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Emotion Knowledge: Further Exploration of a Prototype Approach

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Recent work on natural categories suggests a framework for conceptualizing people's knowledge about emotions. Categories of natural objects or events, including emotions, are formed as a result of repeated experiences and become organized around prototypes (Rosch, 1978); the interrelated set of emotion categories becomes organized within an abstract-to-concrete hierarchy. At the basic level of the emotion hierarchy one finds the handful of concepts (love, joy, anger, sadness, fear, and perhaps, surprise) most useful for making everyday distinctions among emotions, and these overlap substantially with the examples mentioned most readily when people are asked to name emotions (Fehr & Russell, 1984), with the emotions children learn to name first (Bretherton & Beehly, 1982), and with what theorists have called basic or primary emotions. This article reports two studies, one exploring the hierarchical organization of emotion concepts and one specifying the prototypes, or scripts, of five basic emotions, and it shows how the prototype approach might be used in the future to investigate the processing of information about emotional events, cross-cultural differences in emotion concepts, and the development of emotion knowledge.

Ordinary people know a great deal about emotion. When given posed or natural photographs of common emotional expressions, people around the world can reliably name the emotion being expressed (Ekman, Friesen, & Ellsworth, 1982a, 1982b). People from a variety of cultures agree on which emotion generally follows a particular set of abstract antecedents, such as insult, loss, and danger (Boucher & Brandt, 1981; Brandt & Boucher, 1984; Ekman, 1984; Roseman, 1984; Sullivan & Boucher, 1984). Both children and adults can report and agree on typical antecedents of several common emotions (Harris, 1985; Masters & Carlson, 1984; C. Smith & Ellsworth, 1985). They can also talk about methods for controlling the ex-

pression of negative emotions (Hochschild, 1983; Johnson, 1983; Masters & Carlson, 1984; Saarni, 1979, 1984). Children as well as adults agree about the similarity or distinctiveness of a diverse array of emotions, and their similarity ratings, when multidimensionally scaled or factor analyzed, reliably form a two- or three-dimensional structure, with positive-negative valence, activity or arousal, and potency or dominance being the most frequently obtained dimensions (e.g., Averill, 1975; Osgood, Suci, & Tannenbaum, 1957; Russell, 1978, 1979, 1980; Russell & Ridgeway, 1983; Schlosberg, 1952, 1954). Because emotions play a central role in individual experience and interpersonal relations, it is no wonder that people are highly knowledgeable about them.

With few exceptions (e.g., Averill, 1982; de Rivera, 1981a; Scherer, 1984), emotion knowledge has been studied piecemeal, some studies focusing on antecedents, some on emotional expressions and responses, others on self-control of these responses, and still others on the dimensions underlying the large emotion lexicon. But an extensive body of research and theory in cognitive and cognitive-social psychology suggests that the various components of emotion knowledge are likely to be parts of an organized whole. Numerous studies have shown that repeated experiences with similar objects or events lead to the construction of generic mental representations of the important elements, and the relations among elements, of these objects or events (e.g., Bobrow & Norman, 1975; Posner & Keele, 1968; Rumelhart & Ortony, 1977). Although generic representations go by a variety of different names in the scientific literature—schemas (Bartlett, 1932; Mandler, 1984), scripts (Schank & Abelson, 1977), prototypes (Rosch, 1978), and stereotypes (Hamilton, 1981)—all have in common the notion that features shared by many or most members of a category occupy central places in an organized mental representation.

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Emotion knowledge, organized into generic representations, almost certainly plays an important part in social interaction. A substantial part of interaction involves interpreting one's own and other people's emotional reactions, predicting reactions from antecedent events, controlling emotional expressions, attempting to influence others' emotions, and sharing and talking about emotional reactions to past and present events (Goffman, 1959; Jones & Pittman, 1982; Kelley, 1984). Moreover, an important part of reading and writing fiction and of watching films and stage productions is anticipating characters' emotional reactions and making attributions about likely causes of such reactions when they occur (Schwartz & Shaver, in press).

For our long-term purposes, which include mapping both the overall structure of the domain of emotion knowledge and the content and structure of typical emotion episodes, prototype theory and research are especially useful. Rosch (1973, 1978; Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976), the originator of prototype analysis, has proposed that category systems or taxonomies can be viewed as having both a vertical and a horizontal dimension. The vertical dimension concerns the hierarchical relations among categories in treelike taxonomies. Often the vertical dimension can be analyzed in terms of three major levels of inclusiveness: the *superordinate* (furniture, for example), the *basic* (chair), and the *subordinate* (kitchen chair).

Rosch calls the middle level "basic" because research has revealed that it is special in several respects. Basic-level categories are learned first during language acquisition; are accessed most quickly when a relevant stimulus is encountered; are likely to have short, single-word names; and are the most abstract categories that can be represented by a single visual image (Mervis & Crisafi, 1982; Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976). Basic-level concepts accomplish two important functions of categorization: They convey more, and more specific, information about category members than superordinate categories do, and at the same time, they are superior to subordinate-level concepts in identifying major distinctions between categories. Because the basic level offers the best compromise between informativeness and cognitive economy, people seem naturally to prefer basic-level categorization for much of their everyday conversation and thought.

Category systems also have a horizontal dimension that, according to Rosch (1978), "concerns the segmentation of categories at the same level of inclusiveness" (p. 30)—categories such as chair, table, and sofa. Prototype researchers argue that many such categories used in everyday cognition are best conceptualized as "fuzzy sets" separated by vague rather than sharp boundaries. (Objects such as loveseats and chaises longues, literally "long chairs," illustrate the vagueness of the boundaries between *chair*, *sofa*, and *bed*.) Each of these fuzzy categories is defined, not by a conclusive set of necessary and sufficient features (such as might define the category of even numbers), but rather by a *prototype*—an abstract image or set of features representing the best, most representative, most typical example of the category (e.g., the "prototypical" chair). Categorization decisions are made by comparing instances with this prototype. Individual objects vary in their degree of similarity or "family resemblance" to the prototype—the degree to which they are good examples of the category.

Empirical studies have demonstrated that people can make

reliable judgments of object prototypicality (e.g., Rosch, 1973, 1975; Rosch & Mervis, 1975; E. E. Smith, Shoben, & Rips, 1974), that prototypical objects are more quickly and more frequently identified as category members than are less prototypical objects (e.g., McCloskey & Glucksberg, 1978; Rosch, Simpson, & Miller, 1976), and that people often fill gaps in information about an object by inserting features that are consistent with the category prototype (e.g., Cantor & Mischel, 1977; Franks & Bransford, 1971; Posner & Keelc, 1970; Reitman & Bower, 1973; Schank & Abelson, 1977). Thus, the view of categories as fuzzy sets organized around abstract prototypes—categories whose members bear a family resemblance to one another—seems to fit people's representation of common categories.

In the years since Rosch and her colleagues introduced the prototype approach to the categorization of colors and physical objects, other researchers have applied it to a wide variety of domains, including grammatical categories (Maratsos & Chalkley, 1980), person categories (Cantor & Mischel, 1979a; Chaplin, John, & Goldberg, 1986; Hampson, John, & Goldberg, 1986), psychiatric categories (Cantor, Smith, French, & Mezzich, 1980; Horowitz, French, & Anderson, 1982; Horowitz, Wright, Lowenstein, & Parad, 1981), and categories of social situations (Cantor, Mischel, & Schwartz, 1982) and environmental scenes (B. Tversky & Hemenway, 1983). In each of these areas, prototype researchers have learned a great deal about categorization and representation processes and about the actual structure of the domains being categorized or represented. In fact, it is common for prototype researchers, following Rosch (1978), to argue that the structure of representation necessarily reflects the gross structure of reality, or at least the distinct features of reality that are most important for human transactions with the world. This suggests that a prototype analysis of the emotion domain might produce useful information not only about the cognitive representation of emotion episodes but also about the actual nature of human emotion.

Viewing emotion knowledge from a prototype perspective suggests why it has been difficult for psychologists to agree on a number of fundamental issues concerning emotion. For example, there is no agreement on a formal definition of the construct; as Fehr and Russell (1984) have observed, "Everyone knows what an emotion is, until asked to give a definition" (p. 464). If the category *emotion* is itself "fuzzy," defined mainly by prototypical members or features, there may be no classical definition associated with it. Moreover, most emotion theorists have claimed that there is a set of basic emotions, the term *basic* supposedly pointing to underlying biological substrates. But there has been considerable variability in published lists of basic emotions (e.g., Ekman et al., 1982a, 1982b; Epstein, 1984; Izard, 1977; Roseman, 1984; Tomkins, 1984). Prototype theory suggests that the most salient and frequently used categories, at least as used by ordinary people, are basic in Rosch's sense; that is, they occupy the basic level of categorization. The reason for making everyday distinctions at this level remains to be discovered, biological "basicness" being just one of several possibilities. It has also proved difficult to say why, if there is a mere handful of basic emotions, the emotion lexicon in most modern languages contains hundreds of emotion names (Averill, 1975). What exactly is the need for so many nonbasic terms? Proto-

type theory suggests that they are used to make subordinate-level distinctions—fine distinctions that are not needed for most everyday purposes. Finally, what are the most appropriate statistical techniques for detecting and representing cognitive relations among emotions (or emotion names)? Emotion researchers have tended to use dimensional techniques such as factor analysis or multidimensional scaling. The prototype approach suggests the use of hierarchical cluster analysis, which, although occasionally used in the past (e.g., Fillenbaum & Rapoport, 1971; Scherer, 1984), has rarely been used within a theoretical context.

Although studies of ordinary people's cognitive representations of emotion episodes, and of the emotion domain as a whole, cannot resolve scientific debates about the nature of emotion, they may be able to reveal the origins of emotion theorists' intuitions (e.g., the intuition that there are such things as basic emotions) and, at the same time, by providing details of such intuitions that have been neglected in the past, may suggest deficiencies in current emotion theories. Aside from these outcomes, studies of emotion knowledge should open up new avenues for research on social perception and memory for social events.

Emotion Categories as Fuzzy Sets

In recent years, several authors have suggested that the term emotion and specific emotion terms such as anger, fear, and sadness designate fuzzy sets, indicating that the emotion domain might fruitfully be analyzed from a prototype perspective. For example, Russell (1980), at the time writing within the psychometric tradition, asserted that "each emotion word can . . . be considered a label for a fuzzy set, defined as a class without sharp boundaries, in which there is a gradual but specifiable transition from membership to nonmembership" (p. 1165). In a 1981 footnote, de Rivera, writing within the phenomenological tradition, said, "It is conceivable that . . . all the different instances of anger . . . simply bear . . . a 'family resemblance' to each other. . . . To the extent this were true, one might want to use the tactic that Rosch (1973) has described" (1981b, p. 78). Averill, the leading proponent of the social-constructionist approach to emotion, stated in his 1982 book on anger, "Emotional categories . . . form taxonomies, with categories like anger, fear, and hope representing the basic level" (p. 330). Working from a psycholinguistic perspective, Lakoff and Kovecses (1983) concluded that "the metaphors and metonymies . . . we have investigated so far converge on a certain prototypical cognitive model of anger" (p. 20). Writing about emotions within the context of close relationships, Kelley (1983) observed,

The varieties of love and commitment are reflected in the fact that, in natural language, each concept refers to a "fuzzy category." Like other such categories . . . , love and commitment include a number of different phenomena that are distinguishable as to their prototypicality. (pp. 313-314)

Writing about the emotion-elicitation process, Ekman (1984) said, "In automatic appraisal an event is instantly matched with one of the prototypic situations, thereby setting off emotion-specific changes in expression and physiology" (p. 338). Finally, Kagan (1984) suggested

that variations in bodily change, incentive, and evaluation lead to a family of feeling states, each of which has a prototypic core. These prototypes include the emotions we call fear, worry, anger, sadness, joy, guilt, shame, empathy, contentment, and interest. I am not certain how many prototypes are needed to account for all of the basic human feelings. (p. 169)

Despite the promise evident in these converging insights, there has been little empirical research to follow them up. In 1984, however, Fehr and Russell reported a seminal series of studies, based on Rosch's ideas, that supported the hypothesis that emotion itself is a fuzzy category. Although no compelling classical definition of emotion exists, Fehr and Russell found that people are quite able to say which emotions are better and which are worse examples of the category.

