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Depression and Everyday Social Activity, Belonging, and Well-Being

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Abstract

Dysfunctional social behavior has been implicated in the experience of depression. People with greater depressive symptoms report more frequent negative social interactions and react more strongly to them. It remains unknown, however, whether reaction strength differs depending on whether social interactions are positive or negative. Drawing on socio-evolutionary models of depression (N. B. Allen & P. B. T. Badcock, 2003), we proposed that people with greater depressive symptoms should not only react more strongly to negative social interactions but also to positive social interactions and a sense of belonging. Using non-clinical samples, two daily process studies examined the role of depression in people's reactivity to social interactions in natural, ongoing, social contexts. In Study 1, the number of positive and negative social events showed a stronger relation to well-being among people with greater depressive symptoms. Study 2 extended this finding to perceptions of belonging in memorable social interactions, finding a stronger link between belonging and well-being among people with greater depressive symptoms. Together these studies provide the first indication that depressive symptoms may sensitize people to everyday experiences of both social rejection and social acceptance.

Keywords

Depression; Social activity; Need to belong; Well-being; Daily life events; Reward responsiveness

A lonely man is a lonesome thing, a stone, a bone, a stick, a receptacle for Gilbey's gin, a stooped figure sitting at the edge of a hotel bed, heaving copious sighs like the autumn wind. (Cheever, 1991)

Humans have a profound need to connect with others and gain acceptance into social groups (i.e., belonging; Baumeister & Leary, 1995; Deci & Ryan, 2000). People form bonds readily and organize much of their behavior around establishing and maintaining those bonds. Further, people suffer when relationships deteriorate and social bonds are severed. Although feeling disconnected from others and experiencing a lack of belonging bothers everyone, depressed people may be particularly sensitive to these painful social encounters (Allen & Badcock,

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2003). Because of the importance of social experiences to people's well-being (e.g., Diener & Seligman, 2000), and to the etiology and maintenance of depression (e.g., Allen & Badcock, 2003; Barnett & Gotlib, 1988; Coyne, 1976b), it is vital to examine how depressed people's well-being is enhanced or eroded by positive and negative social interactions. The present research used two daily process studies to test the degree to which naturally occurring positive and negative social interactions interact with depressive symptoms to predict well-being.

Depression and Social Dysfunction

The motivational and affective profile associated with depression can be expected to influence the ability to feel a sense of social belonging and how, in turn, these feelings influence well-being. It is rare for a social interaction to provide objective evidence of rejection or acceptance, leaving the ultimate impact of social interactions up to people's perceptions. When people experience positive social interactions they should be more likely to feel a sense of belonging. However, depressed people's social information-processing biases appear to make it less likely that they will perceive cues of acceptance and belonging in social interactions. For example, in laboratory studies, clinically depressed people show preferential attention to sad faces, adjectives, and emotion words (e.g., Gotlib, Kasch, et al., 2004; Gotlib, Krasnoperova, Yue, & Joormann, 2004; Mogg & Bradley, 2005). Further, depressed people typically view ambiguous social interactions as negative, attribute these negative outcomes to the self, and act in accord with expectations that negative social interactions are likely and costly (Beck, Rush, Shaw, & Emery, 1979; Joiner & Coyne, 1999). It appears that depressed people should be more likely to pay attention to negative social interactions, and less likely to feel a sense of belonging.

Evidence does, indeed, suggest that depressed people often fail in their quest to satisfy their need for belonging in relationships (e.g., Hagerty, Williams, Coyne, & Early, 1996), with potentially severe consequences (Leary, 1990). Depressed people report fewer intimate relationships, and elicit fewer positive, caring responses and more negative, rejecting responses from others (Gotlib, 1992; Joiner & Coyne, 1999; Segrin & Abramson, 1994). Depressed people also appear to induce negative affect in others, which, in turn, elicits rejection and the loss of socially rewarding opportunities (Coyne, 1976a; Joiner & Katz, 1999).

Dulled or Heightened Reactions to Negative and Positive Stimuli?

A synthesis of the existing literature leads us to conclude that people with greater depressive symptoms are more likely to create difficult social situations, have worse interactions, and preferentially direct their attention to negative emotional social stimuli. As a result of this cascade of social dysfunction, it seems possible that more depressed people are sensitized to negative social interactions. A number of studies have examined sensitivity to rewards and punishments among clinically depressed samples. Generally, laboratory studies show that clinically depressed people experience dulled, not heightened, reactions to negative, punishment cues and positive, reward cues (e.g., winning/losing small to large amounts of money in mock gambling paradigms; Henriques & Davidson, 1990, 2000; Sloan, Strauss, & Wisner, 2001). This dulled reactivity has also been extended to social stimuli (e.g., sad and amusing films; Rottenberg, Kasch, Gross, & Gotlib, 2002). Researchers have concluded from such results that dulling of reactions to positive and negative stimuli is a hallmark of major depressive disorder (Henriques & Davidson, 1991; Rottenberg, 2005). Nonetheless, there are some indications that clinically depressed people show greater reactivity to positive reward cues (Must et al., 2006), particularly if they attribute the onset of positive events in everyday life to global and stable causes (Needles & Abramson, 1990).

However, social experience is best understood as a dynamic, communication-driven process with progressive reciprocal influences of actors, partners, and situational demands (e.g., Gable

& Reis, 1999; Gilbert, 2006). Cross-sectional survey methods miss this dynamic interchange, asking research participants to retrospectively evaluate and generalize across varying experiences in different social contexts. Laboratory studies often employ singular, sometimes arbitrary, de-contextualized stimuli (e.g., words or pictures of facial expressions; Gotlib, Kasch, et al., 2004). For example, it is not clear that images of an angry person would hold the same implications for social acceptance and rejection as a real-world disagreement with a friend. Daily process studies are able to capture people's everyday social experiences, and their reactions to them, as they unfold in their typical environments. This method confers ecological validity that is often sacrificed with other approaches and can shed light on how people with depressive symptoms react to life events. For example, this type of research has shown that people with greater depressive symptoms reported less intimacy, enjoyment, and perceived influence in everyday social interactions (e.g., Nezlek, Hampton, & Shean, 2000; Nezlek, Imbrie, & Shean, 1994) and report less day-to-day stability in well-being (Gable & Nezlek, 1998). Of particular relevance to this study, researchers have found that depressed people were more reactive to positive life events, reacting to *both* positive and negative events with more strongly enhanced positive affect, among other indicators of well-being (Nezlek & Gable, 2001). Whereas prior laboratory studies indicated dampened reactivity to positive, reward cues among more depressed people (e.g., Sloan et al., 2001), when positive events occur outside of the laboratory, an opposite effect is found (see Needles & Abramson, 1990 for a 6-week prospective investigation). Providing additional weight to the notion that results from laboratory studies diverge from studies with stronger links to everyday functioning, a recent longitudinal epidemiological study showed that depressed people benefit more from becoming married compared to less depressed people (Frech & Williams, 2007).

