Meta-Emotions in Daily Life: Associations With Emotional Awareness and Depression

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Meta-emotions are emotions that occur in response to other emotions (e.g., guilt about anger). Although emotion theories often discuss them, much about meta-emotions remains unknown. In the present study, we aim to assess the frequency of meta-emotions in everyday life, determine whether increased attention to and clarity of emotions are associated with a greater likelihood of meta-emotions, and examine whether negative emotions about negative emotions (negative-negative meta-emotional experiences) are associated with depressive severity. We recruited a diverse adult community sample ($n = 79$) to complete 7 days of experience sampling and a self-report measure of depressive severity. At each survey, they indicated current attention to emotion, clarity of emotion, and whether and what kind of meta-emotional experience they were having. Meta-emotional experiences were categorized as negative-negative (NN), negative-positive (NP), positive-negative (PN) or positive-positive (PP). Approximately 53% of participants reported at least 1 meta-emotional experience. Meta-emotional experiences were reported about twice a week; negative-negative experiences were most frequent. Using multilevel modeling, we found that although attention to and clarity of emotion each individually positively predicted the likelihood of meta-emotional experiences, only attention to emotion explained unique variance. Higher depressive severity was associated with higher likelihood of meta-emotional experiences and specifically negative-negative experiences. Most adults experienced meta-emotions, especially during moments of high attention to emotion, and negative-negative experiences were positively associated with depressive severity. These findings are an important step forward in understanding individual and within-person differences in reactions to emotional experience. Implications for theories of emotion generation and regulation are discussed.

Keywords: meta-emotions, attention to emotion, emotional clarity, depression

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For a moment he felt good about this. A moment or two later he felt bad about feeling good about it. Then he felt good about feeling bad about feeling good about it and, satisfied, drove on into the night.
—Douglas Adams, *So Long, and Thanks for All the Fish*

Meta-emotions, or secondary emotions that occur in response to other primary emotions (Jäger & Banninger-Huber, 2015; Jäger &

Bartsch, 2006; Mendonça, 2013),[1] have been theorized by researchers to be a distinct component of emotional experience (Jäger & Bartsch, 2006; Bartsch, Appel, & Storch, 2010; Hofmann, 2013; Mendonça, 2013; Mitmansgruber, Beck, Höfer, & Schüßler, 2009; Norman & Furnes, 2016; Tomkins & McCarter, 1964) and in some cases associated with psychopathology (Leahy, 2002; Mitmansgruber et al., 2009; Shaver, Veilleux, & Ham, 2013). A meta-emotional experience (MEE) is composed of negative or positive primary and secondary emotions, such that the object of the secondary emotion is the primary emotion (Norman & Furnes, 2016). If, for example, a person feels guilty in response to feeling excited, we will describe that experience as a negative-positive (NP) meta-emotional experience. Meta-emotional experiences can also take negative-negative (NN), positive-negative

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[1] We use the most common definition of meta-emotions, but it is not the only one. Gottman, Katz, and Hooven (1996) originally coined the term to refer to parents' emotions and beliefs regarding their own and their children's emotions. Others define meta-emotions as a set of beliefs about primary emotional processes (e.g., Beer & Moneta, 2010; Ferrari & Koyama, 2002), evaluative cognitions and emotions about one's primary emotions (Bartsch, 2008; Bartsch, Appel, & Storch, 2010), or a set of strategies used to act on emotional information (Koven, 2011).

(PN), and positive-positive (PP) forms (Tomkins & McCarter, 1964).

The construct of meta-emotions is consistent with several theories of emotion, including appraisal and psychological constructionist theories. According to appraisal theories of emotion, emotions come about when any aspect of the environment that has bearing on the individual's well-being is subject to an appraisal or an assessment of how it impacts an individual's values, goals, beliefs, and needs (Moors, Ellsworth, Scherer, & Frijda, 2013). To illustrate, the experience of sadness might be appraised as signifying weakness, which might lead to meta-emotional shame about the sadness. Meta-emotions are also consistent with the emergent psychological constructionist approach, which states that emotions are the product of more basic ingredients such as representations of prior experiences with the stimulus (for a review, see Lindquist, 2013). For example, an individual's experience of sadness (stimulus) might evoke memories of being socially rejected when he has been sad in the past; this might be combined with other basic ingredients to "construct" an experience of shame.

No study to date has empirically examined the frequency of meta-emotional experiences in daily life, but given the role that emotions likely play in the aforementioned theoretical models (e.g., often affecting individuals' values, goals, beliefs, and needs), we expect meta-emotions are experienced by most people. More specifically, of the four types of meta-emotional experiences, we expect that NN and PP meta-emotional experiences will be most frequently reported. When regulating their emotions, people most frequently aim to maximize pleasure by maintaining or increasing positive emotions and eliminating or decreasing unpleasant ones (e.g., Riediger, Schmiedek, Wagner, & Lindenberger, 2009). Negative-negative meta-emotions can also be seen through the lens of hedonic motivation for emotion regulation. If we view secondary negative emotions as serving as a punishment for primary emotions, and secondary positive emotions as positive reinforcement for primary emotions, then the predominance of hedonic motivation might lead us to believe that NN and PP meta-emotional experiences will be most common.

Given that meta-emotions could serve a functional role, it will be important to understand under what circumstances, if any, the experience of meta-emotions can be maladaptive. To this aim, in the present study we examine how the occurrence of meta-emotions is related to two intraindividual variables, attention to and clarity of emotion, and one individual difference variable, depressive severity.

Meta-Emotions and Emotional Awareness

Norman and Furnes (2016) theorized that meta-emotions are closely tied to people's declarative knowledge of their own emotional processes, or what they termed meta-emotional knowledge. One aspect of meta-emotional knowledge is emotional awareness, which includes the conceptually related but distinct constructs of attention to emotion and clarity of emotion (Boden & Thompson, 2017). Attention to emotion is the degree to which one notices and thinks about one's emotions (Salovey, Mayer, Goldman, Turvey, & Palfai, 1995), and clarity of emotion is the degree to which one possesses a definite, unambiguous representation and interpretation of one's own emotions (Kashdan, Barrett, & McKnight, 2015). Both attention to emotion and emotional clarity are also

dimensions of alexithymia, which involves difficulty identifying, interpreting, and communicating emotional experiences (Boden, Thompson, Dizén, Berenbaum, & Baker, 2013; Kashdan et al., 2015).[2]

Given that attention to and clarity of emotion both involve a degree of insight into one's own emotional life, it is fitting that they would be associated with—and perhaps even prerequisite to—meta-emotional experiences. In order for individuals to recognize secondary emotions, they must already have identified primary emotions. That is, they must be clear enough about and have directed enough attention toward the primary emotion so that they are able to formulate an emotional reaction to that primary emotion.

