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

Natasha Haradhvala
Washington University in St. Louis

WASHINGTON UNIVERSITY IN ST. LOUIS

Department of Psychological and Brain Sciences

Thesis Examination Committee:
Renee Thompson, PhD, Chair
Tammy English, PhD
Tom Rodebaugh, PhD

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by
Natasha M. Haradhvala

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Natasha Haradhvala

Washington University in St. Louis

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ABSTRACT OF THE THESIS

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Natasha M. Haradhvala

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Renee J. Thompson, Chair

Meta-emotions are emotions that occur in response to other emotions (e.g., guilt about anger). Although preliminary evidence indicates that depression is associated with a greater likelihood of meta-emotions, much remains unknown about meta-emotions, including how regularly they are experienced and whether emotional awareness constructs (including attention to and clarity of emotion) influence their occurrence. In the present study, we aim to establish norms for meta-emotions in everyday life, determine whether increased emotional awareness is 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 an adult community sample (n=79) to complete seven days of experience sampling. At each survey, they indicated current attention to emotion, clarity of emotion, and whether and what kind of meta-emotional experience they were having. Experiences were categorized as negative-negative, negative-positive, positive-positive or negative-negative. Approximately 53% of participants reported at least one meta-emotional experience. Meta-emotional experiences were reported about twice a week; negative-negative experiences were most frequent. Although attention to and clarity of emotion each individually predicted the likelihood of meta-emotional experiences, only attention to emotion contributed

unique variance. Using multi-level modeling, we found that higher self-reported depressive severity was associated with the likelihood of meta-emotional experiences and specifically with negative-negative experiences. Findings indicate that most adults experience meta-emotions, especially during moments of high attention to emotion, and that negative-negative experiences are associated with depressive severity. These findings suggest that treatments for depression would benefit from emphasizing acceptance of negative emotions.

Introduction

"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 et al., 2009; Norman & Furnes, 2016; Tomkins & McCarter, 1964) and in some cases associated with psychopathology (Leahy, 2002; Mitmansgruber, 2009; Shaver et al., 2013). A meta-emotional experience 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

[1] We use the most common definition of meta-emotions (Jäger & Banninger-Huber, 2015; Jäger & Bartsch, 2006; Mendonça, 2013), but is not the only one. Gottman, Katz, and Hooven (1996) originally coined the term "meta-emotion" to refer to parents' emotions and beliefs regarding their own emotions and their children's emotions. In contrast, others define meta-emotions as a set of beliefs about primary emotional processes (e.g., Beer & Moneta, 2010; Ferrari & Koyama, 2002). Bartsch (2008; 2010) conceptualizes them as evaluative cognitions and emotions about one's primary emotions, and Hofer and Wirth (2012) view them as emotions that are generated as the result of an evaluative appraisal of one's primary emotions. Koven (2011) sees them as a set of strategies used to act on emotional information.

hereafter as a negative-positive (NP) meta-emotional experience. Meta-emotional experiences can also take negative-negative (NN), positive-negative (PN), or positive-positive (PP) forms (Tomkins & McCarter, 1964).

However, relatively little is known about meta-emotional experiences. No study thus far has empirically examined, for example, the frequency of meta-emotional experiences in daily life. We expect that most people will experience meta-emotions. In particular, we expect that NN and PP meta-emotional experiences will be more frequently reported than PN and NP experiences. When regulating their emotions, people most frequently aim to maximize pleasure by maintaining or increasing positive emotions and eliminating or decreasing unpleasant ones (Riediger et al., 2009). Meta-emotions might serve this emotion regulatory function. For example, positive emotions about positive emotions might serve as positive reinforcement for positive primary emotions, and negative emotions about negative emotions might serve as punishment for primary negative emotions. In this framework, PN and NP are contra-hedonic and would involve more complex motivations.

Not only is it unknown how many people and how regularly people experience meta-emotions, but also which other psychological variables are associated with their occurrence. In particular, we explore how emotional awareness and depression severity are associated with the occurrence of meta-emotions. We believe that as a result of this endeavor we will be better situated to assess the role of meta-emotions in emotional experience as a whole and depression in particular.

