Review

Is there a relationship between depression and crying? A review


Objective: To conduct a systematic examination of the relationship between depression and crying by reviewing all relevant theory and empirical data including the performance of crying items in measures of depression.

Method: Review of the extant literature on depression and crying using PubMed, PsychInfo and Google Scholar databases.

Results: Scores on crying items of depression inventories correlate moderately with overall depression severity. Otherwise, there is surprisingly little evidence for the widespread claim that depression leads to more frequent and/or easier crying. There is also little empirical support for the competing claim that severely depressed individuals lose their capacity to cry.

Conclusion: Current claims about the relationship between depression and crying lack a robust empirical foundation. Assessment instruments and diagnostic systems for mood disorders are inconsistent in how they handle crying as a symptom. Further work to investigate the causes and the context of crying in depressed patients is needed.

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Key words: crying; depression/diagnosis; humans; depression measures


Summations

• Crying is generally considered a feature of depression, although occasionally the loss of the ability to cry in severely depressed patients is emphasized.
• Assessment instruments and diagnostic systems for mood disorders are inconsistent in how they handle crying as a symptom.
• Most, but not all, depression measures contain an item on crying or tearfulness. Most measures view increased crying as an indicator of depression.

Considerations

• Future work needs to clarify the precise nature of the relationship between depression and crying and the role of possible moderators, such as gender and premorbid characteristics.
• The inclusion of crying as a diagnostic sign of depression and the scoring of crying items as indicators of depression requires further evaluation.
• Research on crying is critical for expanding our knowledge concerning emotional experience and emotional expression in depression.

Introduction

Major depressive disorder (MDD) is characterized by persistent sad mood and a loss of interest or pleasure in daily activities and by a number of associated symptoms (1). Because sad mood is among the most frequently occurring states that precede crying (2, 3), it is often presumed that
depressed people cry more often than healthy non-depressed persons do. Only rarely, however, have empirical data been marshaled to test this idea. This article is thus intended to address a number of critical theoretical and empirical questions concerning crying and depression. The major questions addressed in this review are: how does depression influence crying? Are gender differences in crying maintained during depression? Finally, what is the role of crying behavior in the diagnosis of depression?

Definition, neurobiology, and functions of normal adult crying

Crying, the excretion of tears in response to emotional stimuli, is typically accompanied by alterations in facial expression, vocalization, and respiration, including, in some cases, sobbing, which is the convulsive inhaling and exhaling of air with spasms of the respiratory and truncal muscle group (4). Crying occurs in various emotionally charged settings, often with negatively evaluated situations related to separation and loss, but also with positive events, such as reunions, weddings, or winning a sports game (3, 5–7). To provide some context for understanding how crying might be altered by a pathological mood state, such as clinical depression, it is helpful to discuss the background and functions of ordinary, non-pathological adult crying.

Shedding emotional tears is regarded as a typically and probably even uniquely human emotional expression. It has been suggested that it originates from the audiovisual communication designed to maintain maternal–offspring contact, which can be observed in mammals. The so-called separation cry is thus considered the earliest and most basic mammalian vocalization, serving to promote and maintain contact between mother and child as well as between members of an affiliated group. Separation cries (also referred to as isolation or distress cries) are produced by all mammals, sometimes in the ultrasonic domain (e.g. in the case of small rodents), probably as a protection against predators.

Human and non-human animal research has increasingly elucidated several neurobiological substrates for crying. According to MacLean (8), based mainly on his research with squirrel monkeys, it is in particular the thalamocingulate division of the limbic system that has become increasingly important for both crying and laughter. Additional evidence from patients suffering from uncontrolled laughter and/or crying suggests also a role for the amygdala. More recently, evidence has been presented indicating a major role of the cerebellum in crying and laughing (9). This structure may determine if the appropriate emotional behavior will indeed be expressed. MacLean further points to observations suggesting a role for opioids in crying behavior, as there is a high concentration of opiate receptors in the primate cingulated cortex. Consistent with this position, it has been shown that small doses of morphine sulphate suppress the separation cry in squirrel monkeys, whereas naloxone, an opiate antagonist, restores it. Panksepp (10) reports additional similar findings, suggesting a link between opiate addiction and feelings of isolation and alienation. These ideas are, among others, based on animal research examining the effects of drugs on separation-induced distress vocalizations (11). Finally, in work that indicates that central serotinergic activity may be related to the disinhibition of the crying response, Murai et al. (12) has shown that serotonin transporter-binding ratios in the midbrain were significantly lower in stroke patients suffering from pathological crying compared with matched stroke patients who did not have these uncontrolled emotional outbursts.