There is another reason why Nezlek and Gable (2001) may have found greater reactivity to life events in contrast to laboratory studies. Lab-based studies have focused on people with clinical levels of depression, often carrying the diagnosis of Major Depressive Disorder, whereas Nezlek and Gable modeled depressive symptoms on a continuum. Clinical levels of depression may represent a significantly more debilitating condition (e.g., Allen & Badcock, 2003), leading clinically depressed people to feel numb and less reactive to negative social experiences as a self-protective strategy (e.g., Rottenberg, 2005). On the other hand, evidence is emerging that depressive symptoms lie on a continuum of increasing impairment (e.g., Backenstrass et al., 2006; Priciandaro, & Roberts, 2005; Ruscio & Ruscio, 2002). Subthreshold depression may be a pre-morbid manifestation of psychopathology, and, in fact, people with subthreshold depression are at substantial risk of developing major depressive disorder (e.g., Cuijpers, Smit, van Straten, 2007; Fogel, Eaton, & Ford, 2006; Regeer et al., 2006; Sherbourne et al., 1994) as well as other adverse outcomes such as suicidal behavior (Fergusson, Horwood, Ridder, & Beautrais, 2005). Understanding how social experiences influence the well-being of people with subthreshold depression may shed light on the progression to disorder. One study has examined the reactivity of clinically depressed people to life events in their naturalistic environments. This study split the difference, so to speak, converging with laboratory studies of clinically depressed people in finding dulled reactivity to negative life events, and converging with daily process studies of subthreshold samples in finding heightened reactivity to positive life events (Peeters, Nicolson, Berkhof, Delespaul, & DeVries, 2003).

The social risk hypothesis of depression (Allen & Badcock, 2003) provides one account of how subthreshold levels of depressive symptoms could have evolved to help people reduce the risk of being excluded from social groups. Ancestral humans faced survival challenges that were best met through participation with reliable others in social groups. Being accepted by a social group increased the likelihood of survival, whereas being rejected decreased the likelihood of survival as well as the ability to find suitable mates to produce offspring and continue one's genetic lineage. Allen and Badcock argued that people with subclinical levels

of depressive symptoms should be highly reactive to cues indicative of threats to one's social resources. The central goal of behavior, then, is to ensure that the benefits that a person provides to a social group far outweigh any perceived burden; a positive value-to-burden ratio is synonymous with secure group status. As people perceive their social value falling and their subsequent risk of social exclusion rising, depressive symptoms direct attentional resources to ongoing social information. With this social attunement, behavior can be modified as needed to prevent social rejection or exclusion. Likewise, people's behavioral repertoire will be subdued to prevent further conflict and potentially catastrophic loss (e.g., rejection from the group or physical harm); such responses would be marked by submissiveness, and inhibition of exploratory and resource-seeking behaviors (Gilbert, 1992; 2006). These responses mimic depressive symptoms, and research has shown that people with greater depressive symptoms react to perceived dominance from others with exacerbated submissiveness and feelings of inferiority compared to people with lesser depressive symptoms (e.g., Zuroff, Fournier, & Moskowitz, 2007). Clinical levels of depression may represent a malfunctioning of the evolved mental apparatus that is proposed to monitor risk for social exclusion. Instead of being sensitive to possible rejection, clinical depression might reflect a lack of context sensitivity such that any situation that is not objectively positive is viewed as threatening. As a result, submissive, self-deprecating psychological and behavioral reactions are rigidly enacted (Allen, Gilbert, Semedjar, 2004).

This model prioritizes social events over other types of life events, making Nezlek and Gable's (2001) study an imperfect test. A better test of this model is provided by a daily process study showing that people with greater depressive symptoms react more strongly (i.e., experience more distress) in response to social stressors than do people with lesser depressive symptoms (e.g., O'Neill, Cohen, Tolpin, & Gunthert, 2004). Thus, there is some evidence for the central proposition of the social risk hypothesis in the naturally occurring social experiences of people with subthreshold depressive symptoms.

Theories such as the social risk hypothesis are fairly explicit in predicting that people with greater depressive symptoms should react more strongly to threats of social exclusion, as would be indicated by negative social interactions or social stressors (Allen et al., 2004; Gilbert, 2006). This perspective is in line with the prevailing tradition in psychology to focus on negative expressions of human behavior and psychopathology rather than on the full spectrum of human behavior, including positive experiences and well-being (Seligman & Csikszentmihalyi, 2000). Therefore, as currently articulated, socio-evolutionary theories neither predict nor account for evidence of stronger reactions to positive events among people with subthreshold (Nezlek & Gable, 2001) and clinical depression (Peeters et al., 2003). We believe that these models can be extended to predict heightened reactions to positive social interactions among people with subthreshold depressive symptoms.

A Balanced Model of Depressive Symptoms as Social Sensitizer

The social risk hypothesis frames social relationships in terms of social value and social burdens – if social burden exceeds, or even equals, one's social value, then one is at elevated risk of being excluded and attracting negative attention (e.g., Allen et al., 2004). Humans presumably evolved the ability to appraise how they are being viewed by others (e.g., if they are attracting negative attention from their group, Gilbert, 1997). According to this perspective, depressive symptoms evolved to facilitate appraisals of falling social value and rising social burden, and it is because of this function that they sensitize people to threats of social rejection. It seems equally likely that depressive symptoms help people identify when their social value is rising and their social burden is falling; positive social interactions signal rising social value, and therefore more secure belonging. Thus, people with greater depressive symptoms can be expected to capitalize on positive social interactions by experiencing enhanced well-being.

From the perspective of a social group, depressed people are prone to unsatisfying, problematic relationships and are often avoided as interaction partners (e.g., Joiner & Katz, 1999). Happy people, in contrast, tend to possess good relationships, and people with higher positive affect are evaluated more favorably by interaction partners (e.g., Gable, Reis, Impett, & Asher, 2004; Lyubomirsky, King, & Diener, 2005). Thus, it would be adaptive for people with greater depressive symptoms to be highly reactive to positive social interactions because their increased well-being would make them more attractive as social partners (decreasing the likelihood of future rejection and solidifying their social membership). In short, there is no particular reason from a socio-evolutionary standpoint to postulate that depressive symptoms might have evolved *only* to sensitize people to risks of *disadvantageous* social value/burden ratios. We argue that people with subthreshold depression may be uniquely attentive to both positive and negative social cues – and may be expected to be particularly reactive to their social experiences – because such cues provide valuable information about their degree of acceptance and security within their social group. In our model, mild to moderate depressive symptoms direct people's attention to seeking and establishing, not just protecting, belonging.

The Present Investigation

Social experiences are strongly implicated in the etiology and maintenance of depression. We propose that mild to moderate levels of depressive symptoms sensitize people to cues regarding their degree of social belonging, extending previous theories to include indicators of rising belonging. That is, when people with greater depressive symptoms perceive their belonging to be at risk, as indicated by negative social interactions, they should react more strongly with decreases in well-being. Similarly, when they perceive their belonging to be secure, as indicated by positive social interactions, they should react more strongly with increases in well-being. We are aware of no previous research that has examined the reactivity of people with mild to moderate depression symptoms to the full spectrum of positive and negative social interactions.

