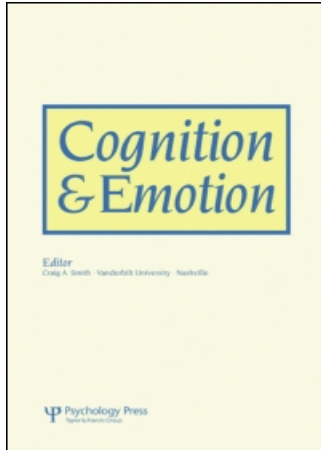


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## **Dissociations in the Similarity and Categorisation of Emotions**

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Most studies of the categorisation of emotions test the prototype model against the classical model, concluding that the prototype model offers the better explanation. Prototype models, as with all similarity-based models, posit that categorisation depends on the similarity between the instance to be categorised and the category representation. However, we find that emotion similarity judgements and categorisation judgements sometimes diverge. Specifically, information about changes in a person's status and/or power is weighted more heavily in categorisation decisions than it is in similarity decisions. We argue that a knowledge-based model, rather than a similarity-based model, offers the best account of emotion categorisation when information about status and power changes is available.

### INTRODUCTION

Social psychologists have recently used cognitive psychological theories of categorisation to explain emotion classification. Some suggest that emotions are structured according to the classical theory of categorisation (Smith & Medin, 1981) in which concepts are defined by singly necessary and collectively sufficient characteristics (Clore & Ortony, 1988; Clore, Ortony, & Foss, 1987; Johnson-Laird & Oatley, 1989; Lysak, Rule, & Dobbs, 1989; Ortony, Clore, & Foss, 1987). For instance, in the process of developing a taxonomy of affective lexicon, Ortony and Clore have shown that subjects categorise a word as an emotion only if it deals with internal, mental, feeling states and focuses exclusively on affect. Thus, they argue, the classical view may offer the best explanation for the categorisation of emotion terms (i.e. the distinction between emotion and nonemotion words).

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Others, however, suggest that emotions cannot be defined with necessary and sufficient features. Instead, these researchers suggest that emotions are scripts which are structured around prototypes, with individual emotions (e.g. fear, joy) having graded membership in the category of emotion (Bullock & Russell, 1986; Burch & Plishkin, 1984; Fehr, 1988; Fehr & Russell, 1984; Fehr, Russell, & Ward, 1982; Horowitz, Wright, Lowenstein, & Parad, 1981; Iaccino, 1989; Russell, 1989, 1991b; Russell & Bullock, 1986; Schwartz & Shaver, 1987; Shaver, Schwartz, Kirson, & O'Connor, 1987; Shields, 1984). For example, Fehr and Russell (1984) found that emotion concepts are graded, meaning that subjects can reliably rate the degree to which emotion words are typical or atypical members of emotion categories. Furthermore, they found that the typicality ratings, in turn, predicted how readily the emotions came to mind when listing emotion words (Fehr & Russell, 1984) as well as the reaction time in an emotion category verification task (Fehr, Russell, & Ward, 1982). Drawing on the prototype view, these researchers argue that because the instances that are rated as more typical are also the instances that come to mind easily as examples of the category, an emotion's typicality depends on its distance from the prototype. Thus, they suggest, when actual events contain enough prototypical attributes, they are perceived as typical of the emotion category and categorised as an instance of this emotion.

Despite the large number of investigations of the structure of emotions, the empirical work within the emotion categorisation literature remains focused on the distinction between the classical and the prototype view. All but two of the studies (Conway, 1990; Conway & Bekerian, 1987) test the prototype theory of emotion classification against the classical view, without questioning the appropriateness of *this* particular alternative to the classical view. Other nonclassical views of categorisation, such as the exemplar view (Hintzman, 1986; Nosofsky, 1986), dual-models (Rosch, 1983; Smith, 1988; Smith & Medin, 1981), and knowledge-based models (Keil, 1989; Murphy & Medin, 1985; Rips, 1989) can explain the findings that are taken as evidence in support of the prototype theory, such as graded membership and unclear cases. However, these models have not been explored as an alternative to the prototype view of emotion classification.