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. Emotional awareness is composed of multiple dimensions, including attention to emotion and clarity of emotion—conceptually related but distinct constructs (Boden & Thompson, in press). Attention to emotion is the degree to which one attends to one's emotions (Salovey et al., 1995), and clarity of emotion is how clearly one understands one's emotions (Gohm & Clore, 2000). 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.

Some preliminary research supports the hypothesis that meta-emotions will be positively related to trait attention to emotion. Mitmansgruber et al. (2009) examined how meta-emotional experiences, assessed using the trait Meta-Emotion Scale (MES), were related to mindful attention and awareness, which is a similar construct to attention to emotion. In this study, mindful attention and awareness was negatively related to negative meta-emotions (a combination of NN and NP meta-emotional experiences) and positively related to positive meta-emotions (a combination of PN and PP meta-emotional experiences). However, the MES assessment of meta-emotions includes the assessment of emotion regulation strategies and cognitive appraisals of emotions, so it is important for research to delineate how emotional awareness variables relate specifically to meta-emotions. Mitmansgruber et al. (2009) did not explore clarity of emotion in relation to meta-emotions, but we hypothesized that it is not only attention to, but also understanding of, one's emotions that is associated with meta-emotional experiences.

Mitmansgruber et al. (2009) provided evidence demonstrating important individual differences in the experience of meta-emotional knowledge and experiences. However, because

people are not likely to experience meta-emotions all the time, it is also important to examine which aspects of people's in vivo emotional experience are related to the occurrence of meta-emotions. We hypothesize that people are most likely to have meta-emotional experiences during moments of high attention to emotion and clarity of emotion. Although Mitmansgruber et al. (2009) examined subtypes of meta-emotional experience, we examine the association between the two dimensions of emotional awareness and meta-emotional experiences in general. We theorize there is a more over-arching relation: that in order to experience and report emotions about other emotions (independent of valence), individuals must be paying attention to their emotions and be clear about what their emotions are.

Meta-Emotions and Depression

Two studies have examined the relation between meta-emotions and depression, and their findings suggest that further research is warranted. In a sample of university students, Mitmansgruber (2009) found that severity of depressive symptoms was positively correlated with negative meta-emotions (i.e., a combination of NN and NP) and negatively correlated with positive meta-emotions (i.e., a combination of PN and PP). In an adult sample of psychotherapy patients recruited from a clinic, Leahy (2002) found that depressive symptom 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 (2009) used a broad conceptualization of meta-emotions (including emotion regulation strategies), and Leahy (2002) only assessed meta-shame, guilt and embarrassment, more research is needed in order to explore the relation between depression and the subtypes of meta-emotional experiences.

Emotional non-acceptance, which occurs when an individual negatively judges his or her own negative emotions (Gratz & Roemer, 2004), is conceptually similar to meta-emotion and has also been linked to depression (Campbell-Sills et al., 2006; Ehring et al., 2008; Ehring et al., 2010; Flynn, Hollenstein, & Mackey, 2010; Gratz & Roemer, 2004; Hayes et al., 1999; Mennin et al., 2007; Neumann et al., 2009; Sauer-Zavala et al., 2007). NN meta-emotional experience can almost be viewed as an example of non-acceptance, but the definition of non-acceptance often includes cognitive appraisals of emotions (Gratz & Roemer, 2004). Several existing treatments for depression, the most well-known of which is acceptance and commitment therapy (Hayes et al., 1999), incorporate acceptance of distress and negative emotion as a key component to recovery.

Importantly, research on meta-emotions can provide information above and beyond what can be gleaned from research on constructs such as emotional non-acceptance. For example, the non-acceptance literature only examines a construct similar to NN, not NP. There is evidence, however, that depressed individuals dampen positive emotions (Feldman et al., 2008; Nelis, Holmes, & Raes, 2015; Werner-Seidler et al. 2013). This means that depressed individuals tend to "respond to positive moods states with mental strategies to reduce the intensity and duration of the positive mood state" (Feldman et al., 2008, p. 509). As suggested above, negative meta-emotions could play a regulatory function; if so, the dampening literature would indicate depressed individuals might experience not only NN meta-emotional experiences, but NP experiences, as well.