Several functions for human crying have been claimed. Following much of the literature on emotion expression, theorists have distinguished between inter- and intrapersonal functions of crying (cf. 2, 13).

The interpersonal view of crying emphasizes in particular communicating the need for care and evoking care from others. Darwin (14) took this view, considering crying as a universal response for the communication of distress. Kottler (15) also postulates that crying is a non-verbal language that functions when words fail or are inadequate. Others emphasize the importance that crying has in motivating others to engage in prosocial behaviors (16). Bowlby (17) likewise considered child crying as attachment behavior, securing the proximity of the caregiver, and Nelson (6) expanded on this view of crying, stressing that crying is an attachment behavior throughout life, which continues to elicit caregiving from others or from internalized objects. The interpersonal effects of crying have also been seen in terms of catharsis (18–20). According to this view, the cathartic effect of crying – positive affect change and tension reduction – depends on the social context of one’s crying and the feedback of the social environment one receives. That is, crying typically elicits cathartic interpersonal effects (comfort and sympathy) but catharsis will not occur if crying elicits disregard or disapproval by others.

A second, not mutually exclusive, view of crying focuses on intra-individual aspects of this behavior.
This view has been elaborated in a number of different ways. For example, many theorists have focused on the cathartic, mood-enhancing functions of this behavior. Breuer and Freud (21) regarded weeping as a means to discharge negative effect and to reduce internal tension. According to these authors, tears flow when distress exceeds a certain quantitative level thus avoiding an excessive build up of emotions which may lead to symptom formation. Crile (22) similarly postulated that crying results from the build up of tension, in preparation for action that subsequently is not performed. Shedding tears then helps to discharge the idle neural energy and to facilitate physiological recovery. In a very similar vein, according to Bindra (23), tears may help to discharge tension in situations in which an individual is unable to cope effectively. He found that the initial emotional state that triggers an episode of crying often dissipates or changes to a less intense mood after the episode, implying a mood-relieving role for crying behavior. Tompkins (24) suggested that crying further functions as a form of self-communication, designed to alleviate distress by motivating oneself to action, and in this way it contains aspects of both the inter- and the intra-individual view of crying. Frey et al. (25) considered the cathartic function of crying to be the result of a biochemical process. These authors hypothesized that emotional tearing may serve to remove waste products or toxic substances from the body that build up during emotional stress. Similarly, recent experimental data suggest that crying may stimulate the activity of the parasympathetic nervous system, which has been hypothesized to neutralize sympathetic arousal and promote physiological homeostasis (13, 26).

Crying in depression: theoretical perspectives

Associations between crying and depression have long been pointed out. Darwin (14), for example, considered crying as a sign of depressed mood: ‘The insane notoriously give way to all their emotions with little or no restraint; and I am informed by Dr. J. Crichton Browne, that nothing is more characteristic of simple melancholia, even in the male sex, than a tendency to weep on the slightest occasions, or from no cause. They also weep disproportionately on the occurrence of any real cause of grief. The length of time during which some patients weep is astonishing, as well as the amount of tears they shed.’ (14). Theorists have thus commonly observed that depression alters crying, but have disagreed over how. Three differing theoretical views of the depression–crying relationship can be extracted from the clinical literature.

First, following Darwin (14), is the view that there is a simple linear relationship between the severity of depressive symptoms and crying frequency. Most depression questionnaires assume a linear relationship between crying and depression severity (see below). A number of other considerations underlie the logic of linearity. First, there is no disagreement that low mood, often described as sadness, is among the key symptoms of depression. A closer look at both phenomena reveals that they share some important characteristics. At the neurobiological level, there is evidence that common limbic, paralimbic, and cortical brain structures are activated both in ordinary sadness and in clinical depression, more precisely, the subgenual cingulated, anterior insula and the right dorsolateral prefrontal, inferior parietal areas (27). Interestingly, these investigators explicitly emphasized that similar patterns of limbic activation and cortical deactivation were found in participants who did and who did not become tearful. However, it must be emphasized that this comparison had inadequate power, implying that until now this issue has not definitely been settled.