Moreover, the theoretical debates about emotion categorisation have generally not gone beyond the distinction between classical and nonclassical views on categorisation. Without research to adjudicate among alternative nonclassical positions "prototype" researchers often advocate a generic nonclassical view that encompasses a wide range of categorisation perspectives. For instance, Russell (1991a, p. 38), in a defence of the "prototype view" of emotion categorisation, states that the family of nonclassical accounts which he endorses includes the "knowledge-based view of similarity". However, there are important differences between

prototype models and knowledge-based models. First, prototype models hold that concept representation consists of a similarity structure or correlated attributes, whereas knowledge-based models hold that concept representation consists of correlated features *plus* underlying principles that influence which correlations are noticed (Murphy & Medin, 1985). Secondly, prototype models posit that categorisation is based on similarity (or attribute matching) to the central tendency or typical case, whereas knowledge-based views maintain that categorisation is based on similarity *plus* inferential, problem-solving processes supplied by underlying principles (Murphy & Medin, 1985). In sum, knowledge-based models assert that categorisation judgements sometimes use additional knowledge and processes that are not necessarily used when making similarity judgements. So, from the perspective of knowledge-based models, similarity and categorisation decisions may differ, but from a similarity perspective these decisions should coincide (and certainly not diverge). But despite these differences between prototype models and knowledge-based models, “nonclassical” emotion theorists try to advocate both positions.

Emotion prototype theorists often characterise the emotion representation as a “script”. This characterisation could suggest that the emotion representation is theoretical, context-sensitive, and nonperceptual (i.e. theory-based). Yet, even if prototype models posit a theory-based emotion *representation* (meaning the attributes in the representation depend on one’s theories), prototype models still depart from knowledge-based models because the categorisation *decisions* in prototype models are grounded exclusively in similarity. So, in prototype models the information used in similarity and categorisation decisions (even if the information is theory-based) should be weighted in the same way in both tasks. Therefore, even if prototype models assume the emotion representation is theory-based, the models still make different predictions about categorisation than knowledge-based models.

The goal of this study is to bring the discussion of emotion categorisation beyond the classical-nonclassical debate by testing the appropriateness of a similarity-based perspective for the classification of emotions. Research within cognitive psychology, social psychology, and sociology provide theoretical and empirical grounds for questioning the viability of similarity-based models as the sole explanation for emotion classification. Within cognitive psychology, empirical and theoretical arguments suggest that although similarity is a vital element in developing and using categories (Goldstone, 1994), inferential processes also play a role in the classification of some categories. And, research on emotions within sociology and psychology suggests that categorising emotions may be a highly knowledge-based process which draws on beliefs about the effects of status and power (also referred to as “potency”) outcomes of social interaction.

Thus, we suggest that when subjects categorise emotions on the basis of information about antecedent events—the events precipitating an emotion—a similarity-based model may not be sufficient. According to similarity-based models, similarity judgements and categorisation judgements should coincide. However, we hypothesise that the categorisation of emotions is more sensitive to information about status and power changes than similarity assessments. We begin by developing the theoretical and empirical grounds for our hypothesis. Then we describe two experiments that support this position by demonstrating that similarity and categorisation judgements are at least partially dissociated.

#### CENTRAL FEATURES: ALTERATIONS IN STATUS AND POTENCY

Despite the importance of similarity to two theories of categorisation—the prototype model and the exemplar model—and despite the sophistication of similarity assessments (Goldstone, 1994a, b), a number of studies have demonstrated problems with relying exclusively on similarity as a basis for classification. First, similarity-based models do not describe how relevant features are selected for the comparison process. This is a significant omission because the similarity of two objects depends on which attributes enter into the comparison and on the weights assigned to the attributes that are compared (Goodman, 1972; Medin, Goldstone, & Gentner, 1993). Second, a number of studies have shown that similarity does not always predict categorisation (e.g. Carey, 1985; Gelman & Markman, 1986; Keil, 1989; Rips & Collins, 1993). In Rips' (1989) study, for instance, subjects read stories about animals undergoing radical changes. One story describes an animal transformed by a chemical accident into something that looks like an insect. The subjects in the similarity task judged the animal to be more similar to an insect, whereas the subjects in the categorisation task judged that the animal was more likely to belong to the bird category. Such dissociations between similarity and categorisation pose a problem for similarity-based perspectives because they suggest that the information used in similarity assessments is different than the information used in categorisation judgements.

