

# Emotion

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# Social Contexts Are Associated With Higher Emotional Awareness Than Nonsocial Contexts: Evidence in a Sample of People With and Without Major Depressive Disorder

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Growing evidence suggests that social contexts may prompt qualitatively distinct experiences of emotions than nonsocial contexts. In this study of people's naturalistic daily emotional experiences, we examined in adults with and without major depressive disorder (MDD) whether experiencing emotions in a social context (with others) versus nonsocial context (without others) was associated with greater emotional clarity and attention to one's emotional experience (i.e., *emotional awareness*). Based on evidence that social stimuli are highly salient to social species, we predicted that interactions with social others—and especially close social others—would be associated with greater emotional awareness. We furthermore expected that individuals with MDD, who tend to have diminished emotional clarity and social deficits, might experience less emotional awareness in social settings than healthy controls. Across a 2-week experience sampling study that concluded in 2019, we assessed emotional awareness when people were interacting with others (vs. not) and interacting with close (vs. nonclose) others among adults with current MDD ( $n = 53$ ), remitted MDD ( $n = 80$ ), and healthy controls ( $n = 87$ ). As expected, attention to emotion and emotional clarity were higher in social versus nonsocial contexts and when interacting with close versus nonclose others. Contrary to expectations that these effects would be weaker among those with current MDD, the current MDD group showed enhanced emotional clarity in social versus nonsocial settings compared to the other two groups. Insofar as emotional clarity is beneficial to well-being, these findings suggest those with MDD may especially benefit from social contexts.

**Keywords:** emotional awareness, depression, social

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There is growing consensus that social others play an important role in how people appraise emotional contexts, construct emotional experiences, and express and communicate their emotions (Lindquist et al., 2022; Mesquita & Boiger, 2014; Moors, 2014). As a highly social species, humans use social others as salient cues (Atzil et al., 2023; Shamay-Tsoory & Abu-Akel, 2016), which has the potential to significantly moderate how emotions are experienced. For instance, some theories of emotion suggest that the ability to construct meaning around emotional situations, and to reflect on and communicate one's feelings with emotional labels, evolved due to pressures to communicate about common social situations (e.g., loss, threat, norm violations, desire to affiliate) with others in one's cultural group (see


Lindquist et al., 2022; Mesquita, 2022). If this is the case, then engagement with others should be an important predictor of the extent to which people are currently aware of their emotional feelings.

## Defining Emotional Awareness

Emotional awareness is a term that encapsulates two related constructs: attention to emotion and emotional clarity (Hoemann et al., 2021; Thompson & Boden, 2019). Attention to emotion describes one's ability to (a) sustain cognitive concentration on emotional events and (b) select which emotional events are important and should

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therefore influence responding (Wells & Matthews, 2014). Emotional clarity describes one's ability to discriminate between and understand the types of emotions they are experiencing (e.g., anger vs. joy) and the source of those emotions (Boden et al., 2013).

Attention to emotion and emotional clarity have typically been studied at the trait-level, and as predictors of well-being versus psychopathology. For instance, some findings suggest attention to emotion predicts greater well-being. Gohm and Clore (2002) found using global self-reports that a greater tendency to pay attention to emotion was uniquely associated with better self-reported coping with negative emotions and with more venting and seeking social support. Thompson et al. (2011) found in an experience sampling study that attention to emotion at one survey prompt predicted decreases in negative affect (NA) at the subsequent prompt. Indeed, it has been repeatedly argued that increased attention to emotion provides emotional information necessary for people to better regulate their emotions, leading to enhanced well-being (e.g., Herwig et al., 2010; Subic-Wrana et al., 2014). However, other investigations have contradicted the notion that attention to emotion is inherently positive for well-being. For example, research finds that intermediate levels of attention to emotion coupled with low emotional clarity and high affect intensity is what defines being emotionally overwhelmed (Kerns & Berenbaum, 2010). In addition, moderate (but not high) levels of attention to emotion predicted remission of MDD, but high levels predicted continued MDD (Thompson et al., 2013) in a longitudinal study. Interestingly, in a review, Lischetzke and Eid (2003) concluded that attention to emotion was associated with enhanced well-being for those adept in emotion regulation, but attention to emotion was detrimental to affective well-being for those who struggle with emotion regulation. Thus, paying attention to one's emotions may only be beneficial if one is able to use emotional information adaptively (Lischetzke & Eid, 2003).

Unsurprisingly, attention to emotion and emotional clarity are moderately associated, and it has been speculated that there may exist a causal association between emotional attention and clarity; that is, the ability to attend to one's emotions may facilitate emotional clarity (Boden & Thompson, 2017). Emotional attention may thus "gate" clarity, which dictates how people behave in the context of emotional feelings (e.g., whether they engage in action, regulate their emotions, etc.). Emotional clarity is routinely positively associated with measures of well-being and inversely associated with negative psychological outcomes in the literature (e.g., Gohm & Clore, 2002; Lischetzke & Eid, 2017; Park & Naragon-Gainey, 2019). Some research suggests that emotional clarity may facilitate a positive mood by enhancing emotion regulation abilities (Gratz & Roemer, 2004). Perhaps unsurprisingly, many mindfulness-based psychotherapy interventions enhance clients' emotional clarity (Cooper et al., 2018). Further, some evidence suggests that enhanced emotional clarity is associated with better relationship quality, another indicator of well-being, possibly because being clear on one's emotions is an important ingredient for regulating one's own and others' emotions in social contexts (Lischetzke & Eid, 2017).