An emotion's goodness of example (prototypicality) . . . was found to predict how readily it comes to mind when one is asked to list emotions, how likely it is to be labeled as an emotion when asked what sort of thing it is, how readily it can be substituted for the word *emotion* in sentences without their sounding unnatural, and the degree to which it resembles other emotion categories in terms of shared features. (Fehr & Russell, 1984, p. 464; see also Fehr, Russell, & Ward, 1982)

A similar approach to the concept of emotion has been taken in recent papers by Conway and Bekerian (1985) and Tiller and Harris (1984).

Although Fehr and Russell (1984) hypothesized in their Discussion section that "what we are calling the middle level of emotion categories is the basic level" (p. 481) and that "middle-level emotion categories possess an internal structure and fuzzy boundaries" (p. 482), these hypotheses remained untested. Fehr and Russell indicated the probable scriptlike nature of basic-level emotion knowledge, using fear as an example, in the following passage:

Although we often speak of fear as a thing, a more apt description may be a sequence of events. . . . [To] know the meaning of the word *fear* is to know some such sequence. It is to know a *script* (Abelson, 1981) [that includes] prototypical causes, beliefs, physiological reactions, feelings, facial expressions, actions, and consequences. The notion of script can thus be seen to extend to episodes the notion of prototype. (1984, p. 482)

Overview of the Present Studies

In the remainder of this article we will explore further the notion that emotion knowledge may be represented hierarchically, with one level corresponding to what both emotion theorists and prototype researchers, for seemingly different reasons, have wanted to call "basic." Fehr and Russell (1984) speculated about the contents of this level, basing their ideas on evidence concerning which emotions are brought to mind most readily as examples of "emotion": "We have short names for many of the concepts at the middle level: fear, anger, love, hate, and so forth" (p. 482). They did not examine the treelike structure of the domain of emotion concepts, however, to see where their candidates for basicness actually fall. Besides pursuing that matter here, we have attempted to learn more about people's emotion prototypes, or scripts, on the assumption that descriptively rich prototypes will prove useful in future research on emotion knowledge, including research on the role such knowledge plays in everyday social interaction (Schwartz & Shaver,

in press). At the end of this article we will consider potential applications and extensions of the prototype approach to emotion knowledge.

Study 1: Hierarchical Structure of the Emotion Domain

As explained earlier, a prototype analysis of people's knowledge of a particular domain consists of two parts: (a) description of the hierarchical structure of the domain's categories and (b) specification of category prototypes. In Study 1, we explore the hierarchical organization of the emotion domain and compare it with multidimensional structures identified repeatedly by factor-analytic and multidimensional-scaling techniques. Our goal is not to argue that a hierarchical representation is superior to these other structures for all purposes, but to show that it is intuitively reasonable, hence plausibly related to everyday emotion categorization, compatible with prototype theory, and informative in distinctive ways.

English and many other languages contain hundreds of terms that seem to refer to emotions. It is obvious that some of the emotional states referred to are closely related (e.g., anger, annoyance, hatred, and rage), whereas others (e.g., contentment and despair) are quite distinct. If emotion knowledge has the kind of hierarchical structure that Rosch and others have shown to exist in domains as different as furniture, food items, physical and social environments, and personality types, it should be reflected in subjects' similarity sorts of emotion names. Moreover, if data from similarity sorts are submitted to hierarchical cluster analysis, they should reveal a multitiered hierarchy in which one level can reasonably be called more basic than others. By "reasonably," we mean that (a) the basic-level concepts will correspond roughly to the ones Fehr and Russell (1984) found to be elicited most frequently in response to the instruction "Please list [in 1 min] as many items of the category 'EMOTION' as come readily to mind" (p. 468). The emotions listed by more than 40% of 200 subjects were happiness, anger, sadness, love, fear, hate, and joy. (b) The basic-level concepts will correspond roughly to emotion theorists' lists of basic or primary emotions. There are many such lists. Izard's (1977), one of the longest, includes interest, joy, surprise, distress, anger, fear, shame, disgust, contempt, and guilt. Ekman and his colleagues (summarized in Ekman, 1984) focused their research on fear, anger, surprise, disgust, sadness, and happiness. Epstein's list (1984) includes "fear, anger, sadness, joy, and possibly love and affection" (p. 68). (c) The basic-level concepts will correspond roughly to the ones that children name first in spontaneous speech. Bretherton and Beeghly (1982) reported that the emotion names used most frequently by 28-month-olds are love, like, mad, scared, happy, and sad.

Because the same similarity-sorting data can be submitted to multidimensional scaling analysis, the resulting structures can be compared to determine what each reveals about the organization of emotion knowledge. Providing such a comparison is an additional goal of Study 1.

Choosing Exemplars of the Emotion Category

How should emotion terms be chosen for a similarity-sorting study? In reviewing previous attempts to characterize the struc-

ture of emotion knowledge, we found that some investigators (e.g., Fillenbaum & Rapaport, 1971) had used too few terms to reveal much in the way of hierarchical structure, especially because most of their terms were taken from what we will call the basic level. Other investigators used so many terms (e.g., 235 in Scherer's, 1984, study) that no available computer program could analyze the resulting similarity matrix; besides, many of the terms were debatable as names of emotions and appeared in different parts of speech—some as adjectives, some as nouns, some as adverbs, and so forth—which may have confused subjects. Finally, some researchers, especially those who favor a circumplex (two-dimensional circle) model of emotion (e.g., Russell, 1980), added such terms as *sleepy* to their lists to fill out the low-arousal portion of the circumplex, even though almost no one believes that sleepiness is an emotion (see the tests for "emotionness" developed by Ortony & Clore, 1981, and the prototypicality data reported by Fehr & Russell, 1984).

The prototype approach suggests solutions to these problems. Even if the concept of emotion is fuzzy, subjects ought to be able to report reliably whether a particular mental or physical state word—for instance, anger, happiness, sleepiness, or hunger—denotes a relatively good or a relatively poor example of the concept. In fact, recent studies conducted by unrelated research teams in England (Conway & Bekerian, 1985; Tiller & Harris, 1984), British Columbia (Fehr & Russell, 1984), and the United States (Averill, 1975; the present authors, see next section) demonstrate that subjects can easily make such judgments and that the results correlate highly across studies, despite somewhat different emotionness measures and different subject populations. Tiller and Harris (1984) reported correlations above .80 between ratings they obtained in England and ratings obtained by Fehr and Russell (1984) in British Columbia. We computed correlations between our ratings, gathered in Colorado, and Fehr and Russell's two sets of ratings of 20 emotion names, gathered 5 months apart. The resulting correlations, .94 and .96, were almost perfect. Correlations between our ratings or Fehr and Russell's ratings and ratings obtained by Averill (1975) in Massachusetts and California were all around .80. (The drop from .95 to .80 may be due to Averill's use of adjective forms of the nouns that we and Fehr and Russell used.)

In other words, although English speakers around the world have difficulty giving an explicit rulelike definition of emotion, they have little trouble agreeing that a particular psychological-state name designates a relatively good or a relatively poor example of the emotion category. We decided, therefore, to include in Study 1 a sizable number of emotion names that subjects could agree were representative of the category *emotion*.

Method

Selection of Emotion Terms: Prototypicality Ratings

Subjects. One hundred twelve students in introductory psychology courses participated in the prototypicality-rating phase of the study. They completed the rating task during regular class sessions.

Procedure. A list of 213 emotion names, to be rated for prototypicality or emotionness, was compiled in the following way. We began with Averill's (1975) Semantic Atlas of Emotional Concepts, which contains 558 words "with emotional connotations" (p. 1), and supplemented

these with the few nonoverlapping terms in Davitz's (1969) and de Rivera's (1977) lists of emotion words. To eliminate redundancy, we then removed all but one of each set of words formed from the same root (e.g., *fury* and *furious*) and converted all of the remaining words to their noun forms (e.g., *pitying* in Averill's list became *pity* in ours). Any words that did not have familiar noun forms (e.g., *blasé*) were eliminated. Noun forms were chosen so that the emotions would be cognitively parallel to the "objects" studied in most prototype research. We also eliminated words that seemed to name traits (e.g., *brave*, *patriotic*, *religious*) rather than emotions and metaphorical emotion terms that include the word *heart* (*heartrending*). This left 213 words, shown in Table 1, that could reasonably be considered emotion names.

Subjects rated the states named by each of these 213 terms, in alphabetical order, on a 4-point scale ranging from *I definitely would not call this an emotion* (1) to *I definitely would call this an emotion* (4). (They were also given the option of saying that they were not sure what the word meant. As a result, 4 words, identified in Table 1, were eliminated for being relatively unfamiliar to more than a quarter of the subjects, even though they satisfied our other criteria.) Mean prototypicality ratings were computed and used to select 135 "good" examples of the emotion domain. This number was chosen to sample the domain extensively without burdening subjects with an unmanageable number of terms to sort. The final 135 words, along with their mean prototypicality scores, are marked with superscripts in Table 1. They are the ones subjects rated highest on the 4-point emotionness scale, with one exception: *Surprise* was included because emotion theorists have so often designated it a basic emotion, even though, with a mean of 2.69, it did not quite reach the cutoff for the other 134 terms (above 2.75). The proportion of subjects who indicated that "I'm not sure what this word means" is also shown for each word in Table 1.

Similarity Sorting

Subjects. One hundred students in introductory psychology courses (50 men and 50 women) participated in the similarity-sorting phase of the study. They were tested individually and received course credit for participating. None of them had participated in the prototypicality-rating task.

Procedure. Each of the 135 terms was printed on a small white card, and the cards were presented to subjects with the following oral instructions:

This study has to do with human emotions. Specifically, we want to find out which emotions people think are similar to each other (which "go together"), and which emotions seem different and therefore belong in different categories. We've prepared 135 cards, each containing the name of an emotion. We'd like you to sort these cards into categories representing your best judgments about which emotions are similar to each other and which are different from each other. There is no one correct way to sort the cards—make as few or as many categories as you wish and put as few or as many cards in each group as you see fit. Spread the cards out on the table and keep moving them around until the groupings make sense to you. This requires careful thought; before you stop, be sure you are satisfied that each word fits best in the category where you have placed it.

After receiving these instructions, each subject performed the sorting task, finishing in an hour or less. Because no limit was placed on either the number of categories or the number of terms within each category, these parameters varied widely across subjects. One person put all 135 terms into two categories (positive and negative), and one put them into 64 categories. Category size ranged from 1 to 90 terms.

Results and Discussion

For each subject, a 135×135 co-occurrence matrix was constructed, with 1 indicating that two terms were placed in the

same category and 0 indicating that they were not. These matrices were added across the 100 subjects to form a single 135×135 matrix in which cell entries could range from 0 to 100, representing the number of subjects who placed a particular pair of words in the same category. This matrix was analyzed using the BMDP 1M Cluster Analysis Program's average distance method (Everitt, 1980; Hartigan, 1981). The results are shown in Figure 1.

