Title
Cognitive distortions mediate depression and affective response to social acceptance and rejection

Permalink
https://escholarship.org/uc/item/9f50g883

Authors
Caouette, Justin D
Guyer, Amanda E

Publication Date
2016

DOI
10.1016/j.jad.2015.11.015

Peer reviewed

Cognitive distortions mediate depression and affective response to social acceptance and rejection

Justin D. Caouette and **Amanda E. Guyer**

Department of Human Ecology, Center for Mind and Brain, University of California, Davis

Abstract

Background—The emotional context insensitivity (ECI) hypothesis suggests individuals with depression have blunted affective responses to both positive and negative events. We tested ECI in a social context to examine how depression relates to affective responses to social acceptance and rejection outcomes. Furthermore, we aimed to identify cognitive mechanisms linking depression with affective response to social feedback. Finally, we tested whether these processes are similar for social anxiety.

Method—90 participants (age 18–26 years; 53 women) completed the two-visit Chatroom task. At Visit 1 they rated their expectations about being liked by 60 peers. At Visit 2 they completed self-reports of depressive and social anxiety symptoms, and cognitive flexibility, then received acceptance or rejection feedback from each peer and rated their affective response.

Results—Greater depressive symptoms related to negative expectancy bias, lower cognitive flexibility, and less positive affective response to acceptance, but did not relate to rejection. Negative expectations and cognitive flexibility mediated the relationship between depressive symptoms and affective response for acceptance; only negative expectations mediated rejection responses. These cognitive mechanisms were not related to social anxiety.

Limitations—A community sample was used to assess depression. Rumination and current mood state were omitted as potential predictors of affective response.

Conclusions—Findings support the ECI framework. Depression but not social anxiety interferes with positive and negative affect through cognitively mediated dampening of emotional response to social acceptance and rejection. Emotion regulation strategies in depression therapy can target social flexibility to improve alignment of affective reactions to social outcomes.

Keywords

depression; emotion; appraisal; expectation; social evaluation

---

Correspondence should be directed to: Justin D. Caouette, Center for Mind and Brain, University of California Davis, 267 Cousteau Place, Davis, CA 95618. jdcaouette@ucdavis.edu.

Experiencing stressful life events is strongly linked to increased likelihood of having major depressive disorder (Hammen, 2005). Given that nearly 20% of people in the U.S. alone have experienced major depression at some point in their lifetime (Kessler & Bromet, 2013), there is a critical need to understand the mechanisms underlying how those vulnerable to depression respond to stressful experiences. Several reports indicate that individuals with depression are generally more emotionally reactive to both negative (O'Neill, Cohen, Tolpin, & Gunthert, 2004; Rottenberg, 2005) and positive (DeWall & Bushman, 2011; Steger & Kashdan, 2009) life events. However, the specific attributes that underlie depression-related variation in affective response remain uncertain, as evidence also shows that people with depression demonstrate dulled emotional responses to positive and negative events (Bylsma, Morris, & Rottenberg, 2008; Feeser et al., 2013; Moran, Mehta, & Kring, 2012). Focus on two elements may help gain traction on better understanding this variability. First, whereas much research has centered on the link between depression and experiencing chronic and prolonged life stressors (Hammen, 2005; Monroe, Slavich, & Georgiades, 2009), less is known about how depression relates to more immediate affective responses to stressful events that can occur in everyday life. Second, because distorted cognitions about one's self are a prominent feature of depression (Beck, 2008; Mathews & MacLeod, 2005), identifying specific cognitive mechanisms that influence affective response to stressors will aid our understanding of how to offset depression vulnerability. Thus, the purpose of the current study was to examine whether depressive symptoms and cognitive distortions explain individual differences in momentary affective response following a stressful event.

Some of the most powerful sources of stress that contribute to depression occur from social interactions (DeWall & Bushman, 2011; Slavich, O'Donovan, Epel, & Kemeny, 2010; Steger & Kashdan, 2009). Experiences of social rejection are particularly impactful insofar as they are associated with depression risk to a greater degree than any other type of stress (Kendler, Hettema, Butera, Gardner, & Prescott, 2003; Slavich et al., 2010). Due to the survival benefits of social relationships, humans have a fundamental drive to maintain positive social status and thus sustain their social inclusion (Baumeister & Leary, 1995). Socioevolutionary perspectives posit that subclinical depressive symptoms serve to foster survival by attuning people to their current social status and the potential danger of rejection by other people (Allen & Badcock, 2003; Gilbert, 2006). Thus, it is not surprising that experiences of social evaluation are a crucial elicitor of psychological stress (Steger & Kashdan, 2009). Being rejected by others decreases feelings of self-worth (DeWall & Bushman, 2011), predicts accelerated onset of depression (Slavich, Thornton, Torres, Monroe, & Gotlib, 2009), and leads people to perceive life as less meaningful (Stillman et al., 2009). Furthermore, heightened sensitivity to rejection is overrepresented in major depression relative to other forms of psychopathology (Ayduk, Downey, & Kim, 2001). There is also evidence that people with greater depressive symptoms show a mix of affective responses to positive cues, with some work supporting dampened reactions to positive outcomes (Bylsma et al., 2008; Feeser et al., 2013; Moran et al., 2012) and other work demonstrating greater intensity and higher levels of positive affect in response to social acceptance specifically (DeWall & Bushman, 2011; Steger & Kashdan, 2009).

One guiding explanation to help further evaluate depression-related variability in affective response to social evaluation is the emotional context insensitivity (ECI) hypothesis (ECI; Rottenberg, Gross, & Gotlib, 2005). The ECI hypothesis posits that depressed mood involves a widespread context-inappropriate affective response to both positive and negative stimuli. Across multiple response systems (e.g., self-reported experience, expressive behavior, peripheral physiology, neural function), studies supporting the ECI hypothesis find dampened positive affective response to positive stimuli and blunted negative affective response to negative stimuli (Bylsma et al., 2008; Feeser et al., 2013; Moran et al., 2012). Nevertheless, support for the ECI hypothesis has been inconsistent (Grillon, Franco-Chaves, Mateus, Ionescu, & Zarate, 2013; Sigmon & Nelson-Gray, 1992), prompting the need for more research on the contexts in which ECI does and does not occur.

