

Evaluation of Life Events in Major Depression: Assessing Negative Emotional Bias

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Background: Overly negative appraisals of negative life events characterize depression but patterns of emotion bias associated with life events in depression are not well understood. The goal of this paper is to determine under which situations emotional responses are stronger than expected given life events and which emotions are biased.

Methods: Depressed ($n = 16$) and non-depressed ($n = 14$) participants (mean age = 41.4 years) wrote about negative life events involving their own actions and inactions, and rated the current emotion elicited by those events. They also rated emotions elicited by someone else's actions and inactions. These ratings were compared with evaluations provided by a second, 'benchmark' group of non-depressed individuals ($n = 20$) in order to assess the magnitude and direction of possible biased emotional reactions in the two groups.

Results: Participants with depression reported greater anger and disgust than expected in response to both actions and inactions, whereas they reported greater guilt, shame, sadness, responsibility and fear than expected in response to inactions. Relative to non-depressed and benchmark participants, depressed participants were overly negative in the evaluation of their own life events, but not the life events of others.

Conclusion: A standardized method for establishing emotional bias reveals a pattern of overly negative emotion only in depressed individuals' self-evaluations, and in particular with respect to anger and disgust, lending support to claims that major depressives' evaluations represent negative emotional bias and to clinical interventions that address this bias. Copyright © 2016 John Wiley & Sons, Ltd.

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A key symptom for a diagnosis of major depression is experiencing negative moods that are more severe or of longer duration than expected given the person's life circumstances. For example, one criterion in the DSM-5 (American Psychiatric Association, 2013) is 'excessive or inappropriate guilt' (criteria 7, page 161). Although not a diagnostic criterion, it is not unusual for these negative moods to be preceded by negative life events (Brown, 1987, 1997, 1998; Emmerson, Burvill, Finlay-Jones, & Hall, 1989; Hamman, 2005; Kessler, 1997; Kraaij, Kremers, Arensman, & Kerkhof, 1998; Mazure, 1998). Furthermore, appraisals of the negative impact of life events have been found to be positively associated with past and current depression and have also been found to predict future depression, even after controlling for objective appraisals of these life events (Espejo, Hammen,

& Brennan, 2012). These results suggest that, although negative life events may precipitate depression, it is overly negative appraisals of life events that characterize depression. This conclusion is supported by the literature on cognitive biases in depression, which shows robust evidence of biased attention towards and memory for negative information in major depression (see Gotlib & Joorman, 2010 and Mathews & MacLeod, 2005 for reviews). Given the interplay between cognition and emotion, it is not surprising that emotion biases have also been found in individuals with major depression (Bourke, Douglas, & Porter, 2010; Bylsma, Taylor-Clift, & Rottenberg, 2011; Joormann & Vanderlind, 2014; Murphy *et al.*, 1999; Punkanen, Eerola, & Erkkila, 2010; Raes, Hermans, & Williams, 2006). Emotional biases have not been studied in response to independent ratings of life events, however, and patterns of emotion bias associated with life events are not well understood.

This study sought to explore patterns of emotion bias in response to life events for individuals with major depression by determining (1) which emotions are stronger than expected for individuals with major depression, (2) whether actions and inactions elicit different patterns of emotional bias, and (3) whether increased emotional responding is limited to self-relevant life events. This paper also outlines a

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novel approach for examining emotion biases in depression. Although excessive emotion is typically defined by individual clinicians, this study instead used a normative reference group. Emotional bias was measured as the magnitude of the difference between how individuals evaluated their own life events and how a benchmark group evaluated those same life events. Although it has yet to be examined which of the emotions experienced by depressed individuals in response to life events are actually stronger than would be normative, existing research does suggest how individuals will respond to actions versus inactions and self-relevant versus other-relevant events.

