, although, throughout the ages, the shedding of what may appear to be emotional tears has been reported in isolated examples for a wide variety of animals. This has included case reports of tearfulness in horses and lions (Pliny the Elder, 1940), crocodiles (Aelian, 1958–1959), deer (e.g., Shakespeare, 1603/1966; Webster, 1612/1996; see Bath, 1984), elephants (Darwin, 1872/1998), and gorillas (Fossey, 2000) that all seem to be associated with the experience of distress. However, the best systematic study to date—a

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survey among veterinarians, zookeepers, and other professionals who work with animals—yielded no evidence of emotional tears in any other animal species (Frey, 1985).

To date, only a handful of researchers have studied emotional crying in adults. Nevertheless, we feel that there are some good reasons to pay more attention to this uniquely human characteristic, which, as we will demonstrate, should rather be considered as a behavior that obeys the laws of operant conditioning and is under the influence of biological, psychological, and social factors than as a reflex-like symptom. In addition, some basic questions are still waiting for answers, such as to what extent vocal crying and emotional tearing serve the same purposes (see also Provine, 2012).

In line with some recent publications (Trimble, 2012; Vingerhoets, 2013; Walter, 2006), our claim is that the study of crying, particularly its adaptive functions and developmental aspects, will help to provide more insight into, among others, the development of empathy and morality and, ultimately, human nature. The reasons why we cry disclose much about who we are and what is important to us. Besides understanding normal human behavior, insight into the functions of crying can help us further elucidate the nature of emotional dysfunction in psychopathology. To that end, multidisciplinary collaboration is badly needed—from all domains of psychology, psychiatry, evolutionary biology, neurobiology, neuroscience, anthropology, and ethology. It is our conviction that only an integrated multidisciplinary approach can fathom the riddle of our emotional tears.

In the present article, the focus is on the antecedents of crying, individual and gender differences, and the intra- and interpersonal effects of crying. We focus on adults, but also provide some developmental background to provide a context for understanding crying in adults.

## Developmental Aspects of Human Emotional Crying

Throughout the lifespan crying undergoes important changes, but also maintains several important characteristics (Rottenberg & Vingerhoets, 2012; Zeifman, 2001a, 2001b). Unfortunately, the changes in crying across the lifespan have also not yet been studied very systematically, but they seem to be concentrated on the decrease in frequency with increasing age (until adolescence), an increase in the significance of tears relative to the vocal aspects (Provine, 2012), a change in the antecedents of the crying episodes (see Vingerhoets, 2013, for a review and model), and the development of the gender differential (Jellesma & Vingerhoets, 2012).

According to Bowlby (1980) acoustical crying is an attachment behavior that serves to maintain the proximity of the parent (crying as the “acoustical umbilical cord”; Ostwald, 1972) and to solicit care and assistance, which is particularly important for helpless human infants. The changes in the reasons why children cry seem, to a great extent, connected with other ongoing normal developmental processes (Zeifman, 2001a). To mention a few examples, there is an increasing likelihood that infants start crying when exposed to strangers towards the end of the first year, when the well-known fear of strangers is strongest. On the other hand, colic (i.e., crying in the absence of clear reasons) has its peak

around two months and then rapidly decreases (see Bayley, 1932). Perhaps the recent finding that adult tears have a much stronger impact on observers than those of infants (Zeifman & Brown, 2011) can be considered as further support for the notion that tears replace the acoustical crying of infants, with the great advantage that they can be targeted much more specifically to certain individuals in close interactions without notifying others of one's helplessness. Provine (2012) also emphasizes how acoustical and vocal crying in many respects are complementary and, together, form a solid basis for a multimodal connection with significant others.

With the development of feelings of guilt and remorse, the ability to take another's perspective ("theory of mind"), and empathic skills, children also may cry, not only because of egocentric reasons, but also because they understand what they have done to others and because they can sympathize with others' suffering. Other remarkable changes in crying antecedents that deserve to be mentioned include the huge decrease in crying due to physical pain (Vingerhoets, 2013). Until adolescence, physical pain is very important as a trigger of tears, but for adults and the elderly it no longer plays a significant role. However, feelings of loss and powerlessness seem to remain important for crying throughout the lifespan.

A final development, discussed in more detail in the next paragraph, is that older adults increasingly cry because of positive situations, mainly related to experiences that may give their lives depth and meaning (Cova & Deonna, 2014; Denckla, Fiori, & Vingerhoets, 2014; Rottenberg & Vingerhoets, 2012; Vingerhoets, 2013). Perhaps, once adult humans have successfully spread their genes through having children and grandchildren and thus are more genetically rooted in society, they may feel more strongly connected to and are more easily emotionally moved by what is going on in society at large.

