

WHEN IS CRYING CATHARTIC? AN INTERNATIONAL STUDY

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The idea that crying is a cathartic experience, leading to relief from distress, has deep roots. However, empirical evidence for catharsis after crying is mixed. One explanation for the inconsistent results is that variations in the social context of the crying situation determine whether or not crying-related catharsis occurs. To evaluate the role of social context and other contextual features in crying-related catharsis, self-report data were collected on characteristics of the most recent crying episode and its effects on mood in 2,181 male and 2,915 female students in 35 countries. It was hypothesized that the experience of catharsis after crying would be associated with social support during crying, reasons for crying, and characteristics of the situation where the crying occurred. Several contextual features of crying episodes were indeed predictive of crying-related catharsis. Specifically, the receipt of social support, experiencing a resolution to the event that caused the crying episode, and achieving a new understanding of the event were positively related to catharsis. Crying episodes that featured the suppression of crying or the experiencing of shame from crying were less likely to be cathartic. The data suggest that contextual factors may play an important role in shaping crying-related catharsis.

Catharsis is generally defined as the purging of emotions or relieving of emotional tensions. The idea of emotional catharsis dates

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back to the ancient Greeks and Romans over 2000 years ago, as exemplified by a quote from the famous Roman poet Ovid: "It is a relief to weep; grief is satisfied and carried off by tears" (c.f., Frey, 1985). The Greek philosopher Aristotle (384-322 B.C.) wrote that crying "cleanses the mind" of suppressed emotions through a process of catharsis in which distress is reduced through the release of emotions, which could also be accomplished through the use of theater and drama (see Lutz, 1999). The idea of emotional catharsis was made popular in more recent times by Freud (see Breuer & Freud, 1895/1968) who considered tears as "involuntary reflexes" that discharge affect so that a "large part of the affect disappears." Freud also recommended expressing emotions in various forms in order to experience relief, and therapeutic case studies have demonstrated the cathartic effect of crying and other forms of emotional expression in the context of psychotherapy (Labott, 2001). The idea that crying is a specific form of cathartic behavior is widely asserted in contemporary culture. For example, Cornelius (1986) found that 94% of popular articles in the United States that referred to crying recommended letting tears flow to release psychological tension, implying their cathartic effect.

THEORIES OF CATHARTIC CRYING

The idea that crying is cathartic has also been widespread in scientific literature. In fact, several complementary and related theories of cathartic crying have been put forward, including psychological, psychodynamic/psychoanalytic, social, and physiological perspectives (e.g., Kottler & Montgomery, 2001). One view of cathartic crying that has been made popular by psychodynamic theory asserts that crying acts as a way of releasing pressure or tension and allowing blocked negative emotions to be released and relieved (e.g., Breuer & Freud, 1895/1968, Sadoff, 1966, Heilbrunn, 1955). Darwin (1872/1965) also saw crying as serving to bring relief, though he saw this as an incidental result of crying rather than its primary function. Others theorists see crying as a method of releasing or discharging tension that may be built up by feelings inhibited from expression or by emotions that cannot be expressed effectively in situations where an individual cannot properly cope or deal with behaviorally (e.g., Miceli & Castelfranchi, 2003; Bindra, 1972). Scheff (1977, 1979)

argues that catharsis may explain the paradox that people often enjoy the experience of negative emotions (e.g., watching sad movies, and riding roller coasters). According to this view, seeking exposure to such emotional stimulation can be seen as an attempt to relive, and therefore resolve, earlier unresolved painful experiences. Scheff further suggests that the cathartic effect is dependent on the extent to which the individual feels secure and safe while re-experiencing the emotional event. Along these lines, cathartic crying is seen as occurring when an unresolved emotional distress is reawakened in a properly distanced context, in which there is an appropriate balance of distress and security.

POSSIBLE MECHANISMS FOR CRYING-RELATED CATHARSIS

Several theorists have sought to explain the proximal mechanisms for crying-related catharsis, often in physical terms. For example, Frey, Hoffman-Ahern, Johnson, Lykken and Tuason (1983) explain cathartic crying as serving to release stress-related biochemical toxins. Physiological research has shown that crying usually occurs sometimes after the peak of an emotional experience in the recovery phase following arousal, after the body is already returning to homeostasis (e.g., Efran & Spangler, 1979; Gross, Fredrickson, & Levenson, 1994), though it is not clear whether crying is a means or merely a sign of reduced tension and negative affect. Finally, some evidence suggests the existence of autonomic mechanisms that may subserve cathartic functions of crying: Specifically, crying has been found to be accompanied by increases in respiratory sinus arrhythmia (RSA), an index of the vagal control of the heart rate that is associated with emotion regulatory capacity (Hendriks, Rottenberg, & Vingerhoets, 2007; Rottenberg, Wilhelm, Gross, & Gotlib, 2003).