Moreover, at the level of the functions of depression and sadness or grief there are also some remarkable hypothesized correspondences. For both phenomena, it has been suggested that they communicate an extorting need for help and that they may signal yielding in conflicts (see 28, 29). Then there is the idea that depression and sadness or physical and emotional pain both draw attention to problems, that, if not fixed adequately, may have detrimental fitness consequences and therefore motivate actions aimed to remedy the problem (30). A final similarity in function might be what Frijda (31) describes as the white flag, indicating surrender, function of crying and what Price (32, see also 28), in case of depression, refers to as signaling yielding in a hierarchy conflict.

A final observation that suggests a generally linear relation between depression, sadness, and crying is the remarkable correspondence in the age–gender distribution of crying and depression. Not only are both phenomena observed more often in females than in males, there is evidence that both the gender difference in crying and in depression incidence emerges in adolescence (see 33, 34).

The second major view of crying and depression hypothesizes that the relationship between these phenomena is nonlinear. That is, some authors suggest that although increased crying may accompany milder forms of depression, severely depressed patients often experience an inability to cry (4–6, 35, 36). For instance Hamilton (37), in giving guidelines for scoring his depression scale,
stated that it should be taken into account that severely depressed patients may ‘go beyond weeping’ into a non-crying state. Both Davis et al. (38) and Beck (35, 36) agree that increased periods of crying are a common symptom in depression, but they stress that more severely depressed patients lose their ability to cry. Patel (4, 39) also states that crying occurs more frequently in dysthymic states and mild depressions, but that severe depressions are associated with a reduction of crying behavior.

Interestingly, theorists have postulated that severe sadness, like severe depression, might interfere with emotion expression. Parallel to clinicians’ views that deep depression blocks rather than facilitates the ability to cry, Frijda (31) offers discussion of instances where sadness was too intense for expression. This concerned Herodotus’ account of the anecdote of the Egyptian king Psammenitus, who was defeated by the Persian king Cambyses and was forced to watch the captives parading by. Among them were his daughter dressed in slave’s attire and his son on his way to execution. Psammenitus looked at this scene without batting an eyelid. However, when a little later, an old drinking friend turned beggar passed by, he burst into tears. When Cambyses asked for an explanation of this paradox, Psammenitus answered that some grief simply is too fierce for tears.

Finally, a third view of the relationship between depression and crying is that premorbid characteristics, such as attachment style, moderate the relationship. According to Nelson (5, 6), adult attachment styles influence the frequency and duration of crying patterns generally and may therefore also influence the amount of crying in depressed individuals. Adults who fit the ‘preoccupied’ style of attachment typically hyperactivate their attachment behaviors (crying) leading to more frequent and more prolonged crying episodes, even when they are not clinically depressed or experiencing a significant loss. Individuals with ‘dismissing’ attachment styles tend to deactivate attachment behaviors, such as crying, meaning that they are at greater risk of tearless detached depression. The crying patterns of non-depressed securely attached adults range from those who never cry to those who cry frequently. Their crying frequency during depression would be expected to reflect their crying tendencies when not depressed.

**Aims of the study**

The aims of this review are: i) to describe how crying has been viewed as a diagnostic criterion for depressive disorders and how it has been dealt with in depression inventories; ii) to summarize the available empirical evidence concerning crying in association with depression; and, finally, iii) to review the issue of gender in relation to crying and depression.

**Material and methods**

To collect published material relevant to this review, we scrutinized the literature in the following databases: PubMed, PsychInfo and Google Scholar, with depression and crying, weeping or tearfulness as search terms. In addition, we combed the references of the identified articles for additional sources. To select instruments that are frequently applied to measure depression, we inspected the same databases with the search terms review, depression and measurement or assessment. For completeness, we also referred to major chapters on the assessment of mood disorders (e.g. 40, 41).

In addition to considering the small body of studies that make detailed measurements of crying in depressed patients, we also examined whether single items measuring crying on depression inventories evidence a relationship with overall depression severity. To enable this analysis, we focused on the Beck Depression Inventory (BDI, 36) because it contains a crying item and because an initial search indicated that it was the only depression scale with a body of reported psychometric data assessing the relationship between crying and depression. To collect studies that contained the relevant item–total correlations, two research assistants performed a series of paired keyword searches. In these searches, the keywords ‘item–total correlation,’ (both singular and plural, with and without hypen), ‘item correlation,’ and ‘psychometrics’ were paired with a second relevant keyword, ‘depression’, ‘Beck Depression Inventory’, ‘BDI’, ‘BDI-II’, and ‘crying’. The same databases as mentioned above were used in these searches.