## What Makes Adults Cry?

When adults are asked to mention which *hypothetical* situations are most likely to make them cry, they mention losses, romantic break ups, sad movies and television programs, and physical pain. Weddings, reunions, and music are examples of positive situations that are frequently associated with tears. However, when respondents are asked what actually happened when they cried most recently, this yields a rather different picture. In such studies, conflicts, minor personal failures, criticism, or rejection are among the most important elicitors of tears. Sad movies also rank high in these studies (see Vingerhoets, 2013). The difference in findings can be explained by the fact that most of the strongest elicitors of tears generally are situations that, fortunately, are quite rare. Thus, we cry most often for quite mundane and common situations that tend to be rather idiosyncratic (sentimental movies, minor conflicts, criticism, smaller failures), partially dependent on previous experiences and which do not seem to have a strong, universal tear-eliciting capacity. This observation also supports the notion that for someone to start crying, exposure to an emotional event by itself often does not suffice. Instead, the person may need to be in a particular mental (and/or physical) state and situational factors should not too strongly discourage the shedding of emotional tears.

Focusing on the emotions that are typically associated with tears also yields a wide variety of potential triggers and is helpful to obtain insight into the common characteristics that are shared by the frequent elicitors of crying (Vingerhoets, van Geleuken, van Tilburg, & van Heck, 1997). Probably the most common emotional trigger is a feeling of powerlessness or helplessness, often in combination with other emotions such as sadness, anger, fear, or disappointment. Quite often, there is thus a blend of emotions, with powerlessness in a central position that stimulates our tears. Also in the case of “positive” emotions, one could argue that tears are particularly associated with feelings of being overwhelmed with joy, elation, or gratitude. Tears thus may actually reflect feelings that cannot be expressed or consummated in other behaviors. The eliciting power of such feelings may, however, vary by, among others, gender, age, and culture. Although one thus should be reluctant to attempt to create universal lists of crying-eliciting situations, there seems to be good reasons to postulate that helplessness and hopelessness, particularly when associated with attachment-related issues such as bereavement, romantic break ups, or moves and other separations, have a strong, universal power to elicit tears (Denckla et al., 2014; Vingerhoets, 2013).

Vingerhoets (2013) proposes the following types of emotional tears based on their antecedents: (a) physical pain tears; (b) (egocentric) attachment-related pain tears; (c) empathic, compassionate pain tears; (d) societal pain tears; and, finally, (e) sentimental or morally based tears (see also Denckla et al., 2014). Typical examples of sentimental or moral tears are those tears shed when watching movies with themes as eternal love, self-sacrifice, altruism, the good that overcomes the bad, etcetera (Tan & Frijda, 1999). As emphasized by Solomon (2004), sentimentalism has a strong negative connotation in our current society and is typically associated with culturally inferior products such as B-movies, country-western music, or “camp,” but it cannot be denied that these genres typically address very important societal values and virtues. In sum, the development of crying over the lifespan can be seen as starting from exclusively egocentric reasons (e.g., physical discomfort) and later broadening to more societal (e.g., sentimental or moral) reasons. Cova and Deonna (2014) especially emphasize the potential of events that may give life meaning as important causes of adult tears.

Table 1 summarizes the basic, most important antecedents of crying (Vingerhoets, 2013). The left-hand panel shows the negative antecedents—which can be briefly summarized as physical pain, feelings of powerlessness, and (threats of) loss, whereas the right-hand panel displays their positive counterparts, which, generally speaking, come into play as crying antecedents first in late adolescence or early adulthood.

## Individual Differences in Crying

In addition to the individual’s level of socioemotional development, there are several other individual characteristics that are known to affect one’s crying behavior. Adult women in Western countries cry 2 to 4 times more often than men (Vingerhoets & Scheirs, 2000). In addition, there are also some remarkable gender differences in the antecedents of crying. Specifically, two conspicuous differences are that women cry much more than men do in conflict situations, whereas men cry relatively more often because of positive reasons. On the other hand, the gender differences in reaction to loss and interpersonal rejection seem

very limited at best (Vingerhoets, 2013). Variability in crying frequency depends not only on gender and age, but also on factors like personality, attachment style, mental health, culture, socialization, whether or not one is in a romantic relationship, and previous exposure to traumatic events. In addition, temporary changes in one's crying behavior may result from several different factors, including sleep deprivation, fatigue, stress, mood, mental health, becoming a parent, physical health status, alcohol consumption, and the use of other recreational substances or medications (Vingerhoets, 2013).

Regarding personality features, individuals high on neuroticism and/or empathy cry relatively more (Vingerhoets, 2013; Vingerhoets, van Tilburg, Boelhouwer, & van Heck, 2001), whereas dismissively attached persons tend to cry less than others (Laan, van Assen, & Vingerhoets, 2012). In addition, as we will see later, some psychopathological characteristics may influence an individual's crying behavior.

