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A brief, but nuanced, review of emotional granularity and emotion differentiation research

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Emotional granularity (EG) and emotion differentiation (ED) both refer to the specificity of representations/experiences of emotion, or, in other words, the ability to make fine-grained, nuanced distinctions between similar emotions. Research on EG and ED is in its infancy; however, as reviewed in this paper, accumulating evidence suggests that EG and ED are associated with psychosocial adjustment. Studies have demonstrated that schizophrenia, borderline personality disorder, major depression, autism, and alcohol problems are associated with lower levels of EG/ED. This evidence strongly suggests that EG/ED may represent emotion regulation resources that buffer against the deleterious consequences of negative emotions. Research more clearly establishing the nature and construct validity of EG/ED and more clearly specifying their role in the development of psychosocial adjustment problems is needed.

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Background

A substantial increase in social complexity over the past 10 000 years has facilitated the development of cultural, social, and moral matrices that require humans to cooperate and live in harmony to adapt to environmental challenges (e.g. [1,2]). Emotions represent one mechanism used to attend and respond to social cues and respond to threats in the environment. Nesse [3] suggested that, 'Natural selection may have gradually and partially differentiated a generic state of inhibition into sub-types specialized to cope with particular kinds of situations' (p. 15) and 'that natural selection has partially differentiated several kinds of negative affects to deal with different kinds of unpropitious situations, and predicts substantial overlap for the characteristics of low mood, depression, anxiety, guilt, and grief (p. 15).' Thus, being able to make distinctions among similar emotional states may help successfully navigate the increasing complex social environment of modern humans.

Emotional granularity (EG) refers to individual differences in the specificity of one's emotional experiences and representations or an individual's ability to make fine-grained, nuanced distinctions between similar emotional states (e.g. [4]). Differentiating feeling 'happy' from feeling 'sad' is relatively easy. Feeling happy is a positive emotion associated with moderate to high levels of activation, while feeling sad is negatively valenced and associated with moderate to low levels of activation. On the other hand, distinguishing between two emotions that are of similar valence (e.g. angry versus frustrated) by attending to information concerning arousal (i.e. anger is typically associated with more arousal than frustration) requires a higher degree of EG. Pond *et al.* [5••] stated that, 'Emotion differentiation (ED), also known as EG, refers to how much a person is aware of and able to classify experiences into discrete emotional categories' (p. 327). Barrett [6], who coined the term 'EG', has used the term 'ED' to refer to the same construct [7•]; however, she operationalizes EG slightly differently than ED (i.e. different procedures used to summarize correlations among different emotions across multiple contexts, see below). Thus, EG and ED will be considered synonymous for the following review until a slight difference in how they are typically operationalized is articulated.

Development and construct validity of EG

Barrett (e.g. [8,9]) developed EG to account for individual differences in the valence-arousal circumplex model. This model purports that affective phenomena can be described as the combination of two dimensions: valence refers to hedonic tone (pleasure or displeasure), while arousal refers to the felt activation (activated or deactivated). Although the parsimony, utility, and robustness of the valence-arousal circumplex model are generally agreed upon, meaningful differences across individuals have been documented.

Barrett (e.g. [4]) developed two individual difference variables that capture differences in the valence-arousal circumplex model. Valence focus (VF) refers to the degree to which individuals incorporate information regarding hedonic tone in their representations and experiences of emotion, while arousal focus (AF) refers to the degree to which individuals incorporate information about activation. Making nuanced, fined-grained distinctions among

emotional states (i.e. high EG) requires being able to incorporate adequate information about both valence and arousal.

Barrett and colleagues also provided empirical support for the construct validity of EG demonstrating: (a) substantial variability in VF and AF across individuals [9,10], (b) this variability is only slightly related to differences in language-based representations of emotion [4], (c) individuals with higher levels of VF tend to more readily detect valenced information in faces than individuals with lower levels of VF [11] and (d) AF is positively associated with the ability to accurately perceive internal body cues [12]. Thus, VF appears to be related to the degree to which individuals are sensitive to valence cues in the environment, and AF appears to be related to the degree to which individuals can accurately incorporate information about the body.