The knowledge-based model of categorisation, however, offers an explanation for how relevant features are selected for the category representations and for the dissociations between similarity and categorisation. According to the knowledge-based model, people's object representations often contain an underlying principle which people believe constrains and sometimes generates the more accessible surface features of the object (Medin & Ortony, 1989; Murphy & Medin, 1985). The underlying principle explains how features become part of the category representation:

Features which people believe are an outcome of this underlying principle tend to be those included in their category representation. The presence of an underlying principle also explains the dissociations between similarity and categorisation. Specifically, when the surface features of an object change but the underlying component is not affected, the similarity of the object may change but the category to which it belongs may not change.

We suggest that there may be an underlying component to emotion representations. According to the social interactional theory of emotions (Kemper, 1978, 1981, 1991), the emotion model of affect control theory (MacKinnon & Heise, 1993), and cognitive theories of emotions in psychology (e.g. Beck, 1974; Lazarus, 1968, 1991) most emotions are an outcome of real, anticipated, or recollected outcomes of social relations, specifically, the outcomes of a gain or loss of power and/or status.<sup>1</sup> According to Kemper's model, power is the capacity to get others to comply involuntarily through behaviours, such as coercion, threat, punishment, or assertion, and status is the capacity to get others to comply voluntarily (Kemper, 1978). Thus, we suggest that alterations in status and power may be the causal component to emotions that people believe generate the sequence of events associated with emotional experiences, such as physiological responses and facial expressions. The specific theoretical claims of this tradition for the emotions of joy, sadness, fear, anger, and love are listed in Table 1.

We suggest that the features of emotion concepts may be arranged on a continuum of centrality ranging from the most central or causal aspects to the least central but nonetheless characteristic features of emotions. The most central features are assumed to be information about status and power changes in interaction. These are the features assumed to generate and constrain the accessible, yet characteristic, aspects of emotions, such as facial expressions and physiological changes. In the middle of the feature continuum may be ambiguous information about status and potency alterations. For instance, information about specific events devoid of information regarding the identity of the actor involved (e.g. "person X sat alone in the dark") would be ambiguous for emotion categorisation because events have different status-potency effects on different types of actors (Heise, 1979) (compare "the toddler sat alone in the dark" to "the bodyguard sat alone in the dark"). Finally, at the "characteristic" end of the continuum may be information regarding the outer appearance of emotional responses. These attributes may be less central because they are viewed as simply the

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<sup>1</sup> The emotion model of Heise's affect control theory holds that the activity outcomes of social interaction also affect emotions. However, for this paper we only focus on the status and potency dimensions of his model.

TABLE 1  
Emotion Antecedents

- 
1. Power gain by self or power loss by other instigates *happiness/security*.
  2. Power loss by self or power gain by other instigates *fear/anxiety*.
  3. Status gain by self (where other or circumstance is agent) instigates *joy or happiness*.
  4. Status loss by self (where self is agent in an irremediable sense, or where circumstance—Fate, God, Life, or other intractable force—is responsible) instigates *sadness-depression*.
  5. Status loss by self (where other is agent) instigates *anger*.
  6. Status gain by other instigates *happiness* (in self) if one likes the other and unhappiness if one doesn't.
  7. Status loss by other (where self is agent) instigates *guilt/shame* (in self) if one likes the other *happiness* if one doesn't.
  8. Status loss by other (where other or circumstance is agent) instigates *unhappiness* (in self) if one likes the other, *happiness (Schadenfreude)* if one doesn't.
  9. Conferring status to another is *love*.
- 

*Note:* From Kemper (1989, 1991).

consequences of alterations in status and potency and because these aspects of emotion can be disguised or feigned, thereby offering an unreliable basis for emotion categorisation.

If emotion attributes are organised on a continuum of centrality and alterations in status and power are assumed to be more central, the categorisation and similarity of emotions may not always coincide. We test this hypothesis, predicting that information about changes in status and potency—the central features of emotions—have a greater impact on categorisation decisions than on similarity decisions. We are not suggesting that these are the “definitional” or “necessary and sufficient” features of emotion categories (the classical view). Instead, we suggest that people may view status and power outcomes as *more important* than other kinds of information when categorising emotion.