Inquiry into the ramifications of social experiences can advance by examining how people differing in depressive symptoms act and react in their natural, ongoing social environments. Therefore, we conducted two daily process studies. In Study 1, we examined how depressive symptoms influenced reactivity to an objective list of specific negative and positive social interactions. To better understand reactions to these social events, we assessed affective (positive and negative affect) and cognitive (appraisals of how meaningful and satisfying life is) markers of well-being. Because no finite list can hope to capture all of the significant interactions people might experience, in Study 2, we examined the role of depressive symptoms in response to appraisals of memorable social interactions. Thus, using both objective and subjective measures of interaction quality, we tested our proposal that depressive symptoms attune people to signals of social rejection as well as belonging. Drawing on previous theory and research, we hypothesized people with greater depressive symptoms would report (1) more frequent negative, and less frequent positive, social interactions, and (2) greater reactivity in terms of affective and cognitive markers of well-being to positive social interactions, negative social interactions, and perceptions of belonging.

Study 1

Study 1 focused on relations between positive and negative social interactions and well-being among people with varying depressive symptoms. Previous lab-based research examined depressive symptoms in the context of positive and negative social stimuli, such as photos of facial expressions, in clinically depressed samples (e.g., Gotlib, Kasch, et al., 2004), and some daily process research examined links between subthreshold depressive symptoms and naturalistic daily life events (e.g., Nezlek & Gable, 2001). However, despite the strong role social functioning is thought to play in the etiology and exacerbation of depressive symptoms

(e.g., Coyne, 1976a), research is lacking on the reactivity of people with mild to moderate depressive symptoms to both positive and negative social events. To understand how people with greater depressive symptoms react to positive and negative social interactions, we assessed relations between social interactions and a broad range of well-being measures. Specifically, we measured cognitive evaluations of life satisfaction and meaning in life as well as positive and negative affect. Thus, we assessed what we refer to as cognitive well-being (CWB) and affective well-being (AWB). We used a 21-day daily process method in which participants recorded the occurrence of a variety of social interactions and their well-being each day. This method generates hierarchically structured data in which daily life ratings are nested within individuals. Direct relations between well-being and social experiences reported in daily life were assessed. Additionally, cross-level interactions assessed the extent to which relations between day-to-day social interactions and well-being varied across levels of depression. Thus, we looked at how many positive and negative social interactions people with greater depressive symptoms reported. In addition, we examined whether people with greater depressive symptoms reacted to positive and negative social interactions more strongly in terms of AWB and CWB.

Method

Participants—Participants were recruited from undergraduate psychology courses at a large Midwestern university ($N = 106$; M age = 19.7, $SD = 3.1$; 66% female; 74% European-American), and completed the depression measure and daily reports in exchange for course credit. Missing responses and invalid response patterns (i.e., no day-to-day variation in responses, same rating score given for all items) resulted in a final sample size of 104.

Measures

Global Depression: Depressive symptoms were assessed using the Center for Epidemiological Studies–Depression scale (CES-D; Radloff, 1977). Twenty items were rated from 0 (*Rarely or None of the Time*) to 3 (*Most or All of the Time*) ($\alpha = .86$).¹ The mean symptom severity of this sample ($M = 16.7$, $SD = 10.5$) was roughly 0.5 SD lower than clinical sample means (Radloff, 1977), with 38.5% of the sample scoring above the mild to severe depression cutoff score (17) suggested for comparisons between normal and clinical populations (Radloff, 1977). Thus, this sample appears to have sufficient individuals reporting subthreshold symptoms to be considered at risk for significant distress and/or impairment.

Daily Social Interactions: Positive and negative social interactions were assessed using five positive (e.g., “Flirted with someone or arranged a date,” “Went out socializing with friends/date (e.g., party, dance clubs)”) and five negative items (e.g., “A disagreement with a close friend or steady date was left unresolved,” “Was excluded or left out by my group of friends”) from the Daily Events Survey (Butler, Hokanson, & Flynn, 1994). Items were rated on whether they happened (1) or not (0). Principal axis factor analysis with Promax rotation revealed that items assorted into three factors. One factor ($eigenvalue = 1.85$) was comprised of three positive social items concerning friends and flirting; the second factor ($eigenvalue = 1.55$) was comprised of all five negative social interaction items; the third factor ($eigenvalue = 1.05$) was comprised of the two items concerning interactions with steady romantic partners. Because the negative social interactions formed a clear factor and the two small positive factors were highly related ($factor\ correlation = .55$), the items were assorted into one negative social interaction

¹The temporal stability of the CES-D is important to the present study because the CES-D was administered at the end of the three-week diary period. Moderately strong test–retest reliability has been reported over a 2- to 8-week period (r 's from .51 to .67) and over a 3- to 12-month period (r 's from .32 to .54) (Radloff, 1977). Thus, CES-D scores appear stable enough for the present study. Concerns over when the CES-D was administered also can be allayed somewhat because of the similarity of results from Study 1 (CES-D administered after the daily reports were collected) and Study 2 (CES-D administered before the daily reports were collected).

scale and one positive social interaction scale. Reliability estimates were obtained from Hierarchical Linear Modeling 6.0 (HLM; Raudenbush, Bryk, Cheong, & Congdon, 2004), supporting the consistency of the two scales (*reliability* = .93 and .91, for positive and negative social interactions, respectively).

Daily Cognitive Well-Being: Cognitive well-being was assessed by summing three items used in previous research (Steger, Kashdan, & Oishi, 2008) assessing meaning in life (i.e., “How meaningful does your life feel?” “How much do you feel your life had purpose today?”) and life satisfaction (“How satisfied are you with your life?”) rated from 1 (*Not at All*) to 7 (*Absolutely*). Meaning and life satisfaction items were highly interrelated ($\gamma = 1.14$, $SE = .03$, $t(96) = 35.20$, $p < .0001$) (*reliability* = .98).

Daily Affective Well-Being: Affective well-being was assessed by subtracting average daily negative affect ratings (i.e., sluggish, afraid, sad, anxious, and angry) from average daily positive affect ratings (i.e., relaxed, proud, excited, appreciative, enthusiastic, happy, satisfied, curious, and grateful) (see Schimmack & Diener, 1997). Affective items were rated from 1 (*Very Little/Not at All*) to 5 (*Extremely*). These emotional adjectives are used frequently in experience-sampling studies of emotion (e.g., Kashdan & Steger, 2006). PA and NA subscale scores were highly interrelated ($\gamma = -.11$, $SE = .00$, $t(102) = 25.062$, $p < .0001$) (*reliability* = .93).

Procedure—During an initial orientation session, participants answered demographic questions, and received a packet of 21 duplicate daily reports containing the daily measures specified above, along with instructions to complete a single form at the end of each day or within one hour after waking. Participants were told in class during recruitment and in subsequent emails that it was extremely important to only complete reports at the end of each day, and not to complete more than one report on any single day. After 3 weeks, participants turned in their daily reports. All participants completed the CES-D three weeks into the study, on the day when they turned in their daily reports. Participants received course credit for their completed daily reports and survey responses.