Evaluating Inactions Versus Actions

Gilovich and Medvec (1995) found that, although actions generated significant regret in the short term, it was inactions that produced more regret in the long term (or at least a different kind of regret; see Kahneman, 1995, and Gilovich, Medvec, & Kahneman, 1998). They argued that this difference is because of cognitive and social processes that diminish the severity of action regrets over time but bolster the severity of inaction regrets. Because individuals diagnosed with depression demonstrate a memory bias for negative information (e.g., Breslow, Kocsis, & Belkin, 1981; Gotlib, 1981; Watkins, Vache, Verney, Muller, & Mathews, 1996) and stronger mood-congruence effects than non-depressed individuals (e.g., Dalgleish & Watts, 1990), it might be expected that they would experience less diminution of action regrets over time. Depressed individuals may also be more prone to the severity of inaction regrets than non-depressed individuals. It is possible, therefore, that depressed individuals show emotional bias for both actions and inactions.

Evaluating Self Versus Others

Self-relevant information is more likely to be evaluated in a biased manner than is other-relevant information (e.g., Larsen & Cowan, 1988; Mathews & Bradley, 1983; Segal, Gemar, Truchon, Guirguis, & Horowitz, 1995; Shestyuk & Deldin, 2010; Strauman, 1989). In keeping with these findings, it is expected that, rather than experiencing a generalized tendency towards exaggerated negative emotion, individuals with depression will exhibit emotion biases that are specific to the self. Evaluations of self-relevant life events are therefore expected to lead to greater emotional bias than are evaluations of the life events of others.

Based on the foregoing analysis of potential facets that are associated with biased emotion in depression, the following hypotheses were developed with regard to both actions and inactions. It was hypothesized that depressed participants would have more negative emotional reactions to self-relevant life events than would non-depressed participants and that they would rate these life events

more negatively than would members of the benchmark group. In contrast, it was expected that non-depressed individuals would exhibit minimized negative emotions; that is, that they would rate their own past events as meriting less negative emotion than a benchmark group felt was appropriate. It was also hypothesized that depressed and non-depressed participants would not differ from each other or from the benchmark group in evaluations of the life events of others.

METHOD

Participants

Fifty participants were recruited from the Boston area through newspaper advertisements and posters for a series of studies investigating 'depression' and/or 'thoughts and emotions' and interviewed by telephone and then in person.¹ Participants were paid \$10/h for their time.

Diagnoses of Major Depressive Disorder (MDD) were made on the basis of a Structured Clinical Interview for the DSM-IV, Patient Edition (SCID-I/P; First, Spitzer, Gibbon, & Williams, 2002), administered by a doctoral-level clinical psychologist or advanced doctoral students trained in SCID administration. Of approximately 200 individuals screened, 16 individuals with MDD were chosen. Twenty-five percent of the audiotapes of the interviews were reviewed and confirmed for accurate diagnoses. In addition, the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) was administered to provide an index of depression severity. Four of the 16 MDD individuals had no comorbidity. Of the others, seven were also dysthymic, five had abused alcohol or drugs in the past, two were agoraphobic, and one had panic disorder. Thirty percent of the depressed individuals were

¹A great deal of care was taken to ensure that participation in this study was voluntary and a positive experience. A phone screen served as a preliminary test for participant participation. During the phone screen and again at the beginning of the interview session, participants were told that they would not receive any treatment nor any benefit other than monetary reimbursement for the study. When participants were interviewed, they were reminded of their right to withdraw from the study with no consequence to them if they chose not to participate. Participants who requested information about treatment were given a referral list of mental health care providers that offered treatment on a sliding-fee scale. Confidentiality was assured in written and verbal form and included a detailed description of how data were to be identified by numeric code, not names. Participants put their consent form, the only experiment document with their name on it, in an envelope, sealed it and dropped it in a box. When participants in the depressed and non-depressed groups completed the procedure, a clinician fully debriefed them if they seemed distressed. Some participants expressed that writing about the events elicited intense emotions. Follow-up telephone calls to those participants who found writing about their events to be an emotional experience revealed no discernable adverse effects.

currently in psychotherapy, 50% were taking antidepressants and 85% had a past history of psychotherapy.

Fourteen non-depressed controls, with no current or past Axis I psychiatric diagnosis, were screened with the SCID-I/P by the same clinician and doctoral students and were matched on age, education and sex to the 16 depressed participants. The BDI was also administered to non-depressed participants to check that the depressed and non-depressed populations differed in depression severity.