Just as people do not experience constant levels of attention to emotion (Thompson et al., 2011) or clarity of emotion (e.g., Lischetzke, Angelova, & Eid, 2011), we do not expect people to experience meta-emotions all the time. Consequently, it is important to examine which aspects of people's in vivo emotional experience are related to the occurrence of meta-emotions. We theorize that when people experience meta-emotions, regardless of the type of meta-emotions, individuals must be paying attention to their emotions and be clear about what their emotions are. That is, people are most likely to have meta-emotional experiences during moments of high attention to and clarity of emotion.

Meta-Emotions and Depression

One of the cardinal symptoms of major depressive disorder (MDD) is pervasive negative emotion (American Psychiatric Association, 2013). Prior research has also found that depressed individuals often harbor negative appraisals, or cognitive judgments, about their emotions. More specifically, depressed individuals, as compared to nondepressed individuals, have greater emotional nonacceptance (Gratz & Roemer, 2004; Ehring, Tuschen-Caffier, Schnülle, Fischer, & Gross, 2010; Flynn, Hollenstein, & Mackey, 2010; Neumann, van Lier, Gratz, & Koot, 2010), which occurs when an individual has negative judgments or beliefs about his or her own negative emotions (Manser, Cooper, & Trefusis, 2012; Mayer & Stevens, 1994; Mennin, Holaway, Fresco, Moore, & Heimberg, 2007). Negative appraisals of emotions can have a significant impact on emotional reactions (Mayer & Gaschke, 1988). Indeed, Mayer and Stevens (1994) found that rejection of emotion was positively associated with self-blame, self-isolation, and unpleasant mood, all of which commonly characterize depressed individuals.

Negative appraisals of emotions could reasonably lead to negative emotions about emotions. For example, an overarching belief that emotions are harmful could lead to momentary appraisals that trigger fear about one's emotions, and a belief that emotions are unacceptable could lead to momentary appraisals that trigger shame about one's emotions. If so, it would be important to determine whether findings regarding the association between depression and negative appraisals of emotions extend to meta-emotions. Indeed, the two studies that have directly examined the

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[2] Emotional clarity has been found to be statistically distinct from emotion differentiation, which involves being able to distinguish emotions from one another with a high degree of specificity or granularity (Kashdan et al., 2015).

relation between depressive severity and meta-emotions (Leahy, 2002; Mitmansgruber et al., 2009) provide preliminary evidence for a relation between meta-emotional experiences and depressive severity.

In a sample of university students, Mitmansgruber et al. (2009) found that depressive severity was positively correlated with negative meta-emotions (the authors did not distinguish NN and NP) and negatively correlated with positive meta-emotions (the authors did not distinguish PN and PP). In an adult sample of psychotherapy patients (diagnoses unspecified) who were recruited from a clinic, Leahy (2002) found that depressive severity was related to higher levels of a specific type of meta-emotional experience that involved guilt, shame, and embarrassment about other (negative or positive) emotions. Because Mitmansgruber et al. (2009) used a broad conceptualization of meta-emotions, which included emotion regulation strategies, and Leahy (2002) only assessed meta-shame, guilt, and embarrassment, more research is needed to explore the relation between depressive severity and the subtypes of meta-emotional experiences.

Research on meta-emotions could provide information above and beyond the findings detailed in the prior literature. For example, many studies focus on experiences characterized by negative secondary emotions (or appraisals), but do not differentiate between positive and negative primary emotions. Consequently, it is impossible to tell whether it is the negative secondary emotion that drives the association with depressive severity and the primary emotion is irrelevant (NN and NP), or whether it is experiences with both primary and secondary negative emotions (NN) that primarily drive the association with depressive severity. Other research that finds a positive association between meta-emotions and depressive severity only examines a construct similar to NN (e.g., the nonacceptance literature), so NN and NP cannot be compared. Research is needed that measures NN, NP, PN, and PP constructs in order to isolate the variables that drive the association with depressive symptoms.

The Current Study

Existing research examining meta-emotions has used one of three global self-report measures (i.e., The Non-Acceptance subscale of the Difficulties in Emotion Regulation Scale [DERS; Gratz & Roemer, 2004], the Anxiety Sensitivity Index [ASI-3; Taylor et al., 2007], and The Meta-Emotion Scale [MES; Mitmansgruber et al., 2009]). None of these measures assesses the full spectrum of NN, PN, NP, and PP meta-emotional experiences, while excluding phenomena such as cognitive appraisals of emotion. In contrast, the present study used experience sampling methodology (ESM) to explore the four subtypes of meta-emotional experiences in the daily lives of a diverse group of adults recruited from the community. In addition to assessing the full range of meta-emotional experiences, ESM allows our participants to report intraindividual variation in attention to and clarity of emotion in naturalistic settings. This method obviates the need for participants to take on the daunting task of recalling and categorizing every meta-emotional experience over a much longer period.

The purpose of the study was threefold. First, we aimed to establish the frequency of meta-emotions and meta-emotional experience subtypes in daily life. We hypothesized that most individuals would report meta-emotional experiences. Regarding meta-emotional experience subtypes, we expected that NN and PP meta-emotional experiences would be more frequently reported than PN and NP experiences. Second, we aimed to determine whether, within individuals, higher levels of clarity of and attention to emotion are associated with a higher likelihood of experiencing meta-emotions. Third, we aimed to identify whether depressive severity is associated with the likelihood of certain types of meta-emotional experience. We hypothesized that NN and NP meta-emotional experiences would be the only subtypes of meta-emotional experience positively associated with depressive severity. All of our hypotheses were developed a priori and were given equal weight during conceptualization, and so are considered primary hypotheses. We did not have secondary or exploratory hypotheses.

