

# Gaining clarity about emotion differentiation

Renee J. Thompson<sup>1</sup>  | Tabea Springstein<sup>1</sup>  | Matt Boden<sup>2</sup>

<sup>1</sup>Department of Psychological and Brain Sciences, Washington University in St. Louis, St. Louis, Missouri, USA

<sup>2</sup>Department of Psychological and Brain Sciences, VA Palo Alto Health Care System, Palo Alto, California, USA

## Correspondence

Renee J. Thompson, Washington University in St. Louis, 1 Brookings Drive, Campus Box 1125, St. Louis, MO 63130, USA.

Email: [renee.thompson@wustl.edu](mailto:renee.thompson@wustl.edu)

## Abstract

Emotion differentiation captures the detail with which people describe their emotional experiences. A compelling body of research has linked low and negative emotion differentiation to a host of adverse psychological outcomes, yet conceptual and methodological questions and issues remain. We think that the time is right to review and reflect on this growing literature to gain clarity that can be applied to future research. We first review assessment of emotion differentiation while highlighting the methodological variation across studies. Then supported by the literature review, we discuss disconnections between the conceptualization and measurement of differentiation. Finally, to motivate future research, we propose factors that we hypothesize are associated with potentially beneficial effects of emotion differentiation in a given situation (i.e., related to state emotion differentiation) and more generally across time (i.e., related to trait emotion differentiation).

## 1 | INTRODUCTION

Emotion differentiation captures the specificity with which people describe the types of emotion they experience (Barrett, Gross, Christensen, & Benvenuto, 2001; Kashdan, Barrett, & McKnight, 2015). Emotion differentiation (“differentiation”) has been studied across a wide spectrum of subfields in psychology. There is accumulating evidence for its role in emotion regulation, psychopathology, and judgment and decision-making, to name a few. Given the rapidly developing body of research, we think it is the right time to reflect on the current state of the literature, which is the central goal of this paper. First, we review how differentiation has been assessed and quantified, highlighting strengths and weaknesses of each method and providing assessment recommendations for future research. Second, we describe how the conceptualization and measurement of differentiation do not always align. Third, we identify factors that influence how and when emotion differentiation is associated with various psychological outcomes.

Typically, researchers examine the extent to which people differentiate their emotions, separately for negative emotions (i.e., negative emotion differentiation) and for positive emotions (i.e., positive emotion differentiation). In both clinical and nonclinical populations, low differentiation of negative emotions has typically been associated with maladaptive outcomes, including rumination in association with internalizing symptoms (e.g., Starr, Hershenberg, Li, & Shaw, 2017), nonsuicidal self-injury and impulsivity among people with borderline pathology (Tomko et al., 2015; Zaki, Coifman, Rafaeli, Berenson, & Downey, 2013), and heightened distress-related neural responses to social rejection (Kashdan et al., 2014). There are exceptions: For example, generalized anxiety disorder is not significantly related to lower negative emotion differentiation (Decker, Turk, Hess, & Murray, 2008). High differentiation of negative emotions has typically been linked to positive outcomes, such as empathic accuracy (Erbas, Sels, Ceulemans, & Kuppens, 2016) and more successful decision-making under certain risk conditions (Li & Ashkanasy, 2019). A meta-analysis on negative emotion differentiation suggests that the effect of emotion differentiation on positive outcomes might be smaller than previously thought though (O'Toole, Renna, Elkjær, Mikkelsen, & Mennin, 2019).

In contrast to negative emotion differentiation, positive emotion differentiation has been examined less extensively (O'Toole et al., 2019) and has demonstrated less consistent associations with well-being (Liu, Gilbert, & Thompson, 2019). O'Toole et al. (2019) reported negligible to small effects between positive emotion differentiation and various psychological outcomes. Despite this dearth of empirical work, we think the field can identify key avenues left to examine by borrowing from positive emotion theories, such as the broaden-and-build theory (Fredrickson, 2001) and a functional approach to positive emotions (Shiota et al., 2014).