**Results**

Crying and the diagnosis of depression

Despite theoretical disagreement about the role that crying behavior plays in depression, most depression inventories nevertheless include an item on crying or tearfulness. We summarize how crying is handled in nine commonly used instruments in Table 1.

As is apparent from Table 1, with only one exception (i.e. BDI-II), all inventories assume a
<table>
<thead>
<tr>
<th>Item on crying (yes/no)</th>
<th>Item</th>
<th>Response possibilities and their weight/scores</th>
<th>Is more/easier crying an indication for depression?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center for Epidemiologic studies-Depression (CES-D) (83)</td>
<td>Yes</td>
<td>During the last week I had crying spells</td>
<td>Rarely or none of the time (less than 1 day) 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Some or a little of the time (1–2 days) 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Occasionally or a moderate amount of the time (3–4 days) 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Most or all of the time (5–7 days) 3</td>
</tr>
<tr>
<td>Minnesota Multiphasic Personality Inventory-2 (MMPI-2) (84)</td>
<td>Yes</td>
<td>I cry easily</td>
<td>Agree 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Do not agree</td>
</tr>
<tr>
<td>Beck Depression Inventory-II (BDI-II) (85)</td>
<td>Yes</td>
<td>Crying</td>
<td>I don’t cry any more than I used to 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>I cry more than I used to 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>I cry over every little thing 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>I feel like crying but I can’t 3</td>
</tr>
<tr>
<td>Symptom Check List-90 (SCL-90) (89)</td>
<td>Yes</td>
<td>How much were you distressed or bothered by crying easily?</td>
<td>Not at all 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A little bit 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Moderately 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Quite a bit 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Extremely 5</td>
</tr>
<tr>
<td>Zung Self-rating Depression Scale (SDS) (52)</td>
<td>Yes</td>
<td>I have crying spells or feel like it</td>
<td>A little of the time 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Some of the time 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Good part of the time 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Most of the time 4</td>
</tr>
<tr>
<td>Edinburgh Postnatal Depression Scale (EPDS) (86)</td>
<td>Yes</td>
<td>I have been so unhappy that I have been crying</td>
<td>Yes, most of the time 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Yes, quite often 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Only occasionally 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>No, never 0</td>
</tr>
<tr>
<td>Hamilton Rating Scale for Depression (HAM-D or HDRS) (37)</td>
<td>Yes</td>
<td>Depressed mood, hopeless, helpless and worthless</td>
<td>Absent 0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>These feeling states only indicating on questioning 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>These feeling states spontaneously reported verbally 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Communicates feeling states non-verbally, i.e. through facial expression, posture, voice, and tendency to weep 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Patient reports virtually only these feeling states in his spontaneous verbal and non-verbal communication 4</td>
</tr>
<tr>
<td>Geriatric Depression Scale (87, 88)</td>
<td>Original 30-item version: yes</td>
<td>Do you frequently feel like crying?</td>
<td>Yes 1</td>
</tr>
<tr>
<td></td>
<td>Short 15-item version: no</td>
<td></td>
<td>No 0</td>
</tr>
<tr>
<td>Hospital anxiety and depression scale (HADS) (89)</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Montgomery-Åsberg Depression Rating Scale (MADRS) (90)</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
linear relationship between crying and depression, with more frequent and easier crying scored as indicating a more severe level of depression. To a certain extent this also holds for the BDI-II, but in this questionnaire, a reported inability to cry obtains the highest score and is considered to be a sign of severe depression. Inventories also differ in what is counted as increased crying. Some scales, such as the BDI-II and CES-D are more focused on reports of overt crying behavior (e.g. BDI-II, I do not cry any more than I used to, I cry more than I used to, I used to be able to cry, but now I cannot cry even though I want to), whereas other scales, such as the Zung Self-rating depression scale, also include impulses to cry or 'feeling like crying' as a sign of increased crying.

