

## 7. Sex differences in crying: Empirical findings and possible explanations

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Crying or weeping<sup>1</sup> can best be described as a typically human form of emotional expression. However, despite the vast literature on emotions and emotional disorders, this phenomenon surprisingly appears to have been neglected in behavioral science literature, as was already recognized by Borgquist (1906). Since that time no significant increase in the interest of researchers for this topic has been noted. In recent handbooks on emotions (e.g., Lewis & Haviland, 1993; Magai & McFadden, 1996; Oatley & Jenkins, 1996) hardly any attention is paid to adult crying.

### **The functions of crying**

There is no doubt that crying is by nature a response to an emotional event, or to memories of or reflections on emotional events. The scarce literature on crying reveals the following two functions of this emotional expression: tension relief or catharsis (see, however, Cornelius, 1997) and communication, that is, making clear to others that one feels helpless and in need of comfort and support (e.g., Cornelius, 1997; Kottler, 1996). In addition, there is some evidence that crying can be used to manipulate others (Buss, 1992; Frijda, 1997; Kottler, 1996).

In current stress theory, the term “coping” refers to the behaviors and cognitions of an individual who is exposed to stressful situations, with the aim of eliminating stressors, reducing their intensity, or dampening emotional distress brought about by the confrontation with stressful events (Lazarus, 1991). It thus seems reasonable to assume that crying fulfills some of these coping functions. A global distinction can be made between problem-focused coping and emotion-focused coping (Lazarus & Folkman, 1984; Steptoe, 1991). Problem-focused coping refers to efforts to remove the stressors or to reduce their intensity. Emotion-focused coping, in contrast, implies efforts to diminish the intensity of emotions and to regulate one’s emotions adequately. Seeking social support deserves some specific attention, because it refers to attempts to mobilize informational, emotional, and/or

instrumental support from one's social network. Social support thus may imply both problem-focused coping and emotion-focused coping. Crying may also fulfil both functions. Crying is supposed to relieve tension and to elicit emotional support (comfort), but as pointed out above, crying sometimes can also be used purposefully to manipulate people, turning it into a true problem-focused strategy. We contend that crying should be considered as an ultimate response, which occurs in particular when one does not have any behavioral responses available to deal with the situation. The accompanying emotional state thus can best be described as helplessness (cf. Bindra, 1972; Frijda, 1986; Vingerhoets, Van Geleuken, Van Tilburg, & Van Heck, 1997). Further, we want to emphasize that this state may also apply to positive situations, for example, when people are overwhelmed by positive feelings. Such feelings may prevent them to display appropriate behavior, resulting in the flowing of tears.

### **Methodological issues in the study of adult crying**

Before we continue, it seems useful to discuss some measurement issues in crying research. There are different approaches to examine the question of why and how often people cry, and what the effects may be for the individuals themselves and for their environment. Dependent on the specific nature of the measures and the design of the study, different aspects of crying can be examined. First, one can focus on actual *crying frequency*. How often do men and women cry in a certain time period? This can be examined by asking people to estimate how often they have cried within a given time period (e.g., last week, last 4 weeks, last year) (e.g., Williams & Morris, 1996), or, alternatively, by requesting participants to keep a diary for a certain period, which probably yields more reliable information than retrospective estimates (e.g., Frey, Hoffman-Ahern, Johnson, Lykken, & Tuason, 1983). Still another approach is to consider the time since the last actual crying episode as an index for the person's crying frequency (cf., Wallbott & Scherer, 1986).

In a third type of studies, participants are requested to rate how likely it is that one will cry when being exposed to a specific situation or when experiencing a certain emotion (e.g., De Fruyt, 1997). When applying such an approach, we prefer to speak of measuring *crying proneness* rather than crying frequency. Unfortunately, some authors failed to make this distinction and examined crying proneness while using the term frequency (e.g., De Fruyt, 1997; Williams, 1982; see also table 7.1 for an overview of different studies). The difference between both con-

cepts may become most evident if one realizes that people may prefer to avoid situations that are likely to make them cry. In other words, people might report rather paradoxically that it is unlikely that they would cry in a situation that generally has a high potential of eliciting tears (Gross, 1998; Gross & Munoz, 1995). Thus, crying frequency may tell us more about one's preference to avoid crying, rather than one's tendency to cry.

Finally, there are also examples of observational studies in crying research (e.g., Eibl-Eibesfeldt, 1997), and of experiments in which crying behavior of both sexes in response to a laboratory stimulus like a sad movie has been examined (see Cornelius, 1997). In all types of studies except in observational studies, data have been most frequently collected by means of self-reports. The method of self-report, however, is not without problems. People's limited capability of remembering mood, as well as specific response biases, might distort their reports in a manner and to a degree that we have little knowledge of to date (Stone, 1995).