### Social Context Effects on Emotional Awareness

Although emotional awareness has been studied for many years, relatively few studies have examined the context-level factors that are associated with it. In the present study, we built off theories in social affective neuroscience and recent findings suggesting that social

emotional experiences may be qualitatively different from nonsocial emotional experiences. In particular, we predicted that whether an emotion is experienced in a social versus nonsocial context will moderate a person's state-level emotional awareness. This hypothesis derives in part from evidence and theory that social information is particularly salient for social species such as humans, who rely on others for survival (e.g., Atzil et al., 2018; Shamay-Tsoory & Abu-Akel, 2016). Indeed, there is growing evidence that social (as opposed to nonsocial) affective stimuli are visually attended to and garner greater sympathetic arousal than nonsocial stimuli in nonhuman primates (e.g., Machado et al., 2011). Such findings are replicated in humans, where social stimuli garner greater visual attention and neural processing than nonsocial stimuli (Klein et al., 2009; Risko et al., 2012). In a recent large-scale meta-analysis of the human neuroimaging literature, Atzil et al. (2023) revealed that social (vs. nonsocial) pleasant and unpleasant stimuli activated swaths of the brain that are relatively more associated with visual attention, sympathetic arousal, semantic knowledge, and self-reflexive processing. Taken together, these findings suggest that experiencing emotions in a social context may prompt individuals to dedicate greater attentional resources to that context and perhaps also engage in greater self-referential and conceptual processing—two cognitive processes that might contribute to greater emotional clarity.

According to some psychological theories of emotion, greater emotional awareness might also occur in social contexts because social contexts prime a need to make meaning of one's emotions (Barrett, 2006; Lindquist & Barrett, 2008). For instance, psychological constructionist theories of emotion contend that discrete experiences of emotions occur when people implicitly draw on category knowledge to make meaning of instances characterized by certain sets of situational, autonomic, and behavioral features (Lindquist et al., 2022). Just as objects defined by roundness, redness, and crunchiness are often categorized as "apples" (an instance of the larger category, "fruit"), mental and physical states defined by goal obstruction, sympathetic activation, and defensive attack may be categorized as "anger," and states defined by reunion, sympathetic activation, and approach behaviors may be categorized as "joy" (both instances of the larger category, "emotion"; Satpute & Lindquist, 2019). Psychological constructionist theories hypothesize that the ability to categorize psychological events marked by certain situations and feelings as instances of a culturally agreed upon category (e.g., anger) may have been advantageous over the course of human evolution because it allowed members of a cultural group to communicate about their internal psychological states (Lindquist et al., 2022). Emotion categories can thus be conceived as "cultural artifacts" that evolved as adaptations to human social ecologies (Lindquist et al., 2022). By this account, emotion concepts are *learned* in the context of one's culture and social context (Atzil et al., 2018) and serve an important role in facilitating social coordination and communication (Barrett, 2006; M. J. Feldman et al., 2023; Lindquist et al., 2022; Theriault et al., 2021).

If emotion categories are cultural artifacts that, at least in part, function to enable adaptive social functioning, then it makes sense that people may be primed to employ emotion concepts more often or more effectively within social contexts. For example, social others often create "contexts of obligation" dictating how one "should" feel in a certain situation (Theriault et al., 2021). Increased awareness of internal states and clarity of consequent emotion categories may result as people track their convergence or divergence from these social

“emotional obligations” (Fischer & Manstead, 2008). Importantly, under psychological constructionist theories of emotion specifically, individuals are expected to be more aware of their emotions in the presence of close versus nonclose others, with whom they are more likely to share a common “emotional vernacular” (Gendron & Barrett, 2018). That is, people may be more attentive to and clearer about emotion categories during interactions with people known to repeatedly evoke familiar emotions. Despite this theorizing, no research to date has directly tested this hypothesis which, if true, would provide support to psychological constructionist theories.

To our knowledge, only two studies to date have examined emotional awareness in social contexts using experience sampling methodology. In Thompson and Boden (2019), people reported greater attention to emotion and emotional clarity in social versus nonsocial in-person settings during daily life. Notably, these findings were contradicted in a similar experience sampling study in which Springstein et al. (2024) found emotional clarity was lower in social (vs. nonsocial) settings that could take place either in-person or over the phone. Neither of these investigations examined effects based on relational closeness to the individual with whom a person was interacting, nor did they examine effects by clinical status, underscoring the need for continued work in this area.

### Person-Level Effects on Emotional Awareness

It is important to consider that hypothesized associations between attention to emotion and emotional clarity with social context may differ based on person-level factors, like experiencing psycho pathology such as major depressive disorder (MDD). MDD is a disorder characterized by emotion dysregulation (Thompson et al., 2021a; Vanderlind et al., 2022), such as elevated mean and variability of negative affect and decreased upregulation of positive affect, and social impairments, such as lack of social connectedness and maladaptive beliefs about relationships (Aanes et al., 2010; Coiro et al., 2017; Hammen, 2003). Following Lischetzke and Eid’s (2003) contention that attention to emotion is associated with enhanced affective well-being for those adept in emotion regulation, attention to emotion in those with MDD may not be associated with the same positive outcomes as in nonclinical samples. In addition, MDD is associated with diminished emotional clarity (Thompson et al., 2017; Vine & Aldao, 2014), which is speculated to be a mechanism driving emotion regulatory deficits in MDD; if one is unclear about how they are feeling, they may be unclear on how to regulate those feelings (Boden & Thompson, 2015). Taken together, due to the emotional and social disruption present in MDD, the role of social context in predicting attention to emotion and emotional clarity may be quite different among those with MDD compared to those in remission (i.e., who have experienced a major depressive episode [MDE] in the past but do not currently meet criteria for MDD) or healthy controls. Understanding these dynamics in those with and without MDD could lend insights into (a) how to generalize psychological constructionist theories of emotion to clinical samples and (b) potential mechanisms explaining socioemotional deficits in MDD.

### The Present Study

Given the important role of attention to emotion and emotional clarity in mental health—and the prospective role of social others in facilitating emotional attention and clarity—the present study sought

to achieve four aims. First, we aimed to replicate prior findings that individuals report greater attention to emotion and emotional clarity in social contexts compared to nonsocial contexts during daily life (Aim 1). Second, we aimed to extend these findings by testing whether effects differ in the presence of close versus nonclose social others (Aim 2). We hypothesized that individuals would experience greater attention to emotion and emotional clarity in the presence of close (vs. nonclose) others (Gendron & Barrett, 2018).