Besides scientifically establishing individual and group differences in crying frequency, it is also relevant to understand *why* these differences exist. Bekker and Vingerhoets (2001; see also Vingerhoets, 2013) developed a model to illustrate that each of the following four factors (and any possible combination of them) might be responsible for individual and group differences in crying. First, there may be differences in the degree of exposure to emotional situations. For example, the differences in crying frequency between men and women could perhaps be explained to a large extent by the fact that women more often watch tearjerkers and more likely read "sentimental" literature. This difference in exposure to emotional stimuli may also extend to one's professional work setting, as currently more women than men are working in health care, whereas men are still overrepresented in more technical and less social professions. Additionally, women may more easily cry because they are more vulnerable to interpersonal traumas and emotional disturbances (including depression). The second factor is appraisal, or more precisely, how individuals and specific groups differ in the way they perceive and evaluate potentially emotional situations. For example, it has been demonstrated that women tend to appraise certain situations (e.g., burglary, computer crash, etc.) as more helpless than men do. The powerless anger typically experienced by women in conflict situations is another appropriate example (Fischer, Bekker, Vingerhoets, Becht, & Manstead, 2004). Third, the existence of a crying threshold may be postulated, which is presumably under the influence of, among others, physical and psychological factors such as fatigue, sleep deprivation, but also hormonal levels. It is assumed that this threshold differs for men and women, because of the difference in the levels of the male sex hormone testosterone, which might explain why men have a higher threshold. Finally, the (learned) capacity to control one's tears, as well as the social acceptance of tears, should not be overlooked. This concerns the influence of parents, but in particular also of peers, and other societal pressures. Both gender and cultural differences in how crying is perceived may result from these influences.

To illustrate the possible contribution of each of these factors, let us briefly consider the following example. Some studies suggest that students who are in romantic relationships cry more often than those who are single (Jarrín Hernández, 2011; Sung et al., 2009; Vingerhoets & van Assen, 2009). Why might that be the case? Is it because individuals with a romantic partner are more often exposed to situations that may evoke tears (e.g., conflicts

with parents and/or same-sex friends, one's own problems and the problems of one's partner, as well of shared positive events, such as when the partner declares his love, etc.)? Or because they appraise both the positive and negative behaviors of others (in particular of their romantic partner) differently, resulting in stronger emotional reactions? Further, even the influence of a neurobiological factor may be postulated; individuals being in love have been shown to have low levels of brain serotonin, which likely also affects the crying threshold (van der Veen, Jorritsma, Krijger, & Vingerhoets, 2012). Finally, adults (and children) prefer to cry mainly in the company of "attachment figures," such as one's mother or romantic partner, so individuals in romantic relationships may have more opportunities to cry in a preferred environment (Fox, 2004; Vingerhoets, 2013). Crying occurs mostly (and makes most sense) when an attachment figure (or a symbolic equivalent including pets, God, a letter or picture) is available, who is expected to respond positively to the crying, with understanding and support.

In conclusion, differences in crying frequency may result from different combinations of diverse underlying factors. It is clear that the study of these individual variations in crying should focus on an explanation of what may lead to these differences in order to gain a better understanding of the functions of tears. What further is most relevant for the question concerning the functions of emotional tears, concerns the specific consequences of tearful crying. What does tearful crying bring about? In the following paragraphs the focus will be on the effects for the crying individual him/herself and how the mood, cognitions, and behavior of observers are influenced.

## Towards an Understanding of the Functions of Tearful Crying

Theories on the functions of tearful crying formulated in the scientific or clinical literature come from two broad categories: (a) those focusing on the effects on the crier him or herself and (b) those addressing the effects on others. Insight into which factors determine the intra- and interindividual effects of crying is of crucial importance to obtain an adequate understanding of the relevance of tearful crying for human functioning.

One obvious and important omission is that, until very recently, research on crying and tears has generally failed to take into account that crying actually consists of different components (vocalizations, tears, sobbing, facial muscle changes, etc.) that each may serve specific functions (see Gra anin, Bylsma, & Vingerhoets, 2014). However, for some specific research questions (e.g., antecedents of crying, individual differences) this distinction may seem less important than for others (e.g., the intra- and interpersonal functions of crying). Having said this, in what follows we provide an overview of both intra- and interindividual aspects of crying, with the focus on the role of the production of emotional tears. However, it is impossible to determine retrospectively in the studies thus far whether there are differential effects for specific components of crying, as the great majority of research has approached crying as a more or less integrated behavioral response.

### Intraindividual Effects

Theories focused on the possible *intraindividual* effects of crying (i.e., the effects that crying has for the crier) mainly originate from the psychodynamic tradition and are strongly

connected with the concept of catharsis (e.g., Breuer & Freud, 1895/1955; Koestler, 1964; Sadoff, 1966). In these theories the production of tears is considered as a kind of safety valve, with as its main function the release of superfluous emotional energy or relief of tension. The idea was that, if this energy is not released via tears, it could have a major negative impact on bodily processes and result in all kind of psychosomatic dysfunctions. Thus, from this theoretical viewpoint, crying is considered cathartic and healthy, whereas the failure to shed emotional tears may be detrimental to one's physical functioning.