Results

The data consisted of 2,118 daily reports nested within 104 people. Participants reported mean daily CWB of 14.3 ($SD = 3.9$), which is above the midpoint of 12, and mean daily AWB of 0.8 ($SD = 1.3$). This positive number means that participants reported more positive emotions than negative emotions per day. Participants reported more positive social interactions ($M = 1.11$, $SD = 1.19$) than negative social interactions ($M = 0.33$, $SD = 0.69$). Using recommended formulas for calculating intraclass correlations within multilevel datasets, we calculated the proportion of variance in daily scores due to between-person factors (individual differences) compared to within-person factors (days) (Raudenbush & Bryk, 2002, p. 36, 71). In each case, the percentage refers to the proportion of variance attributable to between-person factors (Table 1). From these proportions, we can see that only about one-third to two-fifths of the variance in daily positive and negative social interactions, and AWB, are due to stable, dispositional factors, with the majority of the variance attributable to fluctuating daily factors. The reverse case was true for CWB, which appears more stable overall.

Coefficients representing daily social interactions and well-being were estimated for each person (Level-1) and individual differences in these variables accounted for by depressive symptoms were estimated (Level-2). Level-1 variables were person-centered and Level-2 depression ratings were standardized and entered uncentered. First, we first tested whether more depressed people reported fewer positive and more negative social interactions than less

depressed people using open HLM equations with CES-D scores as a Level 2 covariate of the intercept of positive and negative social interactions.

$$Y_{ij} = \beta_{0j} + r_{ij} \quad (\text{Level 1}) \quad (1)$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01} [\text{depression}] + u_{0j} \quad (\text{Level 2}) \quad (2)$$

where Y_{ij} is either positive or negative social interactions reports for person j on day i , β_{0j} is a random coefficient representing the intercept, or average daily number of interactions for person j , and r_{ij} represents error. At Level 2, β_{0j} is predicted by γ_{00} , which is the average of Level 1 coefficients describing daily reports of interactions, γ_{01} , which is each participants' standardized CES-D scores score, and u_{0j} , which is error.

People with more depressive symptoms reported marginally fewer positive social interactions ($\gamma = -.02$, $SE = .01$, $t(102) = 1.79$, $p < .10$), and significantly more negative social interactions ($\gamma = .03$, $SE = .01$, $t(102) = 4.23$, $p < .0001$).

We next tested whether people with greater depressive symptoms were more reactive to positive and negative social interactions using an equation in which well-being was predicted by an intercept and number of positive and negative social interactions, with CES-D scores as a Level 2 covariate of each term.

$$Y_{ij} = \beta_{0j} + \beta_{1j} [\text{positive social interactions}] + \beta_{2j} [\text{negative social interactions}] + r_{ij} \quad (\text{Level 1}) \quad (3)$$

$$\beta_{0j} = \gamma_{00} + \gamma_{01} [\text{depression}] + u_{0j} \quad (\text{Level 2}) \quad (4)$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11} [\text{depression}] + u_{1j} \quad (\text{Level 2}) \quad (5)$$

$$\beta_{2j} = \gamma_{20} + \gamma_{21} [\text{depression}] + u_{2j} \quad (\text{Level 2}) \quad (6)$$

where Y_{ij} is either CWB or AWB scores for person j on day i , β_{0j} is a random coefficient representing the intercept, or average daily number of interactions for person j , β_{1j} represents each participants' daily positive social interactions, β_{2j} represents each participants' daily negative social interactions, and r_{ij} represents error. At Level 2, β_{0j} is predicted by γ_{01} , which is the average of Level 1 coefficients describing the relations between both positive and negative social interactions and the corresponding Y_{ij} (either CWB or AWB), γ_{00} , which is each participant's standardized CES-D score, and u_{0j} , which is error. Thus, γ_{01} reflects the influence of participants' depressive symptoms on their average daily CWB or AWB. β_{1j} is predicted from γ_{10} , which reflects the Level 1 coefficients describing the average relation between positive social interactions and CWB or AWB, γ_{11} , which represents the influence of depressive symptoms on daily CWB and AWB, and u_{1j} , which is error. β_{2j} is modeled identically, but using reports of negative social interactions rather than positive social interactions. Thus, we modeled daily CWB and AWB as a function of within-person reactivity (slopes) to positive and negative social interactions, γ_{10} and γ_{20} , allowing these relations to

differ for different participants, and using depression scores to predict these individual differences in reactivity, γ_{11} and γ_{21} .

Across participants, positive, γ_{10} , and negative, γ_{20} , social interactions were significantly related to well-being (Table 1). People with greater depressive symptoms reported lower average daily CWB and AWB, γ_{01} . Depression also moderated relations between daily positive, γ_{11} , and negative, γ_{21} , social interactions and daily CWB, and between daily positive social interactions, γ_{21} , and daily AWB. To decompose the interaction between depression and social interactions we calculated means at +1 SD and -1 SD. Compared to people with lesser depressive symptoms, people with greater depressive symptoms reported larger positive relations between daily positive social interactions and CWB (see Figure 1) and AWB, and larger negative relations between daily negative social interactions and CWB.² Positive and negative social interactions, along with the moderating effect of depressive symptoms accounted for 27% of the variance in daily cognitive well-being and 42% of the variance in daily affective well-being (see Table 2).

Discussion

As predicted from previous research and theory, people with greater depressive symptoms reported somewhat fewer positive social interactions and significantly more negative social interactions. Other results extended previous research and provided the first support for our expansion of socio-evolutionary models of depression to predict greater sensitivity to *both* negative and positive social interactions. Specifically, people with greater depressive symptoms were more reactive to both positive and negative daily social interactions. Thus, although previous research has indicated that people with greater depressive symptoms react more strongly to positive life events (e.g., Nezlek & Gable, 2001; Peeters et al., 2003), the present research is the first to develop a conceptual rationale for, and support with data, greater reactivity to social interactions, specifically.

Study 2

Study 1 found that people with greater depressive symptoms reacted more strongly to social interactions included on a short list of positive and negative interactions. A priori lists of interactions might not be an accurate representation, in terms of number and type, of people's interactions in a given day. People undoubtedly engaged in social interactions that were not included on the list. Further, people likely differ in their interpretations of the magnitude of events and in how upsetting the negative events were, or how uplifting the positive events were. For example, some people may not worry about leaving a minor disagreement with a friend unresolved. On the other hand, an unresolved major disagreement may cause some participants to ruminate heavily.

To obtain more naturalistic and representative samples of people's daily social lives, we conducted a second study, allowing participants to rate self-selected "memorable" interactions.

²To investigate the possibility that there was a range restriction in the number of positive and negative social interactions reported by people with lesser and greater depressive symptoms, we split the sample into a Low Depression group (scoring 16 or lower on the CES-D) and a High Depression group (17 or higher on the CES-D). The Low and High Depression groups reported an absence of positive social interactions at similar rates (38.9% of days without a positive social interaction for the Low Depression group versus 40.9% of days for the High Depression group). However, the differences were larger for negative social interactions. Whereas the High Depression group reported 67.0% of days without having any negative social interactions, the Low Depression group reported 84.4% of days without having any negative social interactions. Thus, analyses for people with low levels of depressive symptoms are based on less than 16% of the total number of days. This may have attenuated the magnitude of the associations between negative social interactions and well-being, particularly among those low in depressive symptoms. If this was the case, it might result in an over-estimate of the influence of depressive symptoms on reactions to negative social interactions, although this does not appear to be a problem for positive social interactions.