Method

Participants

The final sample was composed of 79 adults recruited from the St. Louis community as part of a broader study on emotional experience. The calculation of statistical power in the context of multilevel modeling is still an evolving area in which there is no agreed-upon method (Mathieu & Chen, 2011). However, through systematic simulations of multilevel data sets, researchers have found that only a small sample size ($n < 50$) at Level 2 results in biased estimates; other factors, including Level 1 sample size and intraclass correlations, were not found to produce biased estimates (Maas & Hox, 2005). Our Level 2 sample size was well above 50 participants, providing support that our analyses were adequately powered to detect the occurrence of meta-emotions at the time of the surveys. Anonymized data can be accessed at https://osf.io/fyuvt/files.

Individuals who were native English speakers, U.S. citizens, and at least 18 years old were recruited through advertisements posted online and at local businesses. The final sample was 58.2% female ($n = 46$) and ranged in age from 20–71 years ($M = 39.0$, $SD = 14.5$). Ethnic/racial breakdown was 65.8% White/European American ($n = 52$), 21.5% Black/African American ($n = 17$), 7.6% biracial ($n = 6$), 3.8% Asian American ($n = 3$), and 1.3% Middle Eastern American ($n = 1$). A total of 3.8% of participants ($n = 3$) identified as Hispanic. A total of 3.9% of the sample had less than or up to a high school education; 20.3% had attended some college; 54.4% had a college degree; and 21.5% had a professional degree. Exclusionary criteria included active psychosis and current substance abuse or dependence. Because participation in the broader study included assessment of peripheral psychophysiology and inflammatory markers, participants with certain health conditions (e.g., rheumatoid arthritis), who were taking certain medications (e.g., beta-blockers), or had a body mass index of 32 or higher were ineligible to participate. Excluded from the sample of 79 were seven participants whose ESM data were unusable due to technical difficulties and two participants who withdrew from the study. The nine excluded participants did not significantly differ from the rest of the sample by gender, $\chi^2(1, N = 88) = 2.03$, $p = .15$; age, $t(86) = 0.69$, $p = .50$; race, $\chi^2(4, N = 88) = 1.21$, $p = .88$; or education, $\chi^2(5, N = 88) = 5.00$, $p = .42$, and the seven excluded participants who completed the depression measure did

not differ in depressive severity from those included in the final sample, $t(84) = -1.05$, $p = .30$.

Procedure

For the parent study, participants completed two laboratory sessions approximately a week apart; in the interim, they completed 7 days of ESM. At their first session, participants provided informed consent and completed a series of computerized tasks and self-report measures (those related to the current study are noted below). A subset also completed a fasting blood draw. Each participant was individually instructed on the ESM protocol and each completed a practice trial.

For the ESM protocol, participants were instructed to carry with them at all times either their own iPhone or a 4th generation iPod touch that was provided to them. The survey iOS application, SurveyApp, was designed by the last author (RJT) and programmed by an independent software engineer. This app collected data offline, so that it did not require Wi-Fi or a data plan, allowing for a more diverse sample. Participants' devices prompted them at random times within eight 90-min windows during a 12-hr window of their choice (e.g., 8 a.m. to 8 p.m.) on each of the 7 days, totaling 56 surveys. Participants had up to 10 min to respond to each survey before it expired. The mean percentage of surveys completed was 72.4% ($SD = 20.8\%$; range = 20–100%), which is comparable to or higher than prior emotion research (Hill & Updegraff, 2012; Flueckiger, Lieb, Meyer, Witthauer, & Mata, 2016). There were no significant differences between the number of missed surveys in 3-hr within-day time periods (e.g., 6 a.m. to 9 a.m., 9 a.m. to 12 p.m.), $\chi^2(5, N = 4,384) = 6.35$, $p = .27$.

Approximately a week after the first laboratory session, participants returned for the second laboratory session, during which they completed a series of self-report measures (those relevant to the current study are described below) and computerized tasks, some of which included assessing peripheral physiology. Finally, participants were verbally debriefed and compensated. Compensation amounted to $10 per hour for the laboratory sessions, $35 for the EMA portion, $5 for completing more than 90% of the prompts, and $5 for completing an online survey that was sent 6 months after study enrollment. The research protocol was approved by a university institutional review board.

ESM Measures

Meta-emotional experiences. Meta-emotional experiences were assessed at each ESM survey. After participants rated the extent to which they felt a series of emotions, they were asked the following question: "You just finished reporting how you were feeling at the time of the beep. Are you also experiencing any feelings in response to any of the feelings?" They could respond yes or no. If they responded yes, they were asked to use the keyboards on their devices to fill in the two blanks in the following sentence: "I feel _____ about feeling _____." An open-ended question was used to maximize the variety of primary emotion (second blank) and secondary emotion (first blank) words that participants could choose to use. These responses were later coded (details described below).

Great care was taken in instructing participants on the meta-emotional experience items during the individual, in-person tuto-

rial at the first laboratory session. During this tutorial, participants were asked to think of a time when they experienced feelings in response to other feelings. If participants had difficulty doing so, the research team member offered the following NP example of a meta-emotional experience: "You might imagine someone who feels happy that a coworker did not get a promotion because she thought the person did not deserve it. However, you might imagine that this person who feels happy also then feels guilty or bad about feeling happy about someone's misfortune." The participant was then prompted for another example. If the participant had difficulty or provided the same subtype of experience (i.e., NP), the research team member offered a second example, this time NN: "You might imagine someone who gets angry at someone for interrupting them when they are talking. This person may feel worried about being angry about something seemingly small." When participants demonstrated that they understood the concept of meta-emotional experiences, including providing their own example, they were guided through answering the prompt "I feel _____ about feeling _____."