What we will consider subordinate clusters of words are listed along the bottom of the figure, each one having a cluster strength greater than 50. This means that across all pairs of words in that subgroup, the average frequency of co-occurrence (number of subjects placing the two pair members in one category) was greater than 50. For example, in the bottom-left corner of the figure, there are three such clusters: (a) *adoration*, *affection*, and so forth; (b) *arousal*, *desire*, *lust*, and so forth; and (c) *longing*. Each of the first two groups has a cluster strength greater than 50; *longing* forms a category by itself; and the three small clusters combine to form a larger cluster labeled *love*, which has a strength of approximately 27.5 (indicated by the scale on the left). All cluster strengths below 50 can be determined in the same way by referring to the 0-to-50 scale. For the sake of simplicity and figure size, we have placed single-word subcategories (*contempt*, *dismay*, *distress*, *dread*, *hysteria*, *mortification*, and *sentimentality*) into the nearest larger subcategory, with the exception of *longing*, *relief*, and *torment*, each of which co-occurred with the nearest subcluster at a level less than 30, suggesting substantial distinctiveness.

Inspection of the figure suggests that there are five or six separate clusters that might reasonably be considered basic. (Later, we will suggest that one of the six, *surprise*, may not qualify for basic-level status.) The names of these large groups, appearing about halfway up the figure, were determined as follows. For each of the 135 emotion words, two scores were calculated: (a) the average number of co-occurrences with all other words in the same large cluster and (b) the average number of co-occurrences with all words outside that cluster. For each word, the second number was subtracted from the first, and the difference was interpreted as a measure of within-category centrality or prototypicality. (This definition of centrality is similar to Rosch, Mervis, Gray, Johnson, and Boyes-Braem's, 1976, notion of "cue validity" and to A. Tversky and Kahneman's, 1982, notion of "representativeness.") Among the few highest scoring words in each of the six major clusters, an emotion could always be found that at least some theorists have included in their lists of basic emotions. We decided to retain those names—*love*, *joy*, *surprise*, *anger*, *sadness*, and *fear*—even though in four cases a synonym received a slightly higher score: *affection* rather than *love*, *happiness* rather than *joy*, *amazement* rather than *surprise*, and *depression* rather than *sadness*.

In some respects, *affection* may actually be a better name than *love* for the leftmost basic category, which includes *fondness* and *liking*. Similarly, *happiness* may be a better general name than *joy*, which intuitively seems briefer and more intense than *happiness*. On the other hand, *sadness* seems more general than *depression* and, hence, deserves to be the category label, even though our college-student subjects apparently use the more specific clinical term to such an extent that to them it seems slightly more prototypical than *sadness* (see ratings in Table 1).

Table 1

Mean Prototypicality Ratings and Unfamiliarity Proportions (UP) for 213 Emotion Words

Emotion word	M	UP	Emotion word	M	UP	Emotion word	M	UP	Emotion word	M	UP
love ^a	3.94	.00	agitation ^a	3.29	.01	triumph ^a	2.95	.00	calmness	2.63	.00
anger ^a	3.90	.00	outrage ^a	3.28	.00	joviality ^a	2.94	.05	respect	2.62	.00
hate ^a	3.84	.00	resentment ^a	3.28	.00	wrath ^a	2.93	.07	somberness	2.62	.02
depression ^a	3.83	.00	dislike ^a	3.27	.00	arousal ^a	2.92	.03	vehemence	2.62	.34
fear ^a	3.83	.00	glee ^a	3.24	.02	attraction ^a	2.92	.00	sulkiness	2.59	.03
jealousy ^a	3.81	.00	alienation ^a	3.23	.01	contentment ^a	2.92	.04	encouragement	2.58	.01
happiness ^a	3.77	.00	distress ^a	3.23	.01	grumpiness ^a	2.92	.00	frenzy	2.58	.01
passion ^a	3.75	.00	enjoyment ^a	3.23	.00	irritation ^a	2.92	.00	obsession	2.58	.00
affection ^a	3.72	.01	relief ^a	3.23	.00	malevolence	2.92	.32	success	2.56	.00
sadness ^a	3.68	.00	gloom ^a	3.21	.00	ferocity ^a	2.91	.00	forgiveness	2.55	.00
grief ^a	3.65	.01	misery ^a	3.20	.02	enthralment ^a	2.90	.13	indignation	2.55	.17
rage ^a	3.64	.00	euphoria ^a	3.19	.16	revulsion ^a	2.88	.10	discomfort	2.54	.00
aggravation ^a	3.63	.03	bliss ^a	3.18	.07	alarm ^a	2.87	.00	vindictiveness	2.54	.13
ecstasy ^a	3.63	.00	gladness ^a	3.17	.00	eagerness ^a	2.87	.00	aversion	2.52	.25
sorrow ^a	3.62	.00	regret ^a	3.16	.00	hysteria ^a	2.87	.00	power	2.52	.00
joy ^a	3.61	.00	rejection ^a	3.16	.00	liking ^a	2.87	.00	vibrance	2.52	.13
compassion ^a	3.62	.00	pride ^a	3.14	.01	neglect ^a	2.87	.00	sheepishness	2.50	.14
envy ^a	3.58	.00	gaiety ^a	3.13	.04	insult ^a	2.86	.00	jitteriness	2.49	.01
fright ^a	3.58	.00	homesickness ^a	3.13	.00	mortification ^a	2.85	.04	virtue	2.48	.01
terror ^a	3.57	.00	jolliness ^a	3.12	.00	tenseness ^a	2.85	.00	mirth	2.47	.36
elation ^a	3.55	.10	nervousness ^a	3.12	.00	contempt ^a	2.84	.03	demoralization	2.46	.05
guilt ^a	3.53	.00	woe ^a	3.12	.05	amazement ^a	2.83	.00	fierceness	2.46	.01
excitement ^a	3.51	.00	longing ^a	3.11	.00	amusement ^a	2.83	.00	effervescence	2.44	.43
anguish ^a	3.49	.01	loathing ^a	3.10	.05	zeal ^a	2.83	.15	fervor	2.44	.23
embarrassment ^a	3.49	.00	satisfaction ^a	3.10	.01	scorn ^a	2.82	.02	complacency	2.42	.27
worry ^a	3.49	.00	hope ^a	3.08	.00	zest ^a	2.82	.03	nostalgia	2.42	.03
panic ^a	3.48	.00	abhorrence	3.06	.30	astonishment ^a	2.80	.00	modesty	2.40	.00
unhappiness ^a	3.48	.00	insecurity ^a	3.06	.00	titillation	2.80	.27	disgruntlement	2.37	.20
anxiety ^a	3.46	.00	defeat ^a	3.05	.01	torment ^a	2.80	.02	inconsolableness	2.37	.34
desire ^a	3.45	.00	dread ^a	3.05	.00	optimism ^a	2.78	.01	belligerence	2.33	.20
horror ^a	3.45	.00	fondness ^a	3.05	.00	vengefulness ^a	2.78	.03	disconsolateness	2.33	.41
sympathy ^a	3.45	.00	enthusiasm ^a	3.05	.00	impatience	2.75	.00	determination	2.30	.00
shame ^a	3.44	.00	sentimentality ^a	3.05	.00	persecution	2.75	.01	doubt	2.30	.00
lust ^a	3.43	.00	hopelessness ^a	3.04	.01	viciousness	2.75	.01	superiority	2.29	.00
disgust ^a	3.42	.00	annoyance ^a	3.03	.00	edginess	2.74	.05	vanity	2.28	.05
hostility ^a	3.41	.00	cheerfulness ^a	3.03	.00	awe	2.73	.03	acceptance	2.26	.00
jubilant ^a	3.41	.01	displeasure ^a	3.03	.00	despondency	2.73	.30	abandonment	2.23	.01
loneliness ^a	3.41	.01	melancholy ^a	3.02	.02	gratitude	2.73	.00	carefreeness	2.22	.00
delight ^a	3.40	.00	glumness ^a	3.01	.02	mellowness	2.71	.00	exhaustion	2.19	.00
pleasure ^a	3.40	.00	shock ^a	3.01	.00	vexation	2.71	.32	craving	2.16	.00
tenderness ^a	3.40	.00	spite ^a	3.01	.01	enchantment	2.70	.01	inclination	2.16	.00
pity ^a	3.39	.00	suffering ^a	3.01	.00	exultation	2.70	.15	approval	2.14	.00
bitterness ^a	3.38	.00	dismay ^a	3.00	.01	sullenness	2.69	.06	distraction	2.14	.01
disappointment ^a	3.38	.00	exasperation ^a	3.00	.02	surprise ^a	2.69	.00	freedom	2.13	.00
humiliation ^a	3.38	.00	infatuation ^a	3.00	.04	discontentment	2.67	.00	startle	2.11	.01
dejection ^a	3.37	.04	apprehension ^a	2.99	.03	discouragement	2.66	.00	indecision	2.02	.01
despair ^a	3.37	.01	caring ^a	2.98	.01	boredom	2.65	.01	interest	1.96	.00
frustration ^a	3.37	.00	isolation ^a	2.98	.00	exuberance	2.65	.05	self-control	1.95	.00
hurt ^a	3.37	.00	exhilaration ^a	2.96	.00	forlornness	2.65	.25	alertness	1.94	.00
adoration ^a	3.36	.07	rapture ^a	2.96	.11	lividness	2.65	.20	carefulness	1.84	.00
agony ^a	3.35	.01	uneasiness ^a	2.96	.00	moroseness	2.65	.25	practicality	1.75	.00
thrill ^a	3.34	.00	grouchiness ^a	2.95	.00	dolefulness	2.64	.40	deliberateness	1.73	.05
fury ^a	3.33	.01	ire	2.95	.57	wonderment	2.64	.01	intelligence	1.57	.00
remorse ^a	3.30	.03									

Note. Ratings were made by 112 subjects on a 4-point scale ranging from 1 (*I definitely would not call this an emotion*) to 4 (*I definitely would call this an emotion*). The words *abhorrence*, *ire*, *malevolence*, and *titillation* were excluded from the sorting study because many subjects were unfamiliar with them.

^a Words used in the emotion-sorting study.

Notice that in each of the three cases, the term often favored by emotion theorists and the term generated by analysis of co-occurrence data fell within the same subordinate category. For purposes of this article, we will use the labels *love*, *joy*, *surprise*,

anger, *sadness*, and *fear*. Future work may persuade us and other researchers to replace some of these with more general synonyms.