### **Gender differences in crying: Empirical evidence**

We traced 14 studies in the literature in which the relationship between sex and any aspect of adult crying was investigated. We further decided to add the preliminary data obtained by Vingerhoets and Becht (1996) (see table 7.1 for a summary of these studies). Table 7.1 shows that crying has mostly been investigated by asking questions about the estimated proneness, frequency, intensity and duration of a past crying episode. In addition, questions have been asked about the reasons for crying and the effects of crying on mood. As was argued above, sex differences in actual crying behavior might well be determined by two factors: differences in crying proneness and differences in the actual situations that men and women are confronted with in their daily lives (or that they successfully seek or avoid).

A quick look at the listed studies reveals that the methodology, i.e. the questions that were asked and their exact wording, as well as the length of the time period that the subjects had to describe, substantially differs among the reported studies. In addition, the composition of the study samples shows considerable variation in age, background, and the relationship between male and female participants. These different methods and subject samples may partly account for some of the seemingly contradictory results in the table, for instance on crying duration.

Despite this variety, however, we can safely conclude that women report a greater propensity to cry, a greater actual crying frequency and

Table 7.1. Summary of gender differences in crying

| Article               | N (men and women)         | Method/period covered                           | Frequency | Intensity | Duration          | Proneness <sup>1</sup>                             | Reasons for actual crying <sup>2</sup>             | Effects on mood                                             |
|-----------------------|---------------------------|-------------------------------------------------|-----------|-----------|-------------------|----------------------------------------------------|----------------------------------------------------|-------------------------------------------------------------|
| Young, 1937           | 48 M<br>8 W               | Questionnaire/<br>past 24 hours                 | W>M       | *         | *                 | *                                                  | No data on gender differences                      | *                                                           |
| Bindra, 1972          | 25 M<br>25 W              | Questionnaire/<br>description of recent episode | *         | W>M       | W>M               | *                                                  | W> due to anguish; M> due to elation and dejection | *                                                           |
| Williams, 1982        | 70 M<br>70 W              | Questionnaire/<br>last year                     | *         | W>M       | *                 | W>M No sex differences in antecedents <sup>3</sup> | *                                                  | *                                                           |
| Frey et al., 1983     | 45 M<br>286 W             | Record keeping<br>for 30 days                   | W>M       | W>M       | No sex difference | *                                                  | Data only presented for women                      | More improvement for M than W                               |
| Lombardo et al., 1983 | 285 M<br>307 W            | Questionnaire/<br>no specific period            | W>M       | W>M       | *                 | W>M No sex difference in antecedents               | *                                                  | W stronger feelings than M. No sex difference in importance |
| Ross & Mirowsky, 1984 | 680 husbands<br>680 wives | Questionnaire/<br>last week                     | W>M       | *         | *                 | *                                                  | *                                                  | *                                                           |

|                         |                                                                      |                                                |                                         |                                                  |     |                                                                                                                                               |                          |                                                            |
|-------------------------|----------------------------------------------------------------------|------------------------------------------------|-----------------------------------------|--------------------------------------------------|-----|-----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|------------------------------------------------------------|
| Hastrup et al., 1986    | 77 husbands (young)<br>145 wives (young)<br>20 M (old)<br>44 W (old) | Questionnaire/<br>last year                    | W>M, not significant in oldest subjects | *                                                | *   | *                                                                                                                                             | No exact data reported.  | *                                                          |
| Kraemer & Hastrup, 1986 | 23 M<br>33 W                                                         | Questionnaire and record keeping for 9 weeks   | W>M                                     | *                                                | *   | *                                                                                                                                             | No sex differences found | *                                                          |
| Choti et al., 1987      | 58 M<br>56 W                                                         | Questionnaire after watching films             | W>M                                     | *                                                | *   | *                                                                                                                                             | *                        | *                                                          |
| Delp & Sackeim, 1987    | 37 M<br>43 W                                                         | Observation: measuring wetting of filter paper | *                                       | M and W different reactions to mood manipulation | *   | *                                                                                                                                             | *                        | *                                                          |
| Labott & Martin, 1987   | 161 M<br>219 W                                                       | Questionnaire/<br>last year                    | W>M <sup>4</sup>                        |                                                  |     |                                                                                                                                               |                          |                                                            |
| Williams & Morris, 1996 | 224 M<br>224 W<br>2 countries                                        | Questionnaire/<br>one year in general          | W>M                                     | W>M                                              | W>M | W>M<br>Differences smallest for "death of a close person"; and for positive emotions<br>W>M in general <sup>3</sup><br>No data on antecedents | *                        | *                                                          |
| De Fruyt, 1997          | 25 M<br>79 W                                                         | Questionnaire/<br>no specific period           | *                                       | *                                                | *   |                                                                                                                                               | No data reported         | No sex differences for neg. and pos. emotions after crying |