Importantly, some theories postulate cathartic effects of crying that operate via social mechanisms: crying benefits the crier via the empathy, sympathy, pity and/or comfort that this behavior elicits from others (e.g., Borquist, 1906; Cornelius, 1997; Mélinand, 1902). Similarly, other theorists emphasize the communicative aspects of crying, considering crying as serving to facilitate attachment and strengthen social bonds by eliciting caregiving and empathetic behaviors in others (e.g., Kottler, 1996; Nelson, 1998; Hendriks, Nelson, Cornelius, & Vingerhoets, 2008). Crying has also been shown to

be useful in inhibiting aggressive responses (Roes, 1990). In sum, it may be that the cathartic effect of crying is supported by the receipt of positive social support from others during a crying episode or by its ability to suppress others' hostile behaviors (cf., Cornelius, 1997, 2001).

MIXED EMPIRICAL SUPPORT FOR CRYING-RELATED CATHARSIS

Despite the popular idea that crying produces physical and mental benefits and the multiple theories developed to account for the cathartic effects of crying, empirical examinations of the effects of crying have actually yielded a mixed (and potentially confusing) set of results. We turn now to a brief exposition of this mixed empirical record. Specifically, naturalistic studies, such as survey and diary research, generally find that people believe that they experience catharsis after crying (e.g., Bindra, 1972; Frey et al., 1983); whereas results from laboratory research have consistently failed to show cathartic effects of crying (see Cornelius, 1997; Stougie, Vingerhoets, & Cornelius, 2004).

NATURALISTIC STUDIES

Naturalistic and diary studies have consistently shown that crying is experienced as cathartic. For example, Bindra (1972) found through surveying university students that the intensity of the emotional state seems to dissipate after crying and people reported feeling better after crying. Similarly, Frey et al. (1983) conducted a diary study of a large sample of adults over 30 days. The majority of both women and men reported a decrease in negative affect as a result of crying. However, interestingly, a survey study by Kraemer and Hastrup (1986) of crying behavior in college students found that crying was as likely to be associated with a reduction in depression as when reporting feeling like crying but not producing tears, which would suggest that the actual production of tears may not be critical.

LABORATORY STUDIES

By contrast, laboratory experimental studies have consistently failed to show a cathartic effect of crying. In fact, in these contexts, crying has often been associated with increased reported distress and arousal (Cornelius, 1997, 2001). For example, several studies using film-induced emotional crying found no evidence that crying facilitated the reduction of subsequent depressed mood, instead finding that criers were actually more vulnerable to mood disturbance (e.g., Martin & Labott, 1991; Labott & Martin, 1987) and reported feeling more negative affect, while exhibiting increased physiological arousal relative to non-criers (Gross et al., 1994). Similarly, no cathartic effect of crying was observed as a function of instructing participants to cry versus withholding their tears during the viewing of sad material (Kraemer & Hastrup, 1988) although the inhibition of tears has also been reported as being associated with increased sympathetic arousal (Labott & Teleha, 1996).

POSSIBLE EXPLANATIONS FOR THE INCONSISTENT FINDINGS IN THE LITERATURE

There are a number of plausible explanations for the mixed state of the empirical literature on crying and catharsis. One possibility is that different aspects of the crying situation are represented across different studies and these situational variations, in turn, are critical in shaping whether or not catharsis occurs (see Cornelius, 1997). For example, participants in laboratory studies cry in response to a standardized sad film, whereas participants in naturalistic studies cry in response to an unpredictable set of idiographic events. Thus, it is possible that variation in antecedents of the crying episode may shape the experience of catharsis after crying. To the extent that crying is a social signal that elicits support from others or to manipulate the situation (e.g., Kottler, 1996; Hendriks et al., 2008), receiving social support from others may be critical to experiencing catharsis, and this form of social support would not generally be as available in laboratory settings as it is in naturalistic settings, again suggesting why cathartic effects are rarely observed in laboratory contexts. Furthermore, theorists have described crying as likely en-