A review of the different editions of the Diagnostic and Statistical Manual of Mental Disorders (DSM, American Psychiatric Association) (see also 39) reveals that crying or tearfulness has not been handled consistently as a diagnostic criterion for various mood disorders (e.g. dysthymia adjustment disorder with depressed mood and MDD). In DSM-III (42), crying proneness and fits of crying are listed among 13 symptoms, of which three must be met for the diagnosis of dysthymia. Remarkably, in all later editions of the DSM (1,43,44), crying is no longer mentioned as a symptom of dysthymia. Nor is crying required in the diagnosis of adjustment disorder. Adjustment disorder may obtain the qualifier 'with depressed mood' in the last four editions of DSM by virtue of increased tearfulness, or by other manifestations of depressed mood, such as reports of depressed mood or feelings of hopelessness. Finally, neither DSM-III nor DSM-III-R (43) mention crying or tearfulness as a symptom of MDD. Subsequently, in DSM-IV (44) and DSM-IV-TR (1) one of the two symptoms at least one of which should be met for a diagnosis MDD, is depressed mood, a psychological state that can be derived from a list of symptoms that includes feeling or appearing 'tearful' based on subjective reports or observations made by others. In sum, while crying has often been mentioned as a sign of mood disorders, the evaluation of crying as relevant for depression by DSM has been inconsistent, and this symptom is neither a necessary nor a sufficient criterion to diagnose any of the mood disorders. This uncertain posture towards crying is not unique to the DSM. Crying is not also a necessary or sufficient criterion for diagnosis of any of the mood disorders in ICD-10 (45). Crying is not included in the Major Depression module in the Composite International Diagnostic Interview (46), only the Dysthymia module has an item 'During a two year period of being depressed, were you often in tears? (No = 1, Yes = 5).'

Are crying items on depression inventories related to overall depression severity?

A review of the performance of the BDI crying item as a depression indicator across a number of studies reveals a moderate positive relationship between the BDI crying item score and overall depression severity (i.e. BDI total score). As displayed in Table 2, the range of item–total correlations is 0.27–0.61, and the overall mean is 0.40. The item–total correlation for the crying item is representative of how other items on the BDI perform, and there is no obvious difference in the magnitude of this relationship between affectively disordered and non-disordered samples. While these data are consistent with the clinical reports that suggest a positive relationship between depression and crying, these data should not be regarded as strong evidence because: i) the use of a single-item measure of crying does not provide an optimal estimate of this behavior; ii) shared measurement of crying and depression by self-report may inflate this correlation because depression introduces a negative response bias on all self-report measures; iii) the retrospective nature of the data (i.e. depressive memory biases may inflate reports of crying). And finally, iv) interpretation of these correlations is clouded by the fact that the BDI crying item is actually scored in a curvilinear fashion, in which the most severe response on the crying item is to indicate that the person is no longer able to cry. Importantly, none of the studies in Table 2 formally assessed whether there was a nonlinear relationship between the crying item and BDI total scale score. Given the limitations inher-

### Table 2. Item–total correlations between the crying item and overall depression severity scores on the Beck Depression Inventory in clinical and non-clinical samples

<table>
<thead>
<tr>
<th>Study</th>
<th>Affective</th>
<th>Item–total correlation</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D/O sample</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gorenstein et al. (91)</td>
<td>No</td>
<td>0.40</td>
<td>BDI</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>0.27</td>
<td>BDI</td>
</tr>
<tr>
<td>Whisman, 2000 (92)</td>
<td>No</td>
<td>0.43</td>
<td>BDI-II</td>
</tr>
<tr>
<td>Aasen (93)</td>
<td>No</td>
<td>0.47</td>
<td>BDI-II</td>
</tr>
<tr>
<td>Olsson and von Knorring (94)</td>
<td>Yes</td>
<td>0.51 (M)</td>
<td>BDI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.59 (F)</td>
<td>BDI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.58 (Total)</td>
<td>BDI</td>
</tr>
<tr>
<td>Steer et al. (95)</td>
<td>Yes</td>
<td>0.44 (M)</td>
<td>BDI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.47 (F)</td>
<td>BDI</td>
</tr>
<tr>
<td>Kajima et al. (96)</td>
<td>No</td>
<td>0.30</td>
<td>BDI-II</td>
</tr>
<tr>
<td>Grothe (97)</td>
<td>No</td>
<td>0.47</td>
<td>BDI-II</td>
</tr>
</tbody>
</table>
ent in this approach, we now review the small body of work containing other estimates of crying in non-clinical samples and in clinical samples of individuals suffering from case-level depression.

The relationship between depression and crying in non-clinical and clinical studies

Despite the strong theoretical assumptions of a systematic relationship between crying and depression that are reflected in depression inventories, empirical research on the association between crying and depression has been surprisingly limited, and largely confined to non-clinical samples. Moreover, as our findings demonstrate, strong relationships between depression and crying have rarely been documented, either in non-clinical or in clinical studies.

