



Mapping the emotional landscape: The role of specific emotions in conceptual categorization



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ABSTRACT

Although researchers generally subscribe to the opinion that emotions play a critical role in cognition, very few (see Niedenthal, Halberstadt, & Innes-Ker, 1999) have examined the specific interaction between the emotional state of the perceiver and the emotional meaning of stimuli in conceptual categorization – an important aspect of “higher-level” cognition. Niedenthal et al. (1999) advanced a fine-grained theory of emotional response categorization, arguing that emotional states increase the tendency to categorize concepts into a predictable set of emotional response categories characterized by the common, distinct emotional responses elicited by the concepts. Based on the pioneering work of Niedenthal et al., we further argued that (1) the specific emotion experienced by the individual should selectively facilitate the categorization of concepts associated with the same emotion, (2) both in terms of category inclusion and category exclusion, and (3) this facilitation effect should not be contingent on the awareness of the emotional state. In three experiments, participants were induced to experience different emotional states through movies or a facial-feedback manipulation. They judged whether or not a target concept belonged to the same category as the two comparison concepts. Some of the concept triads shared emotional associations, while others didn't. Results showed that emotive participants had a greater tendency than those in a neutral mood to group concepts according to their emotional associations, and to distinguish concepts with different emotional associations. They were also more efficient in categorizing concepts that had specific emotional meaning corresponding to their own emotional state than to other emotional concepts. Furthermore, participants posing a disgust expression without their knowledge showed higher tendency to categorize concepts according to their relevance to disgust. Implications and potential applications of the findings were discussed.

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1. Introduction

Concepts and categories are the building blocks for human thought (Medin, 1989). As human beings, we have the natural impulse to perceive anything we encounter as belonging to one or more categories (Goldstone & Kersten, 2003). However, concepts and categorization are also traditionally seen as part of the higher-level form of cognition, which is relatively separated from its sensorimotor and affective content. In addition, most popular theories of categorization (e.g., Medin & Schaffer, 1978; Rosch & Mervis, 1975) locate the basis of categorization in the things to be categorized. Over the past few decades, however, researchers have begun to emphasize the role of the perceiver rather than the characteristics of the to-be-categorized stimuli. Some have taken into account motives and short-term goals (e.g., Barsalou, 1983). Others assign importance to the interaction between emotional

states and the emotional content of the stimuli (i.e., emotional response categorization, see Niedenthal, Halberstadt, & Innes-Ker, 1999).

There is ample evidence associating emotions and moods with certain styles of categorization (e.g., Bodenhausen, Mussweiler, Gabriel, & Moreno, 2001; Isen, 1987; Isen & Daubman, 1984; Isen, Johnson, Mertz, & Robinson, 1985). Several studies have demonstrated that positive emotions facilitate holistic processing, while negative emotions facilitate local processing (Basso, Schefft, Ris, & Dember, 1996; Derryberry & Tucker, 1994). Others have shown that participants in positive emotional states tend to use more inclusive and flexible categories, so that they rate nonprototypic exemplars as more representative of the category, or assign category membership to unorthodox exemplars (Isen, 1987; Isen & Daubman, 1984; Murray, Sujan, Hirt, & Sujan, 1990). Similarly, Isen et al. (1985) found that participants experiencing positive emotion generated more unorthodox first associations in a word-association task than did participants in a negative or neutral mood. Previous studies have also found that positive affect predisposes individuals to higher level of abstraction in conceptual categorization (e.g., Dovidio, Gaertner, Isen, Rust, & Guerra, 1998), more reliance on

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heuristics, and increased risk of stereotyping (Bodenhausen et al., 2001), while sadness tends to cause more accurate and low-level categorization and less reliance on heuristics (Bodenhausen et al., 2001; Schwarz, 2012). However, most of these studies didn't go beyond generalized effects of emotional states on categorization in order to explore the interaction between perceivers' discrete emotional states and the emotional response associated with the to-be-categorized stimuli. Thus, it remains unknown whether specific emotions can serve as the basis of conceptual categorization.

1.1. Specific emotions as the basis of emotional response categorization

Discrete emotional states have been found to ground emotion-congruent conceptual processing, social perception, and judgments (e.g., Clore, Schwarz, & Conway, 1994; Schwarz, 2012; Siemer, 2001, 2005). For instance, specific emotions were found to enhance the efficiency of lexical decision or recognition of words that match participants' emotional states (Niedenthal, Halberstadt, & Setterlund, 1997; Niedenthal & Setterlund, 1994). Moreover, emotion-specific facial reactions were detected when individuals were judging whether a word is emotional or neutral (Niedenthal, Winkelman, Mondillon, & Vermeulen, 2009).

Of most relevance to the present study, Niedenthal et al. (1999) reported a series of studies that tested the assertion that categorization can be based on specific emotions. The authors constructed a triad task in which participants were instructed to compare two concepts with a third, target concept and to decide which one was more similar to the target. In each triad, the target shared a common emotional relation with one comparison concept (the emotional equivalent) and shared a common non-emotional taxonomic relation with another (the taxonomic equivalent). Furthermore, according to pilot studies, individuals in a calm state were equivocal about the choice between emotionally associated concepts and taxonomically related concepts. The studies showed that sad, happy, or fearful participants, compared to neutral participants, increased their use of emotional cues in categorization. In other words, participants who were in emotional states had a higher probability of grouping stimuli together according to common emotional relations than according to taxonomical relations. The resulting pattern was theoretically interpreted as reflecting a reorganization of conceptual space (clustering concepts related to the same emotion together) due to increased attentional resources being allocated to the affective modality while in an emotional state (Niedenthal et al., 1999).