One reason for inconsistent support of the ECI hypothesis may be heterogeneity in the probes used to elicit psychological stress. Prior studies supporting ECI have used multiple stimulus classes, including shock exposure (Grillon et al., 2013), emotional images (Feeser et al., 2013; Forbes, Miller, Cohn, Fox, & Kovacs, 2005; Sloan, Strauss, & Wisner, 2001), and passive listening to positive and negative social interactions (Sigmon & Nelson-Gray, 1992). Yet ECI is often viewed as an adapted response to experiences of social stress (Rottenberg et al., 2005; Steger & Kashdan, 2009), and thus, studies exposing people with depression vulnerability to social stressors may be most likely to evoke affective responses that are consistent with ECI. One such study by Ellis, Beevers, and Wells (2009) used a paradigm in which dysphoric and non-dysphoric young adults received positive or negative feedback from the experimenter about their performance on a social intelligence test. Consistent with ECI, dampened negative affective responses to negative feedback was seen for dysphoric young adults vs. controls, and diminished affective response to positive vs. negative feedback was found for the dysphoric group. More work is needed, however, to test whether these effects also emerge for social evaluation, given the human need to be accepted by others, and the link between depression and social rejection.

Being socially evaluated initiates not only emotional reactions, but also implicates a set of cognitions about these experiences. Indeed, cognitive theories of depression underscore biased and negative cognitive appraisals as vulnerability mechanisms for depression and negative affect more generally (Beck, 1983; Gotlib & Joormann, 2010; Mathews & MacLeod, 2005). For example, social evaluation requires us to appropriately adapt our thoughts to match (or disprove) the information being given. In addition, being evaluated negatively threatens social self-preservation, which can elicit self-referential cognitions about one's value for fear of being socially excluded. Impaired cognitive flexibility, involving difficulty disengaging from negative emotional stimuli, and having negative expectations that lead to biases in processing and reacting to socially evaluative information (Gotlib & Joormann, 2010) are each important yet understudied cognitive appraisal mechanisms that may elucidate depression-related variability in affective response to social evaluation.

Cognitive flexibility reflects an aptitude for reappraising one's cognitions as situations change (Martin & Rubin, 1995). Cognitive flexibility plays an integral role in affect regulation and is associated with reappraisal in situations that elicit negative emotion (Gross,

2007). Deficits in cognitive flexibility are linked to general low mood (Johnco, Wuthrich, & Rapee, 2014), heightened negative affective response to social rejection (Gyurak et al., 2012), increased rumination about negative daily events (Genet, Malooly, & Siemer, 2013), and more difficulty shifting attention between emotional categories in adults with clinical depression (Murphy, Michael, & Sahakian, 2012). Low cognitive flexibility is especially related to depressed mood in situations that are mood incongruent (e.g., positive events coincide with negative mood; Deveney & Deldin, 2006). In particular, this inflexibility may contribute to ECI by reducing one's ability to switch affective responses flexibly between mood-congruent (i.e., negative) and mood-incongruent (i.e., positive) events; this has yet to be tested in the context of social evaluation, however.

Also critically important to consider in the context of social evaluation are overly negative expectations that lead to exaggerated estimates of the likelihood for negative events to occur, which is referred to as *negative expectancy bias*. Indeed, depressed mood relates to increased negative expectations for future events and reduced expectation of positive future events (Feeser et al., 2013). Often these negative self-referential cognitions stem from past experiences of social rejection (Slavich et al., 2010). Furthermore, negative expectations in relation to self-relevant events (e.g., low self-esteem) are associated with less positive affective response to unexpected positive events (Wood, Heimpel, & Michela, 2003), as well as biased recall of negative social feedback (Somerville, Kelley, & Heatherton, 2010). As with cognitive flexibility, evaluation of negative expectancy bias in the context of depression and response to social evaluation is warranted.

The present study

The first aim of the current study was to evaluate the impact of depression symptoms on momentary affective responses to social acceptance and rejection events, a common and robust source of interpersonal stress (Steger & Kashdan, 2009). Our second aim was to test whether negative expectations and cognitive flexibility mediated the association between depressive symptoms and affective response to these socially evaluative outcomes. To achieve these aims, we used a social evaluation task called the Chatroom task (Caouette et al., 2014; Guyer, Caouette, Lee, & Ruiz, 2014; Guyer et al., 2012; Guyer, McClure-Tone, Shiffrin, Pine, & Nelson, 2009) that measures expectations about and affective response to self-relevant positive and negative feedback in a way that simulates these everyday social events. Although our focus is in part to understand links between depression and emotional response to social stress, our paradigm included social acceptance events in order to assess whether depression-related variability in affective response to social evaluation was unique to rejection or whether this also extended to acceptance. Symptoms of major depression can include both deficient positive affect, such as anhedonia, as well as high negative affect, such as hopelessness or sadness, (American Psychiatric Association, 2000). As such, we aimed to construct a task design that would allow us to account for atypical positive affect in a normally rewarding context (e.g., social acceptance), as well as atypical negative affect in a normally threatening context (e.g., social rejection). Furthermore, given the extensive work linking social anxiety with affective response to social evaluation (e.g., Caouette et al., 2014; Guyer et al., 2014), we wanted to test whether our hypothesized relationships between

depressive symptoms and affective response would also be observed with social anxiety symptoms.

We predicted that if the ECI hypothesis is supported in a social evaluation context, higher levels of depressive symptoms would relate to dampened positive affective response to social acceptance, consistent with diminished reward responding in anhedonia (Pizzagalli, 2014), as well as less negative affective response to social rejection. Furthermore, we hypothesized that negative expectations and cognitive flexibility would serve as distinct mediating cognitive processes that link depressive symptoms with incongruent affective response to positive and negative forms of social evaluation. Based on past work (Feeser et al., 2013; Slavich et al., 2010), we also hypothesized that those with greater depressive symptoms would have greater negative expectations in regard to being evaluated by others. Furthermore, distinct from cognitive flexibility, negative expectancy bias may contribute to ECI through a process by which the individual affectively "disengages" from valenced social feedback in anticipation of harmful outcomes. Indeed, individuals with major depression respond to social stressors by withdrawing (Slavich et al., 2009), which is likely an adapted response in the context of expecting future negative social events. We tested the same associations using social anxiety in lieu of depressive symptoms.

Method

Participants

Ninety undergraduate students (53 women, mean age=19.80 years, range=18–26 years) were recruited from a participant pool for a two-visit study. The self-reported race/ethnicity breakdown of the sample was 33 Asian, 29 white/Caucasian, 11 more than one race, 10 Latino/Hispanic, 4 native Hawaiian or Pacific Islander, 2 black/African American, and 1 American Indian or Alaska Native.

