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# Mood and Emotion in Major Depression

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**ABSTRACT**—*Nothing is more familiar to people than their moods and emotions. Oddly, however, it is not clear how these two kinds of affective processes are related. Intuitively, it makes sense that emotional reactions are stronger when they are congruent with a preexisting mood, an idea reinforced by contemporary emotion theory. Yet empirically, it is uncertain whether moods actually facilitate emotional reactivity to mood-congruent stimuli. One approach to the question of how moods affect emotions is to study mood-disturbed individuals. This review describes recent experimental studies of emotional reactivity conducted with individuals suffering from major depression. Counter to intuitions, major depression is associated with reduced emotional reactivity to sad contexts. A novel account of emotions in depression is advanced to assimilate these findings. Implications for the study of depression and normal mood variation are considered.*

**KEYWORDS**—*depression; emotion; mood; affect; reactivity*

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Isn't it a common experience that moods make people more emotionally volatile? For example, don't irritable moods make it easier for even a minor slight to trigger outbursts of rage? Don't anxious moods make people so jumpy that a few strange noises in the night will provoke full panic and terror? This article considers the interplay of moods and emotions, by focusing on studies that examine one mood (depressed mood) and one emotion (sadness) in one population (clinically depressed persons). I first consider the intuitive hypothesis that major depression facilitates sad emotional reactions. Second, I describe a series of experiments that yielded results largely inconsistent with this idea. Third, I assimilate these novel findings into an alternative framework for understanding emotions in major depression. Finally, I highlight three directions for future research on the interaction between mood and emotion.

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## DOES DEPRESSED MOOD FACILITATE SAD EMOTIONAL REACTIONS?

One approach to studying mood–emotion interaction is to examine mood-disturbed individuals. People who suffer from major depressive disorder, commonly known as major depression, have a markedly severe type of mood disturbance. Major depression is the leading cause of psychiatric hospitalization; it is estimated to affect nearly one out of seven people and is associated with several adverse consequences, including increased risk of suicide. Major depression is defined as a 2-week period of persistent sad mood and/or a loss of interest or pleasure in daily activities, as well as four or more additional symptoms, such as marked changes in weight or appetite, sleep disturbance, pervasive guilt, fatigue, and difficulty concentrating. Although major depression is a complex package of symptoms, a profound change in mood is its most characteristic feature. Major depression thus provides a rich context for exploring the ways that mood alters emotional reactivity.

In considering mood–emotion interaction in depression, the first problem arises from the very slipperiness of the core terms, *mood* and *emotion*. Indeed, some researchers, clinicians, and laypeople have used these terms in confusing and incommensurate ways. For clarity and to follow current practices in affective science (Watson, 2000; Rottenberg & Gross, 2003), I here use moods to mean diffuse, slow-moving feeling states that are weakly tied to specific objects or situations. By contrast, emotions are quick-moving reactions that occur when organisms encounter meaningful stimuli that call for adaptive responses. Emotional reactions typically involve coordinated changes in feeling state, behavior, and physiology, and last seconds or minutes. Moods, by contrast, exert their clearest effects on feeling states and cognitions (as opposed to behavior and physiology) and last hours or days. When mood and emotion are distinguished in this way, it becomes apparent that depression, by definition, involves changes in moods but does not necessarily involve changes in emotional reactions.

Emotion theorists have posited that moods facilitate emotional reactions when the mood and the emotion are similar in nature

(e.g., Rosenberg, 1998). Does depressed mood facilitate sad emotional reactions? Circumstantial evidence suggests it does. From early psychoanalytic formulations of depression to contemporary cognitive conceptualizations, depression scholars have noted an increased expression of negative thoughts and feelings in this disorder. Depressed persons' increased report and display of negative feelings is apparent in several settings. For example, depressed persons typically report (in interviews and on questionnaires) strong sadness behaviors such as crying spells. These self-reports of increased tearfulness are corroborated by the observations of mental health professionals, who note that depressed persons are prone to cry in therapeutic settings.