couraging change or resolution of issues that triggered the crying episode (Cornelius, 2001) and that crying may help an individual to understand his or her feelings (Miceli & Castelfranchi, 2003). Because film-induced crying may not promote further resolution of a personally relevant issue or lead to further understanding of one's feelings, this may also contribute to why laboratory studies less likely find a cathartic effect of crying. Finally, theorists have described possible negative effects of crying, specifically when crying might be associated with increases in feelings of perceived helplessness, embarrassment and/or loss of self-esteem (Miceli & Castelfranchi, 2003). Negative effects may also occur in situations where crying is suppressed (Gross, 1989). These ideas may also be relevant to laboratory contexts in which individuals may feel embarrassed about crying in a laboratory over a sad film while on camera or while being observed by an experimenter, and they may try to suppress their crying to avoid embarrassment. Finally, the timing of the crying and the mood change measurements may also be critical. Laboratory studies generally measure mood immediately following the negative stimulus. It has been proposed (Cornelius, 2001; Gross et al., 1994) that catharsis may not occur until some time later, which again may help to explain why laboratory researchers have found so little evidence of cathartic mood change (see also Sloan & Marx, 2004a, 2004b for parallels in the delayed timing of benefits for written disclosure).

For a literature that has focused on the question, "Is crying cathartic?" these mixed results pose a problem. However, the mixed nature of findings in this area suggests the value of focusing on a different question, namely, "When is crying cathartic?" In our previous reports, we have examined the role of cultural and country differences in crying behavior and the experience of mood improvement after crying. For example, mood improvement after crying appears to be more common in wealthier, more feminine countries and countries where the average crying frequency was relatively high and feelings of shame about crying relatively low (Becht & Vingerhoets, 2002). Furthermore, we believe that variations in the immediate context surrounding crying episodes--such as the physical setting and the social environment--may have utility for explaining when crying is and is not cathartic. The present study aims to address this issue.

THE PRESENT STUDY

To obtain insight into the role of contextual factors that may shape whether or not crying is cathartic, data were drawn from the International Study on Adult Crying (ISAC; Becht & Vingerhoets, 2002), a large international dataset that contains detailed information on a recent crying episode, including the contextual factors associated with crying episode (e.g., antecedents of crying, characteristics of the situation in which the crying occurred, etc.) and reports of mental and physical improvement after the crying episode. One common thread in discussion of catharsis across fields as diverse as psychology, medicine, religion, and drama is the implication that emotional expression leads to feelings of relief and/or a release of tension. For this reason, we focused on mental and physical aspects of catharsis, as defined by self-report of mental and physical improvement after crying. We have chosen to examine both mental and physical catharsis, because catharsis in the context of crying is seen as involving both physiological (e.g., decrease in arousal, muscle tension, etc.) and emotional changes (e.g., decreases in negative affect) which are distinguishable, though both are assumed to occur (Cornelius, 2001). Based on the theories of crying and catharsis emphasizing the social function of crying (e.g., Kottler, 1996; Hendriks et al., 2008), we predicted that cathartic crying (i.e., crying episodes followed by the greatest mood improvement) would be most likely in episodes in which the person reported positive, supportive, social interactions in which the individual received comfort from others, with catharsis being defined here as the subjective experience of mental or physical improvement. Further, since it has been suggested that crying may be beneficial because it helps an individual understand their feelings better or come to a resolution to the situation that triggered the crying (e.g., Cornelius, 2001; Miceli & Castelfranchi, 2003), we expected that cathartic crying would be most likely in episodes in which the person perceived that the issues that caused the crying episode were resolved or better understood. Although we did not generate formal hypotheses concerning other contextual factors, such as the location of crying, the number of people present, and cause of crying episode these data were collected and analyzed to achieve a fuller description of crying and catharsis.

METHOD

Participants

For the analyses reported here, data were available from 2,181 men and 2,915 women living in 35 countries who were respondents in the International Study on Adult Crying (ISAC; Becht & Vingerhoets, 2002), a large ongoing international study of crying that began in 1996. Because we have already extensively reported on cultural and country differences using the ISAC [Becht & Vingerhoets 2002; van Hemert, van de Vijver, & Vingerhoets (submitted)], the data reported here are collapsed across countries.¹ Most respondents were students. To improve sample homogeneity, only young adults aged between 18-28 years were included in the data analyses. Further, to increase the likelihood of obtaining detailed and accurate reports of a recent crying episode we excluded participants if they did not report crying within the past year. Thus the final dataset for the analyses presented in this paper consisted of 4,249 respondents from 30 countries (2,577 women and 1,672 men), with a mean age of 21 years. For a more extensive description of the data collection for this study, see Becht and Vingerhoets (2002).