Materials

The Chatroom task included 60 photographs of ostensible study participants who appeared college age (30 women). Photographs were headshots of racially/ethnically diverse individuals depicting smiling, friendly expressions while positioned in front of a white background. Pictures were selected from five facial stimulus sets used in past work (see Caouette et al., 2014). Stimuli selection was determined in a validation study in which similarly aged volunteers judged the ages of the actors in a set of photos; we selected the 60 photos rated as being in participants' age range.

Chatroom was administered using E-Prime software (Sharpsburg, PA). A digital camera was used to take headshots of participants positioned in front of a white background in the testing room. Online profiles were collected through a web domain portal, whereby participants answered basic questions (e.g., favorite hobbies). Participants also completed questionnaires online (SurveyMonkey Inc., Palo Alto, CA).

Procedure

All procedures were approved by the Institutional Review Board. The procedures were explained to all participants by trained research assistants (RAs). Participants provided informed consent and received course credit. The study was conducted in a standard testing room.

The Chatroom task is a two-visit experimental paradigm that in this study included three parts designed to simulate different aspects of social evaluation (e.g., Caouette et al., 2014; Guyer et al., 2014). Visits one and two were separated by 1–7 days, with the majority of participants completing the visits 2 days apart.

Visit one—Participants were told this was a nationwide study of how first impressions influence online social interactions. Participants were also told that, after their second visit, they would chat online with a match that was identified for them from among the participants at the other study sites. The RA increased the believability of these procedures by having participants create an online profile and taking their picture. Participants were told the other participants would subsequently indicate whether they wanted to chat with the participant after viewing their profile and picture, just as they were about to do using the same procedures.

Participants first completed a self-paced *selection task*. They viewed information about the off-site participants and indicated with whom they were interested and not interested in chatting online. When the RA tried to access the others' profiles and pictures, a staged computer error appeared indicating failure to load the text information from the profiles. Consequently, participants were asked to make selections based only on the photographs; this minimized information presented about the supposed peers (e.g., hobbies, interests) in order to reduce the influence of extraneous variables on participants' selections. Participants were assured the others would still be able to rate them based on their profiles and photos. Participants then indicated their interest in chatting online with each of 60 individuals by placing 30 photographs into an "interested" (selected) and 30 into a "not interested" (unselected) onscreen bin.

Participants next completed a self-paced *expected evaluation task*. Just prior to the task, participants were reminded they would chat with their best match based on the outcome of the selection task. Participants viewed the 60 individuals again, this time rating how interested each one would be in chatting with them. During each trial, a headshot appeared on the screen with a rating scale superimposed below. Participants were told to move the mouse anywhere along the scale to indicate their expectation (left anchor = *Not at all*; right anchor = *Very much*).

Visit two—Participants first completed a set of questionnaires (see Measures, below), followed by a self-paced *feedback task*. Participants were told they would learn how other people rated them, and that they would have a chance to report how they felt about each rating they received. The 60 photographs were shown one at a time, and below each picture, a reminder appeared (2000 ms) to indicate whether participants had said they were "interested" or "not interested" in chatting with the person. The reminder was then replaced

with feedback (2000 ms) indicating whether the person had said he/she was "interested" (acceptance) or "not interested" (rejection) in chatting with the participant. Feedback was pseudo-randomized, with participants receiving equal numbers of acceptances and rejections by individuals from each selection bin and by gender. Following the feedback display, a question appeared that read, *"How does this make you feel?"* Below the question, a rating scale appeared for participants to report their *affective response* at their own pace (left anchor = *Very bad*; right anchor = *Very good*).

After Chatroom, a funnel debriefing method (Chartrand, van Baaren, & Bargh, 2006) was used to probe for general misgivings about the task and to ascertain whether participants believed they would chat with another person. Participants were then debriefed about the inclusion of misleading information in the task and informed they would not be chatting with anyone. Participants were grouped into "deceived" (*n* = 70) and "non-deceived" (*n* = 20) categories. This proportion was comparable to past studies using Chatroom (Caouette et al., 2014; Guyer et al., 2014). Deceived and non-deceived participants did not differ statistically on sex, race/ethnicity, age, depressive symptoms, social anxiety, cognitive flexibility, negative expectations, or affective response. Thus, to retain statistical power to detect the significance of all hypothesized paths we included the full sample in all analyses.

Measures

Depressive symptoms—The self-reported Beck Depression Inventory – II (BDI-II; Beck, Steer, Ball, & Ranieri, 1996) assessed depressive symptoms. The BDI-II is a self-report tool for screening and assessing the severity of depression in adolescents and adults. It assesses the intensity of depression in diagnosed patients as well as detects possible depression in the general population. The BDI-II has high validity and internal consistency (Beck et al., 1996). Each of 21 items contains a list of four statements arranged in increasing severity from 0 (least severe) to 4 (most severe) about a particular symptom of depression experienced in the past 2 weeks (e.g., lack of pleasure, sadness). One item about suicidal thoughts or wishes was omitted due to its sensitive content, and thus we prorated threshold scores when determining clinical severity. Summary scores were derived by summing the 20 items (sample range=0–38). Depression severity scores in our prorated BDI-II range from 0 (minimal) to a possible 60 (severe), with high internal reliability (Cronbach's alpha = .84). In our sample, 66 met criteria for minimal depression, 14 mild, 8 moderate, and 2 severe.

Social anxiety symptoms—Trait social anxiety was measured with the Liebowitz Social Anxiety Scale (LSAS; Liebowitz, 1987), which contains 24 self-reported items, 13 concerning performance anxiety and 11 concerning social situations. Each item is rated on degree of fear in different situations from 0 = none to 3 = severe. Each item is rated again in terms of avoidance frequency for those situations from 0 = never to 3 = usually. The LSAS provides an overall social anxiety severity score. The LSAS is normally distributed and demonstrates excellent internal consistency (Heimberg et al., 1999). Convergent validity of the LSAS has been demonstrated via significant correlations with other commonly used measures of social anxiety and avoidance (Heimberg et al., 1999). Summary scores were created by summing the 24 items (range=11–111), with high scores indicating greater social anxiety (Cronbach's alpha = .95).

Cognitive flexibility—The self-report Cognitive Flexibility Scale (CFS; Martin & Rubin, 1995) contains 12 items that assess self-perceived ability to communicate effectively, particularly in new situations. The CFS has three primary scales: awareness of options for one's behavior (e.g., "*In any given situation, I am able to act appropriately,*"), willingness to be flexible, and self-efficacy in being flexible. Each item is rated from 1 = *strongly disagree* to 6 = *strongly agree*. The CFS has a test-retest reliability of .83 (Martin & Rubin, 1995). Summary scores were created by summing the 12 items (range=12–72), with lower scores indicating less flexibility (Cronbach's alpha = .53).