Table 7.1. (cont.)

| Article                                | N (men and women)                       | Method/period covered                | Frequency | Intensity | Duration | Proneness <sup>1</sup>                              | Reasons for actual crying <sup>2</sup>                            | Effects on mood                                            |
|----------------------------------------|-----------------------------------------|--------------------------------------|-----------|-----------|----------|-----------------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------|
| Wagner et al., 1997                    | 83 M<br>169 W<br>(health professionals) | Questionnaire/<br>no specific period | W>M       | *         | *        | *                                                   | *                                                                 | *                                                          |
| Vingerhoets & Becht, 1996 <sup>5</sup> | 1687 M<br>2280 W<br>(30 countries)      | Questionnaire/<br>last four weeks    | W>M       | W>M       | W>M      | W>M. Sex differences smallest for positive emotions | W more due to conflict;<br>M more due to loss and positive events | Improvement of mood for both sexes; effect larger in women |

Note:

\*. Aspect of crying not investigated

<sup>1</sup> The label “proneness” refers to the extent to which different situations or emotions may elicit crying. Subjects were asked to indicate how likely it was that they would cry in certain situations.

<sup>2</sup> Subjects were asked to describe the precipitating factors of the crying episode that had occurred on a recent occasion and that was still vivid in their memories.

<sup>3</sup> Proneness to cry was erroneously called “weeping frequency” in this study.

<sup>4</sup> The number of different situations in which subjects had sometimes cried was considered as a measure of crying frequency in this study.

<sup>5</sup> Preliminary data of this large cross-cultural study were first presented at “The international conference on the (non)expression of emotions in health and disease,” which was held at Tilburg University (The Netherlands, August 1996). The data have not yet been published.

more intense crying than do men. Whether women also cry for longer periods needs further exploration. To give an indication of how large the sex difference in crying frequency really is, we would like to refer to Frey et al. (1983). To date only they have collected data of men (45) and women (286), who kept records of both irritant and emotional crying during a 30 day period. Leaving out those who gave evidence of any psychiatric illness, their results showed a mean crying frequency of  $5.3 \pm 0.3$  episodes per month for normal women and of  $1.4 \pm 0.4$  episodes per month for normal men (the modes were 3 and 0 respectively).

Some investigators (e.g., Bindra, 1972; Vingerhoets & Becht, 1996, see table 7.1) provided evidence on the reasons why men and women cry. It appeared that men cry relatively more often in positively appraised situations and in loss situations, whereas women cry more frequently in conflict situations. In addition, Buss (1992) showed that women tend to use crying more frequently as a way to manipulate others than do men.

### Explaining gender differences in crying

The assumption of a close association between crying and coping potential is crucial for the present purpose, because there is a large body of evidence on sex differences in coping that may be helpful to gain a better understanding of sex differences in crying. Although there are notable exceptions, the general picture that emerges is that women are more inclined to emotion-focused coping and seeking emotional support in comparison with men, who instead favor problem-focused coping strategies (Ptacek, Smith, & Dodge, 1994; Vingerhoets & Van Heck, 1990). Women also feel helpless and powerless more often, not in the least when angry (Crawford, Kippax, Onyx, Gault, & Benton, 1992). Crying thus seems to fulfil the coping functions that women generally apply and attach much value to. Of further interest is the methodology used to establish whether men and women indeed differ in the type of coping strategies they use. According to Lazarus' (1991) stress model, the nature of coping at least partly depends on the nature of the stressor and the way the stressor is appraised. Therefore, it is important to know more about differences in the kind of stressors men and women are confronted with, as well as about the way they perceive stressors.

Ptacek, Smith, and Zanas (1992) mention two hypotheses that have guided research on sex differences in coping: the *socialization* hypothesis and the *structural* hypothesis. The socialization hypothesis states that boys and girls are socialized to deal with stressful events in different ways. Because of gender role expectations, boys learn to deal with stressors in an instrumental way, whereas girls are encouraged to express

their emotions and to seek social support. The structural hypothesis, in contrast, holds that sex differences in coping can be attributed to differences in the type of stressful situations that men and women typically encounter. Although at first glance it might be reasonable to apply both the socialization and the structural hypotheses to crying (e.g., Blier & Blier-Wilson, 1989; Brody, 1985), we have serious doubts concerning the implied distinction between the two hypotheses, because it fails to recognize that men and women also may "learn" to seek and to avoid certain situations, as may be evidenced, among other things, by differences in career choice. Since we further believe that there are good reasons to evaluate the possible *biological basis* of sex differences in crying, we will limit the discussion of possible explanations of these differences to the socialization hypothesis and biological aspects. It is interesting to note that biological factors are also considered to be potentially relevant to explain sex differences in depression (Halbreich & Lumley, 1993; Harris, Surtees, & Bancroft, 1991; Nolen-Hoeksema & Girgus, 1994). In our view, the intrinsic links between depressive mood and psychological states related to crying such as sadness, helplessness, and despair, justify the attention for factors relevant for the development of depression.