The Adult Crying Inventory

The Adult Crying Inventory (ACI) is part of the ISAC questionnaire (Vingerhoets, 1995; Vingerhoets & Cornelius, 2001). For details on its development, see Becht and Vingerhoets (2002) and Vingerhoets and Cornelius (2001). The present paper focused on responses to Part D of the ACI, which assesses the context and consequences of

1. For extended treatment of cultural and country differences in crying behavior and the experience of mood improvement after crying in the ISAC dataset, see Becht and Vingerhoets (2002) and van Hemert et al. (submitted). Briefly, Becht and Vingerhoets (2002) found that the general experience of mood improvement after crying was positively associated with wealthier, more feminine countries and countries where the average crying frequency was relatively high and feelings of shame relatively low. In addition, there was a small interaction effect between gender and country in relation to mood-improvement after crying. Van Hemert et al. (submitted) found that women cried more often than men in all the sampled countries, but gender differences in crying proneness were more pronounced in wealthier, more Western countries and in feminine countries with more gender equality.

the respondent's most recent crying episode. Some questions from Part A of the ACI concerning general experience of catharsis and crying proneness are also included in the analyses to examine the most recent crying episode in relation to participants' more general crying behavior and experience of catharsis. The ACI defined crying to participants as "tears in one's eyes due to emotional reasons."

Characteristics of Most Recent Crying Episode

Characteristics of the antecedents and context of the most recent crying episode were assessed through a series of multiple-choice questions designed to capture the situational moderating factors of the Vingerhoets, Cornelius, Van Heck, and Becht (2000) model of adult crying. More specifically, Vingerhoets et al. (2000) described a comprehensive, biopsychosocial model of crying which conceptualizes crying as a complex interaction of psychobiological, cognitive, and social processes. The model differentiates between eliciting factors, which may be real events, memories, or thoughts that trigger crying, from predisposing factors that influence one's vulnerability to cry. In addition, the model distinguishes between the possible effects of the act of crying itself on the individual and the indirect effects brought about by the reactions of the social environment, which may offer support or disapproval. Thus, the questionnaire used here integrates several features of this model, including the social context and social responses from others, as well as the internal representation and association factors (i.e., including reasons for crying and resolution of crying).

Antecedents. Questions regarding the antecedents for the most recent crying episode inquired about reasons for crying (e.g., who or what was responsible for the crying episode), duration and intensity of the crying episode, time between the trigger and the crying episode, and emotions experienced during the crying episode. Participants also provided a free-response description of the most recent crying episode, which was later coded into variables to indicate the type of event that caused the crying, which were categorized as follows: conflict, loss, personal inadequacy, witnessing suffering, physical suffering, psychological suffering, and positive events.

Social Context of Crying Episode. Characteristics of the social context of the most recent crying episode were identified. Specifically,

participants were asked to indicate the number and type of people present (e.g., friends, family, strangers, etc.) during the crying episode. Reactions of other persons to the crying episode were also examined. Questions were in a multiple-choice response format and participants were able to select all appropriate responses. Response options included both negative social reactions such as "s/he became mad at me" or "s/he was embarrassed" as well as positive social reactions such as "s/he offered comfort with words" or "s/he expressed understanding."

Crying and Situation Resolution. Resolution of the crying episode, resolution of the event that caused the crying, as well as situation/relationship changes after the crying episode, were also assessed through multiple-choice questions. Specifically we examined reasons the crying episode ended (e.g., feeling emotionally re-stabilized, shame/embarrassment, the situation had changed, etc.), as well as whether the crying may have positively or negatively affected the situation that triggered the crying and how it affected the relationship with any individuals present.

Experience of Catharsis after Crying

Mood change after crying was assessed for the most recent crying episode in terms of the person's report of general mental and physical improvement. Mental and physical improvement were each rated by participants on a 3-point scale with -1 as feeling worse than before, 0 as feeling about the same, and +1 as feeling better than before crying. Since mental and physical improvement after crying were found to be only modestly correlated ($r = 0.32, p < .001$), we examined these constructs separately.