If both NN and NP are associated with depression, this knowledge could help tailor acceptance-based treatments to be more accurate and helpful via the inclusion of acceptance of positive emotions. Furthermore, the non-acceptance literature does not address feeling positively

about one's emotions (i.e., PP and PN meta-emotions). If people who tend to feel positively about their emotions experience lower levels of depression, this could point to the protective role of positive secondary emotions and inform the course of treatment.

The Current Study

Existing research examining meta-emotions has used one of three global self-report measures. None of the existing measure assesses the full spectrum of NN, PN, PP, and PN meta-emotional experiences, while excluding phenomena such as cognitive appraisals of emotion. Consequently, the present study used experience sampling methodology (ESM) to explore the 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 in the moment and in a naturalistic setting. This method also obviates the need for participants to take on the daunting task of recalling and categorizing every meta-emotional experience over a much longer period of time.

The purpose of the study was threefold. Firstly, we aimed to establish the frequency of meta-emotions and meta-emotional experience subtypes in daily life. We hypothesized that the majority of individuals would report meta-emotional experiences. With regard to meta-emotional experience subtypes, we expected that NN and PP meta-emotional experiences would be more frequently reported than PN and NP experiences. Secondly, we aimed to determine whether higher levels of state clarity of emotion and state attention to emotion are associated with the likelihood of someone experiencing meta-emotions. Thirdly, we aimed to identify whether depressive symptoms are 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 depression. This would

indicate that the secondary emotion is the operative component that predicts negative outcomes, regardless of the valence of the primary emotion. These goals have direct clinical implications, as the better we understand who experiences meta-emotions, how frequently, and under what conditions, the more we can add to the knowledge base built by the non-acceptance literature to enhance and refine existing treatments for depression.

Method

Participants

Participants were 88 adults recruited from the St. Louis community as part of a broader study on emotional experience. In order to recruit a representative sample of the community, individuals were recruited through advertisements posted online and at local businesses, and were screened based on age, sex, race/ethnicity, and income. All participants were native English speakers, United States citizens, and at least 18 years old. Exclusionary criteria included active psychosis and current substance abuse or dependence. In addition, 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), had a body mass index of 32 or higher, or were currently pregnant or breastfeeding were ineligible to participate. Seven participants' ESM data were unusable due to technical difficulties, and two participants withdrew from the study before completing the full week of ESM surveys. The final sample of 79 participants was 58.2% female (n = 46) and ranged in age from 20-71 (M = 39.0, SD = 14.5). Ethnic breakdown was 65.8% white (n = 52), 21.5% Black/African American (n = 17), 7.6% biracial (n = 6), 3.8% Asian/Pacific Islander (n = 3), and 1.3% Middle Eastern (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.

Procedure

For the parent study, participants completed two laboratory sessions that were scheduled approximately a week apart during which they completed seven days of ESM. At their first session, participants provided informed consent and completed a series of self-report measures and computerized tasks that were unrelated to the current study. At this session, they were also instructed individually on the ESM protocol. During this tutorial, the experimenter went through each survey item, providing instruction and answering participants' questions. Each participant also completed a practice trial with the experimenter.

For the ESM protocol, participants were instructed to carry with them at all times an iOS-based electronic device—either their own iPhone or a 4th generation iPod touch that was provided to them. The survey iOS app, SurveyApp, which was installed by an experimenter onto the device beforehand, was designed to collect data offline throughout the sampling period so that it did not require Wi-Fi or a data plan. Participants' devices were programmed to prompt them eight times per day on each of the seven days during a 12-hour window of the participant's choice (e.g., 8am to 8pm), totaling 56 surveys over the course of the week. Prompts occurred at random times within eight 90-minute windows per day. Participants had up to 10 minutes to respond to each survey before it expired and data were recorded as missing. The mean percentage of surveys completed was 72.4% (*SD* = 20.8%).