Sex differences in crying might also be explained from an evolutionary point of view. It could be speculated that the main tasks of our male ancestors were hunting and the defense of their tribe. Showing weakness under such circumstances may have been dangerous, not only for themselves, but also for the women, who may have felt unprotected and insecure.

#### *Preliminary model of adult crying*

In an attempt to obtain more insight into the precise nature of the sex differences in crying, we base ourselves on a preliminary model of adult crying (see figure 7.1) that was derived from emotion and stress models.

The model distinguishes between (1) objective situations; (2) (re-)appraisal, resulting in a subjective internal representation of the situations, such as loss, personal inadequacy, conflict, etc.; (3) an emotional response. Together with (4) moderating variables (both personal and situational factors), these exposure and appraisal variables determine whether or not a crying response will occur. By analogy with the previously described structural hypothesis, we assume that differences in crying behavior between men and women may – at least partly – result from differences in each of these components of the model. To make this clear, we will briefly review the literature with respect to sex differences for each of these components.

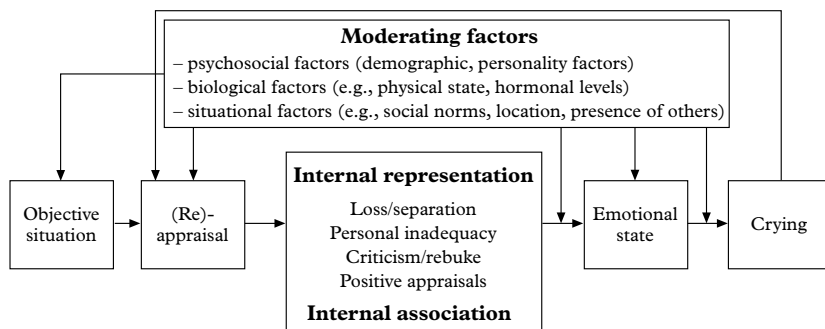


Figure 7.1 Preliminary model of adult crying  
Based on Vingerhoets et al. (1997). *The (non)expression of emotions in health and disease* (p. 334). Tilburg University Press.

### *Gender differences in exposure to objective situations*

Several studies have focused on the issue of whether men and women differ in the quality or quantity of stressful conditions they encounter. These studies, however, have yielded inconsistent results, which may partly be explained by the specific nature of the stressors under investigation. For example, there is evidence that women (and girls) face more negative events like sexual abuse which may have dramatic long-term effects. They may also meet other parental and peer expectations than men and boys (Cutler & Nolen-Hoeksema, 1991; Nolen-Hoeksema, 1994). In addition, it has been shown that women – due to their higher empathic capabilities and their greater emotional involvement in the lives of their intimates (Eisenberg & Lennon, 1983; Kessler & McLeod, 1984; Turner & Avison, 1989) – are more sensitive to events occurring to others. Women further report more stressors related to health and the family, whereas men experience more job-related stressors and miscellaneous problems (Porter & Stone, 1995). Recent not-yet-published data from our own group revealed that women more than men reported to have been exposed to situations and feelings that were identified as very likely to induce crying.

There is thus at least some evidence that women experience different stressors than do men. Crucial, however, is whether this also holds for events that elicit crying. It seems reasonable to assume that events like the death of intimates are experienced by men and women with a similar frequency. However, one might argue that women's stronger empathic skills and their more intimate relationships with other women, make women also more liable to cry for events occurring to their intimates or even to people more distant from them. In addition, there is some evidence suggesting that women may be more prone – and

even enjoy – to watch sad television programs and films and read books with high emotional contents (cf. Tellegen, unpublished data; Van der Bolt & Tellegen, 1995–1996). Frey (1985) indicated that the media are an important trigger of shedding tears. Table 7.1 (see “Reasons for actual crying”) reveals that only few studies to date reported data on this topic. Men and women may thus differ both in the type of situations that they are passively exposed to, as well as in the type of situations that they deliberately seek or avoid. Additional research is needed to establish this difference more definitely.

### *Gender differences in appraisal*

Gillespie and Eisler (1992) have identified stressors related to gender role, which are perceived as more stressful by women than by men. These include fear of unemotional relationships, fear of being unattractive, fear of victimization, fear of behaving assertively, and fear of not being nurturant. In addition, Eisler and Skidmore (1987) devised an inventory of masculine gender role stressors. They found that men perceived physical inadequacy, emotional expressiveness, subordination to women, intellectual inferiority, and performance failure as more threatening than women.