General experience of mood change after crying was also assessed using a scale from Part A of the ACI including the following seven mood states: (1) relaxed, (2) in control, (3) happy, (4) relieved, (5) tense, (6) depressed, and (7) sad. The respondents indicated whether they *generally* experienced more, the same, or less of the specified mood after a crying episode, as compared to before. For each mood indicator, a positive change was scored with +1 ("more" for mood states 1 to 4, "less" for mood states 5-7), no change was scored as 0, and a negative change was scored as -1. The scale yields a total score (Mood Change Score: MCS) ranging between -7 and +7, with

-7 indicating a maximum deterioration of one's mood after crying, and +7 a maximum mood improvement. The internal consistency of this scale in this sample was good ($\alpha = .76$).

Statistical Analyses

Statistical analyses were conducted using the SPSS statistical software package. ANOVA were conducted with the contextual variables (antecedents, social context, etc.) as the independent variables and the catharsis variables (mental and physical improvement) as the dependent variables. Follow-up t-tests were conducted when deemed appropriate. Exploratory analyses of gender were conducted because previous research has found gender differences in crying behavior (e.g., women cry more often than men, Vingerhoets & Scheirs, 2000). Etas were computed as a measure of the magnitude of the effect sizes of the relationship between the variables. Alpha was set to $p = .01$ to provide some protection against Type I error.

RESULTS

Antecedents of Most Recent Crying Episode

To provide a context for our analyses of catharsis, we first report descriptive information concerning participants' most recent crying episode. The triggering antecedents of these crying episodes are displayed in Table 1 by gender. Experiencing loss was the most frequently reported antecedent for both male and female participants. Women reported more crying episodes due to conflict than men. Men reported more crying episodes in response to a positive event than women. In terms of who or what was responsible for the crying episode, both men and women most frequently reported "myself," "partner," or "family/relatives" as the cause. The majority of participants reported crying at home (62%) and most frequently in the late evening (35%) between the hours of 10 pm and midnight. Most individuals reported crying alone (35%) or with 1 other individual present (31%). Individuals most frequently reported crying in front of family members or other relatives (36%), while 18% cried

TABLE 1. Types of Antecedents Reported for the Most Recent Crying Episode and Relation to Mental and Physical Improvement

	Total Sample (%)	Women (%)	Men (%)	Mental Improvement (eta)	Physical Improvement (eta)
Antecedents – Type of Event					
Conflict	13.3	21.7	13.3	-.025	-.004
Loss	23.0	21.8	23.0	-.030	-.046
Personal Inadequacy	8.2	10.0	8.2	.032	-.018
Witness Suffering	14.9	11.2	14.9	-.070**	-.014
Positive Event	15.7	6.0	15.7	.067**	.058**
Physical Suffering	1.8	2.1	1.8	-.024	-.025
Psychological Suffering	8.3	10.2	8.3	.021	.074**
Antecedents – Attributed Responsibility					
Myself	36.0	38.5	32.1	.072**	.043*
Partner	26.0	28.7	21.8	.048*	.005
Family/Relatives	22.5	23.2	21.4	-.041*	-.010
Close Friends	10.9	11.9	9.4	.041*	.013
Acquaintances	4.4	4.2	4.6	-.002	.012
Authorities	3.6	3.8	3.3	.007	-.006
Strangers	4.2	4.6	3.5	-.068**	-.003
Fate/Forces	9.9	9.2	11.1	.030	.008

* $p < .01$. ** $p < .001$.

in front of friends, 7% in front of acquaintances, and 8% in front of strangers.

Timing, Duration, and Intensity of Most Recent Crying Episode

Men reported crying for a shorter duration ($t = -13.55, p < .001$) and less intensely ($t = -12.56, p < .001$) than women. Most men (62%) reported that their last crying episode lasted less than 5 minutes, while only 37% of women reported crying for less than 5 minutes. In terms of intensity, most women (52%) reported experiencing “wet eyes” and “silent sobbing,” while men more commonly reported “wet eyes” only (48%). Individuals most frequently reported crying less than 5 minutes after the triggering situation (29%), 5-15

minutes after the situation (13%), or crying for an ongoing period of time (30%).

Reported Experience of Mood and Physical Change after Crying

As we expected, most participants in the sample reported experiencing catharsis, as defined above, after their most recent crying episode. Specifically, over half of the participants (51.4%) reported feeling better mentally after crying compared to how they felt before crying (51.9% females, 50.5% males), while 38.3% (37.2% females, 40.0% males) reported feeling the same, and 9.7% (10.4% females, 8.7% males) felt worse. In terms of general physical improvement, 27% (27.1% females, 26.9% males) felt better physically after crying, 56.4% (53.4% females, 60.9% males) reported feeling the same and 15.6% reported a deterioration (18.7% females, 10.9% males) in terms of their general physical state. There were no significant gender differences for improvement in mental state after crying. For physical state, men were less likely to feel physically worse than women after crying ($t = 3.80, p < .001$).