Finally, we aimed to examine whether these effects of social context (Aim 3) and social proximity (Aim 4) on attention to emotion and emotional clarity generalized to individuals experiencing MDD. Specifically, we focused on individuals with current and remitted MDD, hypothesizing that attention to emotion and emotional clarity across all social contexts would be diminished in those experiencing current MDD given deficits in emotional attention, clarity, and social functioning in this population. We did not make any specific hypotheses about the remitted MDD group. However, findings from this group will clarify whether any differences in associations between social context and emotional awareness in the current MDD group (vs. control group) were specific to those in a MDE, or whether they characterize people with MDD even when they are not experiencing a MDE.

To achieve these aims, we recruited a large sample of adults from a Midwestern city in the United States with either current or remitted MDD and a healthy psychiatric control group. We used an experience sampling methodology (ESM), which repeatedly assessed adults’ experiences during ecologically valid, everyday life contexts. Experience sampling affords many advantages over cross-sectional self-report measures, which contain reporter bias (Van de Mortel, 2008) and have low ecological validity (Csikszentmihalyi & Larson, 2014).

## Method

### Participants

Participants included 215 individuals between the ages of 18 and 77 ( $M = 44.3$ ,  $SD = 16.1$ ) who were recruited from the community and made aware of the study through participant registries and online advertisements. Recruitment for this study concluded in 2019. The current investigation was part of a large project advertised as a study about understanding people’s everyday emotions and decision making. Findings from this large investigation are also presented elsewhere (Liu et al., 2023, 2024; Thompson et al., 2021a, 2021b). Two thirds of the sample identified as women, and one third identified as men. These proportions were intentional and aimed to reflect rates of MDD in the U.S. population (National Institute of Mental Health, 2023). With regard to race, participants identified as follows: 69.8% White, 19.5% Black, 7.0% multiracial, 2.8% Asian, 0.5% Native American or Alaskan Native, and 0.5% unreported. With regard to ethnicity, about 1.4% of participants identified as Latinx/a/o. The three groups did not differ in age,  $F(2, 212) = 0.72$ ,  $p = .49$ , gender,  $\chi^2(2, N = 215) = 4.83$ ,  $p = .09$ , race,  $\chi^2(8, N = 214) = 6.04$ ,  $p = .64$ , or ethnicity,  $\chi^2(2, N = 215) = 1.43$ ,  $p = .49$ . About 65% of the sample completed a bachelor’s degree or higher. As in our past reports of the sample, including in the parent project (Thompson et al., 2021a), our sample of 215 did not include participants who withdrew ( $n = 7$ ), experienced technical problems ( $n = 7$ ), had low ESM compliance (i.e., completed <20.0% surveys;  $n = 7$ ), or whose

behavior evoked concerns about data validity (i.e., attended a laboratory session inebriated;  $n = 1$ ).

Eligibility criteria included speaking English as a primary language and denying having severe visual or hearing impairments. They were also required to meet diagnostic criteria for one of three clinical groups. Participants were eligible if they (a) were in a current MDE that was either recurrent (i.e., part of a MDD diagnosis) or chronically long (i.e., part of a persistent depressive episode; current MDD;  $n = 48$ ); (b) met criteria for at least two prior MDEs that were currently in full remission (remitted MDD;  $n = 80$ ); or (c) had never experienced a depressive, anxiety disorder (control;  $n = 87$ ). Given high comorbidity rates between MDD and anxiety disorders (Saha et al., 2021), people in the current and remitted MDD groups were eligible regardless of whether they met diagnostic criteria for an anxiety disorder, including generalized anxiety disorder, social anxiety disorder, agoraphobia, and panic disorder. A total of 70.8% of the people in the current MDD group and 18.8% of the remitted MDD group met diagnostic criteria for an anxiety disorder (0% in the control group). Exclusion criteria for all three groups included a bipolar I or II, diagnosis and current or past psychotic symptoms.

## Procedure

All study procedures were approved by the Human Research Protection Office at Washington University in St. Louis. During a laboratory session, participants provided informed consent and were diagnostically interviewed by one of three trained clinical psychology graduate students using the Structured Clinical Interview for *Diagnostic and Statistical Manual of Mental Disorders, fifth edition* (First et al., 2014). If eligible, participants completed an ESM tutorial with an undergraduate research assistant. During the tutorial, the Status/Post iOS app developed by Christopher Metts, MD, was installed on the participant's phone or an iPod Touch provided by the lab. The research assistant provided example ESM survey items with instructions on how to complete each item, followed by comprehension questions and a practice survey. Finally, participants indicated a 15-hr window each day they would like to receive ESM prompts.

The ESM period began the day following the laboratory session. Participants received five survey prompts a day for 14 days, totaling 70 surveys. Prompts were set to occur randomly within five daily 3-hr windows ( $M = 3$  hr, 0 min, 18 s apart;  $SD = 1$  hr, 1 min, 35 s). Participants were compensated \$40 for the ESM portion and were given a \$10 bonus for completing 80% or more of surveys. Average compliance rate was 74.8% of surveys ( $SD = 18.3$ , range = 20%–99%) and did not vary by group (current MDD:  $M = 72.8$ ,  $SD = 19.0$ ; remitted MDD:  $M = 75.7$ ,  $SD = 16.9$ ; control:  $M = 74.3$ ,  $SD = 19.6$ ),  $F(2, 212) = 0.30$ ,  $p = .74$ . Participants received payment for both the laboratory and ESM components of the study, and they received a bonus for completing more than 80% of prompted surveys.

## Measures

### *Social Context, Social Proximity, and Social Propensity*

After reporting on the main activity in which they were engaged when they were notified to complete a survey, participants reported whether they were interacting with anyone by answering the question,

“Who were you interacting with?” An interaction was defined as any “active” interaction with one or more other people. For example, participants were told that simply being around many people (i.e., at a grocery store) was *not* an interaction, but talking to someone (i.e., talking to someone in line at the grocery store) was an interaction. Their options for who they interacted with included: no one, romantic partner, family member, friend, someone at work (e.g., supervisor), acquaintance (e.g., neighbor), and stranger. The question was presented using a check box format, and participants could check as many answers as applied. Participants were instructed that if they interacted with someone who had more than one role in their life (e.g., a co-worker who was also a friend), they should select the option that indicated that person's “primary role” in their life. As in, Liu et al. (2024), we coded surveys based on *social context*: If they checked interacting with anyone, we coded the surveys as social, whereas if they checked “no one,” we coded the prompt as nonsocial. In addition, surveys were coded for *social proximity* such that interacting with a romantic partner, family member, or friend indicated an interaction with a close other, whereas interacting with someone at work, an acquaintance, or a stranger indicated an interaction with a nonclose other. In addition, *social propensity*, or individual's general propensity to interact with others, was computed at the person level by computing the proportion of prompts coded as social versus nonsocial. *Close social propensity*, or individual's general propensity to interact with close versus nonclose others, was also computed at the person level by computing the proportion of prompts coded as close versus nonclose social proximity.

