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Responsiveness to the Negative Affect System as a Function of Emotion Perception: Relations between Affect and Sociability in Three Daily Diary Studies

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Abstract

Perceiving emotions clearly and accurately is an important component of emotional intelligence. This skill is thought to predict emotional and social outcomes, but evidence for this point appears somewhat underwhelming in cross-sectional designs. The present work adopted a more contextual approach to understanding the correlates of emotion perception instead. Because emotion perception involves awareness of affect as it occurs, people higher in this skill might reasonably be expected to be more attuned to variations in their affective states and be responsive to them for this reason. This novel hypothesis was pursued in three daily diary studies (total $N = 247$), which found systematic evidence for the idea that higher levels of daily negative affect predicted lesser sociability particularly, and somewhat exclusively, among people whose emotion perception skills were high rather than low. The results support a contextual understanding of individual differences in emotion perception and how they operate.

Keywords

Emotion Perception; Clarity; Negative Affect; Sociability; Daily

Drawing together scattered literatures but also breaking new conceptual ground, Salovey and Mayer (1990) proposed the construct of emotional intelligence (EI). They suggested that people differ in their abilities to perceive, understand, use, and manage their emotions, and that these abilities should have systematic correlates and consequences in both emotional and social realms. Perhaps unfortunately, Goleman (1995) then popularized EI in a manner that overstated its potential benefits before sufficient scientific data were available. Data now substantiate the point that it is possible to assess EI reliably (Joseph & Newman, 2010), but evidence for the predictive validity of EI is surprisingly meager. Whether pertaining to work-related outcomes, subjective well-being, or to social outcomes (e.g., popularity), one could highlight several handfuls of correlations here and there or characterize the strength and consistency of available findings as disappointing (Matthews, Zeidner, & Roberts, 2012).

We sought to contribute to this important literature in a manner that has a sharper focus than typical. The focus was on the perceptual branch of EI, defined in terms of the accurate perception of affect and emotion. Operationally, this branch often though not always involves asking people to identify emotions in stimuli and scoring their responses as correct or incorrect (Mayer, Caruso, & Salovey, 2002). Theoretically, perceptual EI is foundational in the sense that perceiving affect or emotion with discernment may be necessary for later EI-related achievements such as managing emotions effectively (Joseph & Newman, 2010). In terms of what perceptual EI should predict, the literature often uses retrospective, trait-related outcomes and examines zero-order relationships (Zeidner, Matthews, & Roberts, 2009). There are limitations to this approach including its inability to examine a fundamental question, namely the extent to which variations in perceptual EI predict *responsiveness* to affective states in a manner that is consistent with greater clarity or insight concerning them (Salovey & Mayer, 1990). In examining questions of this type, daily diary protocols are ideal because affective states will naturally vary from day to day and the extent to which people are responsive to such variations is the key sort of question that these protocols are designed to answer (Bolger, Davis, & Rafaeli, 2003; Conner, Tennen, Fleeson, & Barrett, 2009).

Our hypotheses are grounded in two theoretical perspectives of emotion. The first contends that emotions prepare us for action (Frijda, 1986; Lang, 1995). For example, we feel fear when we are threatened and this triggers strategies and behaviors aimed at escape (Frijda, 1986). A problem here, though, is that emotion-action relations are not always especially strong or invariant (Baumeister, Vohs, DeWall, & Zhang, 2007). It is therefore useful to supplement action-oriented theories of emotion with a second theoretical perspective termed affect-as-information theory (Clore, Gasper, & Garvin, 2001). According to this theory, people learn important information about a situation by examining the emotions that they are experiencing (Schwarz & Clore, 1996). If affect informs rather than necessitates certain outcomes (Clore et al., 2001), then people who are clearer about affect may be expected to exhibit stronger emotion-outcome relationships. Putting such theoretical perspectives together, emotions often influence behaviors, but this should be particularly true for people who are clearer about affect – i.e., people higher in perceptual EI. We sought to provide support for these ideas.

In particular terms, we focused on the potential role that negative affective states may play in motivation and behavior because there is some degree of consensus here (Watson, Wiese, Vaidya, & Tellegen 1999). Negative affect arises when personally significant problems occur (Lazarus, 1991) and, through its link to the behavioral inhibition system (Watson et al., 1999), should generally promote cautious, inhibited behavior (Gray & McNaughton, 2000). In support of this suggestion, states like nervousness and distress (i.e., general negative affect) have been linked to avoidance motivation in theoretical (Watson, 2000) and empirical (e.g., Elliot & Thrash, 2002) terms. Such theories are also consistent with a social cognition literature that has shown that manipulations of negative emotional experiences, with the exception of anger, are linked to perceptions of uncertainty and uncontrollability (Lerner & Keltner, 2001). Within this social cognition literature, negative affect has been proposed to “stop” processing routines and behaviors in favor of greater caution (Schwarz & Clore, 1996).

Such theories and sources of evidence therefore converge on the idea that the negative affect system appears designed to encourage inhibition and avoidance (Elliot & Thrash, 2002; Forgas, 1995). Among human beings, inhibition and avoidance often occur in the context of social motivations and behaviors (Lazarus, 1991; Schmidt & Buss, 2010). Indeed, there is evidence for the idea that the negative affect system discourages social activity in temperament-based research (Kagan & Snidman, 1991). Further, Sjöberg (2008) has found that negative emotions are inversely predictive of daily social behaviors and an inverse relationship of this type has also been demonstrated in the mood manipulation literature (Forgas, 2002). A focus on social motivations and behaviors is additionally valuable in meeting the call for an increased effort to understand the social consequences and functions of EI (Lopes et al., 2004).