## 2 | METHODOLOGICAL REVIEW

To assess how emotion differentiation is measured in the current literature, we conducted a search in PsycInfo and PubMed for all peer-reviewed, English-language journal articles from 2001 (the date of the seminal publication by Barrett et al., 2001) to 2019 that included emotion differentiation or emotion granularity in the title, keywords, or abstracts. Of the 180 articles found, we excluded (1) literature reviews or theoretical opinion papers and (2) articles that mentioned but did not assess “differentiation” or “granularity” (i.e., differentiation or granularity were not part of the variables mentioned in the Measures section). Although there are instances in which differentiation and granularity have been described as distinct concepts, we treated these terms as interchangeable following previous reviews (Kashdan et al., 2015; Smidt & Suvak, 2015), leaving 73 articles, including 82 studies. Because only one of the 73 articles, Tomko et al. (2015), assessed state differentiation (i.e., time- or situation-specific differentiation), in our review we focus on trait differentiation, in which momentary emotion reports are typically aggregated across time. We further discuss state differentiation in the next section, Conceptualization and Measurement. We present the results of our review organized by study design, methodological decisions, and differentiation indices. Based on the findings from the review, we end this section with methodological suggestions for future research.

### 2.1 | Study designs

#### 2.1.1 | Ecological momentary assessment

Differentiation is most commonly (39% of studies) assessed using an intensive longitudinal design, often referred to as experience sampling or ecological momentary assessment (EMA). For EMA, participants are prompted to report the extent to which they currently feel the same predetermined series of emotions repeatedly over a given time period. EMA studies have sampled participants' emotions during a 5- to 28-day

period and typically do so randomly (e.g., Dixon-Gordon, Chapman, Weiss, & Rosenthal, 2014), but have also included fixed (e.g., 9 AM, 12 PM, 6 PM; e.g., Starr, Hershenberg, Shaw, Li, & Santee, 2019) and event-contingent (e.g., corresponding with social interactions; Kashdan & Farmer, 2014) sampling designs. Strengths of EMA include in vivo emotion assessment, high ecological validity (i.e., measuring differentiation in context of people's everyday lives), and a typically high number of surveys, which facilitates computation. More recently, researchers have used mobile apps, some of which can collect data offline. Researchers can use web-based data collection tools that are commonly available (e.g., REDCap, Qualtrics). Many of these require a texting service, which often have a fee and require that participants have a smart phone and Internet access. Weaknesses of EMA include high effort and cost, the need to provide smart devices to some participants, and that the contexts in which participants make ratings vary between person.

### 2.1.2 | Daily diary studies

Approximately 14% of studies assessed differentiation using daily diaries (e.g., O'Toole, Jensen, Fentz, Zachariae, & Hougaard, 2014). Designs vary across studies, with participants reporting how they felt over the day or at particular times during the day (e.g., most pleasant event). Apart from Ottenstein and Lischetzke (2019), who used an open response format, these studies have relied on ratings of a predetermined set of emotion terms. Differentiation values should be less valid as people retrospectively report over increasingly longer time frames because they are more associated with people's beliefs about themselves than experiential information (Robinson & Clore, 2002), and people may be averaging over several emotion episodes. Strengths include the relatively low effort and costs of these methods, since researchers can use web-based survey applications. A link to an online survey can be sent as long as participants have a computer or some other smart device, requiring Internet access but not a smartphone. Weaknesses include lower ecological validity than EMA surveys and typically, the use of fewer surveys than EMA studies.

### 2.1.3 | Responses to standardized stimuli

Approximately 19% of studies included a standardized task assessing emotions in real time in response to standardized stimuli. The most commonly administered task is the Photo Emotion Differentiation Task (Erbas, Ceulemans, Pe, Koval, & Kuppens, 2014, Study 3) in which participants rate the extent to which they feel 20 emotions when viewing 20 standardized emotional photos one at a time. Other studies induced emotions via, for example, films to assess differentiation (Aaron, Snodgrass, Blain, & Park, 2018). Strengths of these tasks include the usage of standardized stimuli, low time/effort (i.e., 30 min or less), and low cost (compared to EMA). Furthermore, they can be administered online (e.g., Mankus, Boden, & Thompson, 2016). However, they have low ecological validity, and differentiation values from the photo task and EMA were only moderately associated ( $r \sim 0.22$ ; Erbas et al., 2019), suggesting they measure somewhat different constructs.

Less frequently, researchers have utilized standardized tasks that do not assess momentary emotion (approximately 10%). For example in Boden, Thompson, Dizén, Berenbaum, and Baker (2013; Study 1), participants rated the extent to which they predicted they would feel emotions in a series of hypothetical scenarios. It remains unclear the extent to which differentiation assessed by that scenario-based task is related to other assessments of differentiation. People may forecast emotions whose differentiation pattern maps onto how they normally differentiate emotions, but people are not particularly accurate in affective forecasting (e.g., Wilson & Gilbert, 2005). Another infrequently used method that may fall into this category is having participants rate a series of emotions they felt towards important people in their lives (Erbas et al., 2014, Study 2).