Fischer, Manstead, and Scheepers (in preparation) used vignettes in order to study sex differences in appraisal and crying. They found that powerlessness and a negative self-image were more important for female participants than for men. Applying multiple regression analysis with crying as the dependent variable and appraised powerlessness and social norms as predictors revealed that for women powerlessness was the single main predictor, whereas for men powerlessness and social norms were significant predictors.

There is further evidence that women generally appraise stressful life events as having greater impact on their lives and that women need more time to recover compared to men (Jorgensen & Johnson, 1990). Similar results were obtained in a study on the appraisal of the conflict environment in Northern Ireland by 8 to 11 years old boys and girls (Muldoon & Trew, 1995). On the other hand, there are also indications that in the case of severe events such as the loss of one's spouse, no sex differences in appraisal emerge (e.g., Gass, 1988).

### *Gender differences in emotional response*

Differences in appraisal may not only affect the emotional response to the event, but also the psychophysiological reaction. For example, Lash, Eisler, and Southard (1995) presented some evidence that cardiovascu-

lar responses to the cold pressor test depend on the appraised gender relevance of the stressor. The manipulation of gender relevance was achieved by varying the instructions, suggesting a relationship between the ability to keep one's hands in the ice-water and maternal and social bonding in the "female" version, whereas in the "male" version an association with testosterone was suggested, which is important in physical coping and good performance. The results partly supported the predictions that men showed higher reactivity when having received the "male" version of the instruction, whereas female participants responded more strongly in the "female" condition. Needless to say that, also in this case, the possible different appraisal of specific crying-inducing events is most crucial. Unfortunately, we do not know of any studies addressing this issue directly.

A final and important question refers to the quality and/or intensity of emotional responses, in particular when identical stressors have been appraised similarly by both sexes. Women have been found to be more prone than men to react to stressful events with helplessness and depression (Nolen-Hoeksema & Girgus, 1994), just as there is empirical support for women preferring emotion-focused coping strategies (e.g., Ptacek, Smith, & Dodge, 1994; Vingerhoets & Van Heck, 1990). However, there is little empirical evidence that men and women differ in coping when stressor and appraisal do not differ. An exception is the study by Ptacek et al. (1994), who examined the appraisal and (preparatory) coping reactions in relation to a laboratory lecturing task. These investigators demonstrated that women reported seeking social support and using emotion-focused coping to a greater extent than men in a similar situation, which had also been appraised identically by both sexes. The authors interpreted these results as consistent with the notion that men and women are socialized to cope with stressors in different ways. It is not clear, however, to what extent the results of this single study with a specific laboratory stressor, which has doubtful ecological validity, can be generalized and extrapolated to real life stressors.

### *Moderating factors*

In the model presented in figure 7.1, both person and environmental influences are included as moderating factors. Examples of person factors are psychological and biological trait and state variables, including sex, personality, physical states (fatigue, sleeplessness, phase of the menstrual cycle, pregnancy) and psychological (depressed mood) states. Environmental factors that may act as moderators are parenting style, the sociocultural context, the specific setting, and the presence of others. It is important to note that the different (personal and

environmental) factors that may act as moderators may affect different components of the model and, in addition, may exert additive as well as interactive effects.

Personality may be important because it may at least partially determine what kind of situations one seeks or avoids, it may affect appraisal and coping processes, as well as be closely associated with the tendency to express emotions. One thus may wonder whether sex differences in crying are maintained after having controlled for differences in relevant personality attributes like empathy, depression, neuroticism, emotional expressiveness, and disclosure proneness. Vingerhoets, Van den Berg, Kortekaas, Van Heck, and Croon (1993) observed that men with high self-esteem cry more frequently or at least are more willing to admit in questionnaires that they shed tears, as compared to male individuals low in self-esteem. Unfortunately, to date we do not have any insight into how much of the variance in sex differences in crying may be attributed to differences in personality between the sexes.

As far as environmental factors are concerned, Ross and Mirowsky (1984) found evidence suggesting that the behavioral expression of emotions, in particular crying, is socially conditioned. They emphasized the importance of the relation between adherence to traditional role patterns and crying behavior in men. Men in more traditional roles cried less frequently than those who defined their gender role more flexibly. The willingness to cry when feeling sad was high in women, intermediate in non-traditional men, and low in traditional men. There is further evidence suggesting that women feel more confident in expressing emotions including crying (cf. Fischer, 1993). Since educational level, socioeconomic status and role patterns are closely related, one may expect that higher educated males generally cry more often. Interesting in this respect are the comments by Kottler (1996) stating that a reverse development can be seen in women in higher functions, who reportedly are less prone to cry than women in general.