### *Emotional Awareness*

Then participants were presented with one attention to emotion and one emotional clarity item, the order of which was randomly presented at each survey. For both questions, participants used a 5-point Likert scale (0 = *not at all*, 5 = *extremely*). The attention to emotion item was, “At the time of the beep, I was paying attention to how I feel,” and the clarity of emotion item was, “At the time of the beep, I was clear about my feelings.” The stems of each item reflect the item with the highest factor loading on the Attention to Feelings and Clarity of Emotion subscales of the Trait Meta-Mood Scale (Salovey et al., 1995), respectively. Both items were modified for ESM by adding “at the time of the beep,” and changing the sentence structure to past tense. Both items have been administered in ESM research (Bailen et al., 2019; Thompson et al., 2011). Together, these items showed good within-person ( $\omega = .73$ , 95% CI [0.72, 0.74]) and between-person ( $\omega = .84$ , 95% CI [0.80, 0.88]) reliability (estimated using the omegaSEM function from the multilevelTools package in R; Wiley, 2020). The adjusted intraclass correlation coefficient for attention models using full data (including nonsocial events) was 0.36, and the intraclass correlation coefficient for clarity models was 0.40.

### *Negative Affect*

Participants rated their momentary NA by responding to six items worded “I felt [EMOTION] at the time of the beep” (0 = *not at all*, 4 = *extremely*). NA items included bored, sluggish, sad, frustrated, nervous, and angry. Items were averaged at each survey to compute a NA score. These items showed good within-person ( $\omega = .63$ , 95% CI [0.62, 0.64]) and between-person ( $\omega = .89$ , 95% CI [0.86, 0.91])

reliability (estimated using the omegaSEM function from the multilevelTools package in R; Wiley, 2020). The intraclass correlation for NA was 0.42.

## Data Analysis

### Descriptive Statistics

Means, standard deviations, and correlations for emotional attention, emotional clarity, and state NA were computed at the within- and between-subjects levels using the wtd.mean and wtd.var functions from the Hmisc package (Harrell, 2023) and using the statsBy function from the psych package in R (Revelle, 2023). Within subjects descriptives were pooled across participants, whereas between-subjects descriptives were sample size weighted.

### Hypothesis Tests

All analyses used multilevel modeling due to the nested structure of the data (i.e., surveys within participants). Analyses were run using the ‘lme4’ package in R (Bates et al., 2015). This package uses the Satterthwaite method for computing denominator degrees of freedom and handles missing data by deleting observations with missing values in any variables. Standardized betas were computed using the “effectsize” function from the “effectsize” package in R (Ben-Shachar et al., 2020). All models included participant ID as a random intercept and specified random slopes for social context and social proximity, respectively. Age and gender were included as covariates at Level 2. Continuous predictors at Levels 1 were person-mean centered, and continuous predictors at Level 2 (i.e., age) were grand mean centered (Enders & Tofighi, 2007). A summary of analyses testing each hypothesis can be found in Table 1.

### Exploratory Analyses

We ran exploratory models to examine whether group differences in attention to emotion or emotional clarity held after accounting for

the presence of comorbid anxiety disorders (0 = no current anxiety disorder present, 1 = current anxiety disorder present). We also ran exploratory models to examine whether any group differences were influenced by state NA or trait NA. These models included participant ID as a random intercept and specified random slopes for social context and proximity, respectively. Models included the covariates described above (i.e., age and gender). Critically, models estimated main effects, and all possible two- and three-way interactions between (a) social context/proximity, MDD status, and state NA and (b) social context/proximity, MDD status, and mean NA averaged across all surveys. Including both state- and trait-based NA in these models allowed us to disaggregate effects driven by within-person fluctuations in NA and between-subject differences in NA.

### Missingness

Missingness represented a very small percentage of data: 82 observations of emotional clarity (0.73%), 79 observations of attention to emotion (0.70%), and between 95 and 99 observations of negative emotion word endorsements used to compute negative valence (0.84%–0.88%). Indeed, 96.10% of total cases were complete. When visualized using the “mice” package in R (Sarkar, 2008; van Buuren & Groothuis-Oudshoorn, 2011), there were no pervasive patterns of missingness across experience sampling items (see Supplemental Figure 1). Focusing on emotional clarity, attention to emotion, and negative valence, we also did not see significant differences in rates of missingness across our healthy control, remitted MDD, and current MDD groups or across age or gender (see Supplemental Tables 1–3 in Supplemental Materials). Collectively, this suggests that observations were missing at random. Despite this, all models were run imputing all missing values except those for gender. This was accomplished using the “mice” and “lattice” packages in R (van Buuren & Groothuis-Oudshoorn, 2011). All significant effects reported herein were robust when using imputed data. Given these considerations, we report models using the simpler method of case-wide deletion (i.e., all models are run using only complete observations).