## THE EXPERIMENTS

We predicted that central features—information regarding status and potency changes—should influence categorisation judgements more than similarity judgements. To test this idea, we pitted categorisation decisions against similarity decisions. In both experiments we presented subjects with a list of three antecedent-event features taken directly from the prototypic representation obtained by Shaver et al. (1987). One of the three features was central for one emotion (Emotion X) and the other two were characteristic of a different emotion (Emotion Y). In the “categorisation” task we asked subjects to decide whether the person in

the situation was feeling Emotion X or Emotion Y, and in the “similarity” task we asked subjects to determine the similarity of the situation to a case of Emotion X or Emotion Y. Thus, we asked subjects in each condition very similar questions. According to many similarity-based models, these questions are synonymous, because similarity to the category members determines categorisation in these models. However, we predicted different results for each condition. We expected categorisation decisions to be influenced by the sole central feature, but we expected the similarity judgements to be influenced by the larger number of characteristic features.

If subjects rely on the central attribute for both the categorisation and the similarity decisions, it could be argued that subjects are weighting these features more heavily but still categorising based on similarity to the category representation (Nosofsky, 1986; Shepard, 1957). However, if we find that categorisation decisions are guided by the central feature and the similarity decisions are not, we will have established a dissociation between categorisation and similarity in emotion categorisation: Information is not weighted the same in categorisation and similarity judgements. This would undermine the idea that similarity predicts categorisation for emotions, suggesting that similarity-based models may not always explain emotion classification.

## EXPERIMENT 1

### Method

*Procedure.* Each subject received a packet which included 20 scenarios. All subjects judged the same set of scenarios, but subjects with the “similarity” task judged the similarity of the situation to an emotion, whereas subjects in the “categorisation” task decided which emotion the person in the scenario was feeling. Below is an example of one scenario. Here, “reversal or sudden loss of power, status, or respect; insult” is central for anger, whereas the other two antecedents, “being in the dark” and “being alone (walking alone)” are characteristic of fear. The first page of each test packet contained instructions and a sample scenario. After the sample scenario in the similarity task, the instructions said: “After reading each scenario, rank the experience on a scale ranging from 1 to 7. In this example, 1 indicates high overall similarity to a case of Emotion X, and 7 indicates high overall similarity to a case of Emotion Y.” In the categorisation task the instructions said: “After reading each scenario, circle the emotion that you think the person is feeling.”





features are specific experiences which would generate the appropriate alterations in status and potency in some but not all actors.<sup>2</sup>

A few features were used as both characteristic and central. This was done because some of the attributes were not clear examples of either characteristic or central features; instead, they were somewhere in the middle of the centrality continuum. As a consequence, some features were central relative to one feature but characteristic relative to another feature. This situation allowed us to use some of the features in different ways across scenarios. The central and characteristic features were pseudo-randomly ordered for each scenario. The emotion choices were also randomly assigned to the right or the left side of the response slots.

*Subjects.* Fifty-one subjects participated in this experiment, 26 in the similarity condition and 25 in the categorisation condition. All subjects were Indiana University students and received course credit for participation. They were tested in small groups of up to five people and worked at their own pace, completing the packets in approximately 15 minutes.

## Results and Discussion

*Basic Effects.* As predicted, the categorisation decisions were influenced by the central feature more than the similarity decisions. For the item analyses we compared the average percentage of central responses across conditions and found significant differences across conditions.<sup>3</sup> Forty-nine percent of the categorisation responses were consistent with the single central feature of the scenario, whereas only 38 percent of the similarity choices were consistent with the central emotion. These differences were significant in both the item analysis  $\{t(18) = 2.97, P = 0.008\}$  and the subject analysis  $\{t(49) = 2.78, P = 0.008\}$ .<sup>4</sup> To illustrate the circumstances in which categorisation and similarity judgements diverge the most, we

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<sup>2</sup> We also labelled a feature as characteristic if it was an incomplete central feature. Some emotions (fear, anger, sadness) involve distinct changes in *both* status and potency. Thus, if antecedent features described the appropriate changes in only one of the two dimensions, we labelled it as characteristic rather than central.

<sup>3</sup> The similarity ranks were transformed into binary responses so that they could be easily compared to the categorisation choices. A rating on any of the three scale values on the side of the "central" emotion was scored as a central response, and a rating on any of the three values on the side of the "characteristic" emotion was scored as a characteristic response. The middle responses ("4s") were omitted, so the total characteristic and central responses summed to 100%.