In summary, an important function of the negative affect system is to encourage inhibition and withdrawal (Watson et al., 1999), especially in social contexts (Forgas, 2002; Schmidt & Buss, 2010). People high in perceptual EI should be more attuned to this system and therefore their social motivations and behaviors should vary to a greater extent as a function of day-to-day variations in negative affect. In three daily diary studies, this person by emotion state interaction hypothesis was systematically tested. Given that there are a number of EI measures available, we followed the replication strategy of Moeller, Robinson, Wilkowski, and Hanson (2012) by using a different perceptual EI measure in each study. Following this strategy, perceptual EI was assessed in terms of self-reports of emotional clarity (Study 1), an emotion labeling task (Study 2), and a word evaluation task (Study 3). In all cases, we hypothesized stronger within-person relationships between negative affect levels and social motivations (Studies 1 & 2) or behaviors (Study 3) as individual differences in perceptual EI increased.

Study 1

The extent to which people can accurately perceive emotions is the basis of ability-based measures of perceptual EI (Mayer, Roberts, & Barsade, 2008). Such measures are valuable, but do not assess whether people are clear about their *own* emotions. To assess this sort of individual difference, a well-validated self-report measure of emotional clarity was created (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995). Accordingly, we began our series of studies by focusing on the potential role of emotional clarity in predicting responses to daily negative affect. For discriminant validity purposes, each study also assessed what we deem to be the most affect-relevant traits of the Big 5, namely extraversion, neuroticism, and agreeableness (Robinson, 2007). What we intend to show in this context is that the hypothesized interaction between daily negative affect and perceptual EI remains significant when controlling for these affect-relevant traits. Whether this is true will be reported in the text though some methodological details will be reported in footnotes for streamlining purposes.

Method

Participants and General Procedures

In determining samples size for the studies, the recommendations of Tabachnick and Fidell (2006) were followed. Specifically, they recommend at least 60 participants for studies of an experience-sampling type. Given that some attrition could occur, we began each study with at least 70 participants. In Study 1, ninety-six undergraduates (57 female; 89% Caucasian; M age = 19.17) from North Dakota State University participated in return for course credit. On the first day of the daily diary protocol, the EI measure was completed along with demographic items. On the subsequent day, and for 14 days total, participants reported on day-specific experiences of negative affect and on the extent to which they were motivated to socialize that day (see below). The latter data were collected online using a secure website.

Emotional Clarity

The Trait Meta-Mood Scale (TMMS; Salovey et al., 1995) was administered to assess individual differences in three purported components of emotional intelligence: attention to emotion, emotional clarity, and mood repair. Emotional clarity is defined as the extent to which people are clear about their emotions and this scale was deemed most pertinent to predictions. The scale is positively correlated with other measures that assess skill in identifying and labeling one's feelings (Gohm & Clore, 2000) and consists of 11 items (e.g., "I usually know my feelings about a matter") that are rated in terms of how well they characterize the self (1 = strongly disagree; 5 = strongly agree). The appropriate items were reverse-scored and responses were averaged by participant ($M = 3.55$; $SD = .70$; $\alpha = .87$).

The predictions concern emotional clarity, but the other scales of the TMMS were also administered. The attention to emotion scale has been interpreted in terms of valuing one's feelings while not necessarily being clear about them (Gohm & Clore, 2000). It is composed of 13 items (e.g., "I pay a lot of attention to how I feel"; $M = 3.66$; $SD = .69$; $\alpha = .88$). The mood repair scale is composed of 6 items (e.g., "I try to think good thoughts no matter how badly I feel") that reflect attempts to change negative emotional states rather than understand them ($M = 3.55$; $SD = .76$; $\alpha = .77$). We did not have specific predictions for these scales, which assess tendencies distinct from the clarity with which emotions are felt, but their inclusion seemed potentially useful for discriminant validity purposes.

Daily Diary Protocol and Measures

For each of the 14 days of the protocol, participants logged into a secure website and reported on the day in question. In order to accommodate various schedules, the reports could be completed any time between 5 p.m. and 8 a.m. the next morning. To guard against problems with retrospection, day-specific surveys were removed promptly at 8 a.m.; additionally, reminders were sent every day at 5 p.m. to boost compliance. An a priori decision was made to delete the responses of participants who completed less than 9 of the daily reports. Among the included individuals, compliance was good ($M = 12.60$, $SD = 1.27$).¹

We sought to examine social motivation as a function of day-specific experiences of negative affect. Toward this end, participants were asked the extent to which (1 = not at all; 5 = extremely) they experienced four negative affective feelings (“disappointed”, “distressed”, “nervous”, & “sad”). These items were chosen because they are all markers of general negative affect (Watson, 2000) and because we thought these feelings would vary on a daily basis. A composite score was created by averaging across items ($M = 1.93$; $SD = .58$; $\alpha = .73$). In order to assess social motivation, and because we could not locate a relevant measure suitable to daily diary protocols, we administered a single face-valid item (“I was motivated to socialize”). Participants indicated the extent to which (1 = not at all true today; 4 = very much true today) the item characterized their motivations on the day in question ($M = 2.86$; $SD = .61$).