**Table 1**

*Summary of Multilevel Models Used to Test Each Hypothesis*

Hypothesis examined	Multilevel model
1. Attention to emotion and emotional clarity will be greater in social (vs. nonsocial) contexts.	Attention to emotion and emotional clarity were predicted in two separate models ( $N_{\text{subj}} = 206$ ; $N_{\text{obs}} = 10,808$ ). Social context (0 = nonsocial; 1 = social) was entered at Level 1. For each participant, we computed the proportion of completed surveys in the presence of social others. This proportion was added as a Level 2 covariate.
2. Attention to emotion and emotional clarity will be greater when interacting with close (vs. nonclose) others.	Attention to emotion and emotional clarity were predicted in two separate models. These models only used data from prompting instances wherein participants reported a social interaction ( $N_{\text{subj}} = 206$ ; $N_{\text{obs}} = 4,373$ ). Social proximity (0 = nonclose; 1 = close) was entered at Level 1. For each participant, we computed the proportion of completed surveys in the presence of close others. This proportion was added as a Level 2 covariate.
3. Attention to emotion and emotional clarity in social (vs. nonsocial) contexts will be diminished among those with major depressive disorder (MDD).	Attention to emotion and emotional clarity were predicted in two separate models identical to those for Hypothesis 1. We added a cross-level two-way interaction between social context and MDD status for both models.
4. Attention to emotion and emotional clarity when interacting with close (vs. nonclose) others will be diminished among those with MDD.	Attention to emotion and emotional clarity were predicted in two separate models identical to those for Hypothesis 2. We added a cross-level two-way interaction between social proximity and MDD status for both models.

## Transparency and Openness

All models were assessed for normality and heteroscedasticity of residuals. Code for all models and diagnostic tests can be found on OSF at <https://osf.io/38t6g/> (Feldman & Tuck, 2024). This study was not preregistered. Sample size was determined based on an a priori power analysis for the parent project to determine final sample size; small to moderate effect sizes were anticipated in the parent project and in the current project. However, research recommends a minimum sample size of 100 to produce unbiased regression coefficients in multilevel modeling, which was used for all our analyses (Maas & Hox, 2005). Therefore, the current sample of 215 passes recommendation thresholds.

## Results

The mean proportion of surveys completed in the presence of social others was 41% ( $SD = 18\%$ ), suggesting participants were with others for a substantial proportion of their survey prompts. Emotional attention had a pooled within-subjects  $M$  of 1.38 out of 5 ( $SD_{pooled} = 0.78$ ) and a weighted between-subjects  $M$  of 1.37 out of 5 ( $SD_{weighted} = 0.77$ ). Emotional clarity had a pooled within-subjects  $M$  of 1.88 out of 5 ( $SD_{pooled} = 0.83$ ) and a weighted between-subjects  $M$  of 1.87 out of 5 ( $SD_{weighted} = 0.83$ ). State NA had a pooled within-subjects  $M$  of 0.45 out of 4 ( $SD_{pooled} = 0.32$ ) and a weighted between-subjects  $M$  of 0.46 out of 4 ( $SD_{weighted} = 0.31$ ). These descriptive statistics suggest that attention to emotion, emotional clarity, and state NA were relatively low at the within- and between-subjects levels. Clarity and attention were highly correlated at both the within-subjects ( $r_{pooled} = 0.57$ , 95% CI [0.56, 0.58],  $p < .001$ ) and between-subjects ( $r_{weighted} = 0.70$ , 95% CI [0.63, 0.77],  $p < .001$ ) levels. NA was not correlated with either attention ( $r_{pooled} = 0.01$ , 95% CI [-0.01, 0.03],  $p = .239$ ;  $r_{weighted} = 0.11$ , 95% CI [-0.03, 0.24],  $p = .112$ ) or clarity ( $r_{pooled} = 0.00$ , 95% CI [-0.01, 0.02],  $p = .630$ ;  $r_{weighted} = 0.07$ , 95% CI [-0.07, 0.20],  $p = .322$ ). Simplified, unweighted bivariate correlations for between-subjects continuous variables faceted by

MDD status can be found in Figure 1 (for visualizing gross group differences).

## Attention to Emotion

### Do People Experience More Attention to Emotion in Social Versus Nonsocial Contexts? Does This Effect Vary by MDD Status?

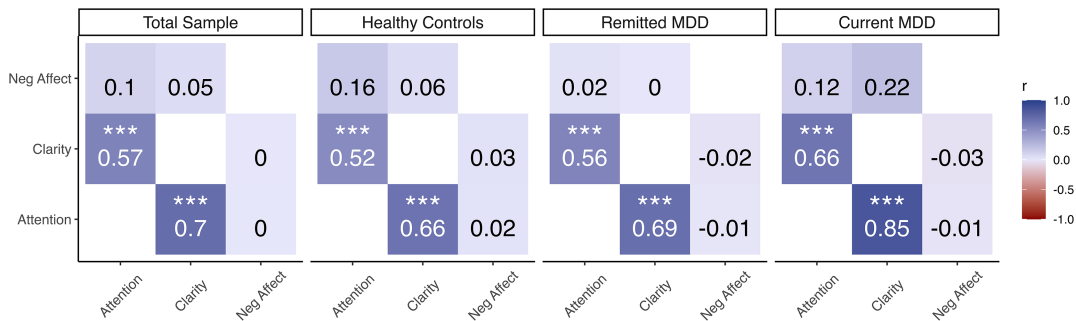
Models revealed a significant effect of social context on attention to emotion;  $F(1189.86) = 97.75$ ,  $p < .001$ . This association was not significantly moderated by MDD status ( $p = .14$ ), inconsistent with hypotheses. Consistent with hypotheses, across groups, participants reported greater attention to emotion in social versus nonsocial contexts on average;  $b = 0.32$ ,  $SE = 0.03$ ,  $t(189.86) = 9.89$ ,  $p < .001$ ,  $\beta = .24$ , 95% CI [0.19, 0.29]. The main effect of social context on attention to emotion was significant above and beyond individuals' general social propensity and other covariates in the model (i.e., age, gender). That said, individuals with a greater social propensity reported greater attention to emotion on average;  $b = 0.89$ ,  $SE = 0.31$ ,  $t(204.74) = 2.87$ ,  $p = .005$ ,  $\beta = .12$ , 95% CI [0.04, 0.20]. Main effects for MDD status ( $p = .391$ ), age ( $p = .205$ ), and gender ( $p = .393$ ) were nonsignificant.

### Do People Experience Greater Attention to Emotion With Close Versus Nonclose Others? Does This Affect Vary by MDD Status?