Because our central argument is that people with mild to moderate levels of depression may be particularly sensitive to social information because that information is relevant to their need to belong, we assessed people's daily sense of belonging. To do this, we measured how close and connected people felt to others, the perceived quality of social interactions, as well as how understood they felt in their interactions. Feeling close, connected, and understood are core features of a sense of belonging (e.g., intimacy, Laurenceau, Barrett, & Rovine, 2005; Reis & Shaver, 1988).

Study 2 used a more refined methodology. Whereas Study 1 used paper and pencil reports, Study 2 used an internet-based daily report method. Paper and pencil reports are at risk for various compliance errors, such as participants completing more than one day's worth of reports at a time. Completing a report for more than one day increases the risk of retrospective reporting biases. This response pattern would undermine the ecological validity of daily process methods. Using an internet-based daily report method corrects for this potential source of error, as well as data entry errors, by virtue of the fact that participants record their own data on the internet site, which then time/date stamps each report. Reports falling outside of the parameters are deleted from the dataset.

Method

Participants—Participants were recruited from undergraduate psychology courses at a large, Midwestern university ($N = 49$; M age = 20.0, $SD = 3.9$; 61% female; 68% European-American), and completed questionnaires and a web-based daily report for 28 consecutive days in exchange for course credit.

Measures—The CES-D ($M = 16.1$; $SD = 8.9$; $\alpha = .86$; 25.9% of the sample exceeded the cutoff score of 17 for mild to severe depression), daily CWB (*reliability* = .94) and AWB measures (*reliability* = .92) were administered.

Daily Interaction Ratings: Participants rated how close and connected they felt to other people each day from 1 (*Not at All*) to 7 (*Absolutely*), and listed up to four “memorable interactions,” which they rated their quality from 1 (*Extremely Bad*) to 5 (*Extremely Good*). Interactions were also rated on feeling understood from 1 (*Very Little*) to 5 (*A Great Deal*). Ratings were averaged across all reported interactions. Principal axis factor analysis with Promax rotation revealed that all three items loaded on one factor (*eigenvalue* = 1.25), supporting their aggregation as an indicator of belonging (*reliability* = .92).

Procedure—Participants completed the CES-D at Time 1, and received instructions to complete internet-based daily reports each night between 7pm and 5am. Participants were told it was extremely important to complete surveys during the timeframe we provided for them, to only complete reports for a single day at a time, and that we would only retain daily reports completed during the timeframe we provided. Participants were reminded to complete their daily reports under these conditions in subsequent emails. Only responses time/date-stamped between these times were retained.

Results

The data consisted of 1,124 valid daily reports nested within 49 participants, structured as in Study 1. Participants reported mean daily CWB of 14.8 ($SD = 2.9$), which is above the midpoint of 12, and mean daily AWB of 0.9 ($SD = 1.2$). Descriptive statistics were very similar to Study 1 for CWB; reports of AWB reflected a larger balance in favor of positive emotions, and greater variability, perhaps as a function of the 28-day timeframe. Participants' belonging scores ($M = 15.9$, $SD = 3.4$) were above the midpoint of 13, indicating a moderately high sense of belonging in daily interactions. According to the intraclass correlation calculations, 41.9% of

the variance in daily belonging scores is due to stable, dispositional factors rather than fluctuating daily factors. As in Study 1, more variance was due to stable factors for CWB (61.1%) than for AWB (47.3%).

Depressive symptoms were inversely related to daily CWB ($\gamma = -1.35$, $SE = .36$, $t(49) = 3.72$, $ES\ r = .35$, $p < .001$), AWB ($\gamma = -.57$, $SE = .13$, $t(49) = 4.30$, $ES\ r = .40$, $p < .001$), and belonging ($\gamma = -.81$, $SE = .34$, $t(49) = 2.39$, $ES\ r = .23$, $p < .05$). The focus of Study 2 was on the role of depressive symptoms in moderating the relation between sense of belonging and CWB and AWB (Table 2). To examine this, we created multilevel models for both outcomes (CWB and AWB) in which outcomes were predicted by daily belonging at Level 1 (γ_{10}), with depressive symptoms as a Level 2 moderator (γ_{01} and γ_{11}). Across participants, feeling a sense of belonging robustly predicted greater daily CWB and AWB, γ_{10} . In accordance with the results from Study 1 and our hypotheses, people with greater depressive symptoms reported stronger positive relations between a sense of belonging and daily CWB (Figure 1B), with a trend toward a significant effect for AWB, γ_{11} .³

Discussion

In line with previous research showing that people with greater depressive symptoms feel that they experience worse social interactions (e.g., Nezlek et al., 2000), Study 2 found that people with greater depressive symptoms reported less satisfaction of their need to belong. Study 2 also provided the first indications that depressive symptoms sensitize people to this subjective sense of belonging. On days when people with greater depressive symptoms did feel a sense of belonging, their pattern of responses demonstrated heightened reward and punishment reactions to social interactions. A strong resemblance exists between the moderation results from Study 1 (Figure 1), which used a paper and pencil method and an a priori list of objective social interactions, and results from Study 2 (Figure 2), which used a more rigorous internet-based method with time and date stamping of entries and a measure of perceived belonging during interactions. Also as in Study 1, the effects were stronger for CWB than for AWB, suggesting that people with greater depression symptoms view their lives as more satisfying and meaningful when they have positive social experiences, with less of an effect on positive or negative affect than other people.

General Discussion

Across two daily process studies, people with greater depressive symptoms reported a higher number of negative social interactions and a lesser sense of belonging in social interactions. In accord with previous research (e.g., O'Neill et al., 2004; Zautra & Smith, 2001), we found that compared to less depressed people, people with greater depressive symptoms experienced less well-being on days when they had negative social interactions (heightened reactivity). These studies also extended previous research, demonstrating that although people with greater depressive symptoms experienced fewer positive social interactions (e.g., Joiner & Coyne, 1999; Nezlek et al., 2000), they were more reactive to their occurrence (i.e., greater reward responsiveness). Previous daily diary studies have shown that people with greater depressive symptoms report more strongly enhanced well-being on days when they experience positive

³We repeated these analyses for both Study 1 and Study 2 separating positive affect and negative affect into distinct dependent variables. In Study 1, the pattern of results was the same: both positive and negative social interactions significantly predicted Positive Affect and Negative Affect, separately, with depressive symptoms significantly moderating the influence of positive social interactions (but not negative social interactions). In study 2, belonging was significantly, directly related to both Positive Affect and Negative Affect, but this relation was only significantly moderated by depressive symptoms with regard to Positive Affect. This split in outcomes is probably what is driving the merely marginally significant moderating influence of depression in Study 2. If this pattern of findings was replicated in future research, it could indicate the possibility that depressive symptoms sensitize people to positive social events by increasing positive affective reactions, as opposed to dampening negative affective reactions.

life events (Nezlek & Gable, 2001). The present studies are the first to focus on social life events and feelings of belonging, as well as the first to extend the measurement of well-being to include meaning, purpose, and satisfaction in life. We used a strategy of assessing both objective positive and negative social interactions (Study 1) and appraisals of the quality of social interactions (Study 2). The present studies used multiple measures to assess the latent construct of belonging that is thought to motivate human behavior (Baumeister & Leary, 1995). Thus, it is with some confidence that we can say that belonging plays an important role in how people with greater depressive symptoms derive well-being from social experiences, whether objectively or subjectively assessed. Specifically, people with greater depressive symptoms reacted with more intense positive life evaluations and more positive affect balance in response to feeling a sense of belonging with others.