Results

Given the nested structure of the data (i.e., daily reports were nested within individuals, with clarity varying between individuals), multilevel modeling (MLM) procedures (Raudenbush & Bryk, 2002) were used (Fleeson, 2007). Individual differences in emotional clarity were z-scored and levels of daily negative affect were person-centered, both in accordance with literature recommendations (Aiken & West, 1991; Nezlek, 2008). Because they were thought to vary between individuals, intercepts and slopes were treated as random effects (Nezlek, 2008; Tabachnick & Fidell, 2006). The SAS PROC MIXED procedure was used to model the within- and between-subjects sources of variance (Singer, 1998).²

Multilevel Analysis

Daily social motivation was the outcome variable. Person-centered scores of negative affect were entered as a level 1 predictor and standardized scores of emotional clarity were entered as a level 2 predictor. Given the interactive nature of the hypotheses, the cross-level interaction between negative affect and emotional clarity was also modeled. Compared to a null model, the predictors accounted for significantly more variance, $\chi^2(3) = 389.45$, $p < .0001$. There was significant interindividual variability for both the intercepts ($\sigma^2 = .32$, $p < .001$) and slopes ($\sigma^2 = .05$, $p < .05$), the intraclass correlation was .39, and the level one reliability estimate (Snijders & Bosker, 2012) was .86.

There was an inverse relationship between negative affect and social motivation, $b = -.11$, $r = -.24$, $t = -2.42$, $p < .05$. This finding is consistent with the idea that one of the consequences of negative affect is diminished interest in and involvement with others (Joiner & Timmons, 2009). There was no main effect for emotional clarity, $p > .10$, nor was one expected. Instead, the hypothesized cross-level interaction was significant, $b = -.09$, $r = .20$, $t = -1.94$, $p = .05$. To better understand the nature of the interaction, estimated means were calculated at $+1$ SD and -1 SD along each of the predictor dimensions (Aiken & West,

¹Dropped participants displayed minimal compliance with the protocol. For example, they completed an average of only 3.5 of the 14 daily reports in Study 2. It was an a priori decision to drop such non-responders prior to MLM analyses. See Appendix A for personality-related comparisons of the included versus excluded participants. Perceptual EI by negative affect interactions remained significant (Studies 2 and 3) or marginally significant (Study 1) when the daily reports of the non-responders were added to the data sets.

²The equations used in the multilevel models were parallel across studies and consisted of the following general form: $\hat{Y}_{ij} = \hat{Y}_{00} + \hat{Y}_{10}(\text{Daily Negative Affect}) + \hat{Y}_{01}(\text{Emotional Clarity}) + \hat{Y}_{11}(\text{Daily Negative Affect} \times \text{Emotional Clarity}) + r_{ij}$.

1991). As shown in Figure 1, levels of negative affect appeared to predict motivation to socialize only at higher levels of emotional clarity. Simple slopes analyses (Preacher, Curran, & Bauer, 2006) confirmed this interpretation of the results: The within-subject slope between daily negative affect and social motivation was significant at the high (+1 *SD*) level of emotional clarity, $t(95) = -2.96, p < .001$, but not at the low (−1 *SD*) level, $t(95) = -0.39, p > .60$.³

Additional Analyses

We deemed it likely that the moderating effect observed would be unique to the emotional clarity component of emotional intelligence. An additional MLM analysis was performed to confirm this. In this analysis, all three TMMS subscales were entered as level 2 predictors, both as main effects and interaction terms. The negative affect by emotion clarity interaction was significant with these other predictors in the model, $p < .05$. By contrast, neither attention to emotion nor mood repair interacted with negative affect, $ps > .20$. Of minor note, higher levels of mood repair predicted higher levels of social motivation in main effect terms ($b = .22, t = 3.29, p < .01$), whereas there was no main effect for attention to emotion ($p > .50$).

Measures of EI can correlate with existing personality measures (Brackett & Mayer, 2003) and it is useful to demonstrate discriminant validity with respect to personality (Zeidner et al., 2009). Toward this end, we had gathered information about participant sex, as women sometimes score higher in EI, in addition to the affect-relevant Big 5 traits of extraversion, agreeableness, and neuroticism. We reran the primary analysis with sex (scored dichotomously) and the three personality traits (standardized) as level 2 covariates. Even after controlling for these variables, the cross-level interaction between emotional clarity and daily negative affect continued to predict social motivation ($p = .05$).⁴

Discussion

Emotions presumably exist because they tell us something important about the state of the self in the world (Lazarus, 1991). Negative affect is a signal that something is wrong and withdrawing or being cautious in this context makes sense (Watson, 2000). We suggest that high clarity individuals are more attuned to the negative affect system and adjust their sociability accordingly. Consistent with this idea, it was found that levels of daily negative affect informed the motivation to socialize at a high, but not low, level of emotional clarity. These results are novel and it was deemed desirable to conceptually replicate them in a second daily diary study.

³The r values reported were estimated using the techniques described by Hunter and Schmidt (1990) as applied to MLM output, following McCullough, Fincham, and Tsang (2003).