Another important environmental factor may be that more women than men spend their time at home, where there are less stringent forces, such as the presence of strangers, that inhibit crying. There is evidence that people cry most often at home (e.g., Vingerhoets et al., 1997) and it has been speculated that crying in the work situation is generally not tolerated, particularly not for women (Cornelius, 1986; Kottler, 1996; Plas & Hoover-Dempsey, 1988). Kottler (1996) suggested that it is the professional context and not one's sex that determines whether or not an individual cries. He argued that therapists and nurses frequently cry, whereas doctors rarely cry. There is some empirical support for this suggestion (e.g., Wagner et al., 1997). It should be kept in mind, however, that sex itself may be a confounding factor in this case, since

most nurses are female and the majority of the responding doctors were males.

Finally, it appears that the sex of an occasional accompanying subject may also be a relevant environmental factor. Choti et al. (1987) observed that both men and women cry more easily when in male company. This finding suggests that in a heterosexual relationship, crying is more likely and acceptable for the wife than for her male partner.

In conclusion, we do not pretend that we have exhaustively discussed all possible moderating factors that may help to explain sex differences in crying. The major problem is the simple lack of data that prevents any more definitive statements.

### **Biological factors in crying**

#### *Genetic basis of crying behavior*

To date, little is known about the role of genetics in crying proneness and actual crying behavior. Frey (1985) concluded in an exploratory study with monozygotic and dizygotic twins that there was no genetic basis underlying crying. However, Lensvelt and Vingerhoets (unpublished data) distinguished in a similar study with 35 monozygotic and 30 dizygotic female twins, between crying frequency and crying proneness which yielded discrepant findings. Actual crying frequency appeared to be environmentally determined to a large extent, whereas crying tendency appeared to be more genetically based.

Interestingly, Flint, Corley, DeFried, Fulker, Gray, Miller, and Collins (1995) have provided evidence in support of a genetic basis for emotionality in mice, which is often used as a model for anxiety and neuroticism in humans. Boomsma and Slagboom (1997) argue that Flint et al.'s results suggest that an important part of the variance in human emotionality may be explained by genetic factors.

Thus, it seems reasonable to assume that some aspects of crying tendency have a genetic basis. The question of whether this can also explain sex differences in crying remains to be examined, however. In this respect it would be of interest to know whether male and female newborns already differ in their crying behavior, because this may increase our understanding of the development and backgrounds of adult crying.

#### *Sex differences in newborns*

It can be assumed that cultural influences are not yet at work and that sex differences in personality do not yet exist in newborns and very young children. Therefore, it seems justified to attribute inter-individual and sex

differences in crying behavior at this age to genetic or biological factors. However, when significant sex differences are found in very young children, this should not be taken as evidence that environmental factors can be excluded. There is always the possibility of a third, contaminating variable affecting the "true" relationship between sex and crying. For example, there is some evidence that circumcision affects several behaviors including crying of new-born males (Feldman, Brody, & Miller, 1980; Philips, King, & Dubois, 1978) and that mothers might interact differently with babies, depending on their sex (Philips et al., 1978).

Most important is the finding that sex differences do not exist in newborns or in children up to two years old. There is even some support for the reversed pattern, namely that boys of this age cry more frequently than girls. Examples of studies failing to show sex differences in crying among babies are those by Feldman, Brody, and Miller (1980) and St. James-Roberts and Halil (1991). In contrast, studies by Moss (1967), Philips et al. (1978), and Kohnstamm (1989) suggest that boys cry more often than girls. However, due to the fact that small sample studies generally have low statistical power, the failure to find a difference in a particular study does not necessarily imply that this difference does not exist on the population level.

Taken together, the evidence leads us to conclude that there are no or only very small sex differences in the amount of crying that is displayed by young infants (St. James-Roberts, 1993). Moreover, the expression of emotions in general does not differ for boys and girls who are a few months old (Cossette et al., 1996).

Unfortunately, the study of emotional expressions including crying has largely been confined to very young children and adults. We are not aware of any published studies that have addressed crying behavior in school children or adolescents. According to Löfgren (1966), the sex difference observed in babies, namely boys crying more than girls, reverses at a certain age between nursery school and college time. Frey (1985) refers to an unpublished study by Hastrup showing that sex differences in the frequency of crying emerge at about age thirteen. To get a clearer picture of the development of sex differences in crying, additional data on child and adolescent crying are strongly needed. A further issue is whether young children's crying is qualitatively and functionally equivalent to the crying of older subjects: newborns and young infants cry a lot and for varying reasons. These reasons might only partly coincide with the reasons for crying in older children and adults (Lester, 1985). Often, it is impossible to observe or reasonably infer the cause of a young child's crying. Moreover, crying frequency data obtained from only two age categories will not suffice. In order to draw any valid conclusions, there is a need of life span data.