Results from both studies were stronger for cognitive well-being (judgments of meaning in life, life satisfaction) than for affective well-being (positive and negative affect balance). Meaning in life concerns people's judgments about whether or not their lives make sense and are endowed with a mission or purpose (e.g., Steger, Frazier, Oishi, & Kaler, 2006; Steger, Kashdan, Sullivan, & Lorentz, 2008). Life satisfaction concerns people's judgments about whether the conditions of their lives are satisfying and conform to their expectations (Diener, Larsen, Emmons, & Griffin, 1985). Together, these variables gauge higher-order judgments about life as a whole, and would seem to require some amount of perspective-taking. In all analyses, the interaction of depressive symptoms and social interactions were significantly related to such judgments. In contrast, only one of three interactions between depressive symptoms and social interactions were significantly related to affective well-being, which concerns people's prevailing affective states over the course of a day. This pattern suggests that for people with greater depressive symptoms, social interactions influence cognitive well-being appraisals more consistently than affective well-being appraisals. Thus, compared to people with lesser depressive symptoms, people with greater depressive symptoms appear to appreciate their lives more when they meet their need to belong.

We derived our hypotheses by extending socio-evolutionary ideas about how mild to moderate depressive symptoms operate in the social world. In our expansion of such models (e.g., Allen & Badcock, 2003; Gilbert, 1992, 2006), we drew on the idea that depressive symptoms serve as a warning signal, directing people's limited attentional resources to their current social status and the potential danger of possible rejection by other people. At low levels, depressive symptoms may help people adaptively regulate their social interactions to maintain social value and belonging. However, at greater levels of depressive symptoms, this social value warning system may become hypersensitive, leading to distress and impairment. Previous work on socio-evolutionary models has focused exclusively on negative interactions as signals of looming rejection; our extension pointed to the importance of positive relations as signals of rising belonging. For example, positive social interactions, particularly when a sense of belonging is felt, suggest to a person that his or her social value is high enough to feel safe and secure, allowing movement away from submissive or defensive postures to more active and exploratory motivational states. Our results provided support for these predictions, bolstering the notion that people with subthreshold levels of depression may be particularly attentive to, and benefit more from, positive social interaction and suffer more from negative social interactions compared with people without emotional disturbances.

When considering models informed by evolutionary theories, it is important to note that a distinction is often made between adaptations that provided survival advantaged to humans in our long-passed ancestral environments and the manner in which they function among contemporary life (e.g., Allen et al., 2004). That is, depressive symptoms may have developed to help ancestral humans respond to social cues by modulating their activity in ways that would have been appropriate under much more hazardous and precarious circumstances. Ancient

adaptations that evolved in response to particular challenges may not be advantageous in our modern environments.

Positive social interactions are probably an encouraging sign for people struggling with depressive symptoms. These interactions might reinforce the idea that they matter to others, counteract the more frequent negative interactions they experience, and provide a tonic for depressive thoughts and emotions. It also may be the case that heightened reactivity – gaining enhanced well-being from these positive social experiences – may signal excessive attachments and vulnerability among depressed people. Their daily levels of well-being may be more “fragile,” subject to the caprices of their daily encounters with others rather than more stable sources of psychological health (see also Gable & Nezlek, 1998; Roberts & Monroe, 1994). Such a possibility fits with some research on sociotropic depression, which finds that sociotropic people are nurturing with relative strangers, but more vindictive in closer relationships (Sato & McCann, 2007). It is not clear from the present data whether people were having the majority of their social interactions and feelings of belonging in the context of very close or less close relationships. It is possible that interactions with relative strangers were providing most of the boost in well-being, which would be similar other reports (Sato & McCann, 2007). People who over-invest in new relationships and neglect or damage closer, more enduring relationships are likely to erode their long-term social resources, which are considered vital to continued functioning (e.g., Baumeister & Leary, 1995; Deci & Ryan, 2000).

Alternatively, heightened reactivity may indicate potentially potent everyday interventions. Behavioral activation interventions encourage patients to engage in a greater ratio of healthy behavior with the potential for positive psychological, social, and physical benefits (e.g., Hopko, Lejuez, Ruggiero, & Eifert, 2003). In the context of social activity, this means decreasing exposure to situations in which patients attempt to elicit sympathy and patronizing concern from others – reinforcing unhealthy depressive behavior, and increasing exposure to situations in which the patient is provided with genuine social support and acceptance – reinforcing healthy and adaptive social behavior (Hopko et al., 2003). Research on depressive rumination supports this hypothesis. Although frequent ruminators are more likely to seek support and assurance, which can lead to rejection, they respond with greater reductions in distress upon receiving social support and other demonstrations of social acceptance than non-ruminators (Nolen-Hoeksema & Davis, 1999).

There is the possibility, however, that the social interactions that give rise to feelings of belonging among people with greater depressive symptoms are the same ones that reinforce unhealthy depression sustaining behaviors. For example, although eliciting sympathy from others helps maintain a sense of helplessness and sustains depression, people with greater depressive symptoms may nonetheless desire sympathetic interactions and feel that positive social interactions are those in which they receive sympathy. Thus, they may interpret potentially unhealthy interactions as beneficial. Self-verification theory makes a similar claim in that it proposes that people with greater depressive symptoms may prefer to experience social interactions that are in concordance with their negative self-views. For example people with greater depressive symptoms may prefer to be socially rejected to being socially accepted (e.g., Swann, Wenzlaff, Krull, & Pelham, 1992). Thus, in addition to interpreting social experiences in a more negative light, people with greater depressive symptoms may also prefer negative social experiences and find them to be more familiar, and consistent with their self-views. Such biased social processing could explain the problematic social behaviors of depressed people, such as eliciting rejection and failing to gain acceptance (e.g., Joiner & Coyne, 1999).

Counseling Implications

The present findings join the growing body of literature linking depression to social functioning. People with greater depressive symptoms experience less pleasant and rewarding social lives – they report fewer positive interactions and more negative interactions. This situation is exacerbated by their greater reactivity to negative interactions. When working with depressed clients, clinicians should recognize that some part of this bleak, social landscape is created through clients' interpretations of events. This observation is consistent with some of the assumptions underlying therapeutic modalities such as interpersonal process therapy and cognitive therapy (e.g., Butler, Chapman, Forman, & Beck, 2006; Hollon, Thase, & Markowitz, 2002). In accordance with these approaches, the present findings support paying attention to helping clients revise and rehabilitate their interpretations of social events.