<sup>4</sup> The number of cases for the item analysis is 19 rather than 20 because a scenario had to be eliminated due to an error which made the feature list different in each condition.

provide Table 2, which lists the scenarios that generated the largest and most significant dissociations.

We also conducted an analysis in which subjects were labelled as either “central” or “characteristic” depending on which type of response they used most often. These analyses are also consistent with a dissociation, because the percentage of subjects giving central responses is larger in the categorisation condition than in the similarity condition. Forty percent of subjects in the categorisation condition gave central responses most

TABLE 2  
Experiment 1: Scenarios Generating the Greatest Dissociations

<i>Scenario Stimulus</i>	<i>Response Options:</i>	<i>Central Response (%)</i>	
	<i>Central (Characteristic)</i>	<i>In Similarity Task</i>	<i>In Categorisation Task</i>
–Receiving a wonderful surprise –Experiencing highly pleasurable stimuli or sensations –Threat of harm or death	FEAR (joy)	26	60**
–Receiving love, liking, affection –Experiencing highly pleasurable stimuli or sensations –Reality falling short of expectations; things being worse than expected	SADNESS (joy)	14	36*
–Exceptionally good communication –Knowing another loves, needs, appreciates him/her –Threat of harm or death	FEAR (love)	23	52**
–Another person provides something that he/she wants, needs, likes –Exceptionally good communication –Reversal or sudden loss of power, status, or respect; insult	ANGER (love)	23	52**
–Experiencing highly pleasurable stimuli or sensations –Being accepted, belonging –Reversal or sudden loss of power, status, or respect; insult	ANGER (joy)	14	60***

\* $P < 0.10$ ; \*\* $P < 0.05$ ; \*\*\* $P < 0.001$ .

frequently, 16% used central and characteristic responses equally, and 44% gave characteristic responses most often. In contrast, only 27% of the similarity subjects made mostly central choices, 8% used each response equally, and 65% used characteristic responses most often.

*Pair Effects.* The pattern of differences between categorisation and similarity judgements was even more evident when scenarios containing differently valenced emotion choices (e.g. joy and sadness) were examined separately. In these 12 scenarios, 42% of the categorisation responses were consistent with the central feature, and only 27% of the similarity responses were consistent with the central feature. Both the item analysis  $\{t(11) = 3.02, P = 0.012\}$  and the subject analysis  $\{t(49) = 3.17, P = 0.003\}$  of these differences were statistically significant.

Finally, a dissociation was also supported when subjects were labelled as either “central” or “characteristic” depending on which response they used most frequently. Twenty percent of the categorisation subjects used primarily central features, 16% used central and characteristic equally, and 64% used mostly characteristic. In contrast, in the similarity task, only 19% used central attributes most often, whereas 81% used the characteristic most often.

The dissociation was significantly stronger for differently valenced pairs in which the central feature belonged to a negative emotion and the characteristic features belonged to positive emotion  $\{t(10) = 2.87, P = 0.017\}$ , which could suggest that negativity is confounded with centrality. However, we think it is premature to make this claim. Shaver et al.’s (1987) representations of positive emotions contained more features closer to the characteristic end of the continuum than their representations of negative emotions. In addition, the negative emotions consisted of more clearly central features. Therefore, the significant effect may have been a function of the features from which we constructed our stimuli, rather than a function of emotions *per se*.

## EXPERIMENT 2

Experiment 1 supported our hypothesis that categorisation judgements are influenced by information regarding status and potency changes more than similarity judgements. However, we were concerned that the difference across conditions was due to an artefact of our measurement technique which forced the categorisation subjects to choose one of two emotions, but allowed the similarity subjects to make ranked judgements (including a “middle” choice) between two emotions. Because the similarity measure is intrinsically along a continuum, similarity subjects may have had a tendency to weight the graded, characteristic features more than the more

clear-cut, central properties. To eliminate this possibility, we conducted a second experiment which used the same approach but gave both categorisation and similarity subjects a binary forced choice. Thus, Experiment 2 offers a slightly more conservative test of our hypothesis than Experiment 1.