## 2.1.4 | Global self-report measures

About 12% of the studies have examined differentiation using a global self-report measure, the Differentiation Subscale of the Range and Differentiation of Emotion Experience Scale (RDEES; Kang & Shaver, 2004). An example item: "I am aware of the subtle differences between feelings I have." This 7-item subscale includes items that assess both negative differentiation and differentiation without regard to valence. Strengths include psychometric validation of items and low cost and time/effort, as no repeated assessments are needed. However, it is not clear how the RDEES differentiation scale corresponds to other assessments of differentiation, and it is possible that self-reports of emotion differentiation reflect more identity-based aspects of people's emotions (Robinson & Clore, 2002).

## 2.1.5 | Measuring related constructs

Approximately 6% of studies have assessed differentiation by administering measures of similar constructs or based on operationalizations of differentiation that we do not consider to clearly align with the most common definition of emotion differentiation. (This is likely partly due to the lack of clarity in defining and measuring emotion differentiation, which we discuss further in the section, Conceptualization & Measurement). For example, measures of emotional awareness—people's perceptions of how much they attend to and value their emotion (i.e., attention to emotion) and understand and discriminate between different emotions (i.e., emotional clarity; Gohm & Clore, 2000), have been used to assess differentiation (e.g., Overbeek, De Schipper, Willems, Lamers-Winkelmann, & Schuengel, 2017). Emotional clarity and differentiation are conceptually similar, but weakly associated (e.g., Boden et al., 2013; Erbas et al., 2014). In addition, the Penn Emotion Differentiation Task (Moore, Reise, Gur, Hakonarson, & Gur, 2015) measures people's abilities to recognize emotions in others, and research assessing judgments of similarity of emotion terms (e.g., Ready, Santorelli, & Mather, 2019) assesses people's judgments and knowledge of emotion categories. Although these measures may provide valuable insight into abilities and processes underlying differentiation, neither assesses one's emotional experience, which does not align with the definition of differentiation (Barrett et al., 2001).

## 2.2 | Methodological decisions

Studies using repeated assessments of emotional experience differ, for example, on the number of surveys administered, the duration of time between surveys, and the number and type of emotions included. These inconsistencies might prevent the generalization of findings across studies, ultimately hindering our understanding of differentiation. We are not aware of research systematically evaluating the reliability of differentiation indices depending on the number of surveys or duration of time between surveys. However, to draw reliable inferences on a between-person or trait level, the number of surveys needed is dependent on the ability to compute the desired statistic reliably and to accurately represent an individual's emotional experience across various contexts.

We think the most critical issue in designing studies on differentiation is the number and type of emotions included in individual surveys. To calculate a differentiation score, an adequate number of emotions are needed (see Boden et al., 2013). However, we acknowledge that characteristics of the English language, used in most studies of differentiation, makes adequately assessing positive differentiation inherently difficult. The English language has fewer words to describe pleasant than unpleasant affect (Averill, 1975). Furthermore, compared to unpleasant emotions, pleasant emotions (e.g., calm, relaxed, peaceful) are more synonymous. Thus, fewer unique emotions may be available for assessments of pleasant emotion.

We also think it is critical to consider which categories and specific emotions are assessed (see Willroth, Flett, & Mauss, 2019), as, for example, a meta-analysis found that a differentiation index that was comprised of both within-category (anger vs. frustration) and between-category distinctions (anger vs. sadness) was most related to well-being (Erbas et al., 2019). As anger and frustration are more closely related in meaning than, for example, anger and sadness, the authors interpreted these findings as indicating that distinctions between these emotions are more indicative of differing abilities than those within these emotions (Erbas et al., 2019). Most studies assess differentiation between categories of emotions, measuring differentiation on an attenuated scale that potentially does not capture the full range of participants' emotion experiences. Importantly, decisions about which emotions to include in the assessments should be driven by researchers' hypotheses and theoretical conceptualization of emotion. Historically, researchers disagree on what constitutes an emotion (for a review see Gross & Barrett, 2011). Whether, for example, researchers subscribe to the idea that there is a finite number of discrete emotions can determine which emotion terms are considered during survey design. Relatedly, studies vary on the extent to which various dimensions of emotion are represented (e.g., arousal, motivation, sociality), which should also be driven by hypotheses, but nonetheless can cloud interpretation and integration of research findings.