⁴Extraversion ($M = 3.30; SD = .80$), agreeableness ($M = 3.87; SD = .42$), and neuroticism ($M = 2.63; SD = .74$) were assessed using 30 items from Goldberg's International Personality Inventory Pool (Goldberg et al., 2006), which uses a 1-5 disagree to agree rating format. The appropriate items were reverse scored and items for each scale were averaged (with α s from .71 to .90). In the Study 1 MLM involving these variables, extraversion and agreeableness predicted higher average levels of daily social motivation ($ps < .05$), whereas neuroticism predicted lower levels ($p < .05$).

Study 2

In order to assess how clear people are about their own emotions, it might be necessary to ask them (Gohm & Clore, 2000). Even so, there is skepticism concerning self-report EI measures because they cannot be verified against an objective benchmark (Zeidner et al., 2009). To examine the generality of the Study 1 findings, then, Study 2 administered an objective test of perceptual EI requiring people to accurately label emotions on the basis of non-verbal vocal parameters. This is an important channel of emotion knowledge (Mauss & Robinson, 2009) and carefully developed stimuli have been created (Scherer, Banse, & Wallbott, 2001). Conceptual replication using this objective assessment of perceptual EI would be encouraging.

Method

Participants and General Procedures

Seventy-two undergraduates from North Dakota State University participated for course credit. The sample was of typical college age ($M_{age} = 19.67$) and included 31 females. Information about race was not collected in this study, but a reasonable inference (on the basis of the participant pool in general) is that the sample was primarily Caucasian. Emotion labeling accuracy (see below) was assessed in the laboratory in groups of six or less. At the end of the week, participants began a 14 day daily diary protocol.

Emotion Labeling Accuracy

Arguably the most common performance-based measures of perceptual EI require individuals to choose which of several potential emotions are being expressed by a trained actor (Ekman, 1992; Mayer et al., 2002). Scherer and colleagues (Banse & Scherer, 1996; Scherer et al., 2001) developed one such test in which trained actors spoke nonsense sentences (e.g., “Hat sundig pron you venzy”) in an emotional tone of voice, with that tone varied to reflect one specific emotion. The 30 auditory clips were recorded and digitized and each lasts approximately 5 seconds.

A computer program was created to randomize the 30 clips, which were played over headphones. Participants were to determine the emotion expressed in each clip and then to choose from among eight emotion labels (anger, annoyance, anxiety, contempt, disgust, fear, joy, & sorrow). These selections were made by using the computer mouse to click inside a text box corresponding to the perceived emotion, with the text boxes arranged alphabetically. After a selection was made, there was a 250 ms blank delay before the next auditory clip started.

A response was coded as 0 if it was inaccurate and 1 if it was accurate (Banse & Scherer, 1996). A participant-specific perceptual EI score was computed by averaging across the 30 clips. Across participants, the mean accuracy rate was well above chance ($M = 41\%$, $SD = 9\%$; for additional information about normative accuracy for this task, see Banse & Scherer, 1996). A few participants with below chance scores were deleted as they may have been confused.

Daily Diary Protocol and Measures

The protocol requested daily reports for 14 consecutive days. Participants could log into a secure website between 5 p.m. and 8 a.m. to complete these reports and daily email reminders were sent to boost compliance rates. After removing the non-compliers who completed fewer than 9 reports, an a priori exclusion criterion, the average number of daily surveys completed was 12.40 ($SD = 1.18$). The daily negative affect scale was similar to the one used in Study 1, but we opted to use 2 markers (with no others administered) that were particularly prototypical of the negative affect construct (Watson, Clark, & Tellegen, 1988). The markers were “distressed” and “nervous” and were rated along a 1 (not at all) to 5 (extremely) scale ($M = 2.00$; $SD = .68$; $\alpha = .63$). The motivation to socialize measure was identical to Study 1 ($M = 2.76$; $SD = .50$).

Results

An MLM analysis parallel to Study 1 was conducted. The level 2 predictor was emotion labeling accuracy (which was z-scored), the level 1 predictor was daily negative affect levels (which were person-centered), and the outcome was daily motivation to socialize. Compared to a null model, the predictors explained a greater proportion of variance, $\chi^2(3) = 180.55$, $p < .0001$. Further, there was significant interindividual variability in both the intercepts ($\sigma^2 = .21$, $p < .001$) and slopes ($\sigma^2 = .03$, $p = .05$), the intraclass correlation was .30, and the level one reliability estimate was .79.

Multilevel Results

As in Study 1, there was a main effect for the level 1 predictor, negative affect, $b = -.10$, $r = -.25$, $t = -2.17$, $p < .05$, but not the level 2 predictor, perceptual EI, $p > .60$. Of most importance, a cross-level interaction was found, $b = -.10$, $r = -.27$, $t = -2.38$, $p < .05$. Estimated means for the cross-level interaction, at $+1/-1$ SD for each of the predictors (Aiken & West, 1991), are displayed in Figure 2. As hypothesized, the inverse relation between negative affect and motivation to socialize was stronger at higher levels of perceptual EI.

Simple slopes analyses were then performed. We hypothesized an inverse relation between daily negative affect and motivation to socialize at the high ($+1$ SD) level of emotion decoding accuracy and this was found, $t(70) = -3.33$, $p < .001$. At the low (-1 SD) level of emotion decoding accuracy, however, there was no systematic relationship between daily negative affect and motivation to socialize, $t(70) = 0.06$, $p > .90$. These results not only closely replicate those of Study 1, but also suggest a qualitative difference between high EI people, who adjust their social motivations in the context of negative affect, and low EI people, who do not.