While it is the case that the social lives of people with greater depressive symptoms appear less desirable than those of other people, it is also apparent that when good events occur, they respond more strongly and positively. Clinicians should find support in these results for efforts to encourage depressed clients to seek out and achieve positive social interactions. In addition to the higher levels of well-being associated with such positive interactions, discussing positive interactions in session with a clinician may help clients capitalize on their experience. Clinicians who are actively encouraging and supportive when listening to clients relate their positive social experience may be further enhancing the well-being benefits that may result from such positive social interchange (Gable et al., 2004). Suggestions to increase positive social interactions would be consistent with behavior activation treatments of depression (e.g., Hopko et al., 2003), which have strong empirical support. Nonetheless, without consideration of the potential for people with greater depressive symptoms to elicit negative responses and initiate uncomfortable social contact (Coyne, 1976a, 1976b), it is possible that encouraging increased social engagement could unintentionally produce increased *negative* social interaction. Regardless of whether they are positive or negative, the present findings demonstrate that the social lives of our depressed clients warrant considerable attention in session.

Limitations and Future Research

Our results are subject to limitations associated with the self-report methods used in the present investigation. There is the possibility that people systematically represented the quantity and quality of their social interactions in ways related to their level of depressive symptoms. If people with greater depressive symptoms interpret their social interactions more negatively (e.g., Swann et al., 1992), then it would be more difficult to argue that they are more reactive to social interactions in general because people with different levels of depressive symptoms recognize, respond to, and modify their environments in different ways (e.g., Barnett & Gotlib, 1988; Joiner & Katz, 1999). They would be, in a sense, reacting to different events, making comparisons difficult. In the present research, Study 2 used subjective ratings of belonging, which could be influenced by differing interpretive tendencies among people with different levels of depressive symptoms. The fact that Study 1's results, which were based on an objective list of social interactions, mirror those from Study 2 helps allay these concerns. However, it is still possible that people with greater depressive symptoms construe some interactions as being arguments or disagreements whereas less depressed people might view them as unexceptional, ordinary exchanges (e.g., Zuroff et al., 2007). Regardless, it is far from obvious that such a bias in perceiving relatively neutral events as more negative could account for stronger reactions, just as it does not explain why there would be greater reactivity to positive events.

Despite this limitation, it is important to understand the nature of depression's interaction with the complexities of people's dynamic, naturally-occurring social contexts, of which interpretations and perceptions are an inextricable part. This is the aim of externally valid

studies like the present one. On the other hand, it is desirable to pinpoint depression's influence not only on interpretations and perceptions, but also reactivity per se. This is the aim of highly internally valid studies and experimental methods. Previous laboratory studies have used non-interactive stimuli (e.g., positive and negative films or facial expressions), rather than actual, in vivo social interactions to assess information perception and reactivity among more depressed people. One solution to the problem of intermingled perceptions and reactivity might be to expose people with different levels of depressive symptoms to standardized, in vivo social interactions in a laboratory setting, and test whether people with greater depressive symptoms interpret positive social stimuli similarly and whether they react more strongly than less depressed people. For example, during a staged collaborative project, a confederate could provide either positive or negative feedback to participants. We would expect that people with greater depressive symptoms would report more strongly enhanced well-being following the receipt of positive feedback and more strongly degraded well-being following the receipt of negative feedback compared to people with lesser depressive symptoms (although self-verification theories of depression might predict the opposite; see Swann et al., 1992).

There are a number of other limitations related to the measures we used in the present study. First, two of the five positive social interaction items we used in Study 1 focus on romantic interactions (flirting or having good interactions with a steady date). This may further limit the how well Study 1 represents the typical and important social interactions of college student samples. Second, our measure of cognitive well-being focused on meaning in life and life satisfaction. There are undoubtedly other indicators of cognitive well-being that should be included in future research (e.g., self-regulation, optimism). Third, our measure of belonging focused on people's appraisals of specific social interactions, and does not capture the full content of this important construct. Future research should consider using broader measures of global belonging (e.g., positive relationships; Ryff, 1989).

Although our sample of people with subthreshold depressive symptoms is appropriate for our extension of recent socio-evolutionary models of depression (Allen & Badcock, 2003), it should be noted that most people in both studies did not meet a criteria of having mild-to-severe depressive symptoms. One strength of the model we presented here is that it regards depressive symptoms as occurring on a continuum; it predicts that sensitivity to social cues should increase in proportion to depressive symptoms, regardless of where they are on the continuum of impairment. Nonetheless, the presence of many people who are not manifesting any significant level of depressive symptoms reduces the degree to which the present studies directly test our proposed model of depression. To explore whether depressive symptoms have a social tuning function even at low levels, it would be valuable to replicate this research in stratified samples of unimpaired, mildly depressed, moderately depressed, and severely depressed people.

Finally, the generalizability of the results of the present investigation is limited by our use of non-clinical samples. Although our findings generally support previous research (e.g., Nezlek & Gable, 2001; O'Neill et al., 2004; Peeters et al., 2003; Segrin & Abramson, 1994), it is unclear whether our findings would extend to clinically depressed samples. Rottenberg's (2005) hypothesis of flattened reactions to positive and negative stimuli may be more accurate for clinically depressed samples than for non-clinical samples (although Must et al., 2006 found results more in line with our model). For example, if depressive symptoms accumulate to the degree that they interfere with basic cognitive and perceptual processes, then people with severe depression may not be able to monitor the social cues they receive from others. Daily process studies in clinical samples are needed to clarify the boundary conditions of sensitizing versus dulling effects posited by these alternative models.

Conclusions

By focusing on people's reactivity in their ongoing social environments, we gain a more reliable picture of life as it is lived. The present results suggest that people with greater depressive symptoms appear to find greater satisfaction and meaning in their lives when they meet their need to belong, suggesting an important role for positive social relationships in buttressing these important cognitive perspectives on life. Thus, the full spectrum of social interactions may provide especially fertile ground for continued research on etiology, maintenance, recovery, and relapse in depression.