Depressed and non-depressed groups did not differ in age (depressed mean = 43.63, SD = 8.85; non-depressed mean = 38.79, SD = 15.33; $t(28) = 1.04$, $p = 0.311$) or education (depressed mean education in years = 14.56, SD = 2.42; non-depressed mean = 15.57, SD = 1.95; $t(28) = -1.25$, $p = 0.224$). Approximately 60% of the depressed group and approximately 70% of the non-depressed group were women. The depressed group had higher BDI scores (depressed mean = 20.94, SD = 7.53; non-depressed mean = 2.93, SD = 3.85; $t(28) = 8.39$, $p < 0.0001$).

A third, benchmark group was recruited to provide a standard for the amount of emotion others feel is warranted in a given situation. This benchmark group standard was akin conceptually to Kenny's social relations method of assessing the accuracy of interpersonal perception (Kenny & Albright, 1987). It is a method of defining 'inaccuracy' that has been used effectively by others, notably by Colvin and Funder (e.g., Colvin, Block, & Funder, 1995; Kolar, Funder, & Colvin, 1996). The 20 members of the benchmark group, unselected with respect to depression, included approximately equal numbers of community members and Harvard undergraduates. Both the community members and undergraduates were recruited using the same advertisements and posters on campus and no exclusion criteria were used. No member of the benchmark group scored over 9 on the BDI. Benchmark group participants had a mean age of 36.89 years (SD = 20.33) and a mean education level of 13.80 years (SD = 2.46). This group allowed testing of whether there is a difference between what individuals themselves feel and what others think they ought to feel (Strauman & Higgins, 1987). In other words, use of the broadly selected non-depressed benchmark group made it possible to determine whether depressed individuals' responses to life events are normative relative to an unselected sample. The intention was not to determine whether depressed or non-depressed reactions to events are correct in a moral sense, only to examine whether depressed individuals' reactions to negative events are more intense than others believe is warranted in a given situation.

Procedures

Depressed and Non-Depressed Participants

Participants were greeted and handed an envelope that included a consent form, instructions, a list of questions

labelled Part 1 and a booklet for recording their responses. They were shown to and left alone in a quiet, private room, where they read and signed the consent form and dropped it in a designated box on the table. Participants then were instructed to 'write a paragraph or two (or more if you would like)' in response to questions about life events—an action and an inaction (also about a victimization experience, not reported here). The instructions asked participants to describe the details of each experience and the circumstances surrounding it, stating 'it is not necessary to discuss your feelings about the event, although you may if you wish,' and that they should 'relax' and 'write whatever comes to mind.' This wording was chosen (1) to elicit but not demand emotional responses, and (2) to avoid eliciting interpretations of events that could potentially colour the responses of benchmark group. Depressed and non-depressed participants were asked to write responses to the following questions about life events: For an Action—'Sometimes people do things that are harmful to others, to society or to themselves. Please write about the worst instance in the past that you feel that you did something wrong or did something that you regret' and for an Inaction—'Sometimes people have regrets about failing to do something that they wish they had done. Please write about the instance that you most regret not taking an action or reaching a goal.'

When participants had completed Part 1, they were immediately given Part 2, which asked them to read their written responses to each question and to rate them on a series of emotion variables. Participants rated their events on the degree to which they currently felt guilty, sad, ashamed, angry, disgusted, afraid, happy and responsible regarding the events. These dimensions were chosen based on Ekman's view of universal emotions (e.g., Ekman & Fridlund, 1987), with the addition of guilt, shame and responsibility, which may be particularly important to evaluations of actions and inactions and not captured well with the other ratings. Ratings were made on a 12.7-cm horizontal visual analog scale anchored by 'Not at all' and 'Very,' with 'Somewhat' centred on the line.

Finally, depressed and non-depressed participants were asked to evaluate a similar set of events described by someone else, the standard transcripts. They viewed a modified transcription of two events from Pennebaker's (1989) study of confession—one of which could be reasonably labelled an action, one an inaction, both of which led to relatively severe negative outcomes (see Appendix A). Participants were asked to rate how the individual who experienced the event should feel on the same rating scales they used to evaluate their own life events.