A popular biochemical variant of this theory (Frey, 1985) emphasizes blood clearance functions of the lacrimal glands and fits the physiological concept of homeostasis. According to this view, very similar as the kidneys, the lacrimal glands also clear the blood and remove stress hormones and other toxic substances that are produced during distress, which would explain why people experience relief after having cried. In this theory, the production of emotional tears thus plays an explicit significant role.

The empirical evidence concerning the effects of crying on mood and well-being, however, reveals a rather complex pattern of findings (Rottenberg, Bylsma, & Vingerhoets, 2008). Indeed, the findings of the scientific literature are at odds with what is asserted in the more popular literature. For example, in his analysis of articles on this topic in popular magazines covering 140 years, Cornelius (1986) found that as many as 94% of the identified articles left little doubt about the effects of crying for one's well-being and depicted crying as beneficial. In addition, they often warned readers that suppressing one's tears could be deleterious to the body and mind. In contrast, an overview of the scientific literature reveals some striking differences among research findings, which seem to be dependent, among others, on the research methodology (Graanin et al., 2014; Rottenberg et al., 2008).

When individuals from the general public were asked whether crying is beneficial, over 70% agreed with that statement. An international study on crying, containing respondents from 37 countries, also reported a great consensus among those surveyed (> 70%) that crying generally helps them to feel better. However, when being asked specifically about their most recent crying episode, only 50% of these very same respondents reportedly had experienced a positive mood change after crying (see Vingerhoets, 2013).

The lay acceptance of the notion that crying induces selfsoothing is further demonstrated in a recent study by Simons, Bruder, van der Lowe, and Parkinson (2013). When participants were asked about the reasons why they sometimes deliberately continue their own crying in sad or upsetting situations, they reported that they were mostly driven by intrapersonal motives. In other words, when people deliberately stimulate their own crying, such as by focusing on particular memories or by modulating facial expression, they reportedly mainly do it for their anticipated own personal benefit or relief (rather than to influence the behavior of others).

Not only the lay public, also mental health professionals generally believe in the benefits of crying—with psychotherapists and counselors from nearly every tradition or background considering crying during the process of therapy as constructive, rather than destructive (Blume-Marcovici, Stolberg, & Khademi, 2013; 't Lam, 2011). In one study, over 70% of

the participating clinicians reported that they actively encourage their clients to cry (Trezza, Hastrup, & Kim, 1988). Similarly, Nelson (2005) stresses the importance of crying in conveying messages about attachment and caregiving in the therapeutic setting.

Crying, however, certainly does not always result in mood improvement. Cornelius (1997) aptly reviewed the literature on this topic which led him to conclude that quasi-experimental studies, in which volunteers were exposed to sad movies without exception showed that the participants who had cried felt worse immediately after the film. This thus seems in stark contrast with the notion that crying facilitates mood improvement. Further, after having analyzed available relevant retrospective studies, Rottenberg et al. (2008) came to conclude that the question “Is crying beneficial?” should rather be reformulated as follows: “For whom, and in what conditions does crying benefit the crying individual?” Decisive factors that may determine whether or not crying is beneficial include the crier’s personality and psychological state (e.g., depressed individuals hardly or never report mood improvement), characteristics of the eliciting event (in the case of uncontrollable events, criers report less mood improvement), and how others react to the crying (receiving comfort is associated with mood improvement, whereas disapproval and other negative reactions is not).

Recently, Gra anin et al. (2015) have specifically designed a study to obtain better insight into the paradox of why, in retrospective studies, people often report relief after having cried, while immediate measurements (in laboratory studies) consistently showed opposite effects, that is, a deterioration of mood. Similar to previous laboratory studies, this study also examined individuals who cried or did not cry in reaction to emotional films with their mood being assessed immediately after the film. However, new was that mood was additionally evaluated at 20 and 90 minutes after the film. The results confirmed those of previous studies (see Cornelius, 1997) showing that crying results in mood deterioration immediately after the movie. Not surprisingly, this decrease in mood is subsequently followed by a recovery after 20 and 90 minutes. Remarkably, however, criers’ self-reported mood after 90 minutes was not only, as expected, better than their mood immediately after the film, but also better than their baseline mood measured before the movie. No such difference was found in the group of noncriers. Assuming that mood improvement after crying may need some time to develop, this pattern of findings thus seems to reconcile the seeming contradictory observations that crying results in a decrease in mood, as always found in laboratory studies, and the typical finding in retrospective studies that suggest that crying may improve mood in a substantial amount of cases. Apparently, the mood improvement needs some time to develop.