Correlational analyses indicated that catharsis reported after the most recent episode was related to a respondent's general tendency to experiencing catharsis after crying. That is, both mental ($r = .32, p < .001$) and physical improvement ($r = .22, p < .001$) after the most recent crying episode were positively correlated with the general tendency to experience catharsis after crying. This suggests that the catharsis reported after the most recent crying episode was at least somewhat typical of the person's crying more generally.

Individual Differences in Crying Behavior and Catharsis

Duration and intensity of crying episode were not found to be related to mental improvement; however, duration and intensity of crying were found to be negatively related to physical improvement ($r = -0.73, p < .001$; $r = -0.50, p < .001$). The time between the event that caused the crying and the crying episode was also found to be significantly related to mental (but not physical) improvement after crying ($\eta^2 = .077, p < .01$). Follow-up t-tests show that those who reported crying in an "ongoing" manner since the triggering situ-

ation reported experiencing significantly less catharsis than those who reported crying at a particular interval ($t = 3.926, p < .001$). There was no significant difference in catharsis between those who cried within a day of the event and those who cried a day or more later. Location and time of day of the crying episode were not found to be significantly related to the experience of catharsis.

Crying Antecedents and Catharsis

Event Antecedents. ANOVA were used to examine the relationship between the type of precipitating event and the experience of mental and physical improvement after crying (Table 1). Specifically, witnessing suffering as a reason for crying was found to be negatively related to mental, but not physical improvement (i.e., individuals crying after witnessing suffering experienced less mental improvement compared to participants crying for other reasons). In contrast, crying due to experiencing a positive event was found to be positively related to mental and physical improvement. Crying due to psychological suffering was also found to be positively related to physical improvement. These results are consistent with our general approach which assumes that some antecedents may contribute to the experience of catharsis, while others may hinder it.

Person Antecedents. Parallel ANOVA of the effect of the persons responsible for the crying episode and catharsis (Table 1) found that if the individual reported that s/he was responsible for the crying episode, both mental and physical improvement were more likely to be experienced. If strangers or family/relatives were responsible for the crying episode, this was negatively related to mental improvement but the relationship with physical improvement was not significant.

Social Context and Catharsis

Social contextual factors of the crying episode were also examined with regard to their relation to mood change, including the number of people and composition of people present, the location of the cry-

ing episode, and the time between the precipitating event and the crying episode. The number of people present during a crying episode was significantly related to mental (but not physical) improvement after crying ($\eta = .056, p < .01$). Specifically, individuals who cried with only one other person present appeared to experience the greatest cathartic effect. Follow-up *t*-tests showed that crying while alone or with one other individual present produced a significantly greater cathartic effect than crying in the presence of two or more individuals ($t = 3.011, p < .01$). However, the cathartic effect was not significantly different when comparing individuals crying alone to those crying with only one other person present. The composition of people present did not appear to be related to the experience of catharsis.

We next examined the reactions of others to an individual's crying and the relation of these reactions to catharsis (see Table 2). Based on social theories of crying, we predicted that the receipt of positive social support would be positively related to the experience of catharsis, while negative social reactions would inhibit catharsis or even cause a worsening of mood. Fifty-seven percent of the sample reported receiving some form of reaction from intimate others that were present during the crying episode. Overall, the most common reactions experienced were comfort words, comfort arms, and understanding. As expected, it was found that positive reactions from intimate others were positively related to catharsis and negative reactions were negatively related to catharsis. Specifically, positive reactions such as comfort words and gestures, offering understanding, and friendly/warm reactions were positively related to mental improvement after crying, while negative reactions such as anger were negatively related to mental improvement after crying. Positive reactions were more likely to be received from others when only one individual was present compared to when two or more individuals were present during crying (comfort words ($t = 5.73, p < .001$), comfort arms ($t = 3.06, p < .01$), or more friendly/warm reactions ($t = 2.79, p < .01$). By contrast, the social reactions that were associated with mental improvement were unrelated to the degree of physical improvement after crying, suggesting that intimates' positive social reactions may be more critical for mental improvement than for physical improvement.