After approximately a week after the first laboratory session, participants returned for the second laboratory session. They completed a series of self-report measures and computerized tasks (those which are related to the present study are described below). Finally, participants

were verbally debriefed and compensated for their participation, with an extra incentive for responding to more than 90% of the prompts. The research protocol was approved by Washington University in St. Louis' 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 _____."* 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 tutorial 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 exactly 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. In order to standardize the procedure by which words were rated, we used Shaver's (1987) list of feeling states as a coding reference. Shaver'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). This list in its original form, while extensive, was not, for the purposes of the current study, sufficient. We modified it in three ways. Firstly, Shaver's list only includes nouns, while 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. Secondly, 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). Our final list contained 159 feeling states.[2, 3]

Coding meetings were held so that coders could discuss any disagreements and come to a consensus. An analysis of inter-rater reliability showed near-perfect agreement between the coders: k = .99 for whether each entry was a meta-emotional experience, and k = .96 for the particular 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.[4] Next, four binary variables were computed to indicate whether the meta-emotional experience met criteria for any of the four subtypes (NN, NP, PN, or PP).

[2] If a feeling state was negated (e.g. "not happy"), we did not code the entry as a feeling state. This is because although we knew which emotion the participant was not experiencing, we did not have enough information to judge which emotion, if any, they were experiencing. If, for example, 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 that would each otherwise have been coded as feeling states were entered into one blank (e.g. "happy and sad") we did not code the entry as a feeling state.

[3] The 24 feeling states we included in addition to those on Shaver's list were as follows: 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.

[4] 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 of 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.

Attention to emotion. Attention to emotion was assessed at each ESM survey with two items. Participants were asked to rate each item on a five-point Likert scale (0 = *not at all*, 4 = *a great deal*). The first item ("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, Mayer, Goldman, Turvey, & Palfai, 1995) and has been used and validated in previous ESM research (Thompson et al., 2011). The second item ("I found myself paying attention to my feelings even though I did not intentionally try to do so") is the item with the highest factor loading on a scale measuring involuntary attention to emotion (Huang, Berenbaum & Chow, 2013). Both items were modified by adding "at the time of the beep" and changing the sentence structure to past tense. Reliability for these items, averaged across prompts within participants, was .98. This reliability estimate is analogous to Cronbach's alpha for items in self-report measures.

Clarity of emotion. Clarity of emotion was assessed at each ESM survey with two items using the same five-point Likert scale as the attention to emotion items. The first item ("At the time of the beep, I was clear about my feelings") is the item with the highest factor loading on the Clarity in Discrimination of Feelings subscale of the Trait Meta-Mood Scale (TMMS; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995). The second item ("At the time of the beep, I would have had to think for a while to figure out who (or what) made me feel the way I was feeling") was adapted from the two highest-loading items on a scale assessing source awareness (Berenbaum, 2011). The specific feeling states listed in each item ("sad, angry, or scared" and "happy or excited," respectively) were replaced with the more general phrase "the way I was feeling." Both clarity of emotion items in our ESM survey were modified by adding "at the time of the beep" and changing the sentence structure to past tense. Reliability for these items,

averaged across prompts within participants, was .98. This reliability estimate is analogous to Cronbach's alpha for items in self-report measures.

Clinical measures.

Depression. 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 depression in community samples (Radloff, 1977) and has demonstrated good convergent and discriminant validity (Milette et al., 2010). The internal consistency of the CES-D items was high in this sample (Cronbach's α = .90). Our sample had a mean CES-D score of 12.44 (*SD* = 9.51; range = 0-44). Because elevated symptoms on the CES-D do not necessarily indicate the presence of a major depressive episode, we invited a subset of participants to complete the Structured Clinical Interview for DSM-5 (SCID-5-RV; First, Williams, Karg, & Spitzer, 2014) to assess their current and past mental health history. Interviews were conducted by one of three 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. Any diagnostic disagreements were discussed at regular group meetings, which were supervised by the last author, a licensed clinical psychologist. Inter-rater reliability for the presence of a current depressive disorder was *k* = .80. Five of the 13 participants interviewed, or at least 6.3% of the total sample, were diagnosed with a current depressive disorder (four with major depressive disorder (MDD), one with persistent depressive disorder). This illustrates that the range of depressive symptoms in the current sample included clinical levels of depression.