Negative expectations—We measured negative expectations based on participants' ratings from the *expected evaluation task*. Each rating from was made on an interval scale from 0 (peer will be *Not at all* interested) to 100 (peer will be *Very much* interested). Responses across the 60 trials were averaged to obtain a mean expected evaluation score per participant. For interpretation, mean scores were subtracted from 50 to make 0 the midpoint and then reverse-coded, thus quantifying increasing values as greater negative expectations while allowing mean scores above and below 0 to signify negative and positive expectancy bias, respectively.

Affective response to feedback—Affective response scores obtained during the feedback task were averaged separately for acceptance (n=15 selected, 15 unselected) and rejection (n=15 selected, 15 unselected) trials.

Analysis Plan

We conducted a parallel multiple mediation analysis to test our hypotheses (Preacher & Hayes, 2008). In this analysis, the independent variable is modeled as influencing the dependent variable directly as well as indirectly through two or more mediators. This model was ideal for probing the distinct and shared contributions of negative expectations and cognitive flexibility on the depression-affective response link, especially given their strong association (see Table 1). Furthermore, in parallel mediation modeling no mediator is modeled as causally influencing another mediator, and it results in more power than conducting separate simple mediation models in the case where each mediator is correlated with the dependent variable (Table 1). We used the PROCESS macro in SPSS (Hayes, 2013) to obtain the total, direct, and indirect effects of depressive symptoms on affective response to evaluation, while also factoring in shared variance between effects. The PROCESS macro allowed for the addition of our independent variable (depressive symptoms), dependent variable (affective response), mediators (negative expectations and cognitive flexibility), and covariates (age, sex, race/ethnicity, and deception status) into a single model. For ease of interpretation, we ran separate models for response to acceptance and rejection.

Significance testing was completed using the total, direct, and indirect effects calculated by the PROCESS macro. The total effect (c) was the effect of depressive symptoms on affective response, without accounting for mediation. The direct effect (c') was the effect of depressive symptoms on affective response when both mediators were added into the model. Indirect effects were the influence of depressive symptoms on affective response through

mediation. To test for significant indirect effects, we used bootstrapping with 10,000 resamples to obtain bias-corrected 95% confidence intervals (Preacher & Hayes, 2008). The model generated three indirect effects: specific indirect effects through negative expectations and CF, and a total indirect effect through the combined influence of negative expectations and CF. The same analysis approach was used to assess the effect of anxiety symptoms on affective responses.

Results

Descriptive statistics and bivariate correlations for all variables of interest are presented in Table 1. We ran a 2x2 repeated-measures analysis of variance to examine differences in mean affective response to feedback as a function of participants' selections and feedback type. There was a significant interaction of selection x feedback type ($F(1,89)$=86.75, MSE=104.72, p<.001 η^2=.49). Post-hoc analyses revealed a main effect for feedback driven by unselected peers ($t(89)$=9.23, SE=2.10, p<.001, η^2=.49, 95% CI [15.20, 23.54], $M_{\text{accepantance}}$=41.74, $M_{\text{rejection}}$=61.11); participants felt worse when socially accepted than rejected by others in whom they were uninterested. No difference in affective response from selected individuals was found ($t(89)$=−.39, SE=1.87, p=.70, η^2=.002, 95% CI [−4.45, 3.00], $M_{\text{accepantance}}$=51.70, $M_{\text{rejection}}$=50.98).

Parallel Mediation Effects of Depressive Symptoms on Affective Response to Feedback

Depressive symptoms, negative expectations, cognitive flexibility, and age were mean-centered in all models. Beta values reported in this section are unstandardized. Effect sizes for all direct effects are reported as standardized beta weights in Figures 1a (acceptance) and 1b (rejection), and mediation effect sizes are reported as the proportion of indirect to total effects, denoted as P_M (see Preacher & Kelley, 2011).

Acceptance feedback—The full model for affective response to acceptance (including depressive symptoms, negative expectations, cognitive flexibility, and all covariates) was significant ($F(7,82)$=4.075, MSE=85.21, p<.001, R^2=25.81%.). Depressive symptoms were positively associated with negative expectations (b=2.16, SE=.78, p<.01, 95% CI [3.72, .61]) and negatively associated with cognitive flexibility (b=−1.91, SE=.53, p<.001, 95% CI [−2.97, −.85]). Negative expectations negatively predicted affective response to acceptance (b=−.34, SE=.11, p<.01, 95% CI [−.11, −.56]), and the path from cognitive flexibility to affective response was marginally significant (b=.28, SE=.17, p=.09, 95% CI [−.05, .61]). Depressive symptoms had a significant negative total effect on affective response (b=−1.95, SE=.85, p<.05, 95% CI [−3.63, −.27]). With the addition of negative expectations and cognitive flexibility to the model, the direct effect of depressive symptoms on affective response became non-significant (b=−.69, SE=.86, p=.43, 95% CI [−2.40, 1.03]). The specific indirect effects of depressive symptoms on affective response through negative expectations (b=−.73, SE=.36, P_M=.37, 95% CI [−1.65, −.19]) and cognitive flexibility (b=−.54, SE=.34, P_M=.28, 95% CI [−1.40, −.02]) were both significant. Furthermore, the combined total indirect effect of depressive symptoms on affective response (negative expectations + cognitive flexibility) was significant (b=−1.27, SE=.50, P_M=.65, 95% CI [−2.49, −.46]). The acceptance feedback model met criteria for full mediation, as the effect

of depressive symptoms was reduced from significant to non-significant with the addition of the mediating variables.

Rejection feedback—The full model for affective response to rejection (including depressive symptoms, negative expectations, cognitive flexibility, and all covariates) was marginally significant ($F(7,82)=2.07$, $MSE=67.01$, $p=.06$, $R^2=15.00\%$.). Negative expectations were marginally associated with affective response to rejection ($b=.20$, $SE=.10$, $p=.05$, 95% CI [−.001, .40]), and cognitive flexibility was a non-significant predictor of affective response ($b=−.15$, $SE=.15$, $p=.31$, 95% CI [−.44, .14]). Depressive symptoms had a marginally significant positive total effect on affective response ($b=1.36$, $SE=.72$, $p=.06$, 95% CI [−.07, 2.78]). The direct effect of depressive symptoms on affective response was non-significant ($b=.64$, $SE=.77$, $p=.40$, 95% CI [−.88, 2.17]). The specific indirect effect of depressive symptoms on affective response through negative expectations was significant ($b=.43$, $SE=.27$, $P_M=.32$, 95% CI [.04, 1.16]). However, the specific indirect effect through cognitive flexibility was non-significant ($b=.29$, $SE=.28$, $P_M=.21$, 95% CI [−.19, .98]). The total indirect effect of depressive symptoms on affective response through negative expectations and cognitive flexibility combined was significant ($b=.71$, $SE=.39$, $P_M=.53$, 95% CI [.01, 1.71]). The rejection feedback model met criteria for full mediation.