Based on the above arguments, it may be concluded that the sex difference in crying frequency that can be observed in adults is not present at birth. The difference seems to unfold from the child's schoolyears onwards. It is appealing to take this as evidence of the role of social factors in the development of crying. Such an argument would fit the common belief that when boys grow up they learn to withhold their tears, even when they are sad, because of the negative evaluation that has traditionally been associated with men who cry, at least in Western society (Lombardo et al., 1983). However, as we will demonstrate next, the possibility that biological factors also play an important role may not be excluded.

*Hormonal factors as possible determinants of crying behavior*

Frey (1985) has put forth the hypothesis that the hormone prolactin, released by the pituitary, lowers the threshold for crying. This is an interesting speculation because men and women differ in plasma prolactin levels during fertile years. Frey points to three observations which have led him to formulate his hypothesis. First, sex differences in crying frequency become manifest during puberty (see above), when prolactin levels in girls are rising. Second, an illustrative case of a woman suffering from excessive crying spells showed a significant decrease in her crying after prolactin levels had been reduced pharmacologically. Third, marine ducks show an increase in the secretory activity of the salt glands, which are similar in location and innervation to the human lacrimal gland, after prolactin had been administered. We can further add the arguments that prolactin increases during pregnancy and especially just after labour, when the mother breast feeds her baby. It is tempting to speculate about a relationship with well-known post-partum phenomena like the maternity blues (cf. Beck, 1991). This is a transitory phenomenon of mood changes starting in the first days after delivery through approximately the first 10 post-partum days. Not only depression, anxiety, irritability, and lability of mood, but especially tearfulness are most characteristic symptoms. Finally, Theorell (1992) has argued that prolactin is the hormone that mirrors passivity and inability to cope, the psychological state particularly characteristic of crying.

On the basis of Frey's theory, we might expect that women are more prone to cry during pregnancy. In order to test this hypothesis, we<sup>2</sup> examined the responses of a sample of 396 primiparous pregnant women and 275 age-matched "normal" controls on two crying-related items ("Lump in throat" and "Prone to cry") from the Dutch version of the Hopkins Symptom Checklist (HSCL; Derogatis, Lipman, Rickets,

Uhlenhuth, & Covi, 1974; Dutch version by Luteijn, Hamel, Bouman, & Kok, 1984). It appeared that the pregnant women indeed reported a higher crying propensity. The pregnant women had completed the questionnaires three times during their pregnancy (weeks 12–13, 24–25, and 35–36), but there were no significant changes during the course of pregnancy. Lutgens (1998) provided preliminary evidence suggesting that crying proneness in pregnant women shows a U-shape over trimesters, with the second trimester as the most emotionally stable phase of pregnancy. Since prolactin levels show an almost linear increase from the first weeks of pregnancy until delivery, this pattern clearly does not parallel crying proneness data. A further observation by Lutgens disfavoring the prolactin hypothesis was that there was a strong effect of parity on post-partum tears. First-time mothers reported much more crying during the first month post-partum than multiparous women. Although we are aware of the fact that these data are far from conclusive due to the retrospective character of the studies, the unclear relation between crying proneness and actual crying and to the neglect of the role of other important psychosocial factors (cf. Paarlberg, Vingerhoets, Passchier, Heinen, Dekker, & Van Geijn, 1996), the data nevertheless fail to support the prolactin hypothesis. On the other hand, one should realize that the relationship between biological processes and behavior or mood seldom can be represented by simple linear functions. More evidence for the role of prolactin may be obtained by comparing crying behavior in breastfeeding and bottlefeeding mothers and, most directly, by comparing prolactin levels of frequent criers and individuals who have a high crying threshold.

Another speculation is that crying proneness varies as a function of phase of the menstrual cycle. A link with the premenstrual syndrome seems obvious, although one should be aware that it may make a big difference whether women actually cry or whether they feel like crying or feel they are more inclined to do so. To date, there are only few data available. Moos (1968) asked 839 women to rate 47 symptoms associated with their most recent and their worst menstrual cycles. Crying was one of the negative symptoms, like depression, tension, irritability, and mood swings. Crying was 5 times increased during the premenstrual period and 4 times during menstruation, as compared to the intermenstrual period. From additional comments made by the subjects, it appeared that some women indeed showed very low thresholds for shedding tears, as evidenced by the reports of crying without any obvious reasons, and without feeling depressed or sad.