When the same kind of analysis was performed on all catego-

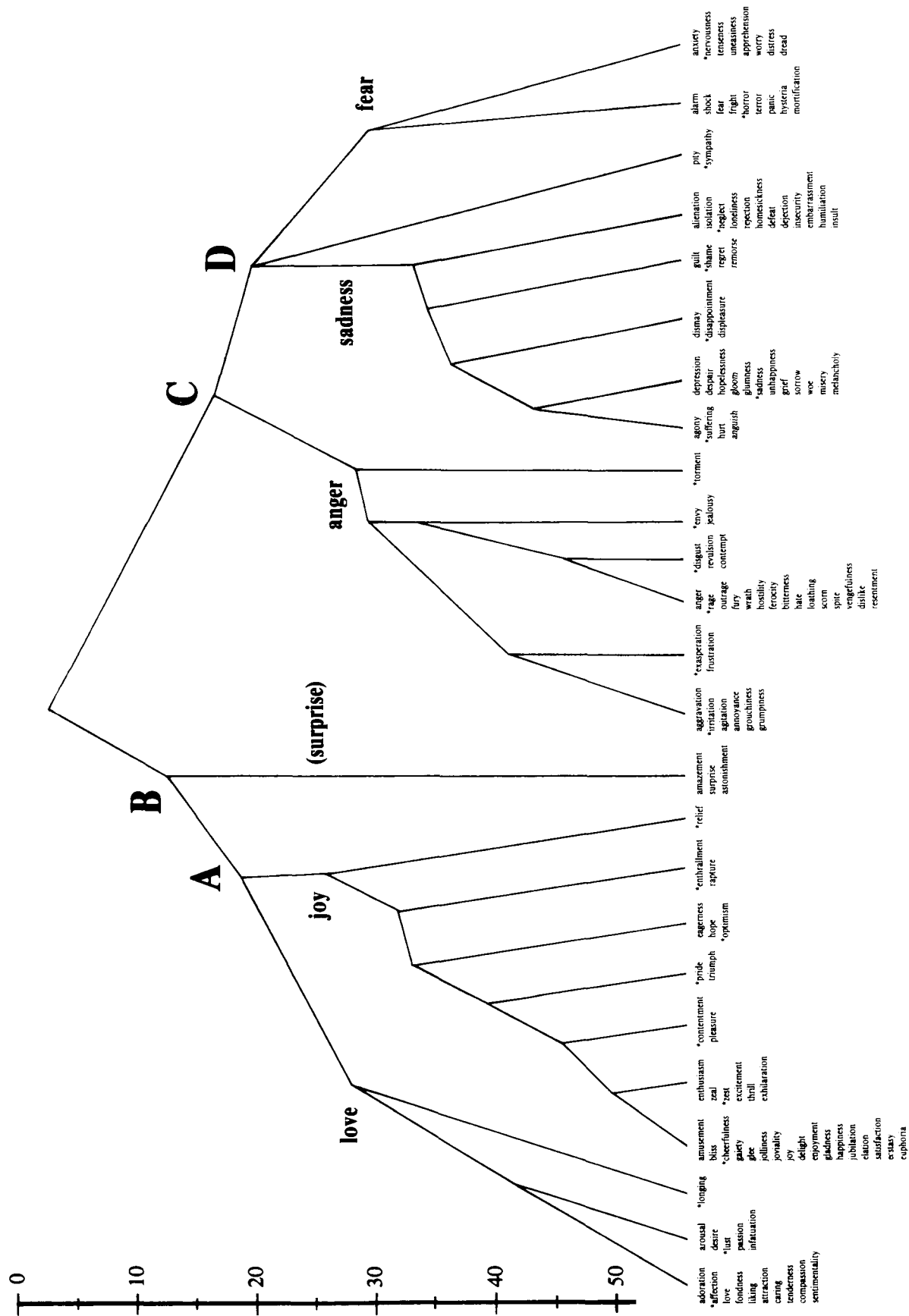


Figure 1 Results of a hierarchical cluster analysis of 135 emotion names. (Cluster strength can be determined by referring to numerical scale at left. Asterisks indicate empirically selected subcluster names.)

ries in the hierarchy above what we are calling the basic level (see the nodes labeled A, B, C, and D in Figure 1), Node A was labeled *joy*, B was labeled *cheerfulness*, C was labeled *sadness*, and D was also labeled *sadness*. These results seem to indicate that above the basic level, the only meaningful distinction is the one between positive and negative emotions. Because no general term such as *negative emotion* was included in the sorting study, the analysis was forced to select names that seem inappropriate labels for their subordinates—*sadness*, for example, is an odd superordinate label for categories such as rage and panic. When the analysis was performed on each of the subordinate categories (those below the basic level) containing more than one term, the labels shown with asterisks in Figure 1 were chosen: *affection*, *lust*, and *longing* (for the love category); *cheerfulness*, *zest*, *contentment*, *pride*, *optimism*, *enthralment*, and *relief* (for the joy category); *irritation*, *exasperation*, *rage*, *disgust*, *envy*, and *torment* (for the anger category); *suffering*, *sadness*, *disappointment*, *shame*, *neglect*, and *sympathy* (for the sadness category); *horror* and *nervousness* (for the fear category). (There were no subcategories within the small surprise group.)

The cluster-analytic results therefore provide three sets of candidates for basicness: a 2-term list at a high level of abstraction (essentially, positive vs. negative emotions), a 5- or 6-term list, and a 25-term list. Given these alternatives, we have tentatively decided to accept the 5- or 6-term list, which conforms most closely to the three basicness criteria listed earlier: (a) correspondence with Fehr and Russell's (1984) exemplar-listing data, (b) correspondence with several emotion theorists' lists of basic or primary emotions, and (c) correspondence with data on language learning in early childhood.

Recall that Fehr and Russell's emotion-naming procedure produced a list topped by happiness, anger, sadness, love, fear, hate, and joy. If happiness and joy are accepted as synonyms, only hate in Fehr and Russell's list and surprise in ours fail to correspond. In comparison with the lists proposed by various emotion theorists, ours matches Epstein's (1984) except for *surprise* in our list; it matches the list of emotions studied extensively by Ekman (1984) except for *disgust* in his list and *love* in ours; finally, five of our six basic emotions are included in Izard's (1977) list (all but *love*), in addition to which he included interest, distress, shame, disgust, contempt, and guilt. In comparison with Bretherton and Beeghly's (1982) list of emotion terms learned early by American children, ours contains *surprise* but is otherwise the same—assuming that *love* and *like* in the children's list are closely related. In all respects, then, it seems reasonable to adopt as a working hypothesis that the labeled level of the hierarchy in Figure 1 is the basic level of emotion knowledge, at least for our subjects. Only Izard's (1977) list of basic emotions, which we chose for comparison because of its unusual length, is very different from ours, and even in that case, five of our six categories appear on his list.

We have reservations concerning the *surprise* cluster, which is obviously much smaller and less differentiated than the others. In Fehr and Russell's (1984) exemplar-listing study, only 8.5% of the subjects listed surprise within a minute, whereas between 41% and 76% listed each of the other five basic-level terms. In Bretherton and Beeghly's (1982) study, well over half (57% to 87%) of 28-month-olds used the words *sad*, *happy*,

scared, *mad*, and *love*, whereas only 13% used *surprise*. We have therefore chosen in this article to examine prototypes of only five basic-level categories—fear, sadness, anger, joy, and love—although we retain surprise in our examination of results from multidimensional scaling analyses. Future research will be needed to clarify the unique status of surprise.

If we accept as a working hypothesis that there are five basic-emotion categories, what kinds of distinctions seem to be added to the differences among these five when one moves to the subordinate level? First, notice that each basic category includes one large subcluster containing the basic-level term. These subclusters seem to designate a generic, core, or nonspecialized form of the emotion in question. For example, within the love category, the affection subcategory seems to designate the generic form of love, which Sternberg and Grajek (1984) found applies to friendship, family relationships, marital relationships, and so forth, whereas the lust (or passion) subcategory refers only to romantic or sexualized love. Similarly, in the joy category, the cheerfulness subcategory contains fairly general names for joyful or happy feelings, whereas the other subcategories (zest, contentment, pride, etc.) have more specialized meanings.

To test the hypothesis that what we are calling core or generic subordinate categories are more central or representative members of their basic-level categories, we performed a new analysis. This involved computing mean within-category (within the basic category, in this case) centrality or prototypicality scores (the ones used to select category names) for terms in the core subclusters and separately for terms in the noncore (more specialized) subclusters. A *t* test was used to compare the two means ($M = 41.02$ for the core subclusters and 28.09 for the noncore subclusters), and the difference was found to be highly significant, $t(130) = 8.31, p < .001$. When five separate such comparisons were made, one for each basic-level category, four of the five were highly significant (all but the analysis for the fear category). Thus, the core subcategories are more representative of their basic-level clusters, on the average, than are the noncore subcategories. Theoretically, this representativeness should be reflected in judgments of the degree to which various terms are judged prototypical of the category *emotion* because the basic-level emotions themselves are highly prototypical (Fehr & Russell, 1984). This implication was tested by comparing the prototypicality (or emotionness) ratings of two groups of words: those contained in core subclusters ($M = 3.29$) and those contained in noncore subclusters ($M = 3.17$). The difference was significant, $t(130) = 2.29, p < .03$.

One might expect the naming analysis described earlier to have selected the basic-level term within each core subcluster as that subcluster's name. Except in the case of sadness, however, that did not happen. Recall that the selection of names was based on the difference between a term's average co-occurrence with other terms within its subcluster and its average co-occurrence with all terms outside its subcluster. Although the basic-level names co-occurred frequently with terms that fell within their core or generic subclusters, they also co-occurred frequently with words appearing in other subclusters of the same basic-level category. Instead of the basic-level term, then, the analysis selected the term that tended most strongly to co-occur with terms in the core or generic subcluster and *not* with other terms in the same basic-level category.

Core or generic love (*affection*) is similar to what social psychologists have called *companionate* love (e.g., Walster & Walster, 1978). It is usually contrasted with *passionate* love, which corresponds to the second large subcluster (*lust*) within the love category in Figure 1. Interestingly, several recent studies have shown that descriptions of different kinds of close relationships (e.g., friendships, sibling relationships, parent-child relationships) have a core construct of love in common, whereas romantic love seems to be conceptualized as this core kind of love plus passion, sexual attraction, and so forth (e.g., Davis & Todd, 1982; Sternberg, 1986; Sternberg & Grajek, 1984).

The joy category contains a core or generic subcategory (*cheerfulness*) containing the words *joy* and *happiness*, plus subcategories that our statistical procedures labeled excitement, zest, contentment, pride, optimism, enthrallment, and relief. Each of these subordinate-level clusters makes sense as a distinct category, and together they suggest that the major reasons for the evolution of a large and differentiated emotion lexicon are twofold: The lexicon marks differences in intensity within each of the basic emotion categories (e.g., contentment vs. ecstasy) and communicates something about the conditions or context in which the basic emotion under consideration arises (e.g., *pride* indicates that the self is the agent of a joy-producing outcome; *optimism*, that one expects a joy-producing outcome in the future).

The anger category contains a core or generic subcategory (*rage*), which includes the word *anger*, plus five additional subcategories: irritation, exasperation, disgust, envy, and torment (which subjects may have misunderstood). *Hate*, which Fehr and Russell (1984) found to be among the most psychologically accessible emotion names, appears within the core anger subcluster, indicating that subjects closely associated it with anger. Disgust, which many emotion theorists have treated as a basic emotion in its own right (because of its distinct facial expression and supposed links to innate reactions to bad tastes and smells), is clearly part of the basic-level anger category in the present study. (This fits with such everyday remarks as "I was disgusted when I heard that he got promoted" or "Did you hear Reagan's commercial about how much he has helped poor people?—Disgusting!") Thus, although disgust may be a separate, identifiable physical reaction across the life span, in the adult emotion lexicon it becomes metaphorically transformed into a type of anger akin to contempt. This transformation is neither arbitrary nor limited to our culture. Cross-cultural studies of emotional expressions (e.g., Ekman, Sorensen, & Friesen, 1969) and emotion antecedents (e.g., Boucher & Brandt, 1981) reveal frequent worldwide confusion between anger and disgust expressions and elicitors. A study of Pacific islanders' emotion classification yielded results similar to ours, with disgust being seen as a type of anger (Lutz, 1982).