Secondary Analyses: Social Anxiety Symptoms as a Predictor

We repeated our mediation models in PROCESS, with social anxiety symptoms replacing depressive symptoms as a predictor. As with depressive symptoms, greater social anxiety symptoms directly predicted less positive affective response to acceptance outcomes ($b=−.19$, $SE=.05$, $p=.000$, 95% CI [−.28, −.10]). Greater social anxiety also predicted less negative affective response to rejection outcomes ($b=.11$, $SE=.04$, $p=.01$, 95% CI [.03, .19]). Unlike depressive symptoms, for both acceptances and rejections we failed to observe any indirect effects of social anxiety symptoms on affective response through cognitive flexibility, negative expectations, or their combined variance.

Discussion

The current study examined whether depressive symptoms and cognitive distortions account for individual differences in affective responses to social evaluation, a known social stressor relevant to depression. Guided by the ECI hypothesis (Rottenberg et al., 2005), we examined how depression relates to affective responses to simulated social acceptance and rejection outcomes, and evaluated the mediating role of two cognitive appraisal vulnerability factors, negative expectations and cognitive flexibility, in this relationship. The results of our study provided general support for our hypotheses. Specifically, more severe depressive symptoms related to negative expectancy bias, lower cognitive flexibility, and less positive affective response to acceptance. Full mediation was supported for each type of social evaluation. Having more severe depressive symptoms was associated with a higher expectation to be socially rejected and lower reports of flexibility, which in turn were both associated with feeling worse after being socially accepted. Having more elevated depressive symptoms was associated with less negative affect after being socially rejected only in the presence of strong expectations of being rejected. Furthermore, cognitive flexibility and negative

expectations played a unique mediating role for depressive symptoms, and this role was absent for social anxiety symptoms.

For social acceptance, our finding of depression-related blunted positive affective response to acceptance is consistent with studies that report greater social anhedonia in relation to dampened affective response to positive outcomes (e.g., Keedwell, Andrew, Williams, Brammer, & Phillips, 2005). Dampened positive affect in response to positive social feedback is not universal, and in fact, at least one study has reported heightened reward responsiveness after positive social feedback in depression (Steger & Kashdan, 2009). However, that study used social feedback from loved ones, whereas the current study employed feedback from unfamiliar others. Given these discrepant results, whether depression-related affective response to positive social evaluation is moderated by familiarity with the evaluator is an intriguing avenue for future research. For social rejection, although the depression-affective response link was only marginally significant, the direction of effect was consistent with our hypothesis, showing less negative affective response with increasing depressive symptoms. This result is consistent with published studies linking social rejection to withdrawal motivation (e.g., Beeney, Levy, Gatzke-Kopp, & Hallquist, 2014). In contrast, other studies have reported either heightened negative affective response to negative events, or a lack of blunting, in depressed individuals (e.g., Elliott, Sahakian, Herrod, Robbins, & Paykel, 1997; Grillon et al., 2013). Our results likely differ from these studies due to the heterogeneity in stimulus classes used. The results for social acceptance and rejection taken in conjunction lend support to the ECI hypothesis, insofar as depressed mood interferes with affect regulation in response to emotionally salient, self-relevant outcomes, especially in the case of social acceptance.

Our mediation results implicate negative expectancy bias and cognitive flexibility as cognitive appraisal mechanisms that contribute to the coordination of affective response to social evaluation. For acceptance, as hypothesized, more severe depressive symptoms predicted higher negative expectations and lower cognitive flexibility, which in turn predicted less positive affective response to acceptance. The indirect effect through negative expectations suggests that in those with more severe depressive symptoms, negative schemas about being evaluated interfered with the hedonic value of being liked by another person. The indirect effect through cognitive flexibility suggests that participants with greater depressive symptoms likely failed to adapt positive affective responses that were mood incongruent. This view is consistent with studies linking depression with deficits in cognitive flexibility for emotional events (e.g., Deveney & Deldin, 2006). Though negative expectations and cognitive flexibility made distinct contributions to the model, their shared effect was also large. In reality these appraisal processes likely interact (e.g., adapting mood-incongruent positive affect after receiving positive social feedback may be especially difficult when the feedback violates expectations).

For rejection, our mediation hypotheses received partial support, with higher negative expectations but not lower cognitive flexibility, in the causal path from depressive symptoms to affective response. Here, cognitive flexibility was likely unimportant for coordinating affective response to a mood-congruent negative event. In contrast, negative expectations may have served an important function in guarding against difficult emotional

consequences of future negative events. If so, this may explain why those with greater depressive symptoms reported less negative affect upon being socially rejected. This interpretation is consistent with an evolutionary framework for depressed mood, whereby negative mood decreases motivated action through dampened affective response to stimuli in risky situations or in situations with high costs and low payoff (DeWall & Bushman, 2011; Nesse, 2000; Slavich et al., 2010). Expecting rejection may be a cognitive process through which people decrease the probability of experiencing social exclusion by withdrawing from high-risk social interactions.

Our results should be interpreted with respect to some limitations. First, our analyses collapsed across selected and unselected peers to increase statistical power but may have masked differences in emotional meaning prescribed to feedback from these two categories of individuals. Second, we did not measure rumination despite its established link with cognitive vulnerability to depression (Mathews & Macleod, 2005); doing so in future work can help elucidate why participants with greater depressive symptoms showed less differentiated affect between acceptances and rejections (e.g., focusing on rejection from a single person). Rumination may be especially important in the context of receiving both acceptances and rejections within a group of people. Rejection by even a single person can lead to overestimation of rejection within the entire group (Chernyak & Zayas, 2010), likely due to increased and sustained activation of negative self-concept evoked by the rejection cue, or to biased attention toward a threatening outcome. Third, we used a healthy community sample, which limits generalizability of our findings to populations with major depressive disorders. Nevertheless, the proportion in our sample that met threshold criteria for moderate to severe depression was representative of the general young adult population with 12-month prevalence of major depression (SAMHSA, 2014). Fourth, we did not include a control feedback condition, but doing so in future work would allow for disentangling the effect of feedback valence on affective response from the effect of being evaluated vs. not being evaluated. Finally, although our findings suggest mood incongruence may contribute to the failure to adapt positive affective responses, we did not include a measure of current mood state in our study, and thus we were unable to test for this relationship directly.