Non-clinical studies A number of studies have examined the relationship between crying and depression in non-clinical samples. Kraemer and Hastrup (47) found no relationship between general depression levels, measured by the Multiple Affect Adjective Checklist (48) and estimated yearly crying frequencies in a non-clinical sample. Labott and Martin (49) found no relation between self-reported mood disturbance and measured crying frequency. In contrast, Hastrup et al. (50) demonstrated a significant correlation between the frequency of feeling like crying and the BDI score, in a non-clinical sample of volunteers 65 years and older. No association was found between the yearly crying frequency and the BDI score, but when the sample was divided into a mildly depressed (BDI > 4) and a non-depressed group (BDI < 4) there was a small but statistically significant difference in yearly crying frequency, with greater crying frequency found in the mildly depressed than in the non-depressed group. Frey et al. (51) reported a significant difference in crying, indicating a greater monthly crying frequency, in a depressive group (defined on the basis of Zung Depression Scale scores (52), compared with healthy controls. These investigators noted, however, that the ranges of the crying frequencies of both groups were quite similar, and that this overlap limits the usefulness of crying as a diagnostic criterion for depression. In a non-clinical sample of 82 men and 118 women with a BDI score of 15 and higher, 43% of the depressed men reportedly were unable to cry, even if they wished to, compared with 14% of the depressed women (53). This finding suggests that the gender differences in crying frequency (possibly related to premorbid emotional expressivity) may moderate the association between crying frequency and depression as well. However, it would be necessary to know whether the depressed men and women cry at all when they are not suffering from depression to accurately interpret this finding. As will be seen later on, some researchers in particular point to the role of sex role socialization rather than specifically biological sex (cf. 54).

Recently, Gran (55) conducted a population-based study among Norwegian women on depression with special attention for the postpartum period. She concluded that crying did not reflect the prevalence of other depression symptoms and therefore could not be considered an expression of depression. A remarkable finding was that postpartum women reported easily crying more often than non-postpartum women.

Clinical studies It is possible that a more robust association between depression and crying would be found if clinically depressed individuals were studied or if behavioral measures of crying were used. Unfortunately, prior studies of crying in clinically depressed samples have largely been limited to describing demographic and clinical features associated with this behavior. For example, on the basis of ward observations, Davis et al. (38) concluded that crying was more common among neurotic than among psychotic depressives.

In a rare experimental study, Rottenberg et al. (56) examined crying behavior in a clinically depressed sample. Their study revealed that there was no significant difference in the likelihood of crying in response to a sad film between the depressed and the non-depressed group. These results again fail to support the idea that a lower crying threshold characterizes depression.

We are unaware of studies that have explicitly focused on the effects of anti-depressive medication on crying in depressed patients. Research on patients with neurological disorders also suffering from pathological crying or emotional incontinence suggests dramatic decreases in crying even after rather low doses of different medication including tricyclic antidepressants, but in particular SSRIs (57).

Gender, depression, and crying

Both depression and crying are more prevalent among women. Especially during their reproductive years, women are more at risk of developing depression (33), the average female-to-male ratio in different populations being approximately 2:1 (58–60). Crying also occurs more frequently in women,
Relationship between depression and crying

The aim of the present review was to obtain more insight into the relationship between depression and crying. To this end, we scrutinized diagnostic instruments and summarized relevant findings. This approach made clear that many sources, including DSM-IV and most depression inventories, consider increased crying to be an indicator of depressed mood. However, empirical studies addressing the relationship between depression and crying do not yield strong evidence for this claim. Moreover, the idea that severe depression involves a loss of the capacity to cry has rarely been tested and thus needs special attention. Our review of extant findings further suggests that, although there are some remarkable exceptions, the preponderance of evidence favors the idea that gender differences in crying are maintained in depression. Depressed women seem to cry more often than depressed men, whereas depressed men likely seem to suffer from the inability to shed tears. Finally, little is known about the possible role of premorbid person characteristics, as well as the possible moderating effects of medication in altering crying behavior. Future research should therefore address the possible role of potential moderators, in particular premorbid features, such as gender and attachment style.