Although these clinical observations are consistent with the mood-facilitation hypothesis, they do not in themselves establish that depressed persons react more strongly than other people to sad stimuli. For example, observations of notable crying in clinical contexts could reflect changes in depressed persons' social behavior, such as a tendency to seek comfort from potentially sympathetic others (Coyne, 1976). Likewise, increased crying could reflect that depressed persons are exposed to more sad stimuli in their everyday environments than are healthy individuals. Indeed, depressed persons are almost certainly faced with a different world of emotion-generative stimuli than healthy individuals are. For these reasons, a better way to test the mood-facilitation hypothesis is to assess depressed and healthy individuals' emotional reactivity to controlled sadness-eliciting stimuli in the laboratory.

### Testing the Mood-Facilitation Hypothesis

To test the mood-facilitation hypothesis, my colleagues and I created short films, using material taken from commercially available movies; our films were designed to elicit specific emotional states, and we pretested them in healthy populations. Of particular interest were responses to films that were edited either to elicit sadness or a neutral state (i.e., few reports or displays of emotion in healthy participants; Rottenberg, Kasch, Gross, & Gotlib, 2002). The sad film dramatized a death scene and revolved around themes of loss and grief; the neutral film depicted relatively innocuous landscape scenery. We recorded depressed and nondepressed participants' self-reported emotional experience and their observed expressive behavioral reactions and physiological reactions to the films. Surprisingly, the results from this study did not support the mood-facilitation hypothesis. First, depressed individuals' experiential, behavioral, and physiological reactions to the sad film were of similar magnitude to those of healthy people. Second, depressed participants reported greater sadness than healthy participants in response to the neutral film. Third, and most strikingly, when responses to the neutral film were used as a reference point, a typical practice in studies of emotional reactivity, depressed subjects actually reported smaller increases in sad feelings in response to the sad film than healthy controls did. Finally, this group difference did not appear to be a ceiling effect—that is, a consequence of depressed

persons' sadness already being at an upper limit of measure while watching the neutral film. The difference remained significant even after depressed participants who had reported very high levels of sadness to the neutral film were removed from the analysis.

### Further Violations of the Mood-Facilitation Hypothesis in Depression

Although a single violation of the mood-facilitation hypothesis is not decisive in itself, the lack of any support for the hypothesis in our first analysis gave us pause. Were our results an anomaly? To find out, we sought to test the mood-facilitation hypothesis under conditions that we expected to favor its confirmation.

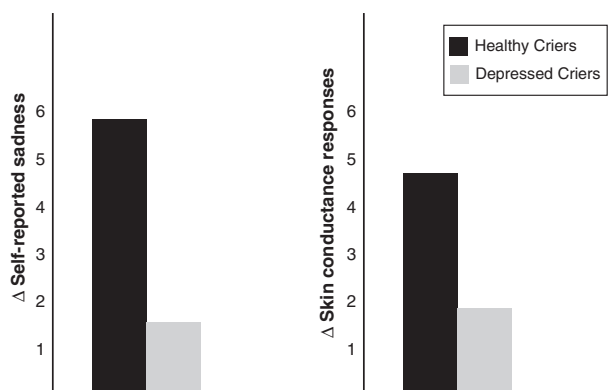
#### *Crying Responses*

One alternative explanation for why depressed individuals originally reported relatively little change in their feeling state in response to our sad film is that the film simply failed to engage the depressed participants. It is easy to imagine, for example, that the concentration difficulties experienced by depressed persons, or their lack of motivation to watch films, could curtail the impact of a sad film. To address the possibility that our results were a consequence of low engagement, we reanalyzed our data, focusing only on those depressed and healthy participants who responded to the sad film with verifiable crying behavior (visible tears in the eyes); we assumed that participants who visibly cried during the film were fully engaged with it. Indeed, given the popular belief that depressed persons cry readily and intensely, it seemed reasonable to expect that these analyses of criers would favor the facilitation hypothesis.