Data Analytic Plan

Our data plan involved two steps. First, we calculated frequencies and descriptive statistics to examine various characteristics of our participant pool. We then 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. (For correlations between attention to emotion, clarity of emotion, and depression variables, see Table 1 below.) 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 the hypotheses for clarity of emotion, attention to emotion, and depressive symptom severity. We conducted a series of multilevel models to account for the hierarchical structure of the data (i.e., beeps 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 takes into account the fact that the relations between within-person variables might vary from individual to individual. Furthermore, MLM is able to account for missing data and varying time intervals between beeps. 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 the probability of experiencing meta-emotion. The logit values can be exponentiated to transform them into

probabilities, which we did 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 et al., 2015) in the program R v3.2.3 (The R Foundation for Statistical Computing for Mac, 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 are no Level 1 (within-person) random error terms because the variance is known at Level 1 of HGLM models. u represents the Level 2 (between-person) random error term.

Results

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 one-week ESM period. On average, participants reported meta-emotional experiences at 5.7% of their surveys (*SD* = 9.1%, range = 0-41%). The frequency of meta-emotional experiences did not differ by gender, $t(77) = 0.80$, $p = .43$, and was not significantly associated with age, $r = -0.11$, $p = .22$. With regard to race, we limited analyses to the two largest racial groups, Black/African American and white, which composed approximately 80% of our sample; participants did not differ in frequencies of meta-emotions as a function of race, $t(67) = 0.11$, $p = .74$. Frequencies of meta-emotions also did not vary by education, $F(5, 73) = 0.65$, $p = .66$.

With regard to meta-emotional experience subtypes, 45.6% (n = 36) reported at least one NN meta-emotional experience (*M* = 4.2% of surveys, *SD* = 7.1%, range = 0-31%). A total of 15.2% (n = 12) reported at least one NP meta-emotional experience (*M* = 0.7% of surveys, *SD* = 2.1%, range = 1-12%). Of our sample, 7.6% (n = 6) reported at least one PN meta-emotional

experience (*M* = 0.2% of surveys, *SD* = 0.6%, range = 0-3%). A total of 17.7% (n = 14) reported at least one PP meta-emotional experience (*M* = 0.7% of surveys, *SD* = 1.6%, range = 0-8%).

Hierarchical Linear Models

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

One of our models examined attention to emotion as a Level 1 predictor of meta-emotional experiences:

Model 1

Level 1 (level of beeps):

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

Level 2 (level of individuals):

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

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

Meta-Emotion_{ij} represents the likelihood (in logits) of having a meta-emotional experience for participant *j* at beep *i*. At Level 1, β_{0j} 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} represents the grand mean of the likelihood of having a meta-emotional experience; γ_{10} 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, $\gamma_{01} = 1.32$, *SE* = 0.21, *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 instead 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, γ_{01} = 1.18, *SE* = 0.30, $p < .001$. 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 similar to 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, γ_{01} = 1.18, *SE* = 0.24, $p < .001$. However, clarity of emotion was not significantly associated with the likelihood of having a meta-emotional, γ_{01} = 0.65, *SE* = 0.47, $p = .16$. This suggests that attention to emotion, but not clarity of emotion, is uniquely related to a higher chance of experiencing meta-emotions. The attention to emotion by clarity of emotion interaction term was not significant, γ_{01} = -0.10, *SE* = 0.29, $p = .74$.

Severity of Depressive Symptoms Predicting Likelihood of Meta-Emotional Experiences

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

Model 2

Level 1 (level of beeps):

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

Level 2 (level of individuals):

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

As in Model 1, Meta-Emotion$_{ij}$ represents the likelihood (in logits) of having a meta-emotional experience for participant *j* at beep *i*. Depression was grand-mean-centered. At Level 1, β_{0j} 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 symptom severity; γ_{01} represents the change in the likelihood of having a meta-emotional experience per unit change in depressive symptom severity.

Depressive symptom severity was positively associated with likelihood of having a meta-emotional experience, $\gamma_{01} = 0.05$, $SE = 0.02$, $p < .05$. Figure 1 displays this association after we have transformed the logit model back to the original probability metric. 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 symptoms would be associated with NN and NP meta-emotional experiences was partially supported: depressive symptom severity was positively associated with the likelihood of having a NN meta-emotional experience; however, depressive symptom severity did not predict any of the other three subtypes of meta-emotional experience, including NP (see Table 2).