The responses to the meta-emotional experience item were text-based (e.g., "I feel angry about feeling sad"). Two trained undergraduate raters independently coded each response for (a) whether it was a feeling state, and (b) if so, whether the feeling state was positive or negative. If each word in the entry was a feeling state, the raters coded the entry as a meta-emotional experience. To standardize the procedure by which words were rated, we used P. Shaver, Schwartz, Kirson, and O'Connor's (1987) list of feeling states as a coding reference. P. Shaver et al.'s original list includes 135 feeling states and identifies them as either positive (e.g., relief, delight, pride) or negative (e.g., hopelessness, dread, irritation). Although this list in its original form was extensive, it was not sufficient for the purposes of the current study. We modified it in three ways. First, P. Shaver et al.'s list only includes nouns, whereas our prompt implicitly solicited adjectives, so we accepted adjectival forms of the nouns on the list (e.g., hopeless instead of hopelessness) as feeling states. Second, we added words that were direct synonyms of words already on the list, including adjectives that did not have a noun form but that are synonymous with the adjectival form of a noun that is on the list (e.g., mad, because it is synonymous with angry). Finally, we added words that showed poor understanding of the exact type of emotion the participant was feeling, but still clearly represented positive or negative emotion (e.g., good, bad, terrible); this decision was made in an effort to capture meta-emotional experiences from participants with lower levels of emotion differentiation. Our final list contained 159 feeling states.[3,4]

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[3] If a feeling state was negated (e.g. "not happy"), we did not code the entry as a feeling state, as we did not have enough information to judge which emotion, if any, was experienced. If two positive words that would otherwise be coded as feeling states were entered into one blank, the entry was coded as a positive feeling state. However, if one positive and one negative word were entered into one blank (e.g. "happy and sad") we did not code the entry as a feeling state. This is because such occurrences were extremely rare in our sample (there were only eight meta-emotional experiences that were excluded because they were mixed or ambiguous).

[4] The 24 feeling states we added to Shaver et al.'s (1987) list were: accomplishment, angst, bad, bothered, calm, chilling, concerned, discontent, dissatisfied, foolish, good, humored, mad, mean, positive, ridiculous, scared, silly, sour, stress, terrible, uncomfortable, unsettled, and upset.

Coding meetings were held for coders to discuss any disagreements and come to a consensus. An analysis of interrater reliability showed near-perfect agreement between the coders prior to consensus: $k = .99$ for whether each entry was a meta-emotional experience, and $k = .96$ for the subtype of meta-emotional experience. Consensus ratings were used in the present analysis. From these ratings, several variables were computed. First, a binary variable was computed to indicate whether the response qualified as a meta-emotional experience.[5] Next, four binary variables were computed to indicate determine the subtype of meta-emotional experience (i.e., NN, NP, PN, or PP).

Attention to emotion. State attention to emotion was assessed at each ESM survey with one item that was rated on a 5-point Likert scale ($0 = not at all$, $4 = a great deal$). The item we used ("At the time of the beep, I was paying attention to how I was feeling") is the item with the highest factor loading on the Attention to Feelings subscale of the Trait Meta-Mood Scale (TMMS; Salovey et al., 1995) and has been used and validated in previous ESM research (Thompson et al., 2011). It was modified by adding "at the time of the beep" and changing the sentence structure to past tense. At the first laboratory session, trait attention to emotion was assessed via 10 items selected from the TMMS (Salovey et al., 1995) and the TAS (Bagby, Parker, & Taylor, 1994) based on results from multidimensional scaling and confirmatory factor analyses by Palmieri, Boden, and Berenbaum (2009). Participants indicated the degree to which they agreed with each statement ($1 = strongly disagree$, $5 = strongly agree$). Internal consistency (Cronbach's alpha) of the attention scale was .84. As reported in Thompson and Boden (2017), trait attention to emotion was positively and significantly associated with state attention to emotion, $\gamma_{01} = 0.54$, $SE = 0.15$, $p < .001$.

Clarity of emotion. State clarity of emotion was assessed at each ESM survey with one item that was rated on the same 5-point Likert scale as the attention to emotion items. The item we used ("At the time of the beep, I was clear about my feelings") is the item with the highest factor loading on the Clarity of Feelings subscale of the TMMS (Salovey et al., 1995). It was modified by adding "at the time of the beep" and changing the sentence structure to past tense. At the first laboratory session, trait clarity of emotion was assessed via 13 items selected from the TMMS (Salovey et al., 1995) and the TAS (Bagby et al., 1994) based on results from multidimensional scaling and confirmatory factor analyses by Palmieri et al. (2009). Participants indicated the degree to which they agreed with each statement ($1 = strongly disagree$, $5 = strongly agree$). Internal consistency (Cronbach's alpha) of the clarity scale was .90. As reported in Thompson and Boden (2017), trait clarity of emotion was positively, but not significantly, associated with state clarity of emotion, $\gamma_{01} = 0.10$, $SE = 0.18$, $p = .55$.

Clinical Measure

Severity of depressive symptomatology was assessed using the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977) during participants' second visit to the lab. Twenty items are rated on a 4-point Likert scale ($0 = rarely or none of the time$, $3 = most or all of the time$) and assess symptomatology during the past week; higher scores indicate greater symptomatology. The CES-D was designed to assess depressive severity in community samples (Radloff, 1977) and has demonstrated good convergent and discriminant validity (Milette, Hudson, Baron, Thombs, & Group, 2010). The internal consistency of the CES-D items was high in this sample (Cronbach's alpha = .90). The mean CES-D score was 12.44 ($SD = 9.51$, range = 0–44). A total of 18 participants (22.8%) met or exceeded the recommended clinical cutoff score of 20 (Vilagut, Forero, Barbaglia, & Alonso, 2016). Because scores in the clinical range do not necessarily indicate that the person is in a current major depressive episode, we invited a subset of participants who had elevated depressive and/or anxiety symptoms to complete the Structured Clinical Interview for *DSM–5* (SCID-5-RV; First, Williams, Karg, & Spitzer, 2014). Interviews were conducted by clinical psychology graduate students who had completed an assessment course in which they learned to administer the SCID. All interviews were audio recorded and coded by a second graduate student. Interrater reliability for the presence of a current depressive disorder was good ($k = .80$). Five of the 13 participants interviewed, or at least 6.3% of the sample, met criteria for a current depressive disorder, providing additional evidence that the range of depressive severity in the current sample included clinically significant levels.

Data Analytic Plan

Our data analytic plan involved two steps. First, we calculated the percentage of surveys at which participants reported any type of meta-emotional experience, and calculated whether that frequency varied as a function of different demographic variables. Next, we calculated frequencies and descriptive statistics of all meta-emotional experience subtypes, and used paired t tests to determine whether frequencies of each subtype significantly differed from frequencies of the other subtypes. All meta-emotional experience variables were subject to an arcsine transformation, which was selected for its ability to accommodate proportional data when correcting for skewness. We used SPSS v23, IBM SPSS Statistics for Windows, 2016, to analyze all descriptive data.