Benchmark Group Participants

After benchmark group participants completed a consent form, they rated the standard transcripts and

transcripts of the depressed and non-depressed participants' written descriptions of their actions and inactions. The benchmark group participants were asked to indicate the degree to which they felt the individual who reported the event would feel each of the emotions listed. All identifying information was removed in making the transcripts, and grammar and spelling errors were corrected. Benchmark group participants did not know the purpose of the study, nor did they know anything about the participants who had written the responses (e.g., whether they were depressed). They were told that the stories depicted actual life events reported by participants, and each transcript was presented with the same rating scale used by the depressed and non-depressed participants.

RESULTS

Severity of Life Events as Rated by the Benchmark Group

Benchmark group ratings of the life events of depressed and non-depressed individuals were compared. A repeated-measures ANOVA of emotion ratings (guilt, sadness, regret, shame, anger, disgust, fear and joy) with Group (Depressed versus Non-Depressed) as a between-subjects variable showed that the benchmark group did not rate the life events of depressed participants more negatively than they rated the events described by non-depressed participants (within-subjects: $F(15,390) = 65.21$, $p < 0.001$; between-subjects: $F(1,26) = 1.03$, $p = 0.320$). Therefore, differences in subsequent comparisons of the depressed and non-depressed groups and of self-benchmark group discrepancies suggest differences in self-evaluation, rather than in severity of experience.

Actions of Participants

Emotion Ratings for Depressed Versus Non-Depressed Participants

The scores for the eight emotion ratings of actions (guilt, sadness, regret, shame, anger, disgust, fear and joy) were submitted to repeated-measures ANOVA with Group (Depressed versus Non-Depressed) as a between-subjects variable (within-subjects: $F(7,182) = 26.32$, $p < 0.001$, $\eta_p^2 = 0.503$; between-subjects: $F(1,26) = 10.33$, $p = 0.002$, $\eta_p^2 = 0.307$)² (see Table 1). Follow-up independent samples

²When an overall F is significant, the computation of follow-up t -tests is 'protected' against capitalization on chance (Rosenthal & Rosnow, 1991, pp. 328–329). Furthermore, the focus was on pattern of bias, rather than specific emotion variables (e.g., disgust versus guilt). Therefore, procedures such as Bonferroni to adjust the p -values were not needed.

Table 1. Mean (standard deviation) differences from benchmark group in evaluations of actions

Emotions	Depressed				Non-depressed							
	Self-evaluation ¹		Standard transcript ²		Self-evaluation ¹		Standard transcript ²					
	Score	Benchmark group	Dif	Score	Benchmark group	Dif	Score	Benchmark group	Dif			
Guilt	4.10 (.99)	3.16 (1.27)	.94*	2.46 (1.48)	2.42 (1.37)	.06	3.33 (1.20)	3.39 (1.09)	-.06	3.11 (1.63)	2.42 (1.37)	.69
Sad	3.56 (1.82)	3.57 (.90)	-.01	3.51 (1.56)	4.32 (.88)	-.81	2.61 (1.57)	3.33 (.97)	-.72	4.16 (.96)	4.32 (.88)	-.16
Responsible	4.12 (1.36)	3.72 (1.15)	.40	1.75 (1.40)	1.75 (1.42)	.00	3.77 (1.19)	3.57 (.95)	.20	1.78 (1.73)	1.75 (1.42)	.03
Ashamed	3.91 (1.16)	2.91 (1.33)	1.00*	2.09 (1.88)	1.88 (1.27)	.21	3.21 (1.62)	3.08 (.92)	.13	2.81 (1.07)	1.88 (1.27)	.93**
Angry	3.35 (1.59)	1.67 (.70)	1.68***	2.67 (1.53)	3.52 (1.35)	-.85	2.14 (1.85)	1.76 (.85)	.38	3.22 (1.61)	3.52 (1.35)	-.30
Disgusted	3.49 (1.39)	2.45 (1.02)	1.04**	2.67 (1.77)	3.61 (1.60)	-.94	1.74 (1.77)	2.74 (.78)	-1.00**	1.90 (1.78)	3.61 (1.60)	-1.71**
Afraid	1.90 (1.60)	1.73 (1.04)	.17	1.23 (1.10)	1.59 (1.03)	-.36	.77 (1.08)	1.18 (.52)	-.41	1.14 (.96)	1.59 (1.03)	-.45
Happy	.51 (.68)	.30 (.13)	.21	.61 (.72)	.39 (.32)	.22	.23 (.14)	.32 (.07)	-.09**	.49 (.73)	.39 (.32)	.10