### 2.3 | Differentiation indices

Two methods are commonly used to quantify differentiation. The less common method is to calculate the extent to which ratings of emotions are correlated by calculating correlation coefficients between all possible pairs of emotions, and averaging Fisher's z-transformed coefficients. In this method, higher values reflect lower levels of differentiation.

The more common method is to compute the intraclass correlation coefficient (ICC) of repeated assessments of emotions that were rated on Likert-type scales. In contrast to Pearson's correlations, ICCs enable researchers to compute a single statistic for measuring homogeneity for larger sets of measurements (McGraw & Wong, 1996). ICCs have traditionally been used to assess the reliability of different raters across a number of targets (Shrout & Fleiss, 1979). In assessing differentiation on a between-person level, ICCs represent the variability within specific emotions across time points (raters) relative to the variability between emotions at the same time point (targets). Higher ICCs represent less variability between emotion ratings at the same time point relative to the variability within emotions across time (i.e., emotions are rated relatively similarly). ICCs are typically reverse-scored after being transformed using a Fisher  $Z'$  transformation, so that higher values indicate higher differentiation.

Beyond the decision to assess differentiation by using an ICC, researchers vary in how exactly these ICCs are computed and how negative ICCs are handled. ICCs can be calculated for absolute agreement, which accounts for correlations among emotions and their magnitude (e.g., Tugade, Fredrickson, & Barrett, 2004), or consistency, which accounts only for correlations among emotions (e.g., Erbas et al., 2014). Though there is inconsistency in the use of absolute agreement or consistency, this distinction may not have consequences for prediction as correlations between them are quite high ( $r_s = 0.95-0.99$ ; Erbas et al., 2014). ICCs are theoretically bound between 0 and 1, but negative values are possible due to measurement error (Shrout & Fleiss, 1979). Some studies include individuals with negative ICCs by assigning them the value 0 based on recommendations by Cohen, Cohen, West, and Aiken (2003), thereby defining them as "high differentiators" (e.g., Boden et al., 2013) while others exclude subjects from the study (e.g., Erbas et al., 2018). These decisions could impact results when factors, such as low variability within emotions, account for measurement error in ICCs for some people. Systematic differences between participants whose ICCs can be regularly interpreted and participants whose ICCs cannot be computed due to measurement error in variables of interest should be examined and reported (e.g., Boden et al., 2013; Liu et al., 2019).

## 2.4 | Assessment recommendations

We offer suggestions for future research on differentiation with the intention of increasing consistency across studies while optimizing the explanatory value of differentiation. First, we suggest that researchers assess negative and positive differentiation in every study. At minimum, we recommend that researchers report the (1) number of emotions administered, (2) list of emotions assessed including the reasoning to assess emotion differentiation across a certain category (e.g., only NA, between-category and/or within-category), (3) time frame examined (e.g., momentary, over last 3 h), (4) number of assessments, (5) transparent descriptions of assessment schedule, including descriptive stats (e.g., mean, SD, range of minutes [or days] between surveys), (6) the statistic used to compute differentiation (e.g., ICC), including any additional decisions (e.g., consistency, agreement), as well as (7) how negative ICC values are handled. Importantly, assessment decisions should be made in line with aligning measurement and conceptualization of differentiation (see the next section, Conceptualization and Measurement), for example, by including measures of general global feeling states (unpleasant vs. pleasant).

## 3 | CONCEPTUALIZATION AND MEASUREMENT

As our literature review revealed, researchers most commonly assess differentiation as an individual difference construct (i.e., “trait” differentiation) by having participants repeatedly rate the extent to which they currently feel a predetermined list of emotions (e.g., sad, angry, calm, happy) for one or more weeks. To quantify differentiation, researchers typically compute a covariation statistic (e.g., ICC) across each person's series of reports within negative and positive emotions, separately. This value reflects the extent to which ratings of negative or positive emotions co-occur on average over time, roughly speaking. Using this method of measurement, a person who reports experiencing multiple emotions at a time is considered to have lower differentiation than a person who reports a few emotions at a time.<sup>1</sup> This is true of differentiation whether it is measured as an individual difference construct (i.e., “trait” differentiation) or as a single, momentary measure at a given point in time (i.e., “state” differentiation; Tomko et al., 2015).

A rich body of research on trait differentiation has provided critical insights, but disconnections between how differentiation is typically conceptualized compared to how it is measured warrant attention. To explicate the construct of differentiation, researchers typically provide examples of how people low or high in differentiation would describe how they are feeling. According to these examples, people low in differentiation tend to report they feel pleasant or unpleasant, using general terms, such as “good” or “bad”. In contrast, people high in differentiation will use precise terms, such as angry, sad, or happy. These examples apply to both trait and state differentiation.