Despite this expectation, when criers in the two diagnostic groups were compared directly, depressed criers did not exhibit a greater response to the sad film in their emotional experience, expressive behavior (e.g., tearful eyes, furrowed brow, downturned mouth), or physiological responses such as heart rate and skin conductance (a measure of sweat gland activity). In fact, as displayed in Figure 1, when reactivity was computed from a neutral reference, depressed criers actually showed smaller changes in their emotional experience and physiology than healthy criers did (Rottenberg, Gross, Wilhelm, Najmi, & Gotlib, 2002). Therefore, restriction of the analysis to criers did not yield support for the mood-facilitation hypothesis. In fact, our results suggested that depression might actually blunt the distress and arousal that is typically associated with crying (Gross, Fredrickson, & Levenson, 1994).

#### *Personally Tailored Sad Stimuli*

Analysis of criers suggested that depressed persons' reduced response to sad material was unlikely to be an artifact of low engagement. Still, the possibility remained that our sad film was not an ideal stimulus for eliciting sadness in a depressed individual, in part because it was not relevant to the concerns of someone suffering from a serious disorder such as major de-



**Fig. 1.** Differences in self-reported sadness (left) and skin-conductance response rate (right) between healthy and depressed individuals who cried in response to a sad film. Adapted from “Crying threshold and intensity in major depressive disorder,” by J. Rottenberg, J.J. Gross, F.H. Wilhelm, S. Najmi, and I.H. Gotlib, 2002, *Journal of Abnormal Psychology*, 111, p. 307. Copyright 2002 by the American Psychological Association. Adapted with permission.

pression. After all, the sad film had been drawn from a commercial entertainment, and it dramatized the misfortunes of other people using a fairly generic theme of loss. Would the mood-facilitation hypothesis hold if a more personally relevant sad stimulus were employed?

To answer this question, we repeated our experiment with a new sample of participants (again, depressed people and a healthy control group). This time, we included personally tailored emotional films alongside the standardized emotional films previously used. The personally tailored films, drawn from videotaped interviews, were videotapes of the participants themselves talking about the saddest and happiest events from their own lives. (Segments of videotape of participants answering demographic questions about themselves were used as a neutral reference.) Remarkably, results indicated that even when they were responding to emotional films depicting themselves relating sad events that had happened to them personally, depressed persons still did not show greater sensitivity to sad stimuli than healthy controls did. The results instead confirmed our earlier result: Depressed individuals reported considerable sadness to neutral emotional material and reported little differential response to acutely sad material (Rottenberg, Gross, & Gotlib, 2004).

### IMPLICATIONS OF THESE FINDINGS

In summary, none of our work conducted with individuals with major depression has adduced evidence for the mood-facilitation hypothesis. In fact, our data indicate that major depression actually impedes reactivity to sad stimuli. Thus, contrary to both common intuition and emotion theory (Rosenberg, 1998), strong moods may not always facilitate strong emotional reactions to a mood-relevant stimulus. These findings have implications for how we understand major depression and the broader relationship between mood and emotion.

### Rethinking Emotional Functioning in Depression

It has long been known that depressed individuals exhibit relatively little reactivity to positive emotional contexts (e.g., less smiling at jokes). The data presented here are novel in suggesting that this lack of reactivity extends to negative emotional contexts. To be clear, in these studies, depressed persons do respond to sad stimuli with reports of sadness and behavioral signs of sadness. But, remarkably, they appear to show essentially the same pattern of response to sad stimuli as they do to emotionally innocuous stimuli. In other words, depression flattens the emotional landscape, greatly constricting the range of emotional reactions to differing emotional contexts. My colleagues and I label this emotionally constricted pattern *emotion context insensitivity* (ECI; Rottenberg et al., 2004).

### Converging Evidence for ECI in Major Depression

ECI—though a novel label—accords with several previous observations of depression. First, ECI accords with naturalistic observations of depressed persons’ behavior. Depressed patients often exhibit few changes in expressive behavior to environmental events and display monotonous sad expressions. Second, ECI accords with depressed patients’ personal descriptions of their disorder, which often feature emotional constriction: Patients describe their world as being flat, dull, and empty, and they remark that “everything is the same” (Healy, 1993). Third, ECI accords with the findings of recent investigations of emotion in major depression. For example, a recent naturalistic study found that, relative to healthy persons, depressed persons reported less emotional sensitivity to negative events (Peeters, Nicolson, Berkhof, Delespaul, & deVries, 2003).