Additional Analyses

As in Study 1, the affect-relevant traits of extraversion, agreeableness, and neuroticism were assessed for discriminant purposes. We reran the MLM analysis above while also entering participant sex (scored dichotomously) and the three personality traits (standardized) as level

2 covariates. The cross-level interaction involving emotion labeling accuracy and negative affect remained significant in this follow-up analysis, $p < .05$.⁵

Discussion

People who can perceive affect more clearly should be more responsive to their affective states. This idea has now been supported using both self-reported (Study 1) and performance-based (Study 2) predictors of perceptual EI. Because there are concerns about the predictive validity of ability EI measures (Zeidner et al., 2009), though, it seemed important to conceptually replicate the Study 2 findings using another ability-related EI assessment.

Study 3

Studies 1 and 2 asked people whether they were motivated to socialize on particular days. This seemed to us a straightforward measure of sociability, but motivation to engage in a particular behavior (e.g., socializing) does not always translate into relevant action (Gollwitzer, 1996). Accordingly, Study 3 sought to assess actual social behaviors. In doing so, we were guided by the analysis of Fleeson (2001), who has shown that it is possible to assess something that can be termed “state extraversion” on the basis of daily behaviors modeled on the sociability facet of this trait. In parallel to the previous studies, we hypothesized that daily negative affect would interact with perceptual EI to predict these behaviors.

As others do (e.g., Joseph & Newman, 2010), we generally regard the perception branch of EI as the most basic one. However, most perception-based EI measures involve fairly complex and nuanced stimuli. In addition, such measures primarily adopt a discrete emotions perspective that has been challenged by dimensional models of affect (e.g., Russell, 2003). For these reasons, we have advocated a simpler perceptual EI measure that assesses the extent to which participant evaluations of word stimuli match evaluation norms for these same stimuli. In previous investigations, we have shown that individual differences in *affect decoding accuracy*, assessed in this manner, are predicted by traits that they should be predicted by (Moeller et al., 2012), converge with other perceptual EI measures (Krishnakumar, Hopkins, Szmerekovsky, & Robinson, 2014), and are predictive of processes and outcomes suggested by theoretical models of EI (Robinson, Moeller, Buchholz, Boyd, & Troop-Gordon, 2012). Accordingly, a basic word evaluation probe of perceptual EI was used in Study 3.

There is another potential benefit to the perceptual EI task of Study 3 that should be highlighted. The individual difference predictor of Study 1 does not differentiate clarity concerning positive versus negative emotions, nor does the Study 2 measure. In fact, most EI measures cannot disentangle these possibly distinct skills. In contrast, if one includes an

⁵Reliable (α s from .74 to .87) scales from Goldberg et al. (2006) were used to assess extraversion ($M = 3.25$; $SD = .70$), agreeableness ($M = 3.94$; $SD = .49$), and neuroticism ($M = 2.63$; $SD = .66$). In addition to the Study 2 MLM results reported in the text, extraversion predicted higher average levels of daily social motivation ($p < .05$), agreeableness predicted marginally higher levels ($p = .08$), and there was no main effect for neuroticism ($p > .10$).

equal number of positive and negative stimuli in the word evaluation task of Study 3, separate positive and negative EI scores can be calculated and examined. As will be shown, this feature of the paradigm proved useful in understanding responsiveness to negative affect in daily life.

Method

Participants and General Procedures

A new sample of 79 undergraduates from North Dakota State University received course credit for study completion. The sample was of average college age ($M_{age} = 19.29$) and there were 37 females. Race information was not collected, but it is fair to assume demographics similar to Study 1 (i.e., ~90% Caucasian). The objective assessment of perceptual EI was completed in the laboratory in groups of 6 or less. There were 15 daily reports in comparison to 14 in the previous studies, a minor procedural change that nonetheless resulted in an additional day's worth of data.

Affect Decoding Accuracy

One hundred words were selected on the basis of prior rating norms (Bradley & Lang, 1999; Meier & Robinson, 2004). Fifty were positive (e.g., jolly) and 50 were negative (e.g., offend) such that all were affective in nature and there was an even mix of positive and negative stimuli included. In normative terms, positive words were rated more positively ($M = 6.39$; $SD = .86$) than negative words ($M = 2.43$, $SD = .68$), $t(78) = 26.21$, $p < .001$. A computer program randomized stimulus order and each trial began with a word at center screen. Participants evaluated the word using the 1 (very negative) to 8 (very positive) numeric keys at the top of the keyboard. There was then a brief 150 ms blank interval before the next word was presented.

To score affect decoding accuracy, we used the normative criterion often used in the emotional intelligence literature (Mayer, Salovey, Caruso, & Sitarenios, 2003). First, a mean evaluation for each of the 100 words was calculated across the sample as a whole. Second, for each participant and word, we calculated the difference between the participant's evaluation of a word and its normative evaluation. These difference scores were then squared and added, separately for each participant, yielding a chi-square value in which higher scores reflect greater departures from normative consensus (Cohen, 2001). Such scores were positively skewed and therefore log-transformed for analysis purposes. In contrast to Studies 1 and 2, lower scores for this measure are reflective of greater affective insight.