These examples of how differentiation is conceptualized do not map onto how differentiation is typically measured via self-reports of emotion. A person reporting multiple emotions might be conceptualized as having high differentiation if they truly experience these distinct emotions all at once; however, as assessed, they may be characterized as having low (state or trait, depending on the quantity and timing of assessment[s]) differentiation. For example, a dad may say, “I was angry, worried, and disappointed,” when his teenage child did not come home for the night. The dad is experiencing three types of unpleasant emotions simultaneously, which, as typically measured, would reflect low or medium state differentiation (depending on the total number of emotions assessed). If the dad continually reports feeling this way in many situations over time, he would be assessed as having low trait differentiation. Yet, current conceptualizations would consider this dad as having high state or trait differentiation because he reported emotions, not general feeling states (e.g., bad). Furthermore, measures of differentiation do not typically include general feeling states, the endorsement of which is conceptualized as low differentiation. Assessment of general feeling states might best be accomplished by having participants generating their own descriptions of emotional experience (e.g., open-ended responses), which is rarely done (e.g., Ottenstein &

Lischetzke, 2019). Thus, whether people identified as having low differentiation through typical measures use vague terms to describe their emotional states (e.g., “bad”) awaits empirical examination.

This disconnect between conceptualization and measurement of differentiation leads to difficulties parsing and linking multiple facets of the broader construct, emotional complexity (Grühn, Lumley, Diehl, & Labouvie-Vief, 2013; O’Toole et al., 2019). Emotion differentiation and emotion covariation (also known as emotion dialecticism; O’Toole et al., 2019) are considered distinct facets of emotional complexity (Grühn et al., 2013; O’Toole et al., 2019). Emotion covariation describes the degree to which people experience unpleasant and pleasant emotions simultaneously and is frequently measured by a correlation between negative and positive emotions over a series of momentary reports (Grühn et al., 2013). It is reasonable to assume that the simultaneous experience of emotions within a given valence (e.g., sad and angry) might also be considered a marker of high (within-valence) covariation and, thus, complexity. As typically assessed, low differentiation might correspond with high complexity when a person reports multiple unpleasant emotions (fear + anger + sadness) or pleasant emotions (happiness + serenity + contentment) at a time. Thus, commonly used measures of differentiation, which we argue do not adequately assess low differentiation, might reasonably assess high within-valence emotion covariation (in contrast to between-valence emotion covariation), and thus, high complexity. It will be important to consider these issues and perhaps measure differentiation in a manner more closely aligned with its conceptualization to accurately characterize emotional complexity (i.e., to “carve nature at its joints”).

We think it is critical for theorists and researchers to address these issues and better align the conceptualization and measurement of differentiation. Essential to this endeavor will be exploration of state (vs. trait) differentiation. There is preliminary evidence to suggest that differentiation may vary for an individual over time. For example, differentiation has been associated with contextual factors; higher levels of stress have been associated with lower levels of differentiation (Erbas et al., 2018). And interventions directed at improving mindfulness have proven successful in changing differentiation (Van der Gucht et al., 2019). We suspect that the focus on trait differentiation is in part due to challenges in assessing state differentiation. Importantly, Tomko et al. (2015) have conceptualized and examined state differentiation, and experimental research has successfully manipulated differentiation (Cameron, Payne, & Doris, 2013). Regardless of which avenue of investigation researchers pursue, we think it is important that researchers are explicit about the focus of their work—whether it be trait or state differentiation (or both; O’Toole et al., 2019; Tomko et al., 2015). Similarly, we encourage researchers to consider this distinction when reviewing the literature and providing a theoretical rationale and empirical support for their hypotheses, as examining trait versus state differentiation will clarify different questions.

## 4 | EMOTION DIFFERENTIATION AND ADAPTATION

Any given experience of emotion may be more or less adaptive depending on factors related to the situation/context in which the emotion occurs and the person experiencing the emotion (Lazarus & Lazarus, 1991). As stated by Smith and Lazarus (1990): “In considering the role of the emotions in adaptation, one must remember that the fundamental adaptational task is to mobilize the most efficacious behavior in the face of the biological and social requirements of living” (p. 612). We propose that differentiation influences the adaptiveness of a given experience of emotions (i.e., at the state level), and the adaptiveness of emotions more generally, over time (i.e., at the trait level). Thus, we again distinguish between differentiation as a state or trait construct. To motivate future research, we discuss factors that we propose are associated with differentiation adaptation. These factors, drawn from differentiation and affective science literatures, may serve as mechanisms through which the salutary benefits of differentiation are conferred or moderators that amplify or mitigate the effects of differentiation. More specifically, we focus on four domains that we think will be fruitful to pursue: (1) ability, motivation, and automaticity; (2) goals, action tendencies, and actions; (3) positive and negative emotional reactivity; and (4) emotion regulation.