Admittedly, these findings still do not provide definitive support for the catharsis hypothesis. First, a major problem is that random assignment to conditions is not possible; whether study participants will or will not cry when exposed to an emotional movie might likely depend on several other factors, including personality. Second, it still needs to be established whether this seeming mood improvement indeed represents a real mood improvement, or that it just reflects a kind of memory bias such as an overshoot or a so-called response shift phenomenon (cf. Schwartz & Sprangers, 1999), which reflects an adaptation process that involves possible changing internal standards, values, and conceptualizations of mood and well-being (Bylsma, Croon, Vingerhoets, & Rottenberg, 2011). Finally, the mechanisms



responsible for such possible beneficial effects await identification. Gra anin et al. (2014), in their overview of the literature, conclude that (seeming) mood benefits may originate from very different sources including biases, but also from a variety of physiological, cognitive, behavioral, and social processes. In several ways, intrapersonal effects may thus be strongly intertwined with interpersonal effects, such as when the positive effects actually have been provoked by the emotional support and comfort that was induced from others.

In addition, some specific suggestions have been put forth as putative physiological mechanisms (see Gra anin et al., 2014, for an overview). First, improved mood might result from an increase in parasympathetic nervous system activity, which reflects, or even stimulates relaxation and recovery processes. Probably more speculative is the idea that crying stimulates the release of substances like oxytocin, nerve growth factor and/or endogenous opioids, all having well-described mood-improving effects. For example, Provine (2012) provides compelling evidence that nerve growth factor, which has been found in the lacrimal gland and is secreted in tears, plays a role in wound healing processes and may have antidepressant effects. Finally, it has been hypothesized that the rhythmic sobbing or the inhalation of cool air may have mood-improving effects (see Vingerhoets, 2013). These hypotheses all should be taken more seriously than Frey's (1985) very popular blood clearance hypothesis.

However, what one certainly also should not overlook is that the experience of a low mood may stimulate individuals to apply various cognitive and behavioral mood management techniques that may result in an improved mood, which makes any physiological mechanisms involved in relief after crying superfluous. For example, since crying itself may prompt individuals to utilize mood management strategies, it may have an indirect effect in this way as well. Relatedly, it is also plausible that tears may feed back to the crying individual about his/her psychological state. In particular, sentimental crying (e.g., when watching certain movies depicting situations as self-sacrifice, altruism, gratitude, eternal love, etc.) typically occurs quite unexpectedly, and seems to make the individual aware that there is something important happening and that the situation has a major impact on the crying individual (Cova & Deonna, 2014; Tan & Frijda, 1999; Vingerhoets, 2013). Further, operant and classical conditioning processes might be involved in several ways (see Gra anin et al., 2014). Finally, as said before, in the case when crying elicits understanding and comforting behaviors, these social reactions may significantly contribute to the mood experience of the crier.

So far, we have summarized the main findings with respect to the intraindividual effects of tears. Theories and research that particularly focus on the *interpersonal* effects of crying will be discussed in the next paragraph.

### Interindividual Effects

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. Nowadays, in the newspapers one may occasionally read reports of, for example, swindlers who use crying to steal people's money. In court setting, tears may also be regarded with suspicion. For example, some years ago, an Ohio judge in a death penalty trial warned attorneys to avoid courtroom crying and

said he would do his best to recognize theatrical “crocodile tears.” It is clear from colloquial evidence that tears may have a strong impact on the behavior of others. Is there a theoretical basis for these conclusions? What has more systematic research on this topic yielded?

As mentioned earlier, one of the first and most important representatives of the theories focusing on the interindividual aspects of (acoustical) crying is John Bowlby’s attachment theory (Bowlby, 1980; Nelson, 2005). Nelson (2005) emphasizes that this major function of crying is actually maintained throughout the lifespan into adulthood. Key in this theory is that crying has been designed especially to be directed to (symbolic) attachment figures, to trigger their attention and support. Along these lines, Hasson (2009) analyzed the functions of adult tears from an evolutionary perspective and hypothesized that tears mainly serve interpersonal purposes, such as promoting social bonding and inhibiting aggression and violence in others. Also in the anthropological literature, it has been suggested that common ritual weeping, similar to common praying and singing or making music, was recognized to facilitate social bonding and to stimulate feelings of mutual connectedness, especially in times of adversity (famine, diseases, natural disasters) or when preparing for war (Dissanayake, 2008; Vingerhoets, 2013).

The question how observers respond to a crying adult, also has received significant attention from researchers. For example, Cretser, Lombardo, Lombardo, and Mathis (1982) asked their respondents how they would react to a crying individual. Men were more likely than women to react with negative reactions to male criers (seeing their crying as a sign of weakness and as not appropriate). Reactions to female criers were similar for both genders (more sympathy, acceptance, and a greater willingness to help). In a related study, Jesser (1989) found that men reported more confusion, irritation, and avoidance in response to, especially male, criers, while women reported being more likely to cry along with the individual in distress. Both men and women reported a greater tendency to comfort female than male criers. Similarly, Staebler Tardino (1996) let participants read a script of an employee expressing sadness, anger, or no emotion in a conversation with a coworker. Sadness was operationalized through speech content, voice characteristics, and the presence of tears. Sad coworkers were considered being more passive, lacking in control, and experiencing more negative work relationship consequences relative to those who expressed no emotion. Crying individuals were additionally perceived more negatively compared to neutral individuals.