Daily Diary Protocol and Measures

After deleting the data of participants who did not complete at least 9 of the daily reports, an a priori criterion, the average number of completed reports was 12.65 ($SD = 1.62$). The daily negative affect measure was identical to that of Study 2 ($M = 1.91$; $SD = .56$; $\alpha = .63$). Rather than asking about motivation to socialize again, though, Study 3 sought to focus on social behaviors of a daily extraverted type (Fleeson, 2001). For each day, participants rated the extent to which (0 = not at all true today; 3 = very much true today) three items reflected

their social behaviors (“I laughed out loud”, “I started a conversation”, & “I was the center of attention”) and these items were averaged to form a scale ($M = 1.44$; $SD = .45$; $\alpha = .59$).

Results

An MLM was conducted to examine the potential role of affect decoding accuracy in moderating relations between daily negative affect and daily social behavior. Affect decoding accuracy was z-scored, levels of negative affect were person-centered, and a cross-level interaction term was added to the model. The predictors outperformed a null model in accounting for variations in daily social behavior, $\chi^2(3) = 504.26$, $p < .0001$. Between individuals, there was significant variability in the intercepts ($\sigma^2 = .18$, $p < .001$) and slopes ($\sigma^2 = .01$, $p < .05$), the intraclass correlation was .51, and the level one reliability estimate was .79.

Multilevel Results

Consistent with theorizing, there was an inverse relationship between daily negative affect and daily social behavior, $b = -.03$, $r = -.38$, $t = -3.62$, $p < .01$. As in Studies 1 and 2, furthermore, there was no main effect for perceptual EI, $p > .90$, but there was a significant cross-level interaction involving the two predictors, $b = .05$, $r = .22$, $t = 2.02$, $p < .05$. Estimated means for the cross-level interaction are reported in Figure 3, for the sake of comparability with high affect decoding accuracy levels toward the right side of the graph. As shown in Figure 3, daily negative affect appeared a more consequential predictor of daily social behavior among people whose stimulus evaluations better matched evaluative norms.

Simple slopes analyses (Preacher et al., 2006) were performed to further probe the hypothesized interaction. At the high level of affect decoding accuracy, a relatively strong inverse relationship between daily negative affect and daily social behaviors was found, $t(77) = -4.23$, $p < .001$. The relationship was markedly weaker, though significant, at the low level of affect decoding accuracy, $t(77) = -2.20$, $p < .05$. Overall, what we emphasize is that Study 3's cross-level interaction was conceptually parallel to those found in Studies 1 and 2.

Recall that the Study 3 measure presented participants with 50 positive words and 50 negative words. Because this was the case, we could compute distinct affect decoding accuracy scores for positive and negative stimuli. This was done in a manner parallel to that described above, but for each valence separately. Given the negative valence of the level 1 predictor, it seemed feasible that affect decoding accuracy for negative words would be more likely to moderate relations between daily negative affect and daily social behavior. We conducted a further MLM analysis to examine this idea. In addition to main effects of decoding accuracy for each valence type, the analysis modeled two potential cross-level interactions, one pertaining to decoding accuracy for negative words and the other pertaining to decoding accuracy for positive words. As might be expected, the cross-level interaction involving negative perceptual EI was significant, $b = .07$, $r = .29$, $t = 2.67$, $p < .01$, whereas the cross-level interaction involving positive perceptual EI was not, $p > .30$.

Additional Analyses

As in Studies 1 and 2, we assessed the affective traits of extraversion, agreeableness, and neuroticism. For purposes of discriminant validity, we added these traits (standardized) and participant sex (dichotomously scored) as level 2 covariates to the primary MLM analysis reported above. With these variables controlled, the cross-level interaction between daily negative affect and affect decoding accuracy was still evident ($p = .05$).⁶

Discussion

We primarily emphasize the conceptual replication that occurred in Study 3. A different ability-related EI measure, and a very basic one (Krishnakumar et al., 2014; Moeller et al., 2012), was used. We assessed social behavior rather than social motivation as a way of extending prior results. Despite these changes, an interaction parallel to Studies 1 and 2 was found: Social behaviors were more contingent on negative affect among those high, relative to low, in perceptual EI. A further analysis revealed that the more important ability in this context was one related to evaluating negative stimuli accurately. This result makes quite a bit of sense in that an ability to evaluate negative (relative to positive) stimuli should possess more relevance in understanding responses to negative emotional experiences. By contrast, positive EI should possess greater value in understanding reactions to daily positive emotion, a useful focus for future research. These results and considerations lead us to believe that positive and negative EI may have their own distinct correlates and consequences, an idea bolstered by the moderate nature of the positive EI/negative EI relationship, $r = .33$, $p < .05$.

General Discussion

We hypothesized that higher levels of perceptual EI would predict greater responsiveness to affective states in daily life, a prediction both novel and important in understanding how EI functions. For purposes of building a strong, replicable case for this idea, we focused all three studies on the inverse relationship between daily negative affect and sociability. We found inverse relations at high levels of perceptual EI, but generally not at low levels of perceptual EI. The consistency of the findings, across different assessments, encourages confidence in an affect-responsiveness interpretation of perceptual EI, as further elaborated below.