## 4.1 | Ability, motivation, and automaticity

To the extent that differentiation provides information that is accurate and useful in a given situation (Boden et al., 2013), having a high ability to differentiate will generally, though not always, be adaptive (e.g., Oh & Tong, 2020). Yet, we hypothesize that the adaptiveness of differentiation will be influenced by the related factors of automaticity of differentiation and the motivation to differentiate (also see Erbas et al., 2014).

Related to automaticity, we hypothesize that for some people, differentiation occurs reflexively and automatically, whereas for others, differentiation is an intentional behavior, requiring time and effort. Like any behavior, differentiation may become routinized through learning and practice; indeed, differentiation is frequently considered a skill (e.g., Kashdan et al., 2015). For some, differentiation accuracy would be rewarded with direct (e.g., a parent telling a child to use their emotion words) and indirect positive feedback (e.g., an individual successfully negotiates a conflict by distinguishing among emotions) that would facilitate learning and, ultimately, automaticity (Nook, Sasse, Lambert, McLaughlin, & Somerville, 2018). Others for whom differentiation does not become routinized may still have a high ability to do so but only when motivated to apply mental resources (e.g., in psychotherapy).

We hypothesize that differentiation ability and automaticity are related but distinguishable constructs. For those for whom differentiation is automatic, high (vs. low) ability to differentiate would be more consistently linked to adaptive outcomes. Useful information may be gleaned with little effort and can be leveraged to increase adaptive responding. In contrast, people who automatically differentiate but have low ability may be prone to maladaptive outcomes when they rely on faulty information about the type of emotion experienced obtained through differentiating.

People low in automaticity may not be motivated to differentiate. More generally, people low in differentiation automaticity must be motivated to differentiate for differentiation to be useful and associated with adaptive outcomes. People may be motivated to differentiate when it is less cognitively effortful; the information gained through differentiation is considered valuable or important (e.g., to determine how best to respond to a disagreement); or when they want to learn about their emotions or the situation in which the emotion occurred (e.g., in the context of therapy). Conversely, motivation to differentiate may be limited because of external constraints (see next subsection), such as when it is more cognitively effortful to differentiate, the information gained is not considered valuable or important (e.g., when one is about to miss their train), or when people are avoidant of their (unpleasant) emotions (Erbas et al., 2014). Thus, we posit that for those for whom differentiation is intentional, motivation may play a large role in adaptation, and factors, such as urgency, will be important determinants of adaptivity. Future research will benefit from disentangling ability (and accuracy), motivation, and automaticity by investigating: (1) the learning of differentiation at different stages of development; (2) individual differences in automaticity of differentiation; (3) relation between automaticity, ability, and motivation as they pertain to (mal) adaptive outcomes; and (4) situational determinants of differentiation ability and motivation.

## 4.2 | Goals, action tendencies, and actions

Multiple emotion models posit that emotions arise in situations that are relevant to the goals, needs, and concerns of an individual (e.g., Barrett, 2006; Frijda, 1986; Scherer & Moors, 2019). Thus, in part, emotions indicate the extent to which goals are achieved (or blocked), needs are fulfilled (or neglected), and concerns are alleviated (or exacerbated). Some theories link specific types of emotions to specific goals, needs, and concerns (hereafter “goals,” as fulfillment of needs and alleviation of concerns can also be considered types of goals; Scherer & Moors, 2019). Action tendencies are motivational and cognitive states of readiness to achieve goals, which vary by type of emotion (Frijda, Kuipers, & TerSchure, 1989).



Differentiation provides information about the type of emotion experienced. We hypothesize that this information can be utilized to infer and clarify relevant goals, action tendencies, and actions best suited to achieving goals in any given situation. Thus, high differentiation may be adaptive when it provides information that facilitates identification, clarification, and achievement of relevant goals (i.e., at the state-level). Goals and the actions needed to achieve them are clear and understood perhaps reflexively for most people in circumscribed situations (e.g., run away from a gunman). In situations in which they are not as clear, differentiation may provide information to facilitate goal achievement. For example, while discussing marital dissatisfaction in therapy, identifying emotions that preceded arguments can facilitate identification of actions best suited to remediating the argument. Thus, in situations in which actions needed to achieve goals are not immediately clear, high differentiation may increase adaptive responding, whereas low differentiation may decrease or not influence adaptive responding.