TABLE 2. Social Reactions by Present Intimates and Relation to Mental and Physical Improvement

Social Reactions	% of Sample Reporting this Reaction	Mental Improvement (eta)	Physical Improvement (eta)
Comfort words	21.5	.093**	.005
Comfort arms	18.6	.064**	.008
Understanding	17.7	.081**	.032
Friendly/warm	10.3	.083**	.034
Ignorance	4.7	-.037	-.035
Anger	1.6	-.047*	-.034
Does not know how to behave	4.5	-.034	-.035
Embarrassment	3.2	.032	-.007
Nasty	1.9	.034	-.003
Does not apply	42.7		

* $p < .01$. ** $p < .001$.

Situation Change and Catharsis

Finally, we examined whether a change in the situation or in the relationship with the people present or specific reasons to stop crying were related to catharsis. These analyses supported the prediction that a resolution or new understanding/perception of the issues that precipitated the crying episode would be related to catharsis. Specifically, perceived improvement in the crier's present relationship with the present other was related to both mental ($\eta = .225$, $p < .001$) and physical improvement ($\eta = .121$, $p < .001$). Improvement in the crier's present situation was also related to both mental ($\eta = .346$, $p < .001$) and physical improvement ($\eta = .223$, $p < .001$). Reasons to stop crying and relation to mental and physical improvement are presented in Table 3. Specifically, reasons to stop crying that were positively related to mental and physical improvement were feeling re-stabilized, situation improvement, achieving a goal, changed perception of situation, and finding peace with the situation that caused the crying. Reasons to stop crying that were negatively related to mental improvement were being watched by others, experiencing shame/embarrassment, feeling "dried-up," to prevent negative physical effects. Receiving comfort from oth-

ers as a reason to stop crying was also positively related to mental improvement, while prohibition of crying by others and having to concentrate on other activities were negatively related to mental improvement.

DISCUSSION

Much of the prior literature on crying has focused on describing the overall effects of crying in an effort to establish whether or not crying is cathartic. Motivated by the mixed nature of findings in this literature, the aim of the present study was to better understand variations in the effects of crying. Specifically, this study aimed to address the question: *When* is crying cathartic? We examined detailed reports of thousands of crying episodes in a large international sample to obtain insight into the social and contextual factors of crying episodes that might facilitate or prevent catharsis. The majority of respondents in this study reported improvement in their mental and physical state after their most recent crying episode, which was expected and similar to findings from previous naturalistic studies (e.g., Bindra, 1972; Frey et al., 1983). Importantly, however, not all persons benefited from crying; a distinct minority of criers did not report cathartic effects, and some respondents even reported a deterioration of their mental and physical state after crying. One contribution of this study was that it identified antecedents for crying and contextual features crying episodes to help account for this heterogeneity

Antecedents of Crying

We found a wide range of antecedents for crying as well as relations between the antecedents of crying and the experience of catharsis. Most individuals reported "myself," "partner," or "family/relatives" as the responsible agents of their crying. It was found that if the individual reported that s/he was responsible, both mental and physical improvement were more likely to be experienced. By contrast, strangers, family, or fate being responsible for crying was found to have a negative impact on mood. In terms of the particu-

TABLE 3. Reasons to Stop Crying and Relation to Mental and Physical Improvement

Reasons to Stop Crying	% of Sample Reporting this Reason	Mental Improvement (eta)	Physical Improvement (eta)
Re-stabilized	43.8%	.214**	.124**
Watched by others	6.0%	-.044*	-.051*
"Dried-up"	14.9%	-.046*	-.061**
Shame/Embarrassment	7.5%	-.088**	-.056*
Comfort by others	18.7%	.107**	-.004
Situation Improvement	9.0%	.083**	.070**
Prohibition by others	1.3%	-.052*	-.037
Important goal achieved	3.8%	.071**	.043*
Concentration on other activities	16.4%	-.063**	-.033
Feeling "it was enough"	29.8%	.007	.004
To prevent physical effects	6.6%	-.041*	-.118**
Fell asleep	9.1%	-.010	-.018
Changed perception of situation	13.6%	.109**	.043*
Peace with situation	21.1%	.103**	.070**

* $p < .01$. ** $p < .001$.

lar event that triggered the crying, individuals crying as a result of witnessing suffering tended to experience less mental improvement, while crying due to experiencing a positive event was found to be positively related to both mental and physical improvement. Crying due to psychological suffering was found to be positively related to physical, but not to mental improvement. It is interesting that psychological suffering and individuals reporting themselves as being responsible for the crying episode were found to be positively related to experiencing catharsis. Perhaps it is in these cases that an individual is more likely to experience a resolution due to a new understanding or perception of the event, since the trigger is more internally focused, whereas people may have less control in situations where they are witnessing the suffering of others, resulting in less opportunity for mental and physical improvement.