Horsten, Becht and Vingerhoets (1997) collected retrospective data on the relation between crying and the menstrual cycle. Their data first of all revealed impressive cross-cultural differences in percentages of

women (mainly arts or social sciences students) reporting an association between crying proneness and menses. Of the total sample of 2,018 participants, 44.9% answered positively to the question "Is your crying tendency dependent on the phase of your menstrual cycle?" However, the percentages ranged from as low as 15.4% and 18.9% in countries like China and Ghana, to as high as 69.2% and 68.9% in Australia and Turkey. In other words, in some countries stronger associations were reported than in other countries. To what extent these cross-cultural differences are indicative of a minimal role of biological factors is not clear. The finding of a remarkable correspondence in the data from contraceptive pill-users in comparison with no-pill-users further challenges the role of biological factors. The data revealed a significant increase in self-reported crying proneness from the seventh day before menstruation until the second day of the periods. In addition, some slight elevations were found on the first day after menstruation and around ovulation. This study, however, has two major weaknesses. First, a retrospective design has been used. Second, as mentioned earlier, the question is whether it is justified to equate self-reported crying proneness with actual crying behavior.

As far as we know, two studies have collected data on actual crying behavior, applying a crying diary in a concurrent design. The first one was conducted by Frey and co-workers (cited in Frey [1985] and in Frey, Ahern, Gunderson, & Tuason [1986]). These investigators examined the number and length of the crying episodes of 85 normal female subjects, who were not using anticonceptives nor any other hormone medication. Unfortunately, further information concerning the sample (such as age, marital, and socio-economic status) was not provided. Per cyclus, three consistent peaks of 3 to 4 days of increased crying were observed. The first one occurred 6–4 days *before* the menstrual period, the second 3–5 days *after* the onset of the period, and a third on 13–16 days *after* the onset of menses (around ovulation). Remarkably, the three days immediately preceding the menstrual cycle were quite low with regard to self-reported crying frequency. Frey further noted that the three "crying" peaks did not correspond with the changes in levels of female sex hormones, such as progesterone or estrogen.

In an attempt to replicate these findings, we<sup>3</sup> conducted a pilot-study in which we asked women to complete a crying diary, very similar to the one applied by Frey and co-workers. Data were collected from 21 contraceptive pill-users and 21 no-pill-users. Although the samples differed too much in terms of age, education and marital status to draw definite conclusions concerning the role of oral anticonceptives in mood change, two interesting observations could be made. First, the pill-users failed to report differences in crying frequency during the different

phases of the menstruation, thereby challenging the retrospective data of Horsten et al. (1997). Second, in the no-pill users group, most frequent crying was not reported preceding the onset of the menstruation, but rather during its first days. These data thus do neither correspond strongly with Frey's observations nor with Horsten et al.'s findings. In conclusion, there is a remarkable lack of correspondence in findings of these three studies. An indepth analysis of the causes that induce crying during menstruation versus before and after may be helpful to establish to what extent psychological or social factors, for example not being available for sex, rather than biological factors may be part of the story to explain possible differences in crying behavior during the periods.

To summarize, Frey (1985) advanced an interesting hypothesis arguing that prolactin may lower the threshold to shed tears. Some data have indirectly supported this hypothesis, but other observations seem to contradict it. Thus, conclusions are still speculative, until there is more evidence based on actual measurements of plasma prolactin combined with an adequate and valid assessment of crying. There is further evidence that women do not cry more frequently during the days preceding their menses, thus refuting a relationship between crying and pre-menstrual tension.

In conclusion, we strongly believe that research on the possible biological determinants of crying, in particular the "prolactin hypothesis," deserves further attention in order to gain a better understanding of the possible biological causes of sex differences in crying.

## **Conclusion**

We have shown that there is substantial evidence that adult women are more prone to cry and also actually cry more frequently than men. Without doubt, socialization plays an important role. This socialization process may not be limited to teaching boys to withhold their tears and encouraging girls to let them flow, but may also be related to differential exposure to crying-inducing situations and dissimilar appraisal processes. No clear differences have been reported in crying frequency between newborn girls and boys. At what age or in what developmental phase these gender differences become manifest has not yet been established. More insight into developmental trends can be expected to contribute significantly to a better understanding of the underlying mechanisms explaining sex differences in crying. We strongly feel that in addition to socialization and differential exposure to crying-inducing situations, biological factors should be considered. Although the prolactin hypothesis has received little support in the above-mentioned studies, it should be realized that to date there have been no studies in

which prolactin was measured directly. In future studies, other biological factors (e.g., sex hormones, differences in brain functioning and biochemistry) should also be seriously considered when investigating sex differences in crying and tearfulness.

### Author note

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### Notes

1. Although we are aware that some authors make a distinction between these two terms we will use them as synonyms in the present chapter.
2. The authors would like to thank Marieke Paarlberg for her willingness to provide us with the data of the pregnant women and Nienke Bosma, Marieke Brouwer, Evan van Essen, Nadine Lommers, Aafke Seebregts, and Shiela Vermaas for their help in further data collection and analysis.
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