Sadness includes, besides a core or generic subcluster (*sadness*), suffering, disappointment, shame, neglect, and sympathy. The substructure containing pity and sympathy is fairly distinct from the others because several subjects placed these in a category with love words, from the other side of the positive-negative divide. (*Longing* is a relatively detached member of the love cluster for a similar reason; many subjects classified it as a form of sadness.) Fear comes in two major forms: core, or generic, fear (*horror*) and anxiety—a distinction that corresponds

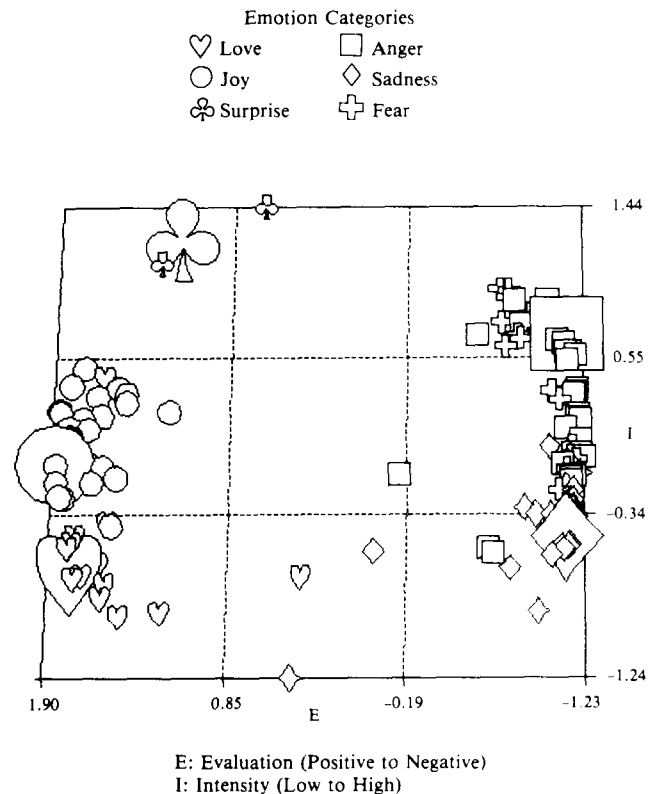


Figure 2. Two-dimensional solution from a multidimensional scaling analysis of the emotion co-occurrence matrix. (Each of the six kinds of symbols—hearts, circles, and so on—represents a different basic-level cluster in Figure 1. The large symbol of each type indicates the location of the word naming the basic-level cluster—love, joy, and so on.)

well to the clinical-psychological distinction between fear and anxiety. Within the sadness and fear categories, we see again that subordinate-level distinctions have mainly to do with intensity differences and with the antecedents or context in which the emotion in question arises.

Hierarchy, Circumplex, or Three-Dimensional Space?

Next, we consider how the hierarchical representation of the emotion domain compares with the more common circumplex and multidimensional portraits. To make comparisons most directly, using our own data, we subjected the 135×135 co-occurrence matrix to a classical nonmetric multidimensional scaling analysis (using the ALSCAL-4 program: Young & Lewycky, 1979; see also Kruskal, 1964). An elbow test, which involves plotting Kruskal stress coefficients as a function of solution dimensionality, indicated that the three-dimensional solution provided a good fit to the data. The stress coefficient was .20 for the one-dimensional solution, .15 for the two-dimensional solution, and .10 for the three-dimensional solution; little reduction in stress resulted from adding further dimensions. Because several contemporary emotion researchers (e.g., Plutchik, 1980; Russell, 1980, 1983) have favored a two-dimensional circumplex representation of the emotion domain, we will discuss both the two- and three-dimensional solutions.

Table 2
Coordinates of 135 Emotion Words in Two- and Three-Dimensional Space

Emotion word	Two-dimensional coordinates		Three-dimensional coordinates			Emotion word	Two-dimensional coordinates		Three-dimensional coordinates		
	Evaluation	Intensity	Evaluation	Potency	Activity		Evaluation	Intensity	Evaluation	Potency	Activity
Love words						Anger words (continued)					
adoration	1.72	-0.60	1.87	-0.05	-0.98	anger	-1.13	0.68	-1.15	1.30	-0.05
affection	1.74	-0.70	1.89	-0.16	-1.08	rage	-1.09	0.71	-1.12	1.28	0.13
love	1.77	-0.67	1.93	-0.08	-1.04	outrage	-1.11	0.63	-1.14	1.25	-0.03
fondness	1.77	-0.64	1.93	0.04	-1.05	fury	-0.96	0.81	-0.99	1.28	0.25
liking	1.79	-0.53	2.00	-0.10	-0.77	wrath	-1.13	0.58	-1.14	1.25	-0.05
attraction	1.76	-0.50	1.88	0.32	-1.03	hostility	-1.07	0.65	-1.08	1.29	-0.06
caring	1.70	-0.68	1.85	-0.31	-1.00	ferocity	-0.82	0.88	-0.83	1.42	0.09
tenderness	1.56	-0.73	1.69	-0.43	-1.02	bitterness	-1.23	-0.02	-1.29	0.92	-0.31
compassion	1.47	-0.90	1.56	-0.54	-1.19	hate	-1.18	0.56	-1.18	1.28	-0.13
sentimentality	1.23	-0.89	1.30	-0.53	-1.21	loathing	-1.11	-0.06	-1.10	1.06	-0.37
arousal	1.61	0.43	1.80	0.71	-0.27	scorn	-1.18	0.34	-1.20	1.11	-0.16
desire	1.55	-0.39	1.61	0.38	-1.03	spite	-1.16	0.58	-1.14	1.32	-0.16
lust	1.60	-0.62	1.68	0.29	-1.15	vengefulness	-1.14	0.54	-1.14	1.27	-0.10
passion	1.75	-0.46	1.91	0.19	-0.90	dislike	-1.21	0.08	-1.24	1.01	-0.30
infatuation	1.58	-0.80	1.65	-0.16	-1.29	resentment	-1.21	0.00	-1.27	0.95	-0.30
longing	0.42	-0.69	0.43	-0.76	-0.84	disgust	-1.20	0.36	-1.27	1.01	-0.04
Joy words						revulsion	-1.12	0.15	-1.20	0.90	-0.08
amusement	1.75	0.02	1.99	-0.26	0.24	contempt	-0.15	-0.11	-0.21	1.07	-0.47
bliss	1.52	-0.14	1.77	-0.01	-0.21	envy	-0.67	-0.52	-0.63	1.16	-0.68
cheerfulness	1.90	0.05	2.17	-0.07	0.13	jealousy	-0.69	-0.55	-0.72	1.00	-0.75
gaiety	1.80	0.10	2.06	-0.05	0.19	torment	-1.19	-0.02	-1.39	0.39	-0.04
glee	1.79	0.08	2.04	-0.06	0.19	Sadness words					
jolliness	1.88	0.10	2.16	-0.08	0.21	agony	-1.15	-0.26	-1.37	0.44	0.06
joviality	1.78	0.09	2.04	-0.04	0.18	suffering	-1.15	-0.40	-1.37	-0.52	-0.34
joy	1.88	-0.06	2.15	-0.06	-0.05	hurt	-1.16	-0.34	1.39	0.30	0.36
delight	1.88	0.04	2.16	-0.11	0.13	anguish	-1.13	-0.05	-1.35	-0.17	0.08
enjoyment	1.84	0.01	2.11	-0.11	0.09	depression	-1.17	-0.30	-1.37	-0.54	-0.11
gladness	1.87	-0.06	2.14	-0.14	-0.04	despair	-1.17	-0.21	-1.37	-0.51	0.05
happiness	1.87	-0.16	2.14	-0.14	-0.13	hopelessness	-1.15	-0.32	-1.35	-0.59	-0.11
jubilant	1.86	0.24	2.14	0.06	0.31	gloom	-1.04	-0.34	-1.20	-0.77	0.04
elation	1.72	0.19	1.97	-0.08	0.33	glumness	-1.14	-0.51	-1.32	-0.84	-0.14
satisfaction	1.82	-0.24	2.08	-0.12	-0.30	sadness	-1.12	-0.47	-1.32	-0.70	-0.27
ecstasy	1.73	-0.06	1.98	-0.02	-0.20	unhappiness	-1.16	-0.43	-1.37	-0.61	-0.32
euphoria	1.67	-0.06	1.93	0.00	-0.01	grief	-1.15	-0.40	-1.35	-0.67	-0.21
enthusiasm	1.85	0.24	2.12	-0.03	0.32	sorrow	-1.11	-0.53	-1.31	-0.72	-0.39
zeal	1.69	0.14	1.92	-0.32	0.34	woe	-0.88	-0.30	-1.05	-0.75	-0.08
zest	1.86	0.25	2.13	-0.03	0.38	misery	-1.17	-0.26	-1.38	-0.50	-0.13
excitement	1.80	0.39	2.06	0.02	0.52	melancholy	0.00	-0.54	-0.18	1.17	0.01
thrill	1.72	0.49	1.94	-0.16	0.78	dismay	1.03	0.04	-1.23	-0.45	0.19
exhilaration	1.64	0.32	1.87	-0.03	0.55	disappointment	-1.19	-0.36	-1.41	0.39	0.33
contentment	1.54	-0.40	1.77	-0.11	-0.46	displeasure	-1.21	-0.11	-1.42	0.28	-0.25
pleasure	1.85	-0.24	2.10	-0.09	-0.38	guilt	-1.10	-0.42	-1.30	-0.62	-0.32
pride	1.60	-0.08	1.85	0.16	-0.20	shame	-1.16	-0.37	-1.37	-0.54	-0.30
triumph	1.80	0.15	2.05	-0.20	0.35	regret	-1.10	-0.35	-1.32	-0.49	-0.27
eagerness	1.52	0.37	1.71	-0.32	0.71	remorse	-1.12	-0.38	-1.34	-0.50	-0.30
hope	1.66	-0.16	1.89	-0.29	-0.28	alienation	-1.10	-0.51	-1.28	-0.80	-0.24
optimism	1.61	0.21	1.84	-0.21	0.42	isolation	-0.96	-0.88	-1.09	-1.26	-0.15
enthrallment	1.47	0.34	1.73	0.04	0.33	neglect	-1.15	-0.31	-1.34	-0.66	-0.12
rapture	1.21	0.24	1.50	0.19	-0.03	loneliness	-1.04	-0.57	-1.22	-0.82	-0.35
relief	1.47	0.29	1.65	-0.49	0.58	rejection	-1.10	-0.35	-1.32	-0.44	-0.32
Surprise words						homesickness	-1.13	-0.52	-1.31	-0.84	-0.25
amazement	1.29	1.10	1.39	-0.05	1.53	defeat	-1.16	-0.31	-1.36	-0.60	-0.12
surprise	1.18	1.24	1.25	-0.19	1.67	dejection	-1.14	-0.46	-1.33	-0.73	-0.20
astonishment	0.68	1.44	0.74	0.07	1.83	insecurity	-1.08	-0.20	-1.26	-0.64	-0.12
Anger words						embarrassment	-0.95	-0.34	-1.03	-0.94	0.37
aggravation	-1.20	0.22	-1.35	0.65	0.10	humiliation	-1.12	-0.19	-1.34	-0.50	-0.08
irritation	-1.20	0.21	-1.30	0.86	0.00	insult	-1.16	-0.14	-1.39	0.08	-0.24
agitation	-1.18	0.35	-1.31	0.78	0.20	pity	-0.80	-0.64	-0.97	-0.45	-0.84
annoyance	-1.22	0.20	-1.30	0.92	-0.12	sympathy	0.47	-1.24	0.40	-1.36	1.00
grouchiness	-1.17	-0.12	-1.34	0.50	-0.28	Fear words					
grumpiness	-1.16	-0.15	-1.35	0.35	-0.28	alarm	-0.78	0.94	-0.78	0.05	1.43
exasperation	-0.60	0.68	-0.73	0.45	0.88	shock	-0.73	0.94	-0.73	0.08	1.43
frustration	-1.10	-0.06	-1.33	-0.02	0.00						

Table 2 (Continued)

Emotion word	Two-dimensional coordinates		Three-dimensional coordinates		
	Evaluation	Intensity	Evaluation	Potency	Activity
Fear words (continued)					
fear	-1.02	0.73	-1.10	0.10	1.15
fright	-0.97	0.73	-1.04	0.31	1.11
horror	-1.01	0.77	-1.08	0.57	1.03
terror	-1.01	0.72	-1.10	0.45	1.04
panic	-0.97	0.74	-1.05	0.02	1.18
hysteria	-0.74	0.75	-0.82	0.43	1.06
mortification	-1.04	0.36	-1.23	-0.13	0.59
anxiety	-0.84	0.68	-0.90	-0.48	1.11
nervousness	-0.96	0.70	-1.03	-0.41	1.14
tenseness	-0.86	0.66	-0.95	-0.09	1.07
uncasiness	-1.09	0.31	-1.22	-0.46	0.72
apprehension	-0.77	0.62	-0.80	-0.27	1.16
worry	-1.13	-0.09	-1.29	-0.55	0.41
distress	-1.18	-0.03	-1.35	-0.49	0.37
dread	-1.16	0.04	-1.37	-0.16	0.29

Note. Words are grouped according to the six major categories that emerged from the hierarchical cluster analysis (see Figure 1).