The Importance of the Social Context of Crying Episodes

The social context and reactions of others present influenced the effects of crying in important ways. Most individuals reported crying alone or with one other individual present. Individuals who cried with only one other person present appeared to experience the greatest cathartic effect, with individuals crying among two or more individuals experiencing less improvement. It may be that individuals crying in the presence of many people were more likely to be embarrassed, or less likely to receive comfort from others, while having one other individual present is the optimal situation for receiving beneficial positive social support. In fact, we did find that individuals with only one other person present were more likely to receive positive social reactions than those with two or more other persons present. In terms of social reactions received from others during the crying episode, the most common reactions experienced were positive/supportive reactions such as comfort, understanding, and warmth. As predicted, positive social reactions of others were related to mental and physical improvement, while negative reactions had the opposite effect. These findings provide support for social theories of crying that focus on the capacity of crying to recruit social support and empathy from others (e.g., Averill, 1968; Gross et al., 1994; Hendriks et al., 2008).

Resolution of Crying

Experiencing a resolution to the event that caused the crying episode was found to be related to catharsis, which is in line with the idea by Miceli and Castelfranchi (2003) that crying helps the crier to understand his or her feelings. Similarly, achieving a new understanding or perception of the event that precipitated the crying episode was also positively related to catharsis, which supports Cornelius's (1997, 2001) theory that crying facilitates change and resolution of the issues that precipitated the crying episode. Furthermore, suppression of crying or experiencing shame or embarrassment from crying were negatively related to catharsis, as suggested by Gross (1989) and Miceli and Castelfranchi (2003).

Limitations

The large sample size collected in 35 different countries speaks to the potential generalizability of the findings and strengths of the study. However, it is also important to point out that this study has several limitations that lead us to temper our interpretations and conclusions. First, although research in the area of crying and catharsis is by its nature highly reliant upon self-report data, we were limited by the problems present in any self-report data, such as reporting biases and relying on the memory of participants. Indeed, it is possible that some participants incorrectly reported the cathartic effects of their crying episodes or the contextual details surrounding their crying episodes. Second, this sample was limited to college students ages 18-28, which limits its generalizability to other age groups or individuals with more limited educational experience. Third, the cross-sectional nature of the data prevents us from inferring causation from the observed relationships. Fourth, it is notable that the effect sizes are relatively small in magnitude, although highly significant due to the large sample size. However, considering the large number of contextual factors that may be related to crying behavior and catharsis, including factors that we did not measure here (e.g., symptoms of depression, personality variables) it is not surprising that individual effect sizes for specific contextual factors are relatively small. Fifth, and finally, as a secondary analysis of pre-existing data we were limited by our measure of mental and physical improvement after crying, which for the most recent crying episode was only a 3-point scale, and which may have constrained our ability to detect small effects. Despite the less than optimal nature of this scale, we found support for our hypotheses, as well as a number of other interpretable effects.

CONCLUSIONS AND FUTURE DIRECTIONS

In summary, the picture that emerges from these results is that not all crying episodes are created equal. Variation in contextual features that surround crying episodes appear to facilitate or inhibit experience of catharsis after crying. To further understand the con-

ditions under which crying may or may not be beneficial, it will be important to obtain convergent evidence using other methods. For example it would be useful for laboratory studies to employ crying triggers that are more like the ones experienced in real life to help address the apparent gap between difficult to achieve naturalistic and laboratory crying findings for catharsis. Furthermore, more naturalistic diary studies that employ more "on-line" measurements of crying effects would also be useful, since these methods avoid some of the problems inherent in retrospective survey data (e.g., memory failure). Finally, the cathartic nature of crying may also have potential clinical implications for emotional disorders suggesting a need to examine cathartic effects in clinical samples. Depression is associated with more frequent crying, but some research suggests more severe depression is associated with an inability to cry (e.g., Vingerhoets, Rottenberg, Cevaál, & Nelson, 2007; Rottenberg, Gross, Wilhelm, Najmi, & Gotlib, 2002) and less experience of mood improvement after crying (Rottenberg, Cevaál, & Vingerhoets, 2008). Thus, future research would be well served by examining the situational factors that determine catharsis in clinical populations.

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