Second, we used multilevel modeling (MLM) to investigate our hypotheses for our two within-person predictors, attention to emotion and clarity of emotion, and our between-person predictor, depressive severity. We conducted a series of multilevel models (equations provided below) to account for the hierarchical structure of the data (i.e., surveys nested within individuals; Nezlek, 2012). MLM was the most appropriate choice for these analyses because it does not assume independence of data, as does regression; that is, it considers the relations between within-person variables might vary from individual to individual. Furthermore, MLM can account for missing data and varying time intervals between surveys. Because our outcomes were binary (i.e., meta-emotion was either present or absent), we used hierarchical generalized linear modeling (HGLM) with the binomial distribution as the sampling model at Level 1 and the logit function to transform predicted values. Thus, our predictors are reported on the logit scale, meaning they represent the natural log of the odds of

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[5] 35.9% of responses to the meta-emotion question were excluded because they were not coded as true meta-emotional experiences. Of these excluded responses, the majority mentioned physical states (e.g., hunger; 32.4%) or cognitive or behavioral states (e.g., productivity; 31.5%) instead of feeling states for at least one word in the response.

experiencing meta-emotion. We exponentiated the logit values to transform them into probabilities across a range of values for predictors that were significantly associated with the likelihood of meta-emotional experiences. The analyses were run using the "lme4" package (Bates, Mächler, Bolker, & Walker, 2015) in the program R v3.2.3 (R Core Team, 2015).

In the equations for the MLM models below, subscript i represents surveys and subscript j represents individual participants. All within-person predictors were person-mean centered. There is no Level 1 (within-person) random error term because the variance is known at Level 1 of HGLM models. We have used u to represent Level 2 (between-person) random error terms.

Results

Descriptives

The means and standard deviations for, and correlations among, attention to emotion, clarity of emotion, and depressive severity are presented in Table 1. We found that, when examined at the within- and between-person levels, attention to emotion and clarity of emotion were significantly related but not redundant constructs. Additionally, at the between-person level, depressive severity was significantly positively associated with attention to emotion but was not significantly associated with clarity of emotion. Before testing our hypotheses, we also tested unconditional models (i.e., with each emotion variable as an outcome, and no predictors), which revealed that 45% of the variance in attention to emotion and 53% of the variance in clarity of emotion was at the between-person level, leaving considerable variance at the within-person level. In addition, the range of depressive severity scores was 0–44, which included scores in the clinical range (Radloff, 1977).

Frequency of Meta-Emotional Experiences

A total of 53.2% ($n = 42$) of the participants reported at least one meta-emotional experience over the course of the 1-week ESM period. On average, participants reported meta-emotional experiences at 5.7% of their surveys ($SD = 9.1\%$, range = 0–41%, 95% CI [3.7%, 7.8%]). The frequency of meta-emotional experiences did not differ by gender, $t(77) = 0.34$, $p = .25$. Participants did not differ in frequencies of meta-emotions as a function of race, $F(4, 74) = 2.22$, $p = .08$. Frequencies of meta-emotions also did not vary by education, $F(5, 73) = 0.75$, $p = .59$. Frequencies of meta-emotions were not significantly correlated with age, $r = -.11$, $p = .33$.

Regarding subtypes of meta-emotional experiences, NN experiences were the most frequently reported (see Table 2). NN experiences were significantly more frequently reported than PP experiences, which were the next most frequently reported, $t(78) = 4.70$, $p < .01$. Although PP experiences were more common than NP experiences, they did not significantly differ in terms of frequency, $t(78) = 0.02$, $p = .99$, which does not support our theory that meta-emotions function in accordance with the hedonic theory of emotion regulation.[6] Finally, NP experiences were significantly more frequently reported than PP experiences, which were least frequently reported, $t(78) = 2.56$, $p = .01$.

Attention to Emotion and Clarity of Emotion Predicting Likelihood of Meta-Emotional Experiences

Our first multilevel model examined attention to emotion as a Level 1 predictor of meta-emotional experiences:
Model 1.
Level 1 (level of surveys):

$$\text{Meta-Emotion}_{ij} = \beta_{0j} + \beta_{1j} \text{ Attention to Emotion} \quad (1a)$$

Level 2 (level of individuals):

$$\beta_{0j} = \gamma_{00} + u_{0j} \quad (1b)$$

$$\beta_{1j} = \gamma_{10} + u_{1j} \quad (1c)$$

Meta-Emotion$_{ij}$ represents the likelihood (in logits) of having a meta-emotional experience for participant j at survey i. At Level 1, β_{0j} (Equation 1a) represents each participant's mean likelihood of having a meta-emotional experience at the person mean of attention to emotion; β_{1j} represents the change in the likelihood of having a meta-emotional experience per unit change in attention to emotion for each participant. At Level 2, γ_{00} (Equation 1b) represents the grand mean of the likelihood of having a meta-emotional experience; γ_{10} (Equation 1c) represents the change in the likelihood of having a meta-emotional experience per unit change in attention to emotion for the entire sample. Consistent with our hypothesis, we found that attention to emotion was positively associated with likelihood of having a meta-emotional experience, $\gamma_{10} = 1.10$, $SE = 0.17$, $p < .001$. This suggests that higher state attention to emotion was related to a higher likelihood of experiencing meta-emotions.

We then ran a model similar to Model 1 entering clarity of emotion as a Level 1 predictor in place of attention to emotion. Also consistent with our hypothesis, we found that clarity of emotion was positively associated with likelihood of having a meta-emotional experience, $\gamma_{10} = 0.55$, $SE = 0.18$, $p < .01$. This suggests that, as with attention to emotion, higher state clarity of emotion was related to a higher likelihood of experiencing meta-emotions.

Lastly, we ran a model like Model 1, entering attention to emotion, clarity of emotion, and their interaction as Level 1 predictors. Attention to emotion was positively associated with the likelihood of a meta-emotional experience, $\gamma_{10} = 1.21$, $SE = 0.22$, $p < .001$. However, clarity of emotion was not significantly associated with the likelihood of having a meta-emotional experience, $\gamma_{20} = 0.26$, $SE = 0.28$, $p = .36$. This suggests that attention to emotion, but not clarity of emotion, is uniquely related to a higher chance of experiencing meta-emotions.[7] The attention to emotion by clarity of emotion interaction term was not significant, $\gamma_{30} = -0.20$, $SE = 0.16$, $p = .19$.