We were also interested in focusing in on situations where a dissociation is most evident. In Experiment 1, the biggest discrepancy between the categorisation and similarity judgements occurred for the differently valenced scenarios. Among differently valenced scenarios, the average difference between categorisation and similarity subjects' central responses was 15%, but among the similarly valenced scenarios the difference was only 4%. Although this difference is not statistically significant  $\{t(17) = 1.48, P = 0.158\}$ , considering the small sample size it remains a relatively significant disparity. Perhaps the differently valenced pairs generate the largest dissociations because they offer the most diagnostic power. Wanting to focus on these situations, we only used scenarios with differently valenced emotion pairs for Experiment 2.

## Method

*Procedure.* Each subject received a packet which included 12 differently valenced scenarios similar to those of Experiment 1. Again, the first page of the test packet contained instructions and a sample scenario. The similarity task instructions said: "After reading each scenario, decide whether this experience has higher overall similarity to the typical situation that would elicit the first emotion listed or the typical situation that would elicit the second emotion listed. Then circle that emotion. For instance, in this example you would decide if the experience had higher overall similarity to the typical case of Emotion X or the typical case of Emotion Y." The categorisation task instructions said: "After reading each scenario, circle the emotion that you think the person is feeling. You will be given a choice of two emotions for every scenario. For instance, in this example you would decide whether the person is feeling Emotion X or Emotion Y." The stimulus scenarios inside the packet did not contain these extended instructions. The similarity task simply said: "Is this experience more similar to the typical case of Emotion X or Emotion Y?" and the categorisation task said: "Circle the emotion that you think the person is feeling."

*Stimulus Materials.* The second column of the Appendix shows which emotion features were used in Experiment 2. We pseudo-randomly ordered both the emotion features and the left-right placement of the central and characteristic response slots.

*Subjects.* Seventy-nine subjects participated in this experiment, 40 in the similarity condition and 39 in the categorisation condition. All subjects were Indiana University students and received course credit for participation. They were tested in small groups of up to five people, working at their own pace and completing the packets in approximately 15 minutes.

## Results and Discussion

Both the item analysis and subject analysis from Experiment 2 indicate that central attributes influence categorisation choices more than similarity choices. The mean percentage of central responses for the categorisation task was 50%, whereas the mean percentage of central responses for the similarity task was 42%. Both the item analysis  $\{t(11) = 2.45, P = 0.032\}$  and the subject analysis  $\{t(77) = 2.52, P = 0.014\}$  of these differences are significant. Table 3 lists scenarios that created the largest dissociations.

As a final analysis, we labelled subjects as either “central” or “characteristic” depending on which response they used most frequently. These analyses also suggest a dissociation because there are far more

TABLE 3  
Experiment 2: Scenarios Generating the Greatest Dissociations

<i>Scenario Stimulus</i>	<i>Response Options:</i>	<i>Central Response (%)</i>	
	<i>Central (Characteristic)</i>	<i>In Similarity Task</i>	<i>In Categorisation Task</i>
–Being accepted, belonging –Experiencing highly pleasurable stimuli or sensations –Threat of harm or death	FEAR (joy)	40	59*
–Real or threatened physical or psychological pain –Stress, overload, or fatigue –Receiving esteem, respect, praise	JOY (anger)	23	46**
–Having spent a lot of time with another person; having shared special experiences –Exceptionally good communication –Reversal or sudden loss of power, status, or respect; insult	ANGER (love)	45	69**

\* $P < 0.10$ ; \*\* $P < 0.05$ .

“characteristic” subjects in the similarity condition than in the categorisation condition. In the categorisation condition, 41% of the subjects made primarily central responses, 15% made central and characteristic choices equally, and 44% used characteristic responses most frequently. In the similarity condition, however, only 23% of the subjects made central responses most often, whereas 78% made characteristic responses most frequently.

The negativity effect we found in Experiment 1 was not found in Experiment 2. That is, the scenarios in which the central feature belonged to a negative emotion did not create significantly greater dissociations than the scenarios in which the central attribute fell into a positive emotion category  $\{t(10) = 1.75, P = 0.110\}$ . This finding supports the idea that negativity and centrality are not inherently confounded but were simply associated in some of the features used for this study.