A computer-generated summary of the two-dimensional solution is shown in Figure 2; the coordinates for each of the 135 emotion words are provided in Table 2. Members of different basic-level emotion clusters in Figure 1, including surprise, are represented in Figure 2 by different symbols (*hearts* for love words, *circles* for joy words, *clubs* for surprise words, *squares* for anger words, *diamonds* for sadness words, and *crosses* for fear words). The large symbols designate the words naming the basic-emotion categories: love, joy, surprise, anger, sadness, and fear. Four features of the results merit discussion: (a) Even though the 135 terms were not preselected to fit a circumplex pattern, or any other theoretically significant configuration, they fall roughly around the perimeter of a circle defined by two orthogonal dimensions, which can be interpreted as evaluation (positive vs. negative hedonic tone) and intensity or arousal. (b) Despite the large number of terms included, many parts of the circle are unoccupied, suggesting (in line with Scherer, 1984) that more perfect-looking circumplex analyses, such as Russell's (1980, 1983), require the inclusion of words that most people would not call emotions (e.g., *sleepy*, *relaxed*). (c) Within each of the basic categories (according to Figure 1) one finds terms that differ with respect to intensity or arousal (as can be seen in Table 2, these include *rage* vs. *grouchiness*, *terror* vs. *worry*, and *ecstasy* vs. *contentment*). Differences between these terms within basic categories are almost as responsible for the intensity dimension's appearance in the analysis as are intensity differences between basic emotion categories. (d) The clusters of terms labeled *fear* and *anger* in Figure 1, which most people see as quite distinct, are almost completely intermingled in Figure 2 (notice the intermingling of crosses and squares). In general, the two-dimensional solution provides no basis for separating terms that, according to both intuition and hierarchical cluster analysis (e.g., fear and anger), belong to qualitatively different emotion categories. (The large cross represent-

ing the word *fear* is nearly obscured by the large square designating the word *anger*; only two of its arms protrude at the top and left of the large square.)

A computer-generated summary of the three-dimensional solution is shown in Figure 3; the coordinates for each emotion word are provided in Table 2. Just as the two-dimensional solution corresponds well with two-dimensional solutions reported by previous investigators, the three-dimensional solution corresponds well with three-dimensional solutions obtained earlier by, for example, Schlosberg (1954), Osgood et al. (1957), and Russell and Mehrabian (1977). The first, horizontal dimension corresponds with what Osgood et al. called "evaluation." The second and third, extending back and up, respectively, are formed by splitting Figure 2's intensity dimension into two separate vectors, which Osgood et al. called "potency" and "activity." The major contributions of moving from two to three dimensions are (a) to reveal that anger-related emotions (e.g., anger, rage, fury, and spite) tend to be high in potency, sadness-related emotions (e.g., loneliness, melancholy, and sadness) tend to be low in potency, and the other four emotion categories (including surprise) tend to be intermediate in potency, although there is substantial variation within categories (see Table 2); and (b) to reveal that fear (e.g., alarm, shock, fear, and panic) and especially surprise are high in activity, love-related emotions are somewhat low in activity, and the other emotion categories are intermediate in activity. The three-dimensional solution helps to differentiate between what the cluster analysis suggests are separate basic-emotion categories, and it is clearly more informative as a representation of emotion knowledge than the two-dimensional solution. Nevertheless, there is still some overlap between categories (reflecting their fuzziness) and

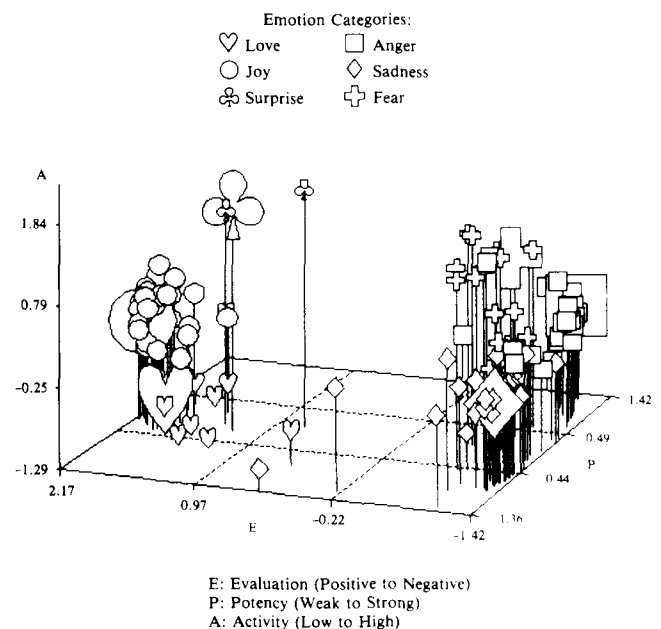


Figure 3. Three-dimensional solution from a multidimensional scaling analysis of the emotion co-occurrence matrix. (The meaning of the large and small symbols and of the six different types of symbols is the same as in Figure 2.)

no way within the multidimensional scaling analysis to tell that frustration, for example, is conceptually closer to anger than to fear or sadness—a fact revealed by cluster analysis. Moreover, the meaningful subordinate-level structure within each of the basic categories, so clear in the cluster analysis, is difficult to derive from the multidimensional scaling analysis (even when all of the names are included, which they cannot be in the small figure shown here).

Summary of Study 1

The prototype approach to emotion proved useful in guiding the selection of emotion terms to be included in the analysis (those that were judged relatively prototypical), in suggesting the use of nouns (“objects in natural categories”; Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976) rather than other parts of speech, and in pointing to hierarchical cluster analysis as a technique that reveals features of categorical structure not revealed by the more usual multidimensional scaling techniques. It seems possible, given the results, that all of the terms in the emotion lexicon—at least the hundred or so that are most prototypical of the category *emotion*—refer in one way or another to a mere handful of basic-level emotions. Each term seems to specify either the intensity of the basic emotion in question (e.g., *jubilant* vs. *satisfaction*, *rage* vs. *grouchiness*, *terror* vs. *worry*) or the antecedent context in which the emotion arises (*disappointment* vs. *grief*, *pride* vs. *hope*). In other words, the emotion lexicon, containing hundreds of terms (only 135 of which were included here), may refer to the particular basic emotion in question and to its intensity, specific eliciting context, or both. If so, the structure of emotion knowledge is not as complex as one might initially expect.

A three-dimensional representation of co-occurrence data from Study 1 was also shown to be statistically justifiable and highly interpretable. Thus, the very same similarity or categorization judgments are meaningfully compatible with both hierarchical and dimensional representations, and the two forms of representation reveal different aspects of emotion knowledge.

Study 2: Contents of Basic Emotion Prototypes

The prototype approach to mental representation suggests that comparisons among named emotions involve comparisons of prototypes or prototypical features. Moreover, as discussed briefly by Fehr and Russell (1984, p. 482), the approach suggests that real emotional events, or exemplars of emotion, are perceived and understood with reference to emotion prototypes or scripts. Finally, it suggests that the initial encoding of an emotion episode is likely to occur at the basic level of the emotion hierarchy. For these reasons, it seemed important to delineate prototypes of the basic emotions, along the lines pioneered by Averill (1982) and de Rivera (1981b) in analyses of anger, and to examine their structures and contents. That was the purpose of Study 2.

Like other prototype researchers (e.g., Cantor & Mischel, 1979a; Horowitz et al., 1982) and cognitively oriented emotion researchers (e.g., Roseman, 1984; Smith & Ellsworth, 1985), we began with the assumption that people's descriptions of specific instances of a category reflect underlying category prototypes.

The average young adult has witnessed thousands of emotion episodes and has experienced thousands more. If contemporary cognitive psychology is correct in claiming that repeated experiences with similar events lead to the construction of generic mental representations, then ordinary, untrained subjects should construct emotion prototypes and implicitly use them when witnessing and recounting emotion episodes. Just as story readers construct generic story schemas (Mandler, 1984) and regular restaurant patrons construct restaurant scripts (Schank & Abelson, 1977), observers and experiencers of emotion should, whether they are aware of it or not, construct basic emotion prototypes.

Method

Subjects and Procedure

One hundred twenty students in introductory psychology courses wrote accounts of emotional experiences. The accounts were of two kinds, *self* and *typical*. Subjects in the *self* condition (30 men and 30 women) wrote descriptions of actual episodes in which they experienced fear, sadness, anger, joy, and love. For each emotion, they were free to choose any incident from their own experience. To elicit a complete account of the relevant episode, subjects were given a questionnaire (similar to ones used by Averill, 1982; Fehr & Russell, 1984; and Scherer, Summerfield, & Wallbott, 1983) containing the following instructions and questions, with blank spaces provided for their responses:

Think of a real incident in which you were AFRAID [SAD, ANGRY, JOYFUL; in the love condition, “in which you felt particularly IN LOVE or LOVING”]. Take a few moments to recall as many details of the incident as you can.

1. Tell in detail what happened to cause you to feel afraid [sad, etc.]
2. Tell in as much detail as you can
 - what you were feeling and thinking
 - what you said, if anything, and how you said it
 - what physical signs of fear [sadness, etc.] you showed, if any; and
 - what you did, how you acted.
3. About how long did the feeling last? How was it resolved? What caused it to change or subside?
4. Can you add anything that would help to describe the emotion episode more fully?

Subjects in the *typical* condition (30 men and 30 women) described their impressions of typical emotion episodes—telling what generally happens when a person becomes afraid, sad, angry, joyful, or loving. The typical condition was included to allow comparisons between descriptions of personal emotional experiences, on the one hand, and beliefs about the emotional experiences of people in general, on the other. The typical version of the questionnaire directly paralleled the self version, but it asked subjects to “think about times when people are afraid,” “tell in detail what typically causes a person to feel afraid,” and so forth.

Sample Accounts

Subjects responded easily to both versions of the questionnaire, producing rich and informative accounts of emotional episodes. An 18-year-old woman, for example, wrote the following description of an actual (self) anger experience:

My boyfriend overheard a friend of his giving me some very nice compliments and being a little suggestive. Because I did not return soon, he assumed something was going on. When I did return, he told me to get out of his life and that “we were over.” I didn't know

the reason for his behavior, and I became very defensive and angry. He went to beat up his friend; I tried to stop him in the elevator by not allowing the doors to close. Then I let him go and went to my room, slamming every door in my path.

I was confused because I didn't know why he was so mad and being so mean to me. I was angry with him for acting the way he was over what I felt was no big deal. (I didn't know his assumptions; I at first did not know he had even heard part of what his friend had said.) I was also sad and scared about our relationship ending, but anger overrode these feelings.

I called him a jerk. I yelled at him. I said (excuse me, please) "fuck you" and called him "shit head." I also tried to tell him he was wrong to act the way he was over no big deal. I hit and kicked and cursed him repeatedly.

The anger lasted about 2 days. It subsided after he found out what really happened and apologized. He got my side of the story and talked with his friend (not a good talk), and our stories of course matched. He then felt really bad and silly about his actions.

An 18-year-old man wrote the following account of an actual joy experience:

I had the opportunity to direct the first all-student musical ever done at my high school. I was producer-director, which put a lot of pressure and responsibility on me. But to see the final play and know that I contributed and brought it all together was great! The lady who usually directs the plays went up to the principal and asked him what they needed her for if the students could do it this well!