Emotion Perception and Affect Responsiveness

Self-reports of EI are often disfavored, but there seems to be no performance-based measure that can reveal the extent to which people can more easily perceive their own emotions rather than external stimuli. We therefore suggest that the findings involving emotional clarity in Study 1 are important in understanding how individual differences of this type are likely to function. Further, what is assessed by emotional clarity does not appear to reflect a repackaging of personality traits in that emotional clarity is not a facet or defining feature of

⁶The personality traits of extraversion ($M = 3.27$; $SD = .70$), agreeableness ($M = 3.85$; $SD = .46$), and neuroticism ($M = 2.87$; $SD = .66$) were assessed using the scales of Goldberg et al. (2006), which were reliable in Study 3 (α s from .74 to .87). In addition to the MLM results reported in the text, there was a level 2 main effect for extraversion ($p < .001$), but not agreeableness or neuroticism (p s $> .10$). The trait of extraversion therefore predicted higher levels of average daily extraverted behavior, replicating Fleenor (2001).

any of the Big 5 personality traits (John & Srivastava, 1999). Consistent with this line of thinking, the cross-level interaction observed in Study 1 was evident when controlling for three affective traits and for participant sex. Thus, we suggest that emotional clarity, as assessed by a scale of the TMMS (Salovey et al., 1995), should not be overlooked in future studies of perceptual EI.

Performance-based measures of perceptual EI require individuals to label emotions or affect in external stimuli (e.g., audio clips read in an emotional manner: Study 2). It is assumed that such abilities may have implications for how people perceive and respond to their own emotional states. Studies 2 and 3 provide perhaps the strongest evidence for this point that we know of in that people scoring higher in perceptual EI – according to objective measures – were in fact more responsive to their own affective states in daily life. These sorts of findings represent an important contribution to EI theorizing and research.

Is it functional to heed the calls of the negative affect system, though? From a temperament-based perspective, it may not be, in that greater reactivity is often found among generally distressed individuals (Suls & Martin, 2005; Zelenski & Larsen, 1999). On the other hand, if one views the negative affect system as one possessing wisdom (e.g., Damasio, 1994; Watson, 2000), then, yes, it should be adaptive to alter one's social motivations and behaviors in the context of high levels of negative affect (Sjöberg, 2008). Given these seemingly discrepant viewpoints, we do not wish to conclude that our findings *necessarily* indicate the greater functionality of higher levels of perceptual EI. Rather, they highlight an important difference between people in the extent to which the negative affect system guides social motivations and behaviors. These differences were as much qualitative as quantitative.

The EI literature generally examines whether variations in such abilities predict cross-sectional outcomes such as subjective well-being or work performance (Mayer et al., 2008). Available results of this type have been characterized as disappointing by some commentators due to the fact that many studies have presumably been conducted and yet evidence for the beneficial correlates of ability EI appears to be modest or scattered (Matthews et al., 2012; Zeidner et al., 2009). The present studies are important in this context precisely because zero-order predictions were *not* made, but rather much more nuanced predictions were made. We suggest that daily diary designs, in particular, may be quite valuable in capturing the contextual manner in which individual differences in EI are likely to operate.

From a big picture perspective, we emphasize the following contributions or at least implications. The results suggest that perceptual EI can be conceptualized, in part, in terms of responsiveness to affect. Stated in other terms, affect may be a far more inert entity among people lower in perceptual EI and a far more coupled one among people higher in perceptual EI. The results also highlight EI's somewhat neglected (Lopes et al., 2004) social face. In addition, the results extend affect-as-information theory (Clore et al., 2001). Specifically, they suggest that this theory can be profitably examined in terms of relations between affect and outcomes in daily life, a surprisingly neglected source of data in relation to this theory. Importantly, the results also suggest that perceptual EI may be a consequential moderator of the extent to which one can make predictions from affect-as-information

theory. That is, the theory may better explain affect's role(s) among people high rather than low in perceptual EI. Finally, despite the action-oriented theories favored by many emotion scholars, the relationship between emotion and behavior remains somewhat of a puzzle (Baumeister et al., 2007). Our results suggest that action-oriented views of emotion may have greater applicability to those who perceive affective signals with greater clarity and discernment. In this sense, the results favor affective insight rather than reflex in understanding the emotion-behavior interface.

Additional Considerations and Future Research Directions

Personality psychology has largely solved the question of how various alternative assessments relate to each other in capturing larger factors or entities (John & Srivastava, 1999). This sort of achievement has yet to occur in the EI literature (Roberts, MacCann, Matthews, & Zeidner, 2010). It was for this reason that we sought conceptual replication across different EI measures in the different studies (Moeller et al., 2012). As to whether the EI measures would correlate with each other, we suggest so based on the results of Krishnakumar et al. (2014). In that paper, moderately strong positive correlations were observed among self-reported (akin to Study 1), emotion labeling (akin to Study 2), and word rating (akin to Study 3) measures of EI (also see Bänziger, Mortillaro, & Scherer, 2012; MacCann & Roberts, 2008; Mayer et al., 2003). Although the Krishnakumar et al. (2014) measures did not overlap perfectly with the present ones, there nonetheless appear to be both conceptual and empirical reasons for emphasizing the skills common to the perceptual EI assessments that were used.