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[6] We found post-hoc that "frustrated" and "disappointed" were the most commonly reported primary emotions and that "guilty" and "sad" were the most commonly reported secondary emotions. However, there was a wide spread of emotion words reported, with 12 primary and 10 secondary emotion words reported five or more times each.

[7] Meta-emotional experiences were not significantly predicted by trait attention to emotion, $\gamma_{10} = 0.17$, $SE = 0.39$, $p = .66$, or trait clarity of emotion, $\gamma_{10} = -0.37$, $SE = 0.36$, $p = .29$.

Table 1

Descriptive Information and Within- and Between-Person Correlations Among Study Variables

Measure	1	2	3
1. Attention to emotion	—	.50***	n/a
2. Clarity of emotion	.11	—	n/a
3. Depressive severity	.17***	<.01	—
M (within-person SD)	1.04 (.80)	2.09 (.88)	12.44 (9.51)

Note. Correlations above the diagonal are within-person correlations obtained from MLM analyses (Nezlek, 2012). Within-person correlations for depression are not available because depression was not assessed during experience sampling. Correlations below the diagonal are between-person correlations calculated using mean scores.
*** p < .001.

Depressive Severity Predicting Likelihood of Meta-Emotional Experiences

Next, we ran a series of models in which the likelihood of experiencing meta-emotions was predicted by depressive severity. We first ran a model with depressive severity as a Level 2 predictor of whether someone would have any type of meta-emotional experience:

Model 2.

Level 1 (level of surveys):

$$\text{Meta-Emotion}_{ij} = \beta_{0j} \quad (2a)$$

Level 2 (level of individuals):

$$\beta_{0j} = \gamma_{00} + \gamma_{01}\text{Depressive Severity} + u_{0j} \quad (2b)$$

As in Model 1, Meta-Emotion$_{ij}$ represents the likelihood (in logits) of having a meta-emotional experience for participant j at survey i. Depressive severity was grand-mean-centered. At Level 1, β_{0j} (Equation 2a) represents each participant's mean likelihood of having a meta-emotional experience. At Level 2, γ_{00} represents the grand mean of the likelihood of having a meta-emotional experience at the grand mean of depressive severity; γ_{01} represents the change in the likelihood of having a meta-emotional experience per unit change in depressive severity (Equation 2b). Depressive severity was positively associated with likelihood of having a meta-emotional experience, $\gamma_{01} = 0.05$, $SE = 0.02$, $p = .02$.

We then ran four models similar to Model 2 but with each of the specific subtypes of meta-emotional experience as our outcome variables. Our hypothesis that depressive severity would be associated with NN and NP meta-emotional experiences was partially supported: depressive severity was positively associated with the likelihood of having a NN meta-emotional experience; however, depressive severity did not predict any of the other three subtypes of meta-emotional experience, including NP (see Table 3). Figure 1 displays the association of depressive severity with NN meta-emotional experience after we transformed the logit model back to the original probability metric.

Discussion

Despite meta-emotions being present in both emotion theory and psychological treatments for various mental disorders, few empirical investigations have focused on meta-emotional experiences. In the present study, we examined the frequency of meta-emotional experiences in everyday life. We tested whether meta-emotional experiences would be more likely when people were paying greater attention to emotion and were clearer about their emotions. We also examined whether higher levels of depressive severity would be associated with a higher likelihood of having NN and NP meta-emotional experiences.

This is the first study to assess frequency of meta-emotional experiences in a community sample. Overall, our findings suggest that the experience of meta-emotions is a common and wide-ranging phenomenon. Approximately half (53%) of the participants reported at least one meta-emotional experience over the course of a week. On average, meta-emotional experiences were reported at 5.6% of surveys, which translates into about two such experiences. Importantly, our sample was diverse regarding gender, race, ethnicity, and age, and our findings did not vary by these key demographics. Our findings can add to both appraisal and psychological constructionist theories of emotion in identifying emotions as not only outcomes of appraisals or outcomes of the combination of constructionist ingredients, but also as antecedent situations or stimuli that can lead to the generation of more emotions.

A total of 47% of our sample did not report meta-emotional experiences. Of course, these individuals might not experience meta-emotions. Tomkins and McCarter (1964) theorized that chil-

Table 2

Rates of Meta-Emotional Experiences Across the Experience Sampling Period

Variable	% Participants	% Surveys		
		M [95% CI]	SD	Range
Any type of meta-emotional experience	53.2	5.7 [3.7, 7.8]	9.1	0–41
Subtype of meta-emotional experience				
Negative-Negative (NN)	45.6	4.2 [2.6, 5.8]	7.1	0–31
Negative-Positive (NP)	15.2	.7 [.3, 1.2]	2.2	0–12
Positive-Negative (PN)	7.6	.2 [.03, .3]	.6	0–3
Positive-Positive (PP)	17.7	.7 [−.3, 1.0]	1.7	0–8

Note. All values are percentages. The column under the header % Participants gives the percentage of participants who reported at least one of the specified types of meta-emotional experience over the course of the ESM period. The columns under the header % Surveys give the mean, 95% confidence interval, standard deviation, and range for the percentage of surveys at which each participant reported meta-emotions.

Table 3
Results of HGLM Models Predicting the Likelihood of Experiencing Meta-Emotions From Depressive Severity

Variable	γ_{01} [95% CI]	SE	p
Any type of meta-emotional experience	.05 [.01, .10]	.02	.02
Subtype of meta-emotional experience			
Negative-Negative (NN)	.06 [.02, .11]	.02	<.01
Negative-Positive (NP)	.06 [−.03, .16]	.05	.20
Positive-Negative (PN)	−.17 [−.39, .06]	.12	.14
Positive-Positive (PP)	.02 [−.05, .10]	.04	.53

Note. γ_{01} is displayed in logits.

dren whose parents react emotionally to their children's emotions might grow up to react emotionally to their own emotions, so it is possible that children whose parents do not react in such a way do not grow up to experience meta-emotions. However, we posit that some, if not most, people experience meta-emotions. We argue that our estimate of the frequency of people experiencing a meta-emotion is a conservative one. First, participants were asked if they were experiencing a meta-emotion at the time of the survey, not if they had experienced them since the previous survey. Consequently, meta-emotions that were experienced at times other than at the time of the survey were not reported. Second, it is also possible that participants did not make the effort to report some experiences (see discussion of limitations). Third, meta-emotions may sometimes operate outside of conscious awareness, as is true of other emotional processes (Tamir, 2009); some participants might have lacked the insight to identify meta-emotions as they occurred. Fourth, in our instructions, we asked participants to report one secondary emotion. Although rare, there were instances when participants reported two secondary emotions. If the two secondary emotions were the same valence, they were included as a meta-emotion, but if the two secondary emotions were different valences (e.g., "excited and anxious" about feeling angry), these responses were excluded. Future research could address this lim-

itation by coding mixed emotions reported in meta-emotional experiences.