I was so proud. I have never had as much fun or excitement as I did that closing night. Everyone was congratulating me, and it made me very naturally high. Everyone could tell I was excited and joyful. I just kept saying, "We did it, and we did it great!" I had the biggest smile on my face, and I was hugging all of the cast members. I was on Cloud 9 for a long time. I acted so proud, I guess like a new father or something.

The feeling lasted for about 2 or 3 days. The thing that made it subside was when I realized that it was over, and all the fun and excitement ended.

Finally, a 19-year-old woman wrote this description of typical sadness experiences:

Disappointments, and deaths of people that one really cares about. When the person has really put everything he has into something (like a relationship, a business venture, an application for a competitive scholarship) and that something doesn't work out, it's a disappointment and the person is sad. Another, more severe sadness is grief over the death of somebody the person really cared about. Someone who has made a significant mark on a person's life, but now they are gone. This creates a feeling of loss or emptiness which is also a form of sadness.

A sad person typically feels empty; they have lost something of great value. They may also feel lost. They don't know what to do next or where to turn. A sad person typically feels unable to remedy the situation. There is no way to make things better or erase what has happened. For example, the dead loved one is dead, and there's nothing you can do about it. A job not gotten is a job not gotten.

A sad person speaks with both words and actions. He might actually tell a close friend how he feels: "Something terrible has happened and I can't help it; I feel devastated, lost, and empty." But people on the street can tell it even if he doesn't say anything. He doesn't initiate conversation; he seems weary with everything. He is likely not to be at his physical best—perhaps his clothes are unironed, his hair uncombed; maybe he doesn't smile even at people he knows. The person might look physically exhausted and drooped over, like he hasn't slept in days. Circles under the eyes, et cetera. Generally run down.

Sad people usually act as if nothing they are doing has much significance. As if at work, or at home or whatever, they are just going through the motions of living.

Coding the Accounts

Six coders read a sample of the 120 accounts for a given emotion and generated, through group discussion, a list of features (antecedents, expressions, feelings, physiological reactions, and behaviors) that they could agree appeared in at least a few of these accounts. This feature list served as the coding system for the relevant emotion. Three of the six coders then independently evaluated each account, judging each feature in the coding system to be either present or absent in that account. Interrater reliabilities (average proportion of agreement between pairs of coders) ranged from .65 to 1.00 and are shown, for all features that we will consider prototypical (see below), in Table 3. Of the 127 prototypical features, 125 were coded with reliability equal to or greater than .70.

The coders' judgments were used to produce a feature summary of each narrative account. A feature was scored as present in a given account if at least two of three coders agreed that it was present. On the basis of these codings, we determined the prototypical features of the basic emotion categories. Following the convention established by Horowitz et al. (1981) and Cantor and Mischel (1979a), a feature was retained in the prototype of a given emotion if it was present in at least 20% of either the self or typical accounts for that emotion. Although somewhat arbitrary, this cutoff resulted in the elimination of infrequent, idiosyncratic features.

These procedures produced a list of 23 to 29 prototypical features for each emotion category. Although informative in themselves, in simple list form the features failed to convey the temporally organized, script-like structure of subjects' accounts, which seemed potentially important for future research and theorizing (Schwartz & Shaver, in press). To organize each emotion prototype into temporal and functional feature groupings, an additional step was taken. We arranged the features for each emotion in random order on a sheet of paper, and the six coders, all of whom had read scores of accounts of each emotion, independently rated all possible pairs of features on a 5-point functional similarity scale. (See Mandler, 1984, for a similar procedure.) If two features played very different functional roles in the emotion episodes (e.g., an intense expression, such as screaming, and an attempt to control such expressions by "trying to keep it inside"), that pair was given a rating of 1. If two features performed very similar functions (e.g., two causal antecedents such as "getting what was not wanted" and "not getting what was wanted"), the pair was given a rating of 5. Correlations between all pairs of raters were computed for each emotion, and Cronbach's alpha was computed as an index of reliability from the resulting correlation matrix. All of the alphas were high: .90 for love, .94 for joy, .93 for anger, .94 for sadness, and .91 for fear.

For each prototype, the matrices of ratings produced by the six coders were averaged and submitted to hierarchical cluster analysis (again using the BMDP 1M program's average distance method) to produce the prototype diagram for that emotion. (This is the procedure used by Horowitz et al., 1981.) Although not completely objective, because the six coders (including the authors) had held many discussions about emotions, emotion accounts, and so forth, the structures shown in Figures 4 through 8 are more systematic than intuitive author summaries. They stand as working hypotheses concerning the internal organization of basic-emotion scripts.

Results and Discussion

Figures 4 through 8 present the prototypes of fear, sadness, anger, joy, and love, respectively. A glance at the five figures re-

Table 3

Prototypical Emotion Features' Coding Reliabilities and Frequencies of Occurrence in Self and Typical Accounts

Emotion feature	Coding reliability (average proportion of agreement)	Proportion of subjects		
		Self (n = 60)	Typical (n = 60)	Self-typical difference
Fear				
Threat of social rejection	0.81	.28	.27	.01
Possibility of loss, failure	0.85	.23	.12	.11
Loss of control, competence	0.75	.28	.20	.08
Threat of harm or death	0.81	.65	.70	-.05
Novel, unfamiliar situation	0.71	.30	.55	-.25**
Being alone	0.90	.47	.08	.39***
Being in the dark	0.90	.08	.23	-.15*
Sweating, perspiring	0.95	.02	.25	-.23***
Feeling nervous, jittery, jumpy	0.70	.33	.63	-.30***
Shaking, quivering, trembling	1.00	.33	.00	.33***
Eyes darting, looking quickly around	0.95	.00	.20	-.20***
Nervous, fearful talk	0.75	.18	.23	-.05
Shaky, trembling voice	1.00	.07	.23	-.16*
Crying, whimpering	1.00	.12	.25	-.13
Screaming, yelling	0.95	.20	.23	-.03
Pleading, crying for help	0.90	.05	.20	-.15*
Fleeing, running, walking hurriedly	0.88	.12	.30	-.18*
Picturing a disastrous conclusion	0.67	.55	.28	.27**
Losing ability to focus, disoriented	0.71	.12	.25	-.13
Hiding from threat, trying not to move	0.81	.07	.25	-.18**
Talking less, being speechless	0.95	.33	.28	.05
Acting unafraid, hiding the fear	0.85	.28	.18	.10
Comforting self, trying to keep calm	0.85	.20	.23	-.03
Sadness				
Undesirable outcome, negative surprise	0.71	.60	.20	.40***
Death of a loved one	0.90	.50	.65	-.15
Loss of relationship; separation	0.77	.50	.63	-.13
Rejection, exclusion, disapproval	0.79	.10	.28	-.18**
Not getting what was wanted, etc.	0.88	.03	.27	-.24***
Reality falling short of expectations	0.83	.15	.37	-.22**
Discovering one is powerless, helpless	0.83	.20	.10	.10
Empathy with someone who is sad, hurt	0.94	.30	.22	.08
Sitting, lying around; inactive, etc.	0.85	.22	.60	-.38***
Tired, run-down, low in energy	0.95	.13	.28	-.15*
Slow, shuffling movements	0.95	.02	.30	-.28***
Slumped, drooping posture	1.00	.03	.37	-.34***
Withdrawing from social contact	0.88	.33	.67	-.34***
Talking little or not at all	0.80	.45	.47	-.02
Low, quiet, slow, monotonous voice	0.95	.02	.40	-.38***
Saying sad things	0.85	.07	.47	-.40***
Frowning, not smiling	1.00	.02	.32	-.30***
Crying, tears, whimpering	1.00	.72	.62	.10
Irritable, touchy, grouchy	0.85	.17	.25	-.08
Moping, brooding, being moody	0.95	.08	.25	-.17*
Negative outlook; thinking negatively	0.79	.12	.63	-.51***
Giving up; no longer trying to improve	0.79	.18	.43	-.25**
Blaming, criticizing oneself	0.85	.22	.13	.09
Talking to someone about sadness	0.90	.23	.17	.06
Taking action, becoming active	0.77	.43	.08	.35***
Suppressing feelings; acting happy	0.88	.25	.15	.10
Anger				
Predisposition to anger	0.79	.27	.08	.19**
Reversal or loss of power, status	0.70	.50	.37	.13
Violation of expectation	0.71	.68	.40	.28**
Frustration/interruption of activity	0.73	.43	.23	.20*
Real or threatened pain	0.67	.55	.58	-.03
Judgment of illegitimacy, unfairness	0.83	.95	.62	.33***
Obscenities, cursing	0.90	.30	.30	.00
Verbally attacking the cause of anger	0.79	.68	.70	-.02
Loud voice, yelling, screaming	0.95	.40	.78	-.38***
Complaining, bitching, etc.	0.85	.13	.22	-.09
Hands or fists clenched	1.00	.10	.33	-.23**

Table 3 (continued)

Emotion feature	Coding reliability (average proportion of agreement)	Proportion of subjects		
		Self (<i>n</i> = 60)	Typical (<i>n</i> = 60)	Self-typical difference
Anger (<i>continued</i>)				
Aggressive, threatening gestures	0.80	.10	.32	-.22**
Attacking something other than cause	0.85	.17	.53	-.36***
Physically attacking the cause of anger	0.92	.18	.33	-.15
Incoherent, out of control, emotional	0.85	.08	.27	-.19**
Imagining attacking the cause of anger	0.85	.38	.23	.15
Heavy walk, stomping	1.00	.02	.20	-.18***
Tightness or rigidity in body	0.85	.10	.23	-.13
Nonverbally communicating disapproval	0.81	.35	.15	.20**
Frowning, not smiling, etc.	1.00	.11	.25	-.14
Gritting teeth, showing teeth, etc.	1.00	.05	.20	-.15*
Red, flushed face	1.00	.18	.47	-.29***
Crying	0.95	.13	.20	-.07
Nervous tension, anxiety, discomfort	0.95	.12	.22	-.10
Brooding; withdrawing from contact	0.92	.07	.22	-.15*
Narrowing of attention	0.79	.02	.30	-.28***
Thinking "I'm right," etc.	0.88	.23	.52	-.29***
Suppressing anger; trying not to show it	0.73	.27	.13	.14
Redefining the situation, etc.	0.81	.20	.02	.18***
Joy				
Task success, achievement				
Desirable outcome: getting what was wanted	0.77 0.75	.63 .68	.45 .68	.18* .00
Receiving esteem, respect, praise	0.85	.42	.25	.17*
Getting something striven for, etc.	0.83	.38	.12	.26***
Reality exceeding expectations	0.81	.27	.17	.10
Receiving a wonderful surprise	0.85	.10	.20	-.10
Experiencing pleasurable stimuli, etc.	0.67	.18	.27	-.09
Being accepted, belonging	0.73	.22	.22	.00
Receiving love, liking, affection	0.81	.15	.38	-.23**
Being courteous, friendly to others	0.90	.05	.28	-.23***
Doing nice things for other people	0.98	.03	.27	-.24***
Communicating the good feeling	0.65	.50	.30	.20*
Sharing the feeling	0.75	.12	.32	-.20**
Hugging people	1.00	.30	.07	.23***
Positive outlook; seeing bright side	0.81	.50	.75	-.25**
High threshold for worry, annoyance	0.90	.12	.45	-.33***
Giggling, laughing	1.00	.33	.30	.03
Feeling excited	0.80	.23	.13	.10
Physically energetic, active, "hyper"	0.95	.13	.52	-.39***
Being bouncy, bubbly	0.95	.03	.20	-.17**
Jumping up and down	0.95	.20	.23	-.03
Saying positive things	0.95	.20	.55	-.35***
Voice is enthusiastic, excited	0.75	.17	.40	-.23**
Being talkative, talking a lot	0.90	.15	.25	.10
Smiling	1.00	.58	.85	-.27***
Bright, glowing face	0.90	.07	.23	-.16**
Love				
Other offers something wanted, etc.	0.77	.22	.22	.00
Person knows other loves, needs, him or her	0.94	.20	.13	.07
Person finds other attractive	1.00	.28	.28	.00
Exceptionally good communication	0.90	.27	.15	.12
Other inspires openness, trust, etc.	0.88	.20	.18	.02
Having shared time, experiences	0.10	.37	.33	.04
Being forgetful, distracted, etc.	0.90	.02	.23	-.21***
Wanting the best for other, etc.	0.81	.12	.25	-.13
Wanting to see, spend time with other	0.83	.30	.23	.07
Saying "I love you"	0.98	.18	.27	-.09
Expressing positive feelings to other	0.92	.17	.23	-.06
Wanting physical closeness or sex	0.94	.25	.32	-.07
Kissing	0.88	.20	.25	-.05
Touching, petting	0.94	.18	.32	.14
Hugging, holding, cuddling	1.00	.38	.33	.05
Eye contact, mutual gaze	0.90	.23	.17	.06