In interpreting the findings, several questions might be raised. Might people low in perceptual EI give unreliable reports of their negative affect? An examination of reliabilities for the daily negative affect scale did not support this interpretation of the findings. Might people high in perceptual EI gain their skills in part by observing how their social motivations and behaviors change as a function of their daily affective states? This seems unlikely to us in that it is not clear how the detection of such covariations across days would support affect perception accuracy, which also represents a much simpler set of skills. Might the covariations observed operate in the opposite direction? That is, might a lack of social motivation or activity be more distressing to people higher in perceptual EI? For this to be true, it would suggest that people lower in perceptual EI have superior abilities to manage their negative emotions when alone or with lesser social activity. This seems unlikely given what we know about EI (e.g., Lopes et al., 2004) but cannot be entirely ruled out. To gain further insight into the temporal order of the relationships observed, a more fine-grained experience-sampling study (e.g., one involving smart phones) could be conducted in the future.

To what extent might we characterize people higher in perceptual EI as *sensitive*? The word sensitive has multiple shades of meaning, some of which may overlap with perceptual EI and some of which may not. If sensitivity is defined in terms of awareness of affective signals in the self or in the environment, then perceptual EI overlaps with this term and construct. If it is defined in terms of reacting emotionally when one should not, then we doubt a systematic relationship of this type. As a personality adjective, sensitive people are

vulnerable (a negative spin on the adjective), but have a greater capacity for empathy (a positive spin on the adjective). We are hesitant to ascribe these traits to people higher in perceptual EI without further study. The term sensitivity, finally, might be stretched to encompass our focus on motivational and behavioral adjustments to the self's varying emotional states. It was a novel contribution of ours to highlight this systematic correlate of perceptual EI. Overall, though, the term sensitivity may carry shades of meaning that are unwarranted in thinking about how perceptual EI operates.

We focused on social motivations and behaviors for theoretical reasons (e.g., Gray & McNaughton, 2000), because of previous findings (e.g., Sjöberg, 2008), and because there are increasing calls for tighter rather than looser replications of findings across studies (Pashler & Harris, 2012). Nonetheless, we would expect similar cross-level interactions in the context of other daily outcomes, a matter for future research. In addition, it might be useful to extend the present results by showing that manipulated negative emotional states have stronger effects on cognition, judgment, or behavior in laboratory paradigms to the extent that perceptual EI is higher. Even so, we follow others (e.g., Bolger et al., 2003; Conner et al., 2009) in thinking that daily diary protocols are particularly useful in understanding how people differ in their reactions to affective states as they go about their day-to-day lives.

Although our focus was on the influence of negative affective states, perceptual EI should also moderate the effects of positive affective states. For example, one might expect relations between daily positive affect and daily approach motivation (Watson, 2000) to be stronger at higher levels of perceptual EI. Positive affective states, though, might also encourage higher levels of impulsivity at higher levels of perceptual EI (Alloy et al., 2009). More or less, we posit that people attuned to affective signals should be more responsive to their affective states, whether negative or positive, and in a manner consistent with the purporting signaling properties (e.g., Lang, Bradley, & Cuthbert, 1997) of these systems. Even so, such relations likely operate probabilistically rather than invariantly. That is, even people very attuned to affect need not necessarily act on it (Gross, 1998). From this perspective, people higher in perceptual EI would gain the behavioral wisdom of their emotional states without the somewhat implausible stereotyped action sequences that can follow from a Darwinian perspective on emotions.

Conclusions

In a book written for popular consumption, Goleman (1995) posited that higher levels of EI should predict higher levels of subjective well-being, social well-being, and work performance. A considerable body of scientific research has evaluated such claims and found them to be less straightforward than assumed (Zeidner et al., 2009). At least in relation to perceptual EI, we suggest that it is more intuitive to suggest that people who can more accurately perceive affect should be more responsive to their affective states. We used daily diary protocols to examine novel predictions of this type. It was found that people higher in perceptual EI adjusted their social motivations and behaviors to a greater extent as a function of daily negative affect. The results encourage a nuanced, contextual view of how perceptual EI operates.

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Appendix A: Descriptive Statistics for Daily Compliers (C) and Non-Compliers (N-C)

Study						
	Measure	C	N-C	Measure	C	N-C
Study 1						
	n	96	13	Emotional Clarity	3.55	3.38
	M Age	19.17	18.69	Extraversion	3.30	3.86
	% Female	59%	54%	Neuroticism	2.63	2.58
	M # Daily Reports	12.60	5.85	Agreeableness	3.87	3.95
Study 2						
	n	72	24	Labeling Accuracy	41%	42%
	M Age	19.67	20.67	Extraversion	3.25	3.51
	% Female	43%	38%	Neuroticism	2.63	2.80
	M # Daily Reports	12.40	3.54	Agreeableness	3.94	3.69
Study 3						
	n	79	3	Decoding Accuracy	24.54	19.95
	M Age	19.29	18.33	Extraversion	3.27	3.37
	% Female	47%	67%	Neuroticism	2.87	3.07
	M # Daily Reports	12.65	4.33	Agreeableness	3.85	3.57

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Figure 1.
Emotional Clarity as a Moderator of the Relationship between Daily Negative Affect and
Daily Motivation to Socialize, Study 1

Figure 2.
Emotion Labeling Accuracy as a Moderator of the Relationship between Daily Negative Affect and Daily Motivation to Socialize, Study 2

Figure 3.
Affect Decoding Accuracy as a Moderator of the Relationship between Daily Negative Affect and Daily Social Behaviors, Study 3