Of the four subtypes of meta-emotional experiences, we hypothesized that NN and PP experiences would be the most frequently reported. Consistent with this hypothesis, when people reported a meta-emotional experience, they were typically experiencing negative emotions about their own negative emotions (i.e., NN experiences). PP experiences were the second most commonly reported subtype, but were not reported significantly more frequently than NP experiences. Because people were no more likely to feel positive emotions about positive emotions than to feel negative emotions about positive emotions, these findings do not support our hypothesis or the hedonic theory of emotion regulation (Riediger et al., 2009). Finally, PN experiences were the least frequently reported. We also examined the frequencies of specific primary and second emotions post hoc, finding that "frustrated" and "disappointed" were the most commonly reported primary emotions and that "guilty" and "sad" were the most commonly reported secondary emotions. There was a wide spread of emotion words reported, with 12 primary and 10 secondary emotion words reported five or more times each.

In addition to documenting frequencies of meta-emotions, we examined how two within-person variables, attention to and clarity of emotion, were associated with the occurrence of meta-emotions. Consistent with research showing that trait attention to and trait clarity of emotion are related but distinct constructs (Boden & Thompson, 2017), we found that, when examined at a state level, they were significantly related but not redundant. With regard to meta-emotions, increased attention to emotion and clarity of emotion were each related to the likelihood of having a meta-emotional experience, in agreement with our hypotheses. However, only attention to emotion, not emotional clarity, was uniquely associated with meta-emotional experiences. We think there are two possible explanations for this pattern of findings. First, the accuracy of self-reports of clarity of emotion might be compromised by natural limitations on participants' capacity for introspection. However, if clarity of emotion scores were affected by capacity for introspection, it is doubtful that attention to emotion scores would remain unaffected, since attention to emotion requires introspection as well. A second possibility is that attention to emotion is simply a better predictor of meta-emotional experiences. This would mean that participants, when paying attention to their emotions, might understand that they are having an emotional reaction to other emotions, while not completely understanding that reaction.
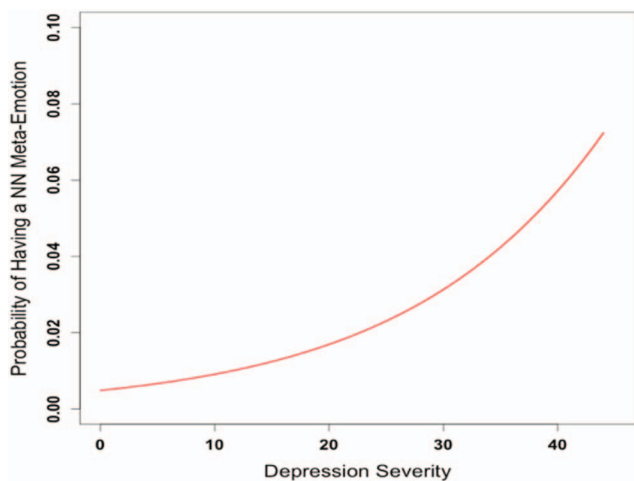

Figure 1. Probability of having a negative-negative (NN) meta-emotional experience as a function of depressive severity, as measured by the CES-D. See the online article for the color version of this figure.

Although attention to emotion was a robust predictor of meta-emotional experiences, it is unclear whether it is the state of heightened levels of attention to emotion that leads to the acknowledgment of meta-emotions, or whether the experience of meta-emotions leads to heightened levels of attention to emotion. We would conjecture that it is more heavily driven by the former; that individuals who are paying attention to their emotions are more likely to have and notice internal states, such as meta-emotional experiences. Of note, these findings are specific to state attention to and clarity of emotion. In other words, levels of state attention to and clarity of emotion predicted meta-emotions in the moment, but trait levels of attention to and clarity of emotion did not predict meta-emotional experiences. These findings suggest that state, not trait, levels of attention to and clarity of emotion are important in predicting MEEs, highlighting the importance of examining both trait and state levels of these emotion constructs.

The discrepancy between state and trait findings that we obtained in our study could be explained by differences in the types of information participants draw from when they report on state versus trait emotion measures. Compared to momentary levels of attention to and clarity of emotions, trait measures of attention to and clarity of emotion may be tapping people's beliefs about their own emotions in general (i.e., identity-related beliefs; Robinson & Clore, 2002). For example, when people retrospectively report on trait emotional characteristics, they are more likely to draw upon beliefs about their own personality (e.g., "I am a cheerful person") and social stereotypes (e.g., that women are more emotional than men; Robinson & Clore, 2002). This suggests that state measures might provide a more accurate measure of participants' attention to and clarity of emotion, and therefore we might be able to detect an association between state levels of attention and clarity and meta-emotions that we cannot detect when using trait measures of attention and clarity.

We also examined depressive severity, a between-person variable. Consistent with our hypothesis, the data showed that higher depressive severity is associated with higher likelihood of having NN meta-emotional experiences. However, other associations between depressive severity and meta-emotional experience subtypes, including NP, were not significant. As noted, existing nonacceptance literature has found that feeling and thinking negatively toward negative emotions is associated with depressive severity, supporting the hypothesized relation between NN meta-emotional experiences and depressive severity (e.g., Ehring et al., 2010; Gratz & Roemer, 2004; Neumann et al., 2010). Less support is available for the relation between NP meta-emotional experiences and depressive severity (Leahy, 2002; Mitmansgruber et al., 2009). Our findings are at odds with our hypothesis that negative secondary emotion toward any primary emotion is associated with depressive severity. They suggest instead that, in accordance with the nonacceptance literature, NN meta-emotional experiences are the only ones associated with depressive severity.