¹Differences computed as paired samples (depressed with mean benchmark group evaluations of depressed participants' written responses, and non-depressed with mean benchmark group rating of non-depressed participants' written responses) t -tests.

²Differences computed as independent samples (depressed with benchmark group ratings of standard transcript, and non-depressed with benchmark group ratings of standard transcript) t -tests.

* = $p \leq 0.10$.

** = $p \leq 0.05$.

*** = $p \leq 0.01$.

t-tests showed that depressed participants rated their actions as eliciting more disgust ($t(26)=2.91$, $p=0.007$, $d=1.14$) and fear ($t(26)=2.20$, $p=0.038$, $d=0.86$) than non-depressed participants rated their own actions as eliciting. Ratings for the remaining emotions did not differ significantly for depressed and non-depressed participants.

Emotional Bias Scores (Participant Rating – Benchmark Group Rating) for Depressed Versus Non-Depressed Participants

Depressed participants also reported greater emotional bias (i.e., more emotion than the independent benchmark group believed was warranted) for actions than did non-depressed participants. Difference scores (participants' self-rating of action minus mean benchmark group ratings of those same actions) were submitted to a repeated-measures ANOVA with Group (Depressed versus Non-Depressed) as the between-subjects variable. This analysis revealed a significant main effect for Group (within-subjects: $F(7,182)=3.11$, $p=0.004$, $\eta_p^2=0.107$; between-subjects: $F(1,26)=6.73$, $p=0.015$, $\eta_p^2=0.206$).

More specifically, depressed participants rated their own actions overall more negatively than the benchmark group rated these actions (the actions of depressed participants), $M=3.49$ ($SD=0.82$) for depressed, $M=2.74$ ($SD=0.82$) for benchmark group, paired-samples ($t(13)=2.32$, $p=0.037$). Depressed participants rated their actions as eliciting more anger ($t(13)=3.93$, $p=0.002$, $d=1.05$) and disgust ($t(13)=2.22$, $p=0.045$, $d=0.59$) than the benchmark group felt was warranted. Non-depressed participants rated their own actions overall at a level of severity similar to those of the benchmark group, $M=2.51$ ($SD=0.80$) for non-depressed, $M=2.72$ ($SD=0.54$) for benchmark group, paired samples ($t(13)=0.98$, $p=0.346$).

Actions of Others

The average rating of negative emotion elicited by the action described in the standard transcript was $M=2.34$ ($SD=0.81$) for the depressed participants, $M=2.59$ ($SD=0.90$) for the non-depressed participants, and $M=2.73$ ($SD=0.82$) for the benchmark group. The scores for the eight emotion ratings of actions (guilt, sadness, regret, shame, anger disgust, fear and joy) were submitted to repeated-measures ANOVA with Group (Depressed versus Non-Depressed versus Benchmark) as a between-subjects variable. This analysis revealed no group differences (emotion: $F(4.534,273)=34.361$, $p<0.001$, $\eta_p^2=0.468$; group: $F(2,39)=0.696$, $p=0.505$; emotion \times group: $F(9.069,273)=1.838$, $p=0.064$).