To guide future work on crying in psychopathology, we recommend that research uses frameworks drawn from basic research on adult crying behavior. Although a large number of factors undoubtedly influence crying, Bekker and Vingerhoets (73) have identified four main factors that may be especially critical for influencing crying in adulthood. These factors include: (i) the baseline threshold for shedding tears; (ii) the amount of exposure to cry-eliciting stimulation; (iii) appraisal processes and capacity to regulate emotional impulses; and (iv) social factors that may encourage or inhibit crying.

Within this four-factor framework, the first question for future research is whether depressed and non-depressed individuals differ in their baseline threshold for shedding tears. Naturalistic studies suggest that the individual’s crying threshold can be reduced by changes in physical state, such as tiredness, sleeplessness, menstrual cycle changes, and fluctuation in serotonin levels, as well as changes in psychological state, such as low mood (2). Depression involves several of these symptoms, presumably reducing the threshold for crying. Careful measurement of these symptoms, as well as experimental studies that present well-controlled cry-eliciting stimuli – ideally using
stimuli that vary in intensity – are needed to clarify how depression alters the threshold for crying. Brain imaging studies will also be important for elucidating the neuroanatomical bases for altered crying threshold in depression.

The second question within this framework is to specify how depression influences exposure to negative and positive cry-eliciting events. Existing research suggests that there is a strong correlation between depression and exposure to stressors, in particular loss and exit events (74) that are ostensibly capable of eliciting crying. Second, it is well known that depression is associated with reduced exposure to positive, rewarding events. Presumably, reduced exposure to positive life events in depression, in turn, reduces exposure to the positive stimuli that are typically associated with crying (e.g. winning an award). Detailed ambulatory studies are needed to clarify the contingency between exposure to positive and negative events to depressed crying episodes. We believe that appropriate attention to event valence (positive vs. negative crying antecedents) may yield important information: in a current investigation of event valence and crying during depressive episodes, we hypothesize that patients with mood pathology will report increased crying proneness to negative events but not to positive events. Data such as these will be critical for demonstrating how mood disorders may selectively alter different aspects of crying.

The third question within this research framework is the role of self-regulatory processes and appraisal in depressed persons' crying. Abundant research has already demonstrated that depressed persons generally have more negative information processing, e.g. negative biases in attention and memory (cf. 75). This could lead to increased crying via increased attention to sad material when reading newspapers, watching the TV news, or when attending to one's own thoughts. This would also be reflected in a bias to recall more frequent memories of loss and failure (76), themes that are associated with crying. Depressed patients (similar to anxiety patients) may also be biased to appraise neutral stimuli as negative, in this way increasing the likelihood of a low mood, even with relatively little environmental input (but see also Ref. 77).

At the same time, and possibly countervailing the influence of appraisal processes, depression in some contexts is associated with a generalized blunting of affective responding, as indicated by emotional indifference, reduced emotional reactivity, and reduced pain perception (78, 79). Finally, in spite of the lack of relevant data, it has been argued that depression involves a reduced capacity to regulate emotional impulses, an incapacity that may lead to more frequent and intense crying. However, related work suggests that depressed persons engage in affect management strategies, such as rumination (80), that may prolong the effects of negative cry-eliciting stimuli. Depressed individuals may also engage in mood-congruent mood management strategies that lead to a more frequent sampling of cry-eliciting stimuli (reading sad stories and poems, watching sad movies). In sum, processes involving appraisal and the regulation of affect would appear to have contradictory effects upon crying in depression. To sort out these issues, detailed studies that document links between appraisal and self-regulatory processes to crying episodes in depression are badly needed.

The fourth and final area for future study concerns crying behavior as a socially sensitive phenomenon that is powerfully influenced by the presence of sympathetic others. Depression is well known to have profound effects upon the social field. For example, depressed individuals are prone to excessive self-disclosure and may search for the company of other vulnerable persons (e.g. 81, 82), effects that, presumably, would be associated with increased crying. Possibly countervailing this, however, depression is associated with smaller social networks, reduced social contacts, and reduced social support. Better measurement of social contextual factors is needed to test these ideas about crying in depression, including the hypothesis that having few shoulders to cry upon will lead a depressed person to actually reduce his/her crying.

In closing, we believe this review suggests that the relationship between crying and depression is more complicated than meets the eye. Our suggestions are designed to allow researchers collect more precise information about the nature of cry-eliciting stimuli and the context of crying in depression. Ultimately, we hope that this contribution will lead not only to a more differentiated picture of how depression influences crying but also that it will shed light on the possible larger clinical significance of this mysterious human behavior.

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References


Vingerhoets et al.