#### GENERAL DISCUSSION

In both experiments we presented the categorisation and similarity subjects with the same information and asked them very similar questions. Despite the similarity of the tasks, the similarity and categorisation judgements often diverged. The categorisation decisions were influenced by the single central attribute in the scenarios more than the similarity decisions. Thus, although both similarity and categorisation decisions use knowledge, theories, and inferential processes, categorisation decisions appear to rely on these factors more. These findings may pose a problem for the similarity approach to emotion classification. Similarity-based models posit that the similarity judgements and classification judgements use the same kinds of information and that therefore these decisions should never diverge. However, our two experiments offer tentative evidence that this is not always the case. Our experiments suggest that people weight central properties more heavily in categorisation decisions than in similarity decisions, and consequently there is sometimes a divergence in these decisions.

Our findings might also apply to other social events. A number of studies have demonstrated the utility of similarity-based models for classifying social categories, such as psychological situations (Cantor, Mischel, & Schwartz, 1982), person categories and traits (Cantor & Mischel, 1977, 1979; Dahlgren, 1985; Mayer & Bower, 1986), and clinical diagnoses (Cantor, Smith, French, & Mezzich, 1980; Genero & Cantor, 1987; Horowitz, Wright, Lowenstein, & Parad, 1981). However, only a few studies of social categories have applied theory-based ideas to the process of categorisation (Ahn, Brewer, & Mooney, 1992; Kunda, Miller, & Claire, 1990). Thus, research on the classification of social categories might continue to test the theory-based approach against the similarity-based approach,

particularly when there is reason to hypothesise that the concept representation contains an underlying core component.

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## APPENDIX

## Antecedent-Event Features\*

## FEAR

<i>Exp. 1</i>	<i>Exp. 2</i>	
		–Threat of social rejection
Ce	Ce	–Possibility of loss or failure
		–Loss of control or competence
Ce	Ce	–Threat of harm or death
Ch	Ch	–Being in a novel, unfamiliar situation
Ch	Ch	–Being alone (walking alone)
Ch	Ch	–Being in the dark

## SADNESS

<i>Exp. 1</i>	<i>Exp. 2</i>	
Ch	Ce	–An undesirable outcome; getting what was not wanted; a negative surprise
Ch/Ce		–Death of a loved one
Ch		–Loss of a valued relationship, separation
Ce	Ce	–Rejection, exclusion, disapproval
Ch	Ce	–Not getting what was wanted, wished for, strived for
Ce/Ch	Ch	–Reality falling short of expectations {things being worse than anticipated}
Ch	Ch	–Discovering that one is powerless, helpless, impotent
Ch		–Empathy with someone who is sad, hurt

## ANGER

<i>Exp. 1</i>	<i>Exp. 2</i>	
	Ch	–{Predisposition to anger, either because of previous similar or related experiences or because of} stress overload, fatigue
Ce/Ch	Ce	–Reversal or sudden loss of power, status, or respect; insult
Ch		–Violation of an expectation; things not working out as planned
Ch		–Frustration or interruption of a goal-directed activity
Ch	Ch	–Real or threatened physical or psychological pain
Ce	Ce	–Judgement that the situation is illegitimate, wrong, unfair, contrary to what ought to be

## JOY

<i>Exp. 1</i>	<i>Exp. 2</i>	
		–Task success, achievement
		–A desirable outcome; getting what was wanted
	Ce	–Receiving esteem, respect, praise
Ce		–Getting something that was striven for, worried about
Ce	Ce	–Reality exceeding expectations; things being better than expected
Ch		–Receiving a wonderful surprise
Ch	Ch	–Experiencing highly pleasurable stimuli or sensations
Ch	Ch	–Being accepted, belonging
Ch		–Receiving love, liking, affection

## LOVE

*Exp. 1*   *Exp. 2*

Ch	Ch	-Another offers/provides something that another wants, needs, likes
Ch	Ch	-Knows/realises that another loves needs, appreciates him/her
	Ce	-Finds another attractive (physically and/or psychologically)
Ch	Ch	-Exceptionally good communication
Ce	Ce	-Another inspires openness, trust, security
Ch	Ch	-Having spent a lot of time together, having shared special experiences

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\* Taken from Shaver, Schwartz, Kirson, & O'Connor (1987).

Ce = a central feature; Ch = a characteristic feature.

The features that are not labelled were not used. We chose not to use a feature if it fell somewhere between what we considered central and characteristic features.