Our findings regarding the frequency of meta-emotional experiences as well as their associations with within- and between-person phenomena indicate that meta-emotional experiences, as both a common and clinically significant phenomenon, are a valuable topic of further research and discussion. First, these data suggest that negative emotions toward negative emotions are implicated in depressive severity across a wide range of scores. Several existing treatments for depression, such as acceptance and commitment therapy (Hayes, Strosahl, & Wilson, 1999), incorporate acceptance of distress and negative emotion as a key component to recovery. However, cognitive–behavior therapy (CBT), which focuses on automatic thoughts and cognitive appraisals, does not explicitly incorporate emotional acceptance. Since CBT is one of the leading treatments for depression (Butler, Chapman, Forman, & Beck, 2006), it might be important to incorporate psychoeducation about, and skills for coping with, emotional reactions into traditional CBT treatment. Our data might also explain one reason why mindfulness-based cognitive therapy (MBCT), which encourages the acceptance of negative thoughts and feelings, is effective for preventing relapse in patients in remission from MDD (Hofmann, Sawyer, Witt, & Oh, 2010; Piet & Hougaard, 2011). Indeed, one of the founders of MBCT declared "depression about depression" to be one of the key forces maintaining the disorder (Teasdale, 1985, p. 159). To explore whether mindfulness is effective in reducing negative secondary reactions to negative primary emotions, further research could examine the frequency of NN meta-emotional experiences in patients in remission from MDD who have undergone MBCT in comparison to those patients who have not undergone MBCT.

Our findings on emotional awareness suggest that during moments when individuals are not paying attention to their emotions, they might either (a) not be experiencing meta-emotions or (b) be less able to recognize and identify meta-emotional experiences. If the latter is the case, this could play an important role in treatment settings, suggesting that patients must first be able to identify when meta-emotional experiences are occurring before they can reduce their occurrence. Once patients are paying attention to their emotions, they will be better able to identify NN meta-emotions and to apply acceptance or reappraisal strategies. However, although our sample included people with clinically significant self-reported levels of depressive severity (confirmed using diagnostic interviewing), we cannot draw generalizations from our findings about MDD. Future research would need to examine meta-emotional experiences in a sample with MDD.

The findings from the current study build upon the nonacceptance literature in several ways. First, because our measure does not directly assess cognitive appraisals of emotions, our findings provide evidence that the meta-emotion aspect of nonacceptance is associated with depressive severity. Second, the nonacceptance literature does not consider non-NN subtypes of meta-emotional experiences, implicitly suggesting that NN is the subtype of most relevance to depressive severity. This is supported by our findings. Finally, our use of experiential sampling serves to establish that not only trait but also moment-to-moment emotional experience is related to depressive severity. This is ostensibly a more compelling assertion, since ESM minimizes retrospective recall and increases the accuracy of self-reports (Schwarz, 2011). Depressed individuals have been found to be even more vulnerable to retrospective recall bias than are nondepressed individuals (Gotlib & Joormann, 2010).

The ESM items we used, while offering us several novel strengths, also entailed a few limitations. First, the item assessing meta-emotional experiences necessitated participants typing responses. Although this allowed us to collect a much wider variety of responses, some participants might not have always wanted to make that extra effort. A second limitation was the number of responses that were excluded because they were nonemotion

words. Most of these excluded responses mentioned physical, cognitive, or behavioral states instead of feeling states. Some participants reported clearly nonemotion words (e.g., "I feel *really hot in temp* about feeling *sluggish*") or used words that were too vague to count as emotion words (e.g., "I feel *strange* about feeling *these feelings*"). It is possible that we were unable to assess MEEs in participants who had difficulties with emotion differentiation— that is, the ability to verbalize emotions with a high degree of complexity (Barrett, Gross, Christensen, & Benvenuto, 2001; Kashdan et al., 2015). Third, with regard to our emotional awareness items, although trait attention to emotion was significantly associated with state (i.e., ESM) attention to emotion, which is consistent with Thompson et al. (2011), trait clarity of emotion was not significantly associated with state clarity of emotion. Although we would have theoretically expected both relations to be significant, these findings are consistent with other research on trait and state clarity of emotion (Lischetzke et al., 2011; Thompson et al., 2015). Fourth, future research will need to disentangle the role of negative affect in NN meta-emotions. In the online supplemental material, we conducted an analysis with this goal in mind. We found that after accounting for general negative affect, depression did not significantly predict NN meta-emotions. However, given our study design, implications that can be drawn from this analysis are limited (see online supplemental material for details). Future research will need to use a different approach to more thoroughly evaluate the relative contributions of general negative affect and NN meta-emotions to outcomes of interest. Finally, as noted above, almost half of our sample did not report meta-emotional experiences; further, NP and PN, compared to NN and PP, meta-emotions were infrequently reported. Future studies will need to either recruit a larger sample or assess participants more frequently in order to draw more confident conclusions about the role of NP and PN meta-emotional experiences and constructs of interest.

Now that we have established frequencies of meta-emotional experiences in daily life and begun to explore their relation with emotional awareness, other emotion constructs (e.g., emotion differentiation) that might be associated with the occurrence of meta-emotional experiences should also be explored. Furthermore, future research could look at dimensions of emotion other than valence, such as arousal, activation, and approach-withdrawal. It is possible, for example, that arousal moderates the relation between NN experiences and depressive severity such that lower arousal NN experiences have greater associations with depressive severity (given that sadness, a low-arousal emotion, is a key depressive symptom). It is also possible that cultural valuation of high- versus low-arousal emotions influences the occurrence of certain meta-emotions. For instance, East Asian cultures tend to value low-arousal positive emotions, such as calm and peacefulness, more than American cultures (Tsai, 2007). Perhaps, then, cultural influences could lead East Asians to more frequently experience PP meta-emotions when the primary emotion is low-arousal.

It will also be important to determine whether applying skills to reduce NN experiences helps alleviate depressive symptoms, and if so, whether acceptance and mindfulness are the most effective strategies to use. Another important avenue for future work is to examine the relation between meta-emotional experiences and other forms of psychopathology; for instance, it would be interesting to explore whether PP meta-emotional experiences precede

manic episodes in bipolar disorder. There is a clear need for further research on the topic of meta-emotional experiences, as those findings will hopefully illuminate our understanding of emotion and its relation with well-being.

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