Inactions of Participants

Emotion Ratings for Depressed Versus Non-Depressed Participants

The scores for the eight emotion ratings of inactions (guilt, sadness, regret, shame, anger disgust, fear and joy) were submitted to repeated-measures ANOVA with Group (Depressed versus Non-Depressed) as a between-subjects variable (within-subjects: $F(7,196)=48.151$, $p<0.001$, $\eta_p^2=0.632$; between-subjects: $F(1,28)=3.48$, $p=0.063$, $\eta_p^2=0.118$) (see Table 2). Follow-up independent samples *t*-tests showed that depressed participants rated their inactions as eliciting more anger ($t(28)=3.06$, $p=0.005$, $d=1.16$) and disgust ($t(28)=3.78$, $p=0.001$, $d=1.40$) than non-depressed participants rated their own inactions as eliciting. Ratings for the remaining emotions did not differ significantly for depressed and non-depressed participants (Table 3).

Emotional Bias Scores (Participant Rating – Benchmark Group Rating) for Depressed Versus Non-Depressed Participants

Depressed participants also reported greater emotional bias for inactions than did non-depressed participants. A repeated-measures ANOVA of difference scores (participants' self-rating of inaction minus mean benchmark group ratings of those same inactions) with Group (Depressed versus Non-Depressed) as a between-subjects variable showed a main effect of Group (within-subjects: $F(7,196)=6.27$, $p<0.001$, $\eta_p^2=0.183$; between-subjects: $F(1,28)=6.94$, $p=0.014$, $\eta_p^2=0.199$).

Depressed participants were more negative than the benchmark group in their evaluations for nearly every rating, whereas non-depressed participants were more negative than the benchmark group for only a few of these variables. Specifically, depressed participants rated their own inactions overall more negatively than the benchmark group rated these inactions (the inactions of depressed participants), $M=3.40$ ($SD=1.02$) for depressed, $M=1.78$ ($SD=0.33$), for benchmark group ($t(15)=5.62$, $p<0.0001$), with these actions eliciting more anger ($t(15)=7.41$, $p=0.001$, $d=1.85$), disgust ($t(15)=4.84$, $p=0.001$, $d=1.21$), sadness ($t(15)=6.09$, $p=0.001$, $d=1.52$), fear ($t(15)=2.42$, $p=0.029$, $d=0.60$), guilt ($t(15)=3.92$, $p=0.001$, $d=0.98$), shame ($t(15)=4.10$, $p=0.001$, $d=1.02$) and responsibility ($t(15)=2.54$, $p=0.023$, $d=0.64$) than the benchmark group thought was appropriate. Non-depressed participants rated their own inactions overall more negatively than the benchmark group rated them, $M=2.74$ ($SD=0.89$) for non-depressed, $M=2.11$ ($SD=0.56$) for benchmark group, ($t(13)=2.56$, $p=0.024$). Their inactions elicited more guilt ($t(13)=3.43$, $p=0.004$, $d=0.92$) and responsibility ($t(13)=4.76$, $p=0.001$, $d=1.27$) than the benchmark group thought appropriate.

Table 2. Mean (standard deviation) differences from benchmark group in evaluations of inactions

Emotions	Depressed						Non-depressed					
	Self-evaluation ¹			Standard transcript ²			Self-evaluation ¹			Standard transcript ²		
	Score	Benchmark group	Dif	Score	Benchmark group	Dif	Score	Benchmark group	Dif	Score	Benchmark group	Dif
Guilt	3.52 (1.46)	1.89 (.48)	1.63***	3.73 (1.39)	3.53 (1.72)	.20	3.68 (1.44)	2.27 (.70)	1.40***	3.86 (1.47)	3.53 (1.72)	.33
Sad	4.38 (.98)	3.01 (.39)	1.37***	4.74 (.46)	4.92 (.26)	-.18	3.95 (1.16)	3.31 (.72)	.64**	4.80 (.36)	4.92 (.26)	-.12
Responsible	3.79 (1.12)	2.64 (.89)	1.15**	3.48 (1.18)	3.12 (1.58)	.36	4.28 (.86)	2.81 (.71)	1.47***	2.60 (1.65)	3.12 (1.58)	-.52
Ashamed	2.94 (1.71)	1.17 (.42)	1.23***	4.04 (1.15)	3.17 (1.97)	.87	2.47 (2.08)	1.73 (.83)	.75	3.62 (1.62)	3.17 (1.97)	.45
Angry	4.16 (1.06)	1.86 (.52)	2.30***	2.66 (1.87)	2.63 (1.60)	.03	2.71 (1.51)	2.11 (.85)	.61	3.33 (1.79)	2.63 (1.60)	.69
Disgusted	3.28 (1.69)	1.14 (.36)	2.14***	3.40 (1.63)	2.74 (1.77)	.66	1.28 (1.20)	1.66 (.70)	-.38	2.70 (1.67)	2.74 (1.77)	-.04
Afraid	1.73 (1.68)	.72 (.41)	1.01**	1.75 (1.46)	2.37 (1.36)	-.69	.80 (1.03)	.91 (.53)	-.12	1.79 (1.50)	2.37 (1.36)	-.58
Happy	.48 (.63)	.36 (.15)	.12	.69 (1.23)	.25 (.00)	.39	.24 (.17)	.33 (.11)	-.09	.22 (.14)	.25 (.00)	-.03