Models revealed a significant effect of social proximity on attention to emotion;  $F(1127.86) = 8.37$ ,  $p = .01$ . This association was not moderated by MDD status ( $p = .39$ ), inconsistent with hypotheses. Consistent with hypotheses, across groups, participants reported greater attention to emotion when interacting with a close versus nonclose other;  $b = 0.13$ ,  $SE = 0.04$ ,  $t(127.86) = 2.89$ ,  $p < .01$ ,  $\beta = .09$ , 95% CI [0.02, 0.15]. The main effects for MDD status ( $p = .36$ ), close social propensity ( $p = .66$ ), age ( $p = .27$ ), and gender ( $p = .14$ ) were nonsignificant.

**Figure 1**

*Bivariate Correlations for Controls, Current Major Depressive Disorder (MDD) Group, Current Remitted MDD Group, and Total Sample*



*Note.* Upper triangle of each matrix represents between-subject correlations and lower triangle represents within subject correlations omitting the diagonals. Cells are annotated with correlation coefficients ( $r$ ). Color represents the size of the coefficient with warmer colors indicating negative correlations and cooler colors indicating positive correlations. See the online article for the color version of this figure.

\*\*\*  $p < .001$ .

## Emotional Clarity

### *Do People Experience More Emotional Clarity in Social Versus Nonsocial Contexts? Does This Association Vary by MDD Status?*

Models revealed a significant effect of social context on emotional clarity;  $F(1189.06) = 118.54, p < .001$ . Consistent with hypotheses, participants reported greater emotional clarity in social compared to nonsocial contexts;  $b = 0.24, SE = 0.04, t(179.22) = 5.24, p < .001, \beta = .18, 95\% CI [0.11, 0.25]$ . Importantly, this effect was significantly moderated by MDD status;  $F(2186.72) = 4.23, p = .016$ . However, inconsistent with hypotheses, individuals with MDD reported significantly *greater* emotional clarity in social versus nonsocial contexts compared to those with remitted MDD,  $b = 0.17, SE = 0.08, t(191.74) = 2.17, p = .031, \beta = .13, 95\% CI [0.01, 0.25]$ , and healthy controls,  $b = 0.22, SE = 0.08, t(191.95) = 2.88, p = .004, \beta = .17, 95\% CI [0.05, 0.29]$ , who did not differ (see Figure 2). Of note, those with MDD did not differ from controls in their overall emotional clarity when alone,  $t(212.75) = -1.13, p = .261$ , or with others,  $t(208.75) = 0.72, p = .473$ , but rather, the effect of social context on emotional clarity was stronger in those with MDD compared to controls. This effect was significant above and beyond individuals' general propensity to interact with others and other covariates in the model. That said, individuals with a greater social propensity reported greater emotional clarity on average;  $b = 1.01, SE = 0.33, t(203.92) = 3.10, p = .002, \beta = .13, 95\% CI [0.05, 0.22]$ . There was also a significant main effect of age, such that with increasing age individuals reported greater emotional clarity on average;  $b = 0.01, SE = 0.003, t(200.22) = 2.72, p = .007, \beta = .12, 95\% CI [0.03, 0.20]$ .

The main effects for MDD status ( $p = .713$ ) and gender ( $p = .749$ ) were nonsignificant ( $ps < .71$ ).

### *Do People Experience More Emotional Clarity With Close Versus Nonclose Others? Does This Association Vary by MDD Status?*

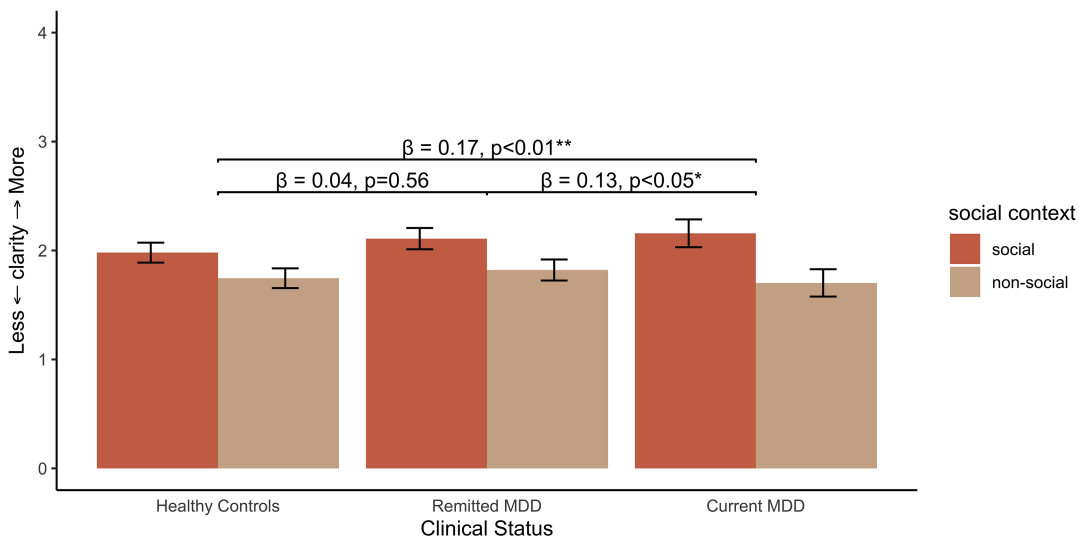
Models revealed a significant effect of social proximity on emotional clarity;  $F(1143.50) = 19.60, p < .001$ . This effect was not moderated by MDD status ( $p = .215$ ), inconsistent with hypotheses. However, consistent with hypotheses, across groups, participants reported greater emotional clarity when interacting with a close versus nonclose others;  $b = 0.18, SE = 0.04, t(143.50) = 4.43, p < .001, \beta = .13, 95\% CI [0.07, 0.19]$ . We also found a significant main effect of age, such that with increasing age participants reported greater emotional clarity in the presence of close versus nonclose others;  $b = 0.01, SE = 0.004, t(195.58) = 2.62, p = .009, \beta = .12, 95\% CI [0.03, 0.22]$ . The main effects for MDD status ( $p = .763$ ), close social propensity ( $p = .457$ ), and gender ( $p = .305$ ) were nonsignificant.