Discussion

The theoretical role of meta-emotions in emotional experience has been explored in the literature, and there is preliminary evidence of their association with depression. In this study, we examined the frequency of meta-emotional experiences in everyday life. We tested whether meta-emotional experiences would be more likely during moments of high emotional awareness, as measured by both attention to emotion and clarity of emotion. We also examined whether

higher levels of depression 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. Approximately half (53%) of the participants reported at least one meta-emotional experience during a period of a week. Further, on average, meta-emotional experiences were reported at 5.6% of surveys, which translates into participants reporting them about two times over the course of a week. This is noteworthy because participants were asked if they were experiencing a meta-emotion at the time of the survey, not if they had experienced them during the period of time since the last survey, meaning that the reported frequency of meta-emotional experiences is likely a conservative one.

These findings indicate that meta-emotions are not only a matter of theoretical interest, but that they might be salient in daily life for the majority of people. Importantly, the sample was diverse with regard to race, ethnicity, education, and age, and our findings did not vary by these key demographics. Our findings suggest that the experience of meta-emotions is a common and wide-ranging phenomenon that cuts across demographic categories.

However, it is also important to acknowledge that 47% of our sample did not report meta-emotional experiences. It is possible that some of these participants experienced meta-emotions, but did not want to take the effort to report them (see discussion of limitations). Another possibility is that meta-emotional experiences may occur more frequently during major life events, such as a divorce or starting a new job, and that such instances were not captured during random sampling. Future research could use event-contingent sampling, during which participants are instructed to report meta-emotions whenever a stressful or noteworthy life event occurs; perhaps a greater percentage of participants will report meta-emotions. Perhaps the

simplest explanation, however, is that certain individuals do not experience meta-emotions. Future research might explore why this might be: these individuals might, for example, have been raised with parents who modeled acceptance of their child's emotions instead of reacting emotionally to their child's emotions (Thomkins & McCarter, 1964).

Of the four subtypes of meta-emotional experiences, NN meta-emotional experiences were the most frequently reported. That is, when people reported a meta-emotional experience, they were typically experiencing negative emotions about their own negative emotions. People reported, for example, feeling sad about feeling disappointed; feeling guilty about feeling frustrated; and feeling anxious about feeling angry. PP meta-emotional experiences were the second most commonly reported subtype. These findings support our hypothesis that NN and PP meta-emotional experiences would be most frequently reported, and is in line with the hedonic theory of emotion regulation (Riediger et al., 2009). In accordance with our hypothesis and the hedonic theory of emotion regulation, the PN and NP subtypes were the least frequently reported: during reported meta-emotional experiences, people were less likely to feel positively about negative emotions or feel negatively about positive emotions.

In addition to documenting frequencies of meta-emotions, we examined how people's momentary levels of attention to and clarity of emotion were associated with the occurrence of meta-emotions. Increased attention to emotion and clarity of emotion were each related to the likelihood of having a meta-emotional experience, which is in line with our hypotheses. These findings expand the literature examining how trait measures of attention to emotion (Mitmansgruber et al., 2009) and clarity of emotion (Leahy, 2002) are related to the occurrence of meta-emotional experiences. Our findings indicate that people who experience meta-emotions do not experience them all of the time, but are more likely to experience them when they are

paying more attention and are clearer about how they feel. However, it is still unclear whether it is the state of heightened levels of attention to and clarity of emotion that leads to the acknowledgement of meta-emotions, or whether the experience of meta-emotions leads to heightened levels of attention to and clarity of emotion. We would conjecture that it is the former: that individuals who are paying attention to and understand their emotions are more likely to have and notice internal states such as meta-emotional experiences.

When we examined whether clarity of emotion and attention to emotion were uniquely associated with meta-emotional experiences, only attention to emotion continued to be significantly associated with meta-emotional experiences. We think there are two possible explanations for this pattern of findings. Firstly, it is possible that the accuracy of self-reports of clarity of emotion might be compromised by natural limitations on participants' capacity for introspection (Thompson et al., 2015). Supporting this theory, a study by Lischetzke, Angelova, and Eid (2011) found that when participants were asked to make ratings of their emotions in the moment, their reaction times to answer the questions (presumably a reflection of clarity of emotion) were unrelated to global self-reports of emotional clarity. However, if clarity of emotion scores were affected by capacity for introspection, it is doubtful that attention to emotion scores would remain unaffected.