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Relation between Positive Social Interactions and Daily Cognitive Well-Being moderated by Depression

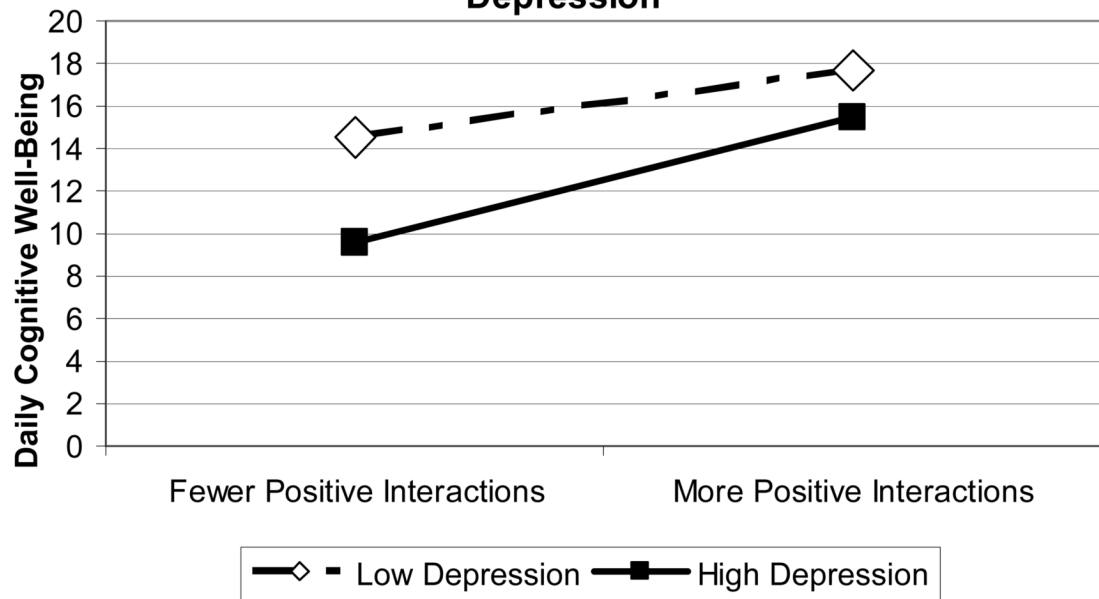


Figure 1. Depressive symptom severity moderates relations between positive social interactions; and daily cognitive well-being (Study 1)

Relation between Daily Belonging and Daily Cognitive Well-Being moderated by Depression

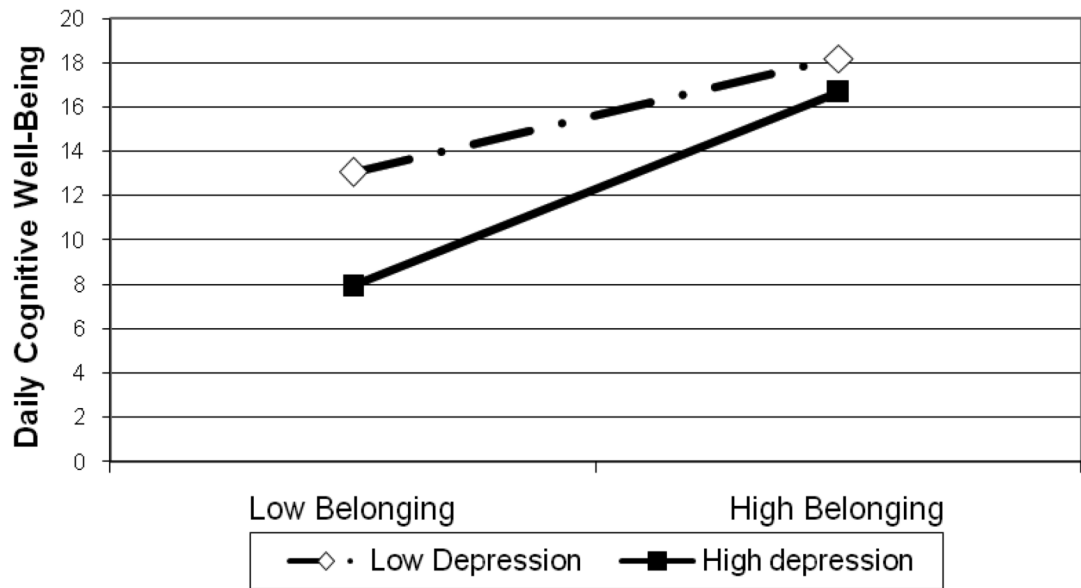


Figure 2. Depressive symptom severity moderates relations between sense of belonging and daily cognitive well-being (Study 2).

Table 1

Descriptive statistics for Studies 1 and 2.

	M	SD	r_{ij}	u_{ij}	ICC
<i>Study 1</i>					
IVs	14.27	3.92	5.20	10.31	.66
	Cognitive Well-Being				
	Affective Well-Being	.81	1.34	1.08	.72
DVs	1.11	1.19	.90	.52	.37
	Positive Social Interactions				
	Negative Social Interactions	.33	.69	.31	.16
					.34
<i>Study 2</i>					
IVs	14.83	2.85	3.12	4.90	.61
	Cognitive Well-Being				
	Affective-Well-Being	.93	1.21	.77	.69
DVs	15.90	3.35	6.50	4.71	.42
	Belonging				

Notes. The following terms were derived from “empty” models, as described in Equations 1 and 2 (except with the depression term excluded from Equation 2), r_{ij} = within-persons variance; u_{ij} = between-persons variance; ICC = proportion of variance in each variable attributable to stable individual differences. Separate models were conducted for each variable.

Table 2

Depression, social interactions, and well-being, Study 1.

DV	Predictor	γ coefficient	SE	t-ratio	% Var ^a
<i>Cognitive Well-Being</i>					
	Intercept ($\gamma00$)	14.37	.28	50.67***	.27
	Depression ($\gamma01$)	-1.81	.29	6.22***	
	Positive Social Interaction ($\gamma10$)	2.01	.27	7.48***	
	Depression ($\gamma11$)	.65	.29	2.20*	
	Negative Social Interaction ($\gamma20$)	-2.67	.50	5.38***	
	Depression ($\gamma21$)	-1.42	.41	3.46**	
<i>Affective Well-Being</i>					
	Intercept ($\gamma00$)	.82	.07	11.82***	.42
	Depression ($\gamma01$)	-.58	.08	7.53***	
	Positive Social Interaction ($\gamma10$)	1.40	.16	8.70***	
	Depression ($\gamma11$)	.55	.18	3.06**	
	Negative Social Interaction ($\gamma20$)	-1.75	.28	4.87***	
	Depression ($\gamma21$)	-.16	.27	.60	

Notes.

p < .001

**
p < .01

*
p < .05. Separate models were conducted for cognitive and affective well-being.

^a% Var = proportion of variance in the dependent variable accounted for by the predictors. It was calculated using the variance accounted for by an empty model (u0) relative to the variance accounted for by the full model with predictors (u1) in the equation (u0 - u1)/u0.

Table 3

Depression, belonging, and well-being, Study 2.

DV	Predictor	γ coefficient	SE	t-ratio	% Var ^a
<i>Cognitive Well-Being</i>	Intercept ($\gamma00$)	9.71	.31	31.75***	.24
	Depression ($\gamma01$)	-1.35	.36	3.72***	
	Belonging ($\gamma10$)	.50	.03	16.55***	
	Depression ($\gamma11$)	.13	.03	3.80***	
<i>Affective Well-Being</i>	Intercept ($\gamma00$)	.94	.11	8.46***	.29
	Depression ($\gamma01$)	-.57	.13	4.30***	
	Belonging ($\gamma10$)	.22	.02	14.61***	
	Depression ($\gamma11$)	.03	.02	1.80 ⁺	

Notes.

p < .001

⁺ p < .10. Separate models were conducted for cognitive and affective well-being.

^a% Var = proportion of variance in the dependent variable accounted for by the predictors. It was calculated using the variance accounted for by an empty model (u0) relative to the variance accounted for by the full model with predictors (u1) in the equation (u0 - u1)/u0.