Nevertheless, Niedenthal et al.'s (1999) findings didn't strongly support a correspondence between discrete emotional states and the clustering of concepts associated with the experienced emotions: sad and happy emotion inductions increased the choice of the emotional equivalent in both sad and happy triads to the same degree (Experiment 1). The pattern of the results in Experiment 2 told a similar story: the choice of emotional equivalents in sad and fear triads increased as a result of sad or fear inductions. In fact, such results cannot rule out an alternative interpretation that emotional arousal (regardless of its valence or specific components) generally increased the salience of emotional association between the target and the emotional equivalent (regardless of whether they were related to the same discrete emotion).

In order to preclude the alternative interpretation, Niedenthal et al. (1999) presented a follow-up study using "mixed triads" (e.g., a happy target concept coupled with a sad emotion equivalent or a neutral taxonomical equivalent) and showed that the taxonomical equivalent became the predominant choice in all the conditions. The authors interpreted this result as supporting the claim that emotional induction doesn't lead to any category-inclusion response based on general emotional associations. Nevertheless, the fact that participants in the control group (whose emotional states were not manipulated) chose taxonomical equivalents almost as frequently as sad and happy participants (Niedenthal et al., 1999, Follow-up Study 1) raised the question of

whether the "emotional equivalent" in the mixed triads might differ significantly from the target in other ways (e.g., semantically), thereby offsetting its similarity to the target afforded by general emotional arousal.

There does seem to be some evidence in favor of the correspondence between discrete emotional states and similarity judgments of specific emotional materials. In two experiments conducted by Halberstadt and Niedenthal (1997), participants received an emotion induction through emotional music or movies before rating the similarity of all possible pairings of a set of neutral, sad, and happy faces of both genders. A general multidimensional scaling (MDS) procedure was applied to find out which dimensions contributed to the psychological distance between those faces. It was found that the dimension corresponding to specific emotions accounted for the most variance in similarity judgment, followed by gender and the direction of faces. Specifically, the results of the second experiment (emotional movie induction), but not the first and the pilot experiment (using music as the emotion induction method), showed that participants in the sad or happy emotional state gave more weight to affective dimension of the faces and less weight to non-affective dimensions. Additionally, sad participants rated pairs of faces expressing sad emotion as more similar, while happy participants rated pairs of happy faces as more similar (Halberstadt & Niedenthal, 1997). Although these findings are interesting in their own right, they cannot be readily generalized to conceptual categorization. Because facial processing is largely a perceptual rather than symbolic process, the perceptual categorization of faces should be distinguished from categorization of verbal or conceptual stimuli (Lamberts, 2000).

Still, one might wonder why the facial similarity judgment task found a selective influence of discrete emotional states on stimuli associated with specific emotions, but the conceptual similarity judgment task did not. One reason might be that emotional expression processing is more automatic or intuitive than the identification of emotional associations in conceptual processing. Indeed, automatic imitation of emotional expression facilitates the performance of categorizing emotional faces (e.g., Wallbott, 1991). Similarly, Niedenthal, Brauer, Halberstadt, and Innes-Ker (2001) found that emotional states advance the detection of the offset of corresponding emotional expressions (Niedenthal et al., 2001). It turned out that people simply attend more to the emotion on one's face than to the emotion in one's words.

Another possible explanation has to do with the different cognitive processes behind the tasks employed in different studies. According to the extended generalized context model (EGCM) of categorization, which demonstrated significant explanatory power with regard to categorization phenomena (Lamberts, 1995), the perceiver stops whenever accumulated evidence suffices to make a categorizing decision (Lamberts, 2000, 2002). For the facial similarity judgment task, participants were hypothesized to engage in elaborate processing of facial features and to transfer those features into degrees of similarity (Halberstadt & Niedenthal, 1997). As a result, more information needed to be accumulated in the process to make a fine-grained differentiation of emotional content.

In comparison, the triad task is known for its simplicity as it only necessitates a comparison between two alternatives related to the target concept (e.g., emotional versus taxonomical in the case of emotional triads in Niedenthal et al., 1999). Applying the explanation of EGCM to the response elicited by the emotional triads, it is likely that noticing the general emotional association (regardless of its valence or specific meaning) is sufficient to bias the choice toward the "emotional equivalent" without further need to process deeper emotional meaning of the concepts. Thus, unlike the facial similarity task, discrete emotional inductions exerted no additional influence on the conceptual categorization of emotional concepts.

Arguably, this problem is difficult to avoid due to the vagueness of the classic triad task (Smiley & Brown, 1979), which might not necessarily reflect categorization as the act of "considering to be the same kind of thing" (Murphy, 2002). For instance, young children often prefer the thematic equivalent over the taxonomic equivalent when asked vaguely

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