A second possibility is that we are observing a true effect, or that attention to emotion is simply a better predictor of meta-emotional experiences. This would mean that paying attention to what you are feeling is the key ingredient to experiencing emotions, even when one is unable to identify exactly what type of emotion one is experiencing and why. This is also a plausible theory: 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. Some participants were rather vague about their primary and meta-emotions (e.g., "I feel negative about feeling bad"), suggesting these participants have a low degree of clarity of emotion while still able to report meta-emotional experiences. However, it is less likely that participants would be able to identify and report meta-emotional experiences if they were not paying attention to their emotions in the first place.

In agreement with our hypothesis, the data showed that higher depression is associated with higher likelihood of having NN meta-emotional experiences. However, other associations between depression and meta-emotional experience subtypes, including NP, were not significant. As noted, existing non-acceptance literature has found that feeling and thinking negatively toward negative emotions is associated with depressive symptoms, supporting the hypothesized relation between NN meta-emotional experiences and depression (Campbell-Sills et al., 2006; Sauer-Zavala et al., 2007). Less support is available for the relation between NP meta-emotional experiences and depression (Leahy, 2002; Mitmansgruber, 2009). Our findings are at odds with our hypothesis that negative secondary emotion is the part of the meta-emotional experience that is key to the association with depression. They suggest instead that the primary negative emotion is just as important: i.e., that in accordance with the non-acceptance literature, NN meta-emotional experiences are the only ones associated with depression.

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. Firstly, these data reinforce that we should focus on negative emotions toward negative emotions in patients with depressive symptoms. Since cognitive-behavior therapy (CBT), which focuses on automatic thoughts and cognitive appraisals, is the

leading treatment for depression (APA), it might be important to incorporate some component of emotional reactions into traditional CBT treatment. Our data might also explain why mindfulness-based cognitive therapy (MBCT) is effective for preventing relapse in patients in remission from MDD (Hofmann, Sawyer, Witt, & Oh, 2010; Piet & Hougaard, 2011): the encouragement of acceptance of negative thoughts and feelings might help patients reduce NN meta-emotional experiences. While patients might still experience negative emotions, they might be less likely to experience a negative secondary emotional reaction. Further research could examine the prevalence 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 data on attention to emotion and clarity of emotion suggest that during moments when individuals are not paying attention to their emotions and/or are less clear about their emotions, they might either 1) not be experiencing meta-emotions or 2) 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: patients must first be able to identify when meta-emotional experiences are occurring before they are able to reduce their occurrence. Our data particularly support training patients in how to pay attention to their emotions. Once patients are paying attention to their emotions, they will be better able to identify NN meta-emotions and to apply acceptance strategies. However, it is worth emphasizing that in our current study, we relied primarily on a self-report measure to assess depressive symptoms. Although our sample included people with clinically significant levels of depression that were confirmed using diagnostic interviewing, before we use our data to draw generalizations with regard to MDD, these findings would need to be replicated with a group of participants who have been diagnosed with MDD.

The findings from the current study build upon that literature in several ways. First, non-acceptance measures assess both negative appraisals of and negative emotions about other emotions. Because our measure does not assess cognitive appraisals of emotions, our findings provide evidence that the meta-emotion aspect of non-acceptance is associated with depression. Of course, our data do not speak to the role of cognitive appraisal of the primary emotion and the formation of a secondary emotion (Hofer & Wirth, 2012). Secondly, the non-acceptance literature does not take into account other subtypes of meta-emotional experiences, implicitly suggesting that NN is the subtype of most relevance to depression; this is consistent with our findings. Finally, our use of experiential sampling serves to establish that it is not only trait meta-emotional experience that is related to depression outcomes; momentary meta-emotional experience is related to depression as well. The frequency with which an individual reports NN meta-emotions on a day to day basis—not just a retrospective account of how he or she "generally" reacts to his or her emotions—is associated with level of depression. 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 non-depressed individuals, as people who are prone to experience negative affect tend to over-report negative affect during retrospective recall (Gotlib & Joorman, 2010).