Numerous studies have induced moods in participants by blocking or facilitating achievement of specific goals (e.g., Boden & Berenbaum, 2007). Similar experimental paradigms might be useful in activating competing goals to determine whether state differentiation helps to clarify goals and actions useful to achieving those goals. More generally, at the trait-level, people high in differentiation ability may have a better understanding of relations between specific emotions, goals, and actions useful for achieving those goals that are embedded in specific contexts and be able to leverage their understanding of emotions to clarify and achieve their goals. Individual differences in the extent to which people understand the sources of their emotions (e.g., goal pursuit is hindered resulting in anger; Boden & Berenbaum, 2011) may also influence the extent to which emotion differentiation clarifies goals in any given situation or more generally.

We further hypothesize that differentiation automaticity influences relations between differentiation, goals/actions, and (mal)adaptive outcomes. Specifically, for people for whom differentiation is intentional/effortful, differentiating emotions may not be helpful in urgent situations in which goals/actions are not clear (e.g., adaptively responding to a neighbor threatening you; Boden et al., 2013; Erbas et al., 2018; Lischetzke, Cuccodoro, Gauger, Todeschini, & Eid, 2005). In contrast, people high in both differentiation ability and automaticity may always have accurate information at hand, and thus use that information reflexively, regardless of urgency and other situational constraints. We hypothesize that urgency does not always entail a clear set of actions or clearly impart action tendencies in all people; even the most urgent situations often lead to dueling action tendencies (e.g., fight or flight response), one of which may be better suited to goal achievement than the other(s).

### 4.3 | Positive and negative emotion reactivity

Research has demonstrated that both positive and negative differentiation have adaptive value (Grühn et al., 2013; O'Toole et al., 2019). Yet, positive and negative differentiation are generally found to be differently associated with (mal)adaptive outcomes (e.g., Barrett et al., 2001; Dixon-Gordon et al., 2014; Selby et al., 2014). We posit that differences in the adaptivity of positive and negative differentiation might be explained by situational and individual differences in the experience of positive and negative emotions. In situations relevant to their goals, some people experience emotions more readily, frequently and strongly than do others. These tendencies are captured by constructs such as emotion reactivity (Berenbaum & Williams, 1995; Ng & Diener, 2009). Some people more frequently and strongly experience positive emotions (e.g., those high in trait extraversion; Shiota, Keltner, & John, 2006). Similarly, some people more frequently and strongly experience negative emotions (e.g., those high in trait neuroticism; Berenbaum & Williams, 1995).

We posit that differentiation may be more relevant to adaptation among people higher in emotion reactivity (in a given situation [i.e., state] and across situations [i.e., trait]), and especially, reactivity of unpleasant emotions (Tomko et al., 2015). Negative emotions signal a need for action to achieve goals (e.g., avoiding threat; O'Toole et al., 2019; Schwarz & Clore, 1983). Negative differentiation may be associated with (mal)adaptive outcomes in situations in which negative emotions arise to a level of intensity that signals a need to take action to achieve goals.

Following, negative (vs. positive) differentiation will be more frequently or strongly linked to (mal)adaptivity among people who more readily experience negative emotions. Consistent with this hypothesis are studies demonstrating: (1) negative (but not positive) differentiation predicted higher frequency of emotion regulation, especially at high level of affect intensity (Barrett et al., 2001); (2) negative differentiation was associated with less maladaptive emotion regulation (Tong & Keng, 2017); (3) negative differentiation was associated with less binge drinking, but only among people experiencing intense negative emotions (Kashdan, Ferrisizidis, Collins, & Muraven, 2010); and (4) the association between anger intensity and aggressive tendencies was weaker among people high (vs. low) in negative differentiation (Pond et al., 2012).

Similarly, we hypothesize that positive (vs. negative) differentiation will be associated with (mal)adaptive outcomes in situations in which positive emotions arise, and more frequently or strongly linked to (mal)adaptive outcomes among people who more readily experience positive emotions. From a functional perspective, discrete positive emotions are linked to different types of rewards that have varying implications for adaptation (Shiota et al., 2014). Thus, positive differentiation may facilitate adaptation by providing information about situations in which positive emotions and rewards are relevant, and actions that can be taken to increase (or that will decrease) rewards. Following, positive differentiation may facilitate positive emotion regulation (e.g., savoring; Starr et al., 2017). Thus, increasing positive differentiation, for example, through a clinical intervention, may benefit people with mood and anxiety disorders who are deficient in positive emotion regulation (Carl, Soskin, Kerns, & Barlow, 2013).