¹Differences computed as paired samples (depressed with mean benchmark group evaluations of depressed participants' written responses, and non-depressed with mean benchmark group rating of non-depressed participants' written responses) *t*-tests.

²Differences computed as independent samples (depressed with benchmark group ratings of standard transcript, and non-depressed with benchmark group ratings of standard transcript) *t*-tests.

* = $p \leq 0.10$.

** = $p \leq 0.05$.

*** = $p \leq 0.01$.

Table 3. Mean negative emotion ratings for participant life events

	Depressed		Non-depressed	
	Self	Benchmark group	Self	Benchmark group
Actions	3.49 (.82)	2.74 (.82) ¹	2.51 (.80)	2.72 (.54)
Inactions	3.40 (1.02)	1.78 (.33) ²	2.74 (.89)	2.11 (.56)

¹Paired-samples *t*-tests, $p < 0.05$.

²Paired-samples *t*-tests, $p < 0.001$.

Inactions of Others

The average rating of negative emotion elicited by someone else's inaction was $M = 3.40$ ($SD = 0.79$) for the depressed participants, $M = 3.24$ ($SD = 1.17$) for the non-depressed participants, and $M = 3.21$ ($SD = 1.24$) for the benchmark group. The scores for the eight emotion ratings of actions (guilt, sadness, regret, shame, anger, disgust, fear and joy) were submitted to repeated-measures ANOVA with Group (Depressed versus Non-Depressed versus Benchmark) as a between-subjects variable. This analysis revealed no group differences (emotion: $F(3.342, 273) = 84.94$, $p < 0.001$, $\eta_p^2 = 0.685$; group: $F(1, 39) = 0.946$, $p = 0.397$, $\eta_p^2 = 0.046$; emotion \times group: $F(6.683, 273) = 1.574$, $p = 0.152$).

DISCUSSION

The present study examined emotion bias in response to life events in individuals with and without major depression. Depressed and non-depressed participants' evaluations of self-reported life-events were calibrated against those made by a third group of participants. Bias was thus operationally defined in this study as differences between self and other evaluations. Using this definition of bias, depressed participants showed greater emotion than expected in response to both actions and inactions, whereas non-depressed participants showed greater emotion than expected (guilt and responsibility) in response only to inactions. Furthermore, depressed individuals experienced excessive anger and disgust in relation to both actions and inactions. These emotions can be considered moral emotions (Rozin, Lowery, Imada, & Haidt, 1999) and have been related to rumination (Cheung, Gilbert, & Irons, 2004). Perhaps past negative events elicit a sort of moral or socio-moral self-loathing in depressed individuals (Power & Dalgleish, 1997; Rozin, Haidt, & McCauley, 2000). If so, it would be useful to explore this unexpected result as a potential hallmark of the triggers and development of emotional bias in individuals with depression.