### *Exploratory Analyses Evaluating the Role of Comorbid Current Anxiety Disorders on Attention to Emotion and Emotional Clarity*

All findings regarding interactions between MDD status with social context and social proximity held after accounting for comorbid anxiety disorders. The main effect of anxiety disorder status was not significant in all models. Results from these models are presented in Supplemental Tables 4–7 in Supplemental Materials.

**Figure 2**

*Significant Two-Way Interaction Between Social Context and MDD Status on Emotional Clarity*



*Note.* Estimated marginal means (and standard errors) of emotional clarity for the healthy control group, remitted MDD group, and current MDD group in social and nonsocial contexts are plotted (controlling for gender, age, and social propensity). Note that the current MDD group reported significantly greater attention to emotion in social versus nonsocial contexts compared to remitted MDD and healthy control groups who did not differ.  $\beta$  = standardized beta for the contrast; MDD = Major Depressive Disorder. See the online article for the color version of this figure.

\*  $p < .05$ . \*\*  $p < .01$ .



### ***Exploratory Analyses Evaluating the Role of Negative Affect on Emotional Attention***

Models exploring the two- and three-way interactions between social context (social vs. nonsocial), MDD status, and NA on attention to emotion retained the significant main effects of social context ( $p < .001$ ) and social propensity ( $p = .006$ ) described above. Neither the main effect of within-person (state) NA ( $p = .415$ ) nor between-subject (trait) NA ( $p = .290$ ) was significant. Likewise, none of the two- or three-way interactions with state or trait NA were significant (see Supplemental Tables 8–11 in Supplemental Materials). That is, neither individuals' state nor trait NA influenced the unique or combined effects of social context and MDD status on attention to emotion.

Likewise, models exploring the two- and three-way interactions between social proximity (close vs. nonclose), MDD status, and NA on attention to emotion retained the significant main effect of social proximity ( $p = .005$ ). All other effects were nonsignificant (see Supplemental Tables 8–11 in Supplemental Materials).

### ***Exploratory Analyses Evaluating the Role of Negative Affect on Emotional Clarity***

Models exploring the two- and three-way interactions between social context, MDD status, and NA on emotional clarity retained the significant main effects of social context ( $p < .001$ ), social propensity ( $p = .002$ ), and age ( $p = .010$ ), as well as the two-way interaction between social context and MDD status ( $p = .009$ ) described above. Neither the main effect of within-person (state) NA ( $p = .826$ ) or between-subject (trait) NA ( $p = .378$ ) were significant. Likewise, none of the two- or three-way interactions with NA were significant. That is, neither individuals' state or trait NA influenced the unique or combined effects of social context and MDD status on emotional clarity (see Supplemental Tables 8–11 in Supplemental Materials).

Likewise, models exploring the two- and three-way interactions between social proximity, MDD status, and state and trait NA on emotional clarity retained the significant effects of social proximity ( $p < .001$ ) and age ( $p = .012$ ), but none of the other effects were statistically significant. For full tables see Supplemental Table 8–11 in Supplemental Materials.

## **Discussion**

This investigation repeatedly sampled the momentary attention to emotion and emotional clarity of people with current MDD, remitted MDD, and healthy controls for 2 weeks. By utilizing ESM methodology, we were able to capture people's emotional reports in ecologically valid contexts while they went about their everyday lives. Consistent with our hypotheses, individuals endorsed both greater attention to emotion and greater emotional clarity in social compared to nonsocial settings. Furthermore, these effects were strongest when interacting with close versus nonclose others. However, inconsistent with our hypotheses, the effect of social context on emotional attention did not differ based on participants' MDD status, despite other evidence that individuals with MDD have low emotional clarity and social deficits. Rather, the effect of social context on emotional clarity was *stronger* for individuals with current MDD. All effects remained significant when accounting for people's propensity to interact with

others in general and with close versus nonclose others. Further, exploratory models showed that effects held when accounting for anxiety disorder comorbidities and state NA and trait NA.

These findings are consistent with growing evidence and theories that social others play an important role in how people appraise emotional contexts, construct emotional experiences, and express and communicate their emotions (Lindquist et al., 2022; Mesquita & Boiger, 2014; Moors, 2014). In particular, the findings are consistent with variants of the "social saliency hypothesis," which argues that social others are highly salient cues to humans, who evolved living in social groups (Atzil et al., 2023; Shamay-Tsoory & Abu-Akel, 2016). Recent constructionist theories of emotion suggest that the ability to construct meaning around emotional situations, and to reflect on and communicate one's feelings with emotional labels, may have evolved because communicating with others about the psychological meanings underlying common social situations (e.g., loss, threat, norm violations, desire to affiliate) was adaptive (see Lindquist et al., 2022; Mesquita, 2022). Our findings that people reported greater attention to emotion and emotional clarity in social versus nonsocial settings supports the notion that social contexts play a critical role in evoking human emotion and that emotions experienced in social contexts may be qualitatively different from those in nonsocial contexts. This finding replicates Thompson and Boden (2019) but contradicts Springstein et al. (2024), both of which used similar methods. Although it is unclear why the findings differed across these two studies, Springstein et al. (2024) assessed when the last time was that a person had a social interaction (coding "at the time of the prompt" as a current interaction), whereas we asked who a person was interacting with at the time of the prompt (coding anything other than "no one" as a current interaction). These differing approaches may have captured different types of interactions. For instance, Springstein et al. (2024) may have been more likely to capture any interaction (e.g., with a barista), whereas participants in our study may have been more likely to only report interactions with a person with a position in one's life (e.g., check the box "friend"). Of interest, our findings and the findings of Thompson and Boden (2019) are also in line with Atzil et al.'s (2023) meta-analysis of the human neuroimaging literature. Although this meta-analysis uses a different method than ESM, it showed that social and nonsocial experiences of emotion evoke activation in very different brain regions. Furthermore, Atzil et al. found that social experiences of emotion, whether pleasant or unpleasant, involved activation in wide swaths of the brain, including those involved in attention, engagement of sympathetic arousal, self-reflexive processing and semantic processing. Convergent evidence from brain and behavior thus suggest that social emotional experiences may cause individuals to recruit greater attentional resources and engage in cognitive processes supporting emotional clarity.