#### 4.4 | Emotion regulation

Researchers have theorized that differentiation is associated with adaptivity through its links with emotion regulation (e.g., Barrett et al., 2001; Kashdan et al., 2015). Research has demonstrated links between differentiation and adaptation (primarily low differentiation and maladaptation) for which emotion regulation and coping are hypothesized mechanisms (e.g., Zaki et al., 2013). Consistent with previous research, we hypothesize that differentiation provides information that can facilitate contextually sensitive and flexible implementation of emotion regulation strategies, and thus, greater adaptation (Barrett et al., 2001; Kalokerinos, Erbas, Ceulemans, & Kuppens, 2019). By providing information regarding type(s) of emotion experienced (e.g., frustrated), differentiation may clarify the source of emotion(s), potential outcomes/consequences, as well as emotion goals (i.e., what a person wants to feel), actions needed to achieve these goals, and progress toward goal achievement (Clore, Schwarz, & Conway, 1994). For example, when reflecting on my unpleasant mood, identifying that I am frustrated may clarify the main source of my emotions (e.g., the presentation I gave was poorly received) and my high expectations for the presentation. Feeling frustrated is not consistent with my goal of feeling peaceful (so that I can work productively), and the distraction I used to reduce frustration has not helped me achieve this goal. Presumably, increased understanding of any of these aspects of emotion experience will facilitate the implementation of an emotion regulation strategy that increases the likelihood of achieving emotion goals. Following the prior example, in service of enhancing my productivity, I might use mindfulness to observe and accept the feelings of frustration and thoughts of perceived rejection.

Theorists have suggested that differentiation itself can serve as an emotion regulation strategy by helping people to distance themselves from emotions (Kashdan et al., 2015). According to these theories, identifying, labeling, and distinguishing (primarily negative) emotions through negative differentiation may function to distance a person from the visceral experience of emotions and related cognitive content, reducing the intensity of unpleasant emotions (Lieberman, Inagaki, Tabibnia, & Crockett, 2011) or freeing resources to achieve other goals.

More generally, people high in trait differentiation may have knowledge instrumental to effective emotion regulation, facilitating successful implementation of emotion regulation. Though prior studies are consistent with these hypotheses (e.g., Kashdan et al., 2010; Pond et al., 2012; Zaki et al., 2013), few studies have provided strong,

direct evidence of links between differentiation, emotion regulation, and adaptive outcomes (e.g., Boden & Thompson, 2015). Especially useful will be studies in which both differentiation and regulation or aspects thereof (e.g., emotion goals) are experimentally manipulated to gauge the effects on (mal)adaptive outcomes (e.g., Kalo-kerinos et al., 2019).

## 5 | CONCLUSIONS

Existing research has provided exciting insights into differentiation, and future research has the potential to further clarify the roles of differentiation, especially as it relates to adaptive and maladaptive outcomes. Comprehensive models of differentiation adaptivity that situate it in the broader realm of emotional understanding and emotional intelligence, for example, are within reach. However, it is important that the field continues to push for clarity and consistency in differentiation research. We are hopeful that by attending to issues with conceptualization and measurement, we will gain greater clarity about emotion differentiation.

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## ORCID

Renee J. Thompson  <https://orcid.org/0000-0002-4479-096X>

Tabea Springstein  <https://orcid.org/0000-0003-4712-6543>

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## AUTHOR BIOGRAPHIES

**Renee J. Thompson**, Ph.D., is an associate professor in the Department of Psychological and Brain Sciences at Washington University in St. Louis. Her research centers on understanding the everyday emotional experience of adults with and without psychopathology.

**Tabea Springstein**, M.S., is a graduate student in Social and Personality Psychology in the Department of Psychological and Brain Sciences at Washington University in St. Louis. Her research is focused on emotion and emotion regulation in daily life and in relationship contexts across the lifespan.

**Matt Boden**, Ph.D. is a Health Science Specialist at the Center for Innovation to Implementation (Ci2i), Veterans Affairs Palo Alto Health Care System. His professional interests are rooted in research and program evaluation supporting the mental and physical wellbeing of populations ranging from military veterans to adults with complex and severe mental disorders.

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