There are also many strengths of our study. Delivering momentary acceptance and rejection social evaluation using experimental methods was useful for eliciting strong affective responses and enabled us to examine how depressed mood interferes with affective response to events that are highly emotionally salient, personally meaningful, and strongly associated with depression. The Chatroom task also imitated the dynamic and evaluative nature of a common social environment that is important in the lives of young adults who have elevated depression symptoms. Furthermore, we identified potential cognitive mechanisms that are involved in depression-related affect regulation of social outcomes. The strong effect sizes for negative expectations across feedback types suggest that negative thinking style is particularly influential for how people with depressed mood respond to social evaluation. We also demonstrated that these cognitive mechanisms are unique to depressive symptoms, despite observing similar affective responses in depression vs. social anxiety. Depression and social anxiety are highly comorbid, and differentiating the cognitive mechanisms adopted by depressed vs. anxious individuals when responding to social evaluation is

valuable for diagnostic and treatment efficacy. Finally, our study highlights the role of momentary affect in response to acute social stress. In the quest to understand mechanisms that explain depression-related variability to psychologically stressful events, we have identified an important role for affect regulatory processes in the context of social evaluation. To this end, the current study suggests cognitively mediated emotion context insensitivity in elevated depression when receiving social acceptance and rejection.

This research has important implications for the use of social-cognitive and emotion regulation training interventions with clinical populations. Specifically, it will be important to consider whether improvements in flexible thinking about one's expectations for and the outcomes of social interactions through cognitive techniques learned in therapy can be implemented to better align affective reactions to social rewards and social threats for those experiencing depression. Notably, our findings pinpoint social-affective flexibility as a target strategy in cognitive behavioral therapy for depression, but not for social anxiety.

References

Allen NB, Badcock PB. The social risk hypothesis of depressed mood: Evolutionary, psychosocial, and neurobiological perspectives. Psychological Bulletin. 2003; 129(6):887–913. [PubMed: 14599287]

Ayduk ON, Downey G, Kim M. Rejection sensitivity and depressive symptoms in women. Personality and Social Psychology Bulletin. 2001; 27:868–877.

Baumeister RF, Leary MR. The need to belong: Desire for interpersonal attachments as a fundamental human motivation. Psychological Bulletin. 1995; 117(3):497–529. [PubMed: 7777651]

Beck, AT. Cognitive therapy of depression: New perspectives. In: Clayton, PJ.; Barrett, JE., editors. Treatment of depression: Old controversies and new approaches. New York: Raven; 1983. p. 265-290.

Beck AT. The evolution of the cognitive model of depression and its neurobiological correlates. American Journal of Psychiatry. 2008; 165:969–977. [PubMed: 18628348]

Beck AT, Steer RA, Ball R, Ranieri W. Comparison of Beck Depression Inventories -IA and -II in psychiatric outpatients. Journal of Personality Assessment. 1996; 67(3):588–597. [PubMed: 8991972]

Beeney JE, Levy KN, Gatzke-Kopp LM, Hallquist MN. EEG asymmetry in borderline personality disorder and depression following rejection. Personality Disorders. 2014; 5(2):178–185. [PubMed: 24364503]

Bylsma LM, Morris BH, Rottenberg J. A meta-analysis of emotional reactivity in major depressive disorder. Clinical Psychology Review. 2008; 28(4):676–691. [PubMed: 18006196]

Caouette JC, Ruiz Sarah K, Lee CC, Anbari Z, Schriber RA, Guyer AE. Expectancy bias mediates the link between social anxiety and memory bias for social evaluation. Cognition and Emotion. 2014; 29(5):945–953. [PubMed: 25252925]

Chartrand TL, van Baaren RB, Bargh JA. Linking automatic evaluation to mood and information processing style: Consequences for experienced affect, impression formation, and stereotyping. Journal of Experimental Psychology, General. 2006; 135(1):70–77. [PubMed: 16478316]

Chernyak N, Zayas V. Being excluded by one means being excluded by all: Perceiving exclusion from inclusive others during one-person social exclusion. Journal of Experimental Social Psychology. 2010; 46:582–585.

Deveney CM, Deldin PJ. A preliminary investigation of cognitive flexibility for emotional information in major depressive disorder and non-psychiatric controls. Emotion. 2006; 6(3):429–437. [PubMed: 16938084]

DeWall CN, Bushman BJ. Social acceptance and rejection: The sweet and the bitter. Current Directions in Psychological Science. 2011; 20(4):256–260.

Elliott R, Sahakian BJ, Herrod JJ, Robbins TW, Paykel ES. Abnormal response to negative feedback in unipolar depression: Evidence for a diagnosis specific impairment. Journal of Neurology, Neurosurgergy, and Psychiatry. 1997; 63(1):74–82.

Ellis AJ, Beevers CG, Wells TT. Emotional dysregulation in dysphoria: Support for Emotion Context Insensitivity in response to performance-based feedback. Journal of Behavior Therapy and Experimental Psychiatry. 2009; 40(3):443–454. [PubMed: 19577738]

Feeser M, Schlagenhauf F, Sterzer P, Park S, Stoy M, Gutwinski S, Bermpohl F. Context insensitivity during positive and negative emotional expectancy in depression assessed with functional magnetic resonance imaging. Psychiatry Research. 2013; 212(1):28–35. [PubMed: 23473989]

Forbes EE, Miller A, Cohn JF, Fox NA, Kovacs M. Affect-modulated startle in adults with childhood-onset depression: Relations to bipolar course and number of lifetime depressive episodes. Psychiatry Research. 2005; 134(1):11–25. [PubMed: 15808286]

Genet JJ, Malooly AM, Siemer M. Flexibility is not always adaptive: Affective flexibility and inflexibility predict rumination use in everyday life. Cognition and Emotion. 2013; 27(4):685–695. [PubMed: 23088513]

Gilbert P. Evolution and depression: Issues and implications. Psychological Medicine. 2006; 36:287–297. [PubMed: 16236231]

Gotlib IH, Joormann J. Cognition and depression: current status and future directions. Annual Reviews of Clinical Psychology. 2010; 6:285–312.