Using vignettes, describing different situations in which the main character did or did not cry, Hendriks, Croon, and Vingerhoets (2008) found that participants again reported a greater willingness to provide emotional support to crying individuals, and were less likely to express negative affect toward such persons, although (or maybe because?) the crying individuals made them feel more uncomfortable. Importantly, the valence of the situation strongly moderated the reactions. Since, in the case of negative situations, the willingness to offer help is probably substantially higher (independent of the presence of tears) than in positive situations, visible tears may have a stronger effect on the willingness to provide support in positive than in negative situations. Wong, Steinfeldt, LaFollette, and Tsao (2011) also applied vignettes to investigate male college football players’ evaluations of crying

behavior and observed that just slightly tearing up (vs. sobbing) was considered to be a most appropriate reaction, particularly after a victory.

Others have used tape recordings to examine reactions to crying in a more controlled setting. For example, Forster and Forster (1971) exposed nurses to tape recordings of five typical crying patient situations (made by a professional actor) and asked participants to report on how they would respond to the patient and how they would feel. Half of the participants listened to a crying patient describing various complaints, while the other half heard a noncrying patient describing the same complaints. The researchers expected that the nurses' responses to crying patients would be "less effective" than those toward the noncrying patients, and that they would more likely express negative emotions toward the criers. The results, however, revealed no significant differences between the two groups and the direction of the, nonsignificant, differences was opposite to expectations.

Wagner, Hexel, Bauer, and Kropiunigg (1997) examined attitudes and reactions to crying of patients and coworkers in an Australian sample of doctors, nurses, and final-year medical students. The responses of all three groups toward crying patients were fairly positive and supportive of the crying. For example, participants reported that their most likely reactions toward a crying patient were holding his/her hand, becoming personally affected, and trying to soothe the patient's distress with words. Nurses were more likely to hold a patient's hand than were doctors or students, and nurses and students were more likely to start crying themselves. Students were more likely to regard crying patients as "lacking in will" than were doctors or nurses. All three groups indicated that patients and relatives should be allowed to cry in the hospital. Nurses were more likely than doctors and students to indicate that hospital personnel should be allowed to cry as well. On the other hand, a fifth of the students who cried during their hospital work were reportedly ridiculed, screamed at, or looked at with contempt by their colleagues. Overall, it seems that students may be less supportive of crying than doctors or nurses who may have more experience with working with emotional patients.

In an international study on adult crying, participants were asked how others had actually responded to their last crying episode (Vingerhoets, 2013). In contrast to what laboratory findings and questionnaire studies with vignettes suggest, the specific relationship with the crying individual appeared to be a major determinant of the reactions. More specifically, reacting to crying individuals by providing comfort and understanding is, in real life, rather exceptional in the case of a stranger, but happens often when we know the crying individual. In the case of strangers, it does hardly make a difference if it concerns a crying man or a woman and the support further will mainly limit itself to expressing understanding and comforting words, whereas offering physical comfort is not very common. Neither gender is likely to receive physical comfort from strangers. In case of intimates, however, women are more likely than men to receive physical emotional support. Men also appeared to have a more limited repertoire of comforting reactions than women (see also Dolin & Booth-Butterfield, 1993).

Plas and Hoover Dempsey (1988) examined the role of the context of crying. Their interviews revealed that crying in an intimate setting is generally accepted, but in the work

setting it may trigger mainly negative reactions in colleagues. Men reportedly tend to react with awkwardness, confusion, and feeling as if manipulated, whereas women more likely reacted with helplessness. Fischer, Eagly, and Oosterwijk (2013) also demonstrated the importance of context. Interestingly, in a work setting, a crying man was considered as more emotional and less competent than a crying woman.

A handful of recent studies in the laboratory have employed pictures of crying individuals and the same pictures with tears digitally removed or added (Balsters, Kraemer, Swerts, & Vingerhoets, 2013; Cornelius & Lubliner, 2003; Cornelius, Nussbaum, Warner, & Moeller, 2000; Provine, Krosnowski, & Brocato, 2009; Vingerhoets, van de Ven, & van der Velden, 2015; Zeifman & Brown, 2011). The results typically demonstrate that tearless crying faces produce confusion about the emotional state of the individual among observers, whereas visible tears have a positive effect on attributed kindness, feelings of empathy and connectedness, and the self-reported willingness to provide support. Provine (2012) additionally demonstrated that the precise position of the tears is important, with only tears below the eyes on the cheek being associated with weeping and the associated effects (as opposed to forehead wetness).