### The Clinical Significance of ECI

What are the clinical implications of ECI? Although ECI is a generally observable feature in depressed patients, patients also vary in the extent to which they show ECI. Early data suggests that depressed patients with the most pronounced ECI may face a relatively worse prognosis. For example, we found that those depressed persons who reported the most similar reactions to sad and neutral contexts (the constricted pattern expected by ECI) evidenced the most impaired functioning—specifically, the most severe depression, the longest episodes of depression, and the poorest overall psychosocial functioning (Rottenberg, Kasch, et al., 2002). Also underscoring the potential clinical importance of ECI, we recently found that depressed individuals who disclosed the least sad emotion when discussing memories of sad life events showed the least improvement of their symptoms 1 year later (Rottenberg, Joormann, Brozovich, & Gotlib, in press).

### Does Depressed Mood Have a Purpose?

Depressed mood is painful, is associated with terrible human costs, and is remarkably prevalent. Scholars and sufferers alike have wondered whether depressed mood has any purpose. That

severe depressed-mood states impede emotional reactions may speak to the possible functions of depressed mood. Nesse (2000) postulated that depressed mood evolved originally as an internal signal designed to bias an organism against action, particularly in adverse situations in which continued activity might prove to be futile or dangerous (e.g., famine). Depressed mood may drive several features associated with depression—such as pessimism, self-absorption, and loss of interest in the environment—that hold a person in place and prevent ill-considered actions. In this way, severe depressed-mood states may constitute a broad defensive response that “shuts down” motivated activity.

### When Might Mood Facilitation Hold?

Strong moods may not always facilitate emotional reactions to mood-relevant stimuli, but how general is the exception? Should the intuition that irritable moods predispose people to angry outbursts and tense moods to anxiety attacks be abandoned? Although more compelling empirical demonstration of mood facilitation is needed, considerable indirect evidence for mood facilitation does exist, particularly for anxiety. In fact, most characterizations of anxiety disorders refer to prevailing anxious mood and to strong emotional reactions to mood-relevant stimuli (e.g., panic attacks, phobic reactions; see Barlow, 2002). Clinical anxiety and depression often co-occur; if it can be shown that anxious and depressed moods affect emotion differently, this fact may help better distinguish the two conditions (Watson, 2000).

### FUTURE DIRECTIONS

This review suggests that studying emotional disorders such as major depression can yield surprising insights about the interactions of mood and emotion. As we learn more about mood–emotion interaction, surely other surprising findings will follow. I close by highlighting three important questions for future research.

Do mild depressed moods affect emotion differently than clinical depression does? Careful assessment of emotional reactivity across the range of depressed mood may reveal that mild depression facilitates emotional reactions, whereas clinical depression impedes them. Such nonlinearity would further enrich the debate about whether depression is best conceived as a continuum or a discrete category (Beach & Amir, 2003). Such nonlinearity would also raise intriguing questions about research on neuroticism (a personality trait, involving unstable affect, that is a risk factor for depression), which has demonstrated that neurotic individuals react more strongly than non-neurotic individuals to negative stimuli (Larsen & Ketelaar, 1991).

How do the consequences of depressed moods differ from that of other moods? Parallel investigations using other mood states (e.g., irritable, anxious, and positive) will be critical for examining the boundary conditions for mood facilitation. Likewise, to determine whether depressed persons’ diminished response to

stimuli designed to elicit sadness is generalizable, other negative emotions (e.g., anger) should be examined with equal care.

How does mood influence other aspects of emotion besides the magnitude of emotional responses? Affective science is increasingly highlighting the payoffs of studying the timing and orchestration of emotion, for instance the speed at which emotional responses rise and fall (e.g., Rottenberg & Gross, 2003). Thus, future work on mood–emotion interaction should study not only mood’s effects on emotion magnitude but on these other aspects of the unfolding emotion waveform.

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