(table continued)

Table 3 (continued)

Emotion feature	Coding reliability (average proportion of agreement)	Proportion of subjects		
		Self (<i>n</i> = 60)	Typical (<i>n</i> = 60)	Self-typical difference
Love (continued)				
Feeling excited, high energy, etc.	0.96	.22	.15	.07
Feeling/acting self-confident, etc.	0.94	.20	.30	-.10
Seeing only the positive side, etc.	0.92	.08	.37	-.29***
Feeling happy, joyful, exuberant, etc.	0.90	.48	.55	-.07
Feeling warm, trusting, secure, etc.	0.77	.45	.40	.05
Feeling relaxed, calm	0.98	.22	.07	.15**
Smiling	0.94	.57	.32	.25**

* $p < .05$, two-tailed.** $p < .01$, two-tailed.*** $p < .001$, two-tailed.

veals a consistent general structure, highlighted by heavy lines surrounding the large exterior boxes. All five prototypes contain a set of *antecedents* (listed in the uppermost of the heavily outlined boxes) and a diverse collection of experiential, physiological, cognitive, expressive, and behavioral *responses* (contained in the second and largest heavily outlined box). Each of the three negative emotions—fear, sadness, and anger—also includes a set of *self-control procedures*, appearing in the third and smallest heavily outlined box. The number in the upper right-hand corner of each box represents the average functional similarity rating (on a 5-point scale) of all pairs of features in that box. Higher numbers identify “tighter” clusters—those containing features judged to be highly similar to one another. All clusters with strengths of at least 2.75 are indicated by boxes in the diagrams. The number in brackets following each feature indicates the percentage of 120 subjects mentioning that feature. (Some of the percentages are less than 20 because the 20% cutoff applied to either the self or the typical subjects, whereas proportions from these two groups of subjects have been averaged in the figure.) Despite this common gross structure, each emotion prototype exhibits unique contents and fine structure. We turn now to a consideration of some of these details.

Fear

The fear prototype is presented in Figure 4. Examination of the antecedents reveals that fear accounts begin with an interpretation of events as potentially dangerous or threatening to the self—most commonly, an anticipation of physical harm, loss, rejection, or failure. The fear antecedents also include a set of situational factors (unfamiliar situation, being in the dark, being alone) that probably increase the person's perceived vulnerability to such threats and impede his or her chances of coping effectively. Thus, as various authors have pointed out (Osgood, May, & Miron, 1975; Roseman, 1984) the fearful person describes himself or herself as relatively weak or low in potency; some aspect of the self (e.g., physical well-being, social position, or sense of competence) is potentially under attack and the fearful person is relatively helpless to do anything about it other than flee or hide.

A central element of the person's response to this dangerous

and weak position seems to be arousal of the autonomic nervous system in preparation for flight (as Cannon, 1927, and others have argued); the person feels jittery and jumpy, perspires, trembles, and looks quickly around. The person's voice shakes or trembles and he or she verbalizes nervousness or fear. Other commonly reported vocal expressions include screaming or

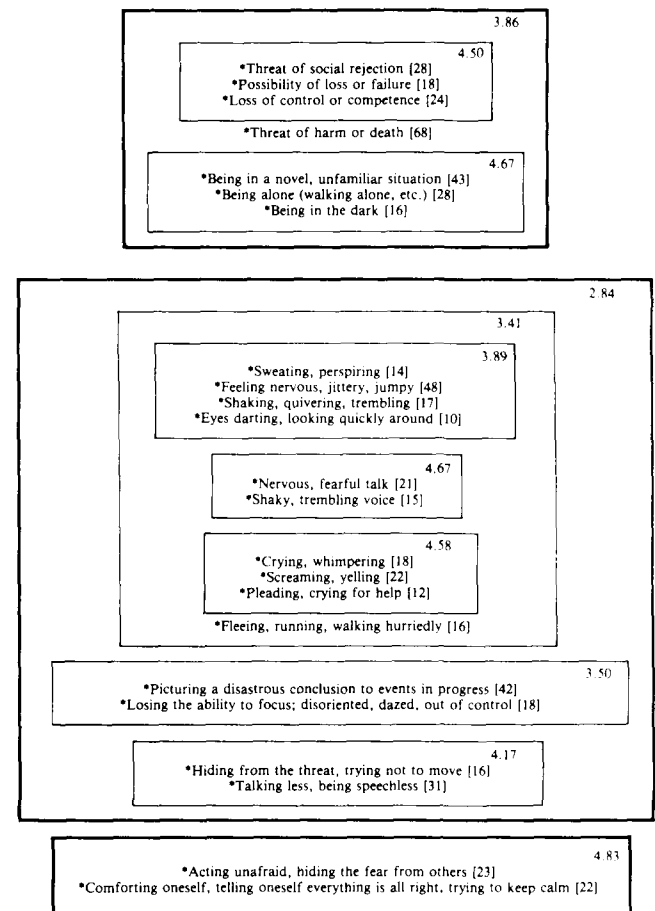


Figure 4. The prototype of fear.

yelling, crying, and pleading for help. This last response is presumably an attempt to avert the imagined disaster, as is flight (fleeing, running, walking hurriedly). These features may explain fear's relatively high standing on the activity dimension of the three-dimensional emotion space (see Figure 3). The remaining responses include an additional pair of coping attempts (hiding from the threat or freezing, and being quiet) and a pair of internal reactions (picturing disaster and becoming disoriented or cognitively impaired). Finally, the fear prototype includes self-control mechanisms. One of these, comforting oneself, is primarily internal and seems designed to reduce fear. Another, acting unafraid, is a form of self-presentation that in many accounts seems designed to reduce the likelihood of a threatening person's (or gang's) attack.

If one were to try to convey fear, say in a novel or a film, Figure 4 suggests that one would want to communicate the threat of harm or death, if possible in an unfamiliar or unpredictable environment and in a situation in which the protagonist is vulnerable or lacking in control; to portray the potential victim's jitteriness and tendency to imagine disaster (perhaps in "flash-forwards"); and to show the victim either screaming or utterly speechless. Taken together, these elements of fear, which of course are often used to depict this emotion, could not possibly be mistaken for any other basic emotion.

Sadness

The prototype of sadness is presented in Figure 5. If fear accounts begin with a description of events as potentially dangerous or threatening to the self, sadness accounts begin with a situation in which the threat has already been realized. The sad person has experienced an undesirable outcome; often he or she has experienced one of the events that the fearful person dreads—death of a loved one, loss of a relationship, or social rejection. Like fear, sadness involves "discovering that one is powerless, helpless, or impotent" to change the unhappy circumstances (cf. Seligman, 1975). This may explain the especially low potency ratings given to sadness-related words in multidimensional-scaling studies of the emotion domain.

Because the sad person (or someone with whom he or she empathizes) has received the negative outcome that the fearful person only anticipates receiving, his or her reported responses are quite different from those contained in the fear prototype. Attempts to flee or avoid harm would be useless because the harmful event has already occurred. Unlike the fearful person, who becomes aroused and vigilant, the sad person becomes inactive, lethargic, and listless—low, compared with the fearful person, in activity. He or she withdraws from social contact and talks little or not at all, frequently expressing sadness by crying or whimpering. Sadness channels the person's cognitions in a negative direction, leading him or her to think only about the unhappy aspects of events. This negative outlook, and the conviction that the situation is hopeless, are reflected in the sad person's tendency to give up—to withhold futile efforts to improve circumstances. Often, however, the sad person reportedly manages to put an end to this downward spiral by enacting some kind of self-control procedure, most frequently by deliberately trying to become more energetic and active.

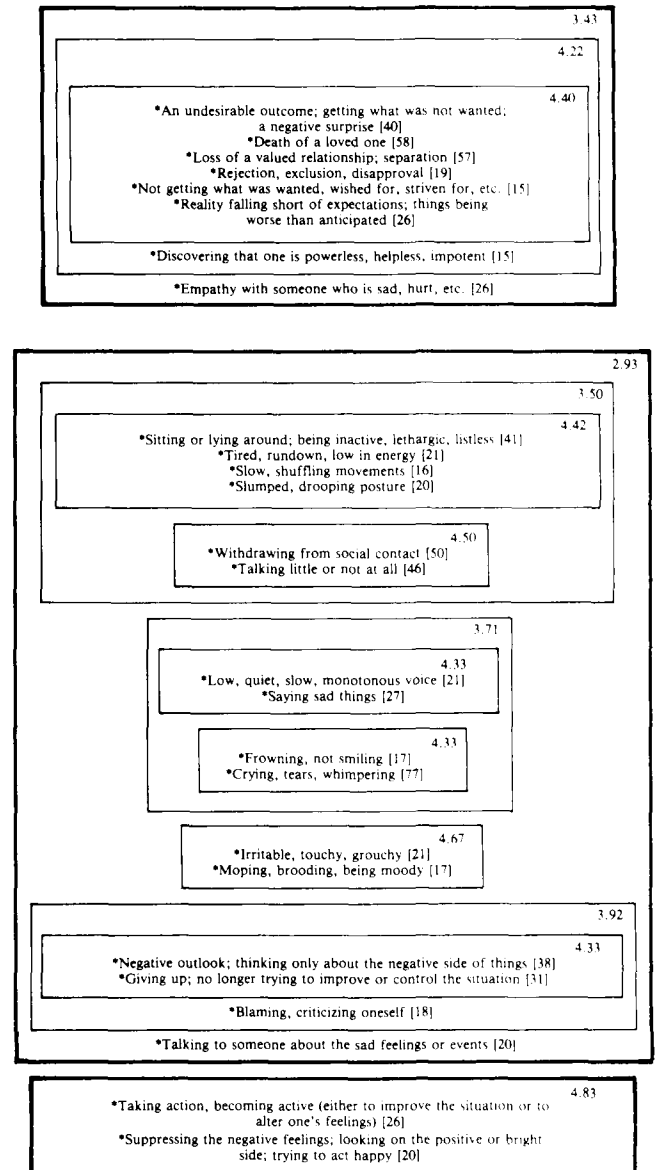


Figure 5. The prototype of sadness.

Anger

Figure 6 contains the prototype of anger. The cognitive antecedents that initiate the anger process, as inferred from subjects' accounts, can be summarized as follows: Something (usually another person, in these accounts) interferes with the person's execution of plans or attainment of goals (by reducing the person's power, violating expectations, frustrating or interrupting goal-directed activities). Alternatively, the person perceives another as harming him or her in some way (inflicting physical or psychological pain). Finally, as de Rivera (1981b) pointed out, the angry person makes the judgment that the frustration, interruption, power reversal, or harm is illegitimate—that the situation is contrary to what ought to be. This last element is the most frequent feature in the anger prototype, occurring in fully 95% of the self anger accounts.