Hendriks and Vingerhoets (2006) exposed study participants to pictures of (the same) individuals posing crying, neutral, anger, and fear expressions and asked them how they would judge the depicted person, how they would feel in the presence of the person, and how they would respond to the person. Compared to individuals expressing other emotions, crying individuals were perceived as less emotionally stable and less aggressive. Participants additionally reported more feelings of sadness in response to crying faces. Further, crying faces evoked more self-reported emotional support and less avoidance behavior. The picture that emerges of these studies is that visible tears have a significant impact on observers that is distinct from other aspects of the expression of sadness.

A limited number of studies (see Cornelius, 2001, for review) have explored the social effects of tears in laboratory studies, with confederates pretending to cry. Labott, Martin, Eason, and Berkey (1991) exposed their participants to a sad movie in the presence of a confederate who either laughed, cried, or showed no emotion. Crying men were liked more than crying women, whereas women were liked more when they displayed no emotional reactions. Crying confederates were rated as more depressed and emotional than laughing and neutral confederates. Hill and Martin (1997) exposed their participants to the film-induced crying of a confederate, in several different conditions. The crying confederates (in this study, always females) elicited greater sympathy than noncrying confederates, but, consistent with Labott et al.'s (1991) findings, were not evaluated more positively than noncrying confederates.

Occasionally, studies were performed in specific, real-life, settings or with specific interactions. For example, Hepburn and Potter (2007) analyzed how crying influenced the responses to callers to a child protection helpline. Crying mainly occurred when callers reported abuse, probably also to emphasize the perceived severity and strong impact of their problems. These researchers distinguished two specific responses of the child protection officers that were rarely observed in noncrying calls. The first was the encouragement to

“Take their time,” which was predominantly used when the crying seriously interfered with talking, and the second specific reaction was expressing empathy, which occurred in particular when the advice given did not seem to have the intended effect.

The interindividual effects of crying are also nicely illustrated in studies addressing the manipulative power of tears. Buss, Gomes, Higgins, and Lauterbach (1987) demonstrated the link between the tendency to use tears as a strategy for manipulating a partner in a close relationship and personality. In particular, women who were highly neurotic seemed to apply this manipulation tactic in order to achieve desired objectives. Also, narcissists (Alexander, 2003), but also psychopaths are known for their extensive use of manipulative techniques including crying. Sociopaths even have been described as the “champions of the crocodile tears” (Stout, 2005).

In conclusion, the picture that emerges is that crying, or even the mere sight of tears, generally elicits positive reactions of observers. Criers are considered as more agreeable, but also more neurotic and emotionally not stable. Male witnesses may often feel confusion and irritation and tend to ignore the crier, women more likely seem to react more positively and with understanding. However, it must be emphasized that the effects of gender seemed to be stronger in the older studies, than in more recent studies. Further, there is suggestive evidence that the specific context and the perceived appropriateness also may determine how people react. Finally, how people, in particular men, cry, also may make a difference. Just moist eyes seem to signal that one is sensitive, but also in control of one’s feelings (Warner & Shields, 2007).

However, other studies have yielded a very different picture of the effects of adult crying. It has to be emphasized, however, that most likely, it is not just the presence of tears, but rather the vocalizations that may produce these negative effects. For example, women in rape situations are at increased risk of being physically assaulted when they cry (Ullman & Knight, 1993; Zoucha-Jensen & Coyne, 1993), and, in particular, women crying in the work setting may be looked upon as not professional and not fit for their job (Lowen, 2008). In addition, insulting and disqualifying people (enemies, politicians, etc.) by depicting them as cry-babies dates back to classic times (Vingerhoets, 2013). The crying of patients with borderline or narcissistic personality disorders may be perceived as manipulative and annoying by therapists in clinical settings. This is a further clear illustration that crying not necessarily and automatically results in positive effects (Alexander, 2003). The crying of these patients apparently can even induce strongly negative feelings in therapists and may even prevent the development of the empathy and rapport that is necessary for an optimal therapist– patient relationship.

Given these seeming conflicting findings, there is thus currently a strong need for more systematic research to obtain clarification from who and in which conditions crying elicits the desired succor and when it may rather result in confusion, irritation, annoyance, or maybe even aggression. Caution is particularly needed when interpreting the results of laboratory studies, because they may be strongly influenced by socially desirable responses of the participants. Also in self-reports, people appear to be unable to take into account or easily overlook decisive aspects of a hypothetical situation when asked how they would

respond to crying. 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 empirical evidence might also be mixed, because the methods and designs of the studies differ widely, with several of them even suffering from important methodological limitations or limited ecological validity and little relevance for the practical field. For example, in the studies using pictures of crying individuals, the study participants do not know why the depicted individual cries and if his or her tears are appropriate, whereas reactions to emotional reactions in general and to tears also very likely depend on the perceived appropriateness (e.g., van Kleef, 2009). In addition, in the past few decades there have been some important developments, in particular with relation to how male crying is perceived and how men perceive crying. It seems that currently more than ever before politicians but also male athletes, be it after a defeat or after a victory, more likely cry and receive attention for this behavior in the media (cf. MacArthur & Shields, 2014). Nevertheless, it is plausible that characteristics of the crier, the observer, the antecedents, and the crying itself all play a certain role but the challenge is to disentangle the contributions of each of these factors and their interactions.