Our sample size was relatively large for an ESM study, but, as noted above, NP and PN subtypes of meta-emotions were infrequently reported. Consequently, we had less power to examine NP and PN meta-emotions. Future studies will need to recruit a larger sample in order to draw more confident conclusions about the role of NP and PN meta-emotional experiences and constructs of interest.

Furthermore, the use of an open-ended to assess meta-emotional experiences, while offering our study several novel strengths, entailed a few limitations. This format necessitated participants typing responses. Some participants might not have always wanted to make that extra effort. If this is the case, then our data underestimates the frequency of meta-emotional experiences in daily life, and our results are conservative.

Another limitation was the number of responses that we needed to exclude based on our coding of emotion words versus non-emotion words. The majority of these excluded responses mentioned physical states or cognitive or behavioral states instead of feeling states. Some participants reported clearly non-emotion words (e.g., "I feel *really hot in temp* about feeling *sluggish.*"). Others might have possibly understood the concept to some degree, but used words that were too vague to count as emotion words (e.g., "I feel *strange* about feeling *these feelings*"). Participants who have trouble distinguishing exactly what they are feeling could potentially have difficulties with emotion differentiation— i.e., the ability to separate emotions into concrete categories such as anger versus sadness (Barrett, Gross, Christensen, & Benvenuto, 2001; Boden et al., 2013). It is possible that we underestimated the number of people who were actually experiencing meta-emotions but could not precisely label them (or the frequency with which this occurred). Future research could examine the role of emotion differentiation in the experience and reporting of meta-emotions.

Now that we have established norms of meta-emotional experiences in daily life and begun to explore their relation with attention to and clarity of emotion, other emotion constructs that might be associated with the occurrence of meta-emotional experiences should also be explored—for example, as was mentioned earlier, emotion differentiation. 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. Incorporating emotional awareness training that emphasizes both attending to and understanding one's emotions could potentially increase the effectiveness of any such strategy. Ideally, taking meta-emotional experiences into account will allow us to better understand, treat, and alleviate depressive symptomatology. Future research could also examine the relation between meta-emotional experiences and other forms of psychopathology beyond depression; for instance, it would be interesting to explore whether PP meta-emotional experiences precede manic episodes in bipolar disorder, or whether PN meta-emotional experiences are associated with rumination. 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 psychopathology in general.

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Figures and Tables

***Table 1*. Within- and Between-Person Correlations Among Study Variables.**

Measure	1	2	3
1. Attention	---	0.48***	n/a
2. Clarity	0.13	---	n/a
3. Depression	0.25*	-0.01	---
Mean, SD	0.94 (0.77)	1.37 (0.59)	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.

Table 2. **Results of Logistic Models Predicting the Likelihood of Experiencing Meta-Emotions at the Time of the Beep**

Meta-Emotional Experience	γ_{01}	*SE*	*p*
Any Type	0.05	0.02	0.02
Positive-Positive	0.02	0.04	0.53
Positive-Negative	-0.17	0.12	0.14
Negative-Positive	0.06	0.05	0.20
Negative-Negative	0.06	0.02	<0.01

Note: γ_{01} is displayed in logits.

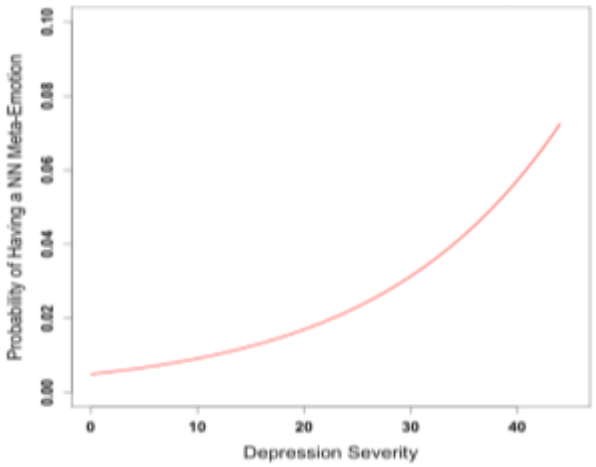

Figure 1. **Probability of having a negative-negative (NN) meta-emotional experience as a function of depression severity, as measured by the CES-D.**