1.1. Measuring EG and ED

Measuring ED and EG requires having participants report on their emotional experiences several times across a variety of circumstances. Experiential sampling (ES), or ecological momentary assessment, which involves reporting on emotional state on several occasions throughout the day for several days, has been most frequently used to investigate EG/ED (e.g. [4,5••]). Operationalizing EG and ED involves summarizing the correlations among the use of emotion terms across situations, contexts, or reactions [4,13•]. One who always reports identical levels of anger and sadness will produce a correlation of +1.0 between these states indicating that no distinction is being made between these emotions (i.e. low granularity). The quantitative procedure used to summarize these correlations differs slightly across EG and ED studies. Barrett (e.g. [4]) developed a procedure that computes the degree to which the correlation of emotion terms across multiple assessments is accounted for by the valence-based or arousal-based properties of words producing estimates of VF and AF (described above). ED studies typically compute intra-class correlations producing an estimate of the overall correlation among emotion terms across occasions. Separate estimates are often calculated for negative and positive emotion terms. Unfortunately, no studies examining the consequences of using estimates of granularity (i.e. VF and AF) versus estimates of differentiation (positive and negative) exist. One potential advantage of deriving estimates of EG is that they provide some information about the mechanism contributing to reduce granularity — whether this is due to smaller VF or AF, or the combination of both. However, specific guidance about what type of estimate to use when awaits future research. The operationalization of EG and ED represents a strength of this research. While many self-report measures of closely related constructs exist (e.g. emotional complexity, emotional clarity, emotional awareness, and alexithymia), the measurement of EG/ED does not involve having individuals describe themselves on an attribute or characteristic. Estimates of EG/ED are derived from correlations among self-reports of emotions across time, which overcomes some of the threats to validity associated with self-report methodology.

EG, ED, and psychosocial functioning

Accumulating evidence indicates that EG and ED are positively associated with adaptive emotion regulation and psychosocial functioning. Barrett *et al.* [6] derived estimates of positive and negative ED from participants' ratings of their most intense emotional experience of the day for 14 days using nine emotion labels (four positive and five negative). Individuals with higher levels of negative ED tended to utilize a wider range of negative emotion regulation strategies, particularly when they experienced their emotions at greater intensity, compared to individuals with lower levels of negative ED. Positive ED was not associated with the use of emotion regulation strategies. This was the first study to demonstrate that how individuals regulate their emotions depends partly on the specificity in which they experience and represent emotions.

The interaction of a variety of implicit and explicit processes [14] involving the combination of information from the body (e.g. increase in heart rate), information from the external environment, information from the past via episodic memories, and semantic knowledge, via a variety of attentional processes shape an emotional experience [15]. Differences in granularity, or differentiation, in any of these processes could impact psychological functioning. Kring *et al.* [16] investigated differences between individuals diagnosed with schizophrenia or schizoaffective disorder and healthy controls in the conceptual representation of emotion knowledge by having participants rate the similarity of pairs of emotion terms based on their understanding of the meaning of words. Similarity judgments can be used to index mental structure anchored in semantic knowledge (e.g. [4,17–19]). Multidimensional scaling applied to the similarity ratings revealed that participants diagnosed with schizophrenia or schizoaffective disorder exhibited less EG on a conceptual level than healthy controls because they tended to emphasize arousal less in their representations than healthy controls.

Building on the seminal work of Barrett and colleagues, research examining associations among EG/ED, emotion regulation, and psychosocial functioning has flourished. Suvak *et al.* [20] applied the EG framework to understanding affective dysregulation of borderline personality disorder (BPD). Forty-six females who met DSM-IV criteria for BPD and 51 females who did not meet BPD or any Axis I criteria rated their emotional reactions to 16 images representing all combinations of valence (pleasant–unpleasant) and arousal (low–high) using