Grillon C, Franco-Chaves JA, Mateus CF, Ionescu DF, Zarate CA. Major depression is not associated with blunting of aversive responses: Evidence for enhanced anxious anticipation. PLoS One. 2013; 8(8):1–7.

Gross, JJ. The handbook of emotion regulation. New York: Guilford Press; 2007.

Guyer AE, Caouette JC, Lee CC, Ruiz Sarah K. Will they like me? Adolescents' emotional responses to peer evaluation. International Journal of Behavioral Development. 2014; 38(1)

Guyer AE, Choate VR, Detloff A, Benson B, Nelson EE, Perez-Edgar K, Ernst M. Striatal functional alteration during incentive anticipation in pediatric anxiety disorders. The American Journal of Psychiatry. 2012; 169(2):205–212. [PubMed: 22423352]

Guyer AE, McClure-Tone EB, Shiffrin ND, Pine DS, Nelson EE. Probing the neural correlates of anticipated peer evaluation in adolescence. Child Development. 2009; 80(4):1000–1015. [PubMed: 19630890]

Gyurak A, Hooker CI, Miyakawa A, Verosky S, Luerssen A, Ayduk ON. Individual differences in neural responses to social rejection: The joint effect of self-esteem and attentional control. Social Cognitive and Affective Neuroscience. 2012; 7(3):322–331. [PubMed: 21609969]

Hammen C. Stress and depression. Annual Reviews of Clinical Psychology. 2005; 1:293–319.

Hayes, AF. Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach. Guilford Press; 2013.

Heimberg RG, Horner KJ, Juster HR, Safren SA, Brown EJ, Schneider FR, Liebowitz MR. Psychometric properties of the Liebowitz Social Anxiety Scale. Psychological Medicine. 1999; 29:199–212. [PubMed: 10077308]

Johnco C, Wuthrich VM, Rapee RM. Reliability and validity of two self-report measures of cognitive flexibility. Psychological Assessment. 2014; 26(4):1381–1387. [PubMed: 25265414]

Keedwell PA, Andrew C, Williams SC, Brammer MJ, Phillips ML. The neural correlates of anhedonia in major depressive disorder. Biological Psychiatry. 2005; 58(11):843–853. [PubMed: 16043128]

Kendler KS, Hettema JM, Butera F, Gardner CO, Prescott CA. Life event dimensions of loss, humiliation, entrapment, and danger in the prediction of onsets of major depression and generalied anxiety. Archives of General Psychiatry. 2003; 60:789–796. [PubMed: 12912762]

Kessler RC, Bromet EJ. The epidemiology of depression across cultures. Annual Reviews of Public Health. 2013; 34:119–138.

Liebowitz MR. Social phobia. Modern Problems of Pharmacopsychiatry. 1987; 22:141–173. [PubMed: 2885745]

Martin MM, Rubin RB. A new measure of cognitive flexibility. Psychological Reports. 1995; 76:623–626.

Mathews A, MacLeod C. Cognitive vulnerability to emotional disorders. Annual Reviews of Clinical Psychology. 2005; 1:167–195.

Monroe, SM.; Slavich, GM.; Georgiades, K. The social environment and life stress in depression. In: Gotlib, IH.; Hammen, CL., editors. Handbook of depression. 2nd. New York, NY: Guilford Press; 2009. p. 340-360.

Moran EK, Mehta N, Kring AM. Emotional responding in depression: Distinctions in the time course of emotion. Cognition and Emotion. 2012; 26(7):1153–1175. [PubMed: 22963575]

Murphy FC, Michael A, Sahakian BJ. Emotion modulates cognitive flexibility in patients with major depression. Psychological Medicine. 2012; 42(7):1373–1382. [PubMed: 22067530]

Nesse RM. Is depression an adaptation? Archives of General Psychiatry. 2000; 57(1):14–20. [PubMed: 10632228]

O'Neill SC, Cohen LH, Tolpin LH, Gunthert KC. Affective reactivity to daily interpersonal stressors as a prospective predictor of depressive symptoms. Journal of Social and Clinical Psychology. 2004; 23:172–194.

Pizzagalli DA. Depression, stress, and anhedonia: Toward a synthesis and integrated model. Annual Reviews of Clinical Psychology. 2014; 10:393–423.

Preacher, KJ.; Hayes, AF. Contemporary approaches to assessing mediation in communication research *The Sage sourcebook of advanced data analysis methods for communication research*. Thousand Oaks, CA: Sage Publications, Inc; 2008. p. 13-54.

Preacher KJ, Kelley K. Effect size measures for mediation models: quantitative strategies for communicating indirect effects. Psychological Methods. 2011; 16(2):93–115. [PubMed: 21500915]

Rottenberg J. Mood and emotion in major depression. Current Directions in Psychological Science. 2005; 14:167–170.

Rottenberg J, Gross JJ, Gotlib IH. Emotion context insensitivity in major depressive disorder. Journal of Abnormal Psychology. 2005; 114(4):627–639. [PubMed: 16351385]

Substance Abuse and Mental Health Services Administration, Results from the 2013 National Survey on Drug Use and Health: Mental Health Findings, NSDUH Series H-49, HHS Publication No. (SMA) 14-4887. Rockville, MD: Substance Abuse and Mental Health Service Administration; 2014.

Sigmon S, Nelson-Gray RO. Sensitivity to aversive events in depression: Antecedent, concomitant, or consequent? Journal of Psychopathology and Behavioral Assessment. 1992; 14:225–246.

Slavich GM, O'Donovan A, Epel ES, Kemeny ME. Black sheep get the blues: a psychobiological model of social rejection and depression. Neuroscience and Biobehavioral Reviews. 2010; 35(1): 39–45. [PubMed: 20083138]

Slavich GM, Thornton T, Torres LD, Monroe SM, Gotlib IH. Targeted rejection predicts hastened onset of major depression. Journal of Social and Clinical Psychology. 2009; 28(2):223–243. [PubMed: 20357895]

Sloan DM, Strauss ME, Wisner KL. Diminished response to pleasant stimuli by depressed women. Journal of Abnormal Psychology. 2001; 110(3):488–493. [PubMed: 11502092]

Somerville LH, Kelley WM, Heatherton TF. Self-esteem modulates medial prefrontal cortical responses to evaluative social feedback. Cerebral Cortex. 2010; 20(12):3005–3013. [PubMed: 20351022]

Steger MF, Kashdan TB. Depression and everyday social activity, belonging, and well-Being. Journal of Counseling Psychology. 2009; 56(2):289–300. [PubMed: 20428460]

Stillman TF, Baumeister RF, Lambert NM, Crescioni AW, DeWall CN, Fincham FD. Alone and without purpose: Life loses meaning following social exclusion. Journal of Experimental Social Psychology. 2009; 45:686–694. [PubMed: 20161218]

Wood JV, Heimpel SA, Michela JL. Savoring versus dampening: Self-esteem differences in regulating positive affect. Journal of Personality and Social Psychology. 2003; 85(3):566–580. [PubMed: 14498791]

Highlights

- Depression predicted blunted affective response to social acceptance and rejection.