Contrary to expectations that these effects would be weaker among those experiencing MDD, our findings showed no moderation for attention to emotion and a greater effect among those with MDD for emotional clarity. Our finding that emotional clarity was even greater in social (vs. nonsocial) settings among the current MDD group compared to the remitted and control groups is interesting and could be interpreted in different ways. On the one hand, it is possible that those with current MDD benefited more with regard to emotional clarity in social settings simply because those with MDD experience diminished emotional clarity (Thompson et al., 2017; Vine & Aldao, 2014), meaning they may have more to gain from social interactions.

Emotional clarity is generally viewed as beneficial, for example, by providing information necessary to regulate one's own and others' emotions (Lischetzke & Eid, 2017). For reasons left to be explored, those with MDD may especially reap the benefit of increased emotional clarity when interacting with others. Another possibility is that those with MDD may invite more emotionally salient conversations when socially engaging. Those with MDD are more likely to vent their negative emotions and co-ruminate when socially engaged (Ames-Sikora et al., 2017; Kasi et al., 2012; Marr et al., 2022). This suggests they may be more likely than nondepressed others to seek clarity of their emotional experiences when engaged with others. Of course, future research is needed to directly test this hypothesis. It is also curious to consider these MDD findings in light of information processing biases in MDD such as increased self-referential processing that is more negative in social contexts (e.g., Wisco, 2009). A reasonable post hoc interpretation of our findings may be that increased emotional clarity among those with MDD in social settings was an artifact of negatively biased self-referential processing in these settings. That is, people with depression may have had more emotional clarity in social contexts because they were experiencing more NA than controls in these contexts. However, results from our exploratory analyses found this effect was not moderated by state NA, which does not lend support to this interpretation. Future research should utilize ESM to directly assess biased self-referential processing in MDD in social contexts and determine whether the relationship between emotional clarity and social contexts vary by momentary self-referential processing.

It is also notable that those with remitted MDD did not differ from controls in the extent to which they experienced emotional clarity in social versus nonsocial contexts, meaning increased clarity in social contexts in MDD may be an episode-specific feature of the disorder. This is significant because it indicates that increased clarity in social contexts may not be a risk factor of MDD that categorizes all people with an MDD history, but rather, a trend that only occurs when people are currently in a depressive episode. Given the social and emotional deficits associated with being in a depressive episode, future research should examine the role of increased emotional clarity in social contexts on the trajectory of a depressive episode. For instance, how do interaction partners of those with depression appraise their interactions with people in a depressive episode who experience elevated emotional clarity when in social contexts? Within those who are currently depressed, does increased clarity in social contexts predict greater likelihood of remission compared to those with MDD who do not experience as large an increase in emotional clarity in social contexts? Such insights could lead to enhanced understanding of the role of emotional clarity in the quality of social relationships when in a depressive episode and the trajectory of that episode.

A limitation to the current investigation is that we did not capture different qualities of participants' interactions beyond with whom they were interacting. Future research is needed to assess other important interaction qualities, such as the length of each exchange and the amount of information shared. For example, it is possible that interactions with close others (vs. nonclose others) were longer in duration and resulted in more information being exchanged, which could have contributed to the increased attention to emotion and emotional clarity observed in these settings. In addition, following precedent from others (e.g., Gable et al., 2004; Liu et al., 2024), we defined participants' closeness to others based on type of relationship

(e.g., friends were assumed to be close, whereas coworkers were assumed to be nonclose), but future research would benefit from directly asking participants to report the extent to which they have a close versus nonclose relationship with the people with whom they interacted.

It was also important to consider the role of comorbid psychiatric disorders, particularly anxiety disorders given their high levels of comorbidity with MDD (Saha et al., 2021). Exploratory analyses revealed that our findings held after accounting for comorbid anxiety disorders, which suggests something unique about MDD in predicting more emotional clarity in social contexts. That is, although MDD and anxiety disorders share similar features and etiological vulnerabilities (Saha et al., 2021), depression uniquely predicted more emotional clarity in social contexts even when anxiety was taken into account. Future research should examine what may make depression unique in enhancing the effects of social contexts on emotional clarity.

More broadly, future research should examine the social consequences of increased attention to emotion and emotional clarity in social contexts. We expect that, at least for nondepressed individuals, increased attention to emotion and emotional clarity are associated with improved interpersonal emotion regulation, both intrinsically (i.e., using interpersonal resources to regulate one's own emotions) and extrinsically (i.e., helping to regulate the emotions of another person; Zaki & Williams, 2013). We further predict that increased attention to emotion and emotional clarity leads to a greater likelihood of disclosing one's emotions to another, a process known to strengthen senses of closeness to and intimacy with others (Zech et al., 2004). If these hypotheses are supported, findings would lend further evidence to the constructionist hypothesis that emotions are co-constructed between individuals and can thus serve socially beneficial purposes (Mesquita & Boiger 2014; Gendron & Barrett, 2018; Mesquita, 2022).

Our findings hold important clinical implications. Improving emotional awareness is a core feature of many empirically supported psychotherapies, including but not limited to cognitive behavioral therapy approaches, emotion-focused psychotherapy, and psychodynamic psychotherapy (see Lane et al., 2022, for a review). All of these psychotherapies view the client's awareness of their emotions as a foundational skill necessary for change (Lane et al., 2022). Whereas psychotherapy can involve helping clients identify their emotions through activities such as having clients keep a log of their emotional experiences (e.g., Greenberg, 2004), our findings indirectly suggest that an effective way of improving emotional awareness is through social engagement, particularly with close others. That is, encouraging clients to engage in social interactions may be a naturalistic way to enhance their emotional awareness. In the case of MDD, this approach could work seamlessly in combination with behavioral activation approaches, specifically those aimed at encouraging clients with MDD to enhance their social skills through more frequent social engagement (Kanter et al., 2010).

Our results indicate that social context may be critical for eliciting attention to emotion and emotional clarity. In addition, our findings considered important individual differences (i.e., psychopathology) and suggested engaging with social others may be even more critical for eliciting emotional clarity in those with MDD. Emotions are a large part of what defines the human experience. We hope our findings contribute one of many building blocks toward understanding where emotions come from and how different people make sense of them.

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