The results also indicate that the emotion biases exhibited in response to life events for individuals with

depression are specific to the self rather than generalized. Individuals with depression demonstrated greater negative emotion when evaluating themselves than an impartial benchmark group thought they should, and the depressed group demonstrated greater negativity in self-evaluation than did non-depressed controls. This negative bias was particular to self-relevant events, in keeping with the notion that depressed individuals show an excessive level of self-focus (e.g., Ingram, Lumry, Cruet, & Sieber, 1987; Ingram & Smith, 1984; Larsen & Cowan, 1988; Pyszczynski & Greenberg, 1987a, 1987b; Pyszczynski, Hamilton, & Herring, 1989; Segal *et al.*, 1995).

There are limitations to the conclusions that can be drawn from this study. First, non-depressed participants did not show the consistent patterns of positive emotion bias that were expected, and actually showed some negative emotional bias (greater guilt and responsibility than expected) in response to their own life events. It may be that the overly optimistic views of self commonly found in typical populations (e.g., Taylor & Brown, 1988, 1994) are strongest in contexts where self is evaluated relative to others, unlike the present protocol. Moreover, it seems that writing about past negative events may dampen tendencies towards unrealistic optimism, in that certain task goals (future-oriented) and 'moods' (positive) are known to elicit more overly positive evaluations than others (e.g., Pyszczynski, Holt, & Greenberg, 1987; Taylor, Aspinwall, & Giuliano, 1993; Taylor & Gollwitzer, 1995). It is also possible that benchmark scores are not accurately capturing emotional bias.

Second, it is notable that depressed and non-depressed participants reported different emotional reactions to their own life events (greater fear and disgust among depressed participants for actions; greater anger and disgust among depressed participants for inactions). It is unclear whether this is a reflection of qualitative differences in the types of experiences recounted by depressed and non-depressed participants, or, alternatively, whether this reflects emotional bias on the part of depressed participants.

Third, the present study did not measure the influence of elapsed time on the rating of reported events. It may be that depressed and non-depressed participants systematically recount negative events that have happened at different times. This is significant in that more recent negative events are perceived more negatively than are more distant negative events (Walker, Vogl, & Thompson, 1997). Subsequent studies should control for, or at least measure, time since event.

Fourth, participants were asked to write about victimization experiences before rating their emotions related to actions and inactions. It is possible that writing about these victimization experiences primed negative affect more strongly in depressed participants and influenced their subsequent ratings of their life events (actions and inactions).

In spite of these limitations, the results of this study indicate that depressed individuals experience greater anger and disgust than expected in response to both actions and inactions, whereas they experience greater guilt, shame, sadness, responsibility and fear than expected in response to inactions. The results also demonstrate that depressed individuals exhibit exaggeration of negative emotions in response specifically to their own – not others' – life events. This provides evidence that they have self-relevant emotional biases, in addition to cognitive biases, that are also thought to be specific to the self. Taken together, these findings emphasize the role of self-relevant biases for emotions other than sadness in depression. Given biases in anger and disgust across both actions and inactions, as well as in shame and guilt with regard to actions, it is plausible then that emotional biases in depression are linked to processes such as self-criticism and self-loathing that elicit these emotions. As such, these results confirm the emphasis on self-critical processes in the treatment of depression (e.g., Kannan & Levitt, 2013) and suggest that treatment interventions should work to transform moral emotions such as anger and disgust in addition to addressing feelings of sadness.

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Appendix A: Standard Transcripts modified from Pennebaker's (1989) study on confession

Action I was seventeen years old. My father and I had begun to argue more than we used to because he was a very

strict father while I felt that I was old enough to make my own decisions. One night we had a horrible fight over the person who I was dating at the time. In a fit of rage, I tried to get back at him. My mother was there during the fight. I yelled at him and accused him of having an affair. At the time that I said this, I did not know that this was in fact true. My mother had not known about my father's affair. Because of what I said, she found out and my parents got divorced.

Inaction When I was ten I was stubborn. My parents had asked me to clean up my room because my grandmother was supposed to come over for dinner later that night. I refused to do what my parents had told me. We fought over it, but my parents were busy preparing everything for my grandmother's visit and soon gave up trying to make me clean my room. When my grandmother arrived, my room was still a mess. As she came into my room to greet me, she stepped on one of my toys and slipped. She fell to the floor and broke her hip. Later that week, she went to the hospital to have an operation on her hip. She died during surgery due to complications.