- Depression predicted negative expectations (NE) & low cognitive flexibility (CF).

- High NE & low CF mediated a depression-affective response link for social acceptance.

- High NE mediated a depression-affective response link for social rejection.

- NE & CF are social cognitive appraisal mechanisms to target in depression treatment.
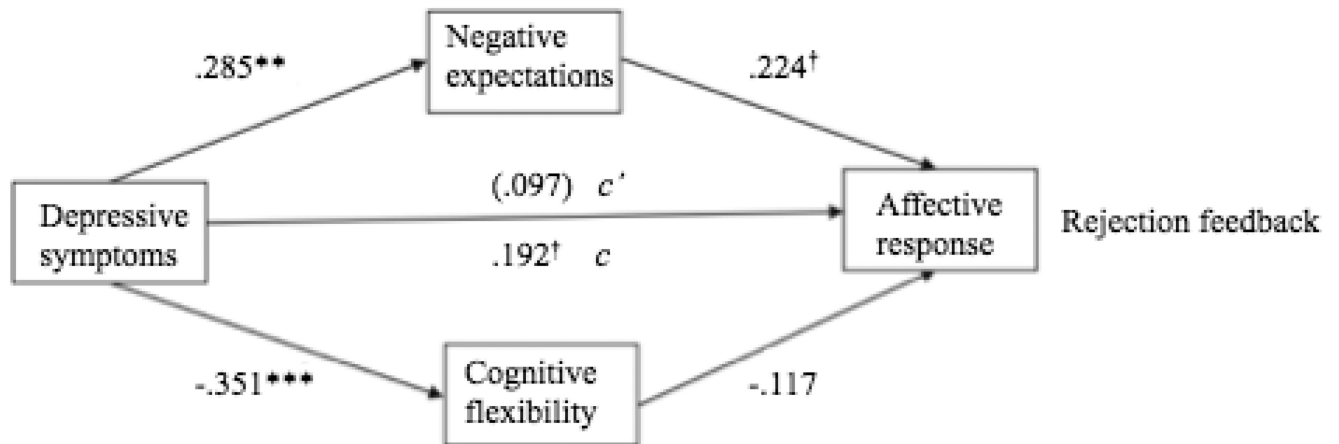
a.
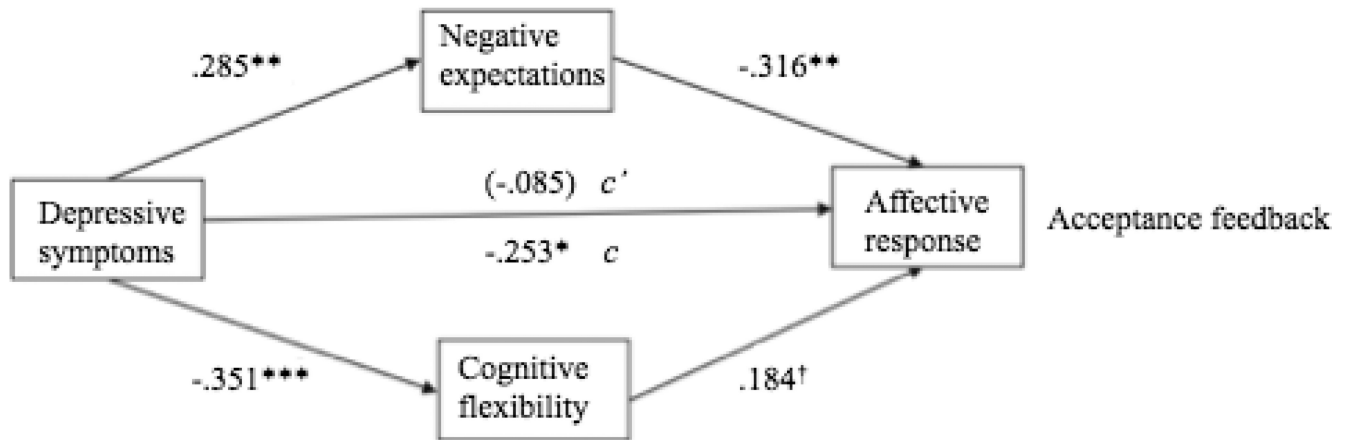
b.

Fig. 1.
Findings from parallel mediation testing for two models: standardized regression coefficients for the relationship between depressive symptoms and affective response to (**a**) acceptance and (**b**) rejection, as mediated by negative expectations and cognitive flexibility. *c* = total effect; *c'* = direct effect.
†*p*<.10; *p*<.05; **p*<.01; ***p*<.001

Table 1

Means, standard deviations, and correlations among study variables.

	M (*SD*)	1	2	3	4	5	6	7	8	9	10
Depressive symptoms	7.68 (7.12)	-									
Social anxiety symptoms	37.97 (22.33)	.47**	-								
Negative expectations	2.32 (9.67)	.30**	.46**	-							
Cognitive flexibility	55.47 (6.68)	−.36**	−.47**	−.32**	-						
Age	19.80 (1.57)	.10	.02	.02	.05	-					
Sex	-	−.22*	−.05	−.23*	.03	−.14	-				
Race/ethnicity	-	.09	−.04	.14	−.17	−.03	−.05	-			
Deception status	-	−.13	−.13	−.06	.13	−.07	.01	−.04	-		
Aff. response to acceptance	46.72 (10.29)	−.24*	−.45**	−.39**	.31**	.10	.09	.08	.19	-	
Aff. response to rejection	56.03 (8.52)	.10	.32**	−.23**	−.23*	−.10	−.11	−.03	−.14	−.40**	-

Depression symptoms = Beck Depression Inventory (BDI); Social anxiety symptoms = Liebowitz Social Anxiety Scale (LSAS); cognitive flexibility = Cognitive Flexibility Scale (CFS).

*
p<.05;

**
p<.01