Vingerhoets (2013) formulated the outlines of a comprehensive model with the following factors as decisive elements: (a) the situation and in particular its perceived appropriateness as an elicitor of crying; (b) the characteristics of the crying person: age, gender, personality, status, and their specific role (caregiver, leader, politician, etc.); (c) the characteristics of the observer: age, gender, personality, professional status, etcetera; (d) 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.); and (e) the specific characteristics of the crying: protest crying, sad crying, mere tearfulness, etcetera. To develop and stimulate future research, a testable refined model needs to be developed that can help to deepen our understanding of the varying reactions to crying and their determinants.

## Conclusion

Tearful crying is a uniquely human emotional expression that is characterized by a strong continuity over the lifespan, yet it also shows some important developmental changes, including the decrease in frequency with age (until the age of 20–25). Further changes include the increasing importance of the visible tears relative to the distress vocalizations, changes in the nature of the situations that induce tears, and the development of the gender differential which results in more female than male adult crying. Tearful crying is hypothesized to facilitate social bonding, to elicit sympathy and empathy, to promote cooperative and helpful behavior, and, probably, the inhibition of aggression in assaulters (Hasson, 2009; Vingerhoets, 2013; Walter, 2006).

Helplessness and loss (e.g., grief, romantic break up, homesickness) seem to be the prototypical situations that induce tearful crying across one’s lifetime. In addition, perceived empathy, altruism, and a basic sense of justice, essential building blocks of human society,

are major reasons for tearfulness in adults. In the realm of morality and ethics, the importance of emotions such as pity, sympathy, fondness, adoration, and compassion—which are often accompanied by tears—should not be underestimated. We argue that the role of adult tears, in particular, is to remind the crying individual that the situation or event to which they are exposed is something that really matters, not only for the crier him or herself, but also for society at large. Vingerhoets (2013) considers these sentimental or moral tears as “exclamation marks” which are placed by our hard-wired unconscious moral system.

Walter (2006) explains how, in human evolution, seemingly mundane developments (e.g., our big toe, thumb, and tears) ultimately had major effects on our phylogenetic development. Tears may have facilitated our unique social evolution. Humans are described as an ultrasocial species, with unique empathic and moral capacities, including caregiving for the sick, disabled, and elderly. Increasing knowledge about the roles and functions of tears may thus not only be helpful in understanding why humans cry, but also may contribute to a better understanding of human nature. In sharp contrast to Darwin (1872/1998) who regarded emotional tears as a purposeless phenomenon, we feel that shedding emotional tears may serve important functions, both intrapersonal and particularly interpersonal ones.

With respect to the individual differences, these seem not just to be related to gender and age, but also to certain personality features, physical makeup, and lifestyle. Why individuals and groups differ in crying, may have very different underlying factors. Exposure to emotional stimuli, appraisal processes, differences in crying thresholds, and the capacity to control one’s tears all may contribute to the individual differences in crying. Along these lines, if the differences are the consequence of a differential exposure to emotional stimuli, it is quite a different story relative to when the difference is due to changes in crying threshold, caused by brain damage, or hormonal changes. For an adequate understanding of individual/group (including patient groups) differences in crying, the comprehensive study of all these factors is necessary.

To conclude, there is still much to discover about human emotional crying. In particular, we lack insight into the brain structures that are involved in crying. Further, little is known about the developmental changes in crying and there is only very limited social and clinical psychological research on this topic. Crying may be a window to obtain a better insight into important developmental processes like empathy and morality, as well as clinical conditions, including depression, emotion dysfunction, psychotrauma (numbness), pathological grief, personality disorders, and “emotional incontinence.” It is a topic that needs a multidisciplinary approach in order to be able to adequately study its meaning and impact on the individual and on society. We fully agree with Provine (2012) that the interdisciplinary study of the functions of (the different components of) crying has much promise for a better understanding of human nature, including our emotional, social, and moral functioning.

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**Table 1.****Antecedents of crying.**

On the left side are “negative” antecedents listed, with on right side, their “positive” counterparts, which first become important in late adolescence or early adulthood.

|                           |                                  |
|---------------------------|----------------------------------|
| Loss, grief               | Birth of a child                 |
| Divorce, break-up         | Wedding                          |
| Separation                | Reunion                          |
| Conflict                  | Harmony                          |
| Loneliness, solitude      | Social bonding, union            |
| Defeat, failure           | Victory, success, achievement    |
| Powerlessness             | Extraordinary performance        |
| Distress, suffering       | Ultimate happiness, rapture      |
| Old, discarded, worn out  | Young, with potential            |
| Sin, egoism, world is bad | Justice, altruism, world is good |
| Tiny, vulnerable          | Awesome, powerful                |
| Physical pain             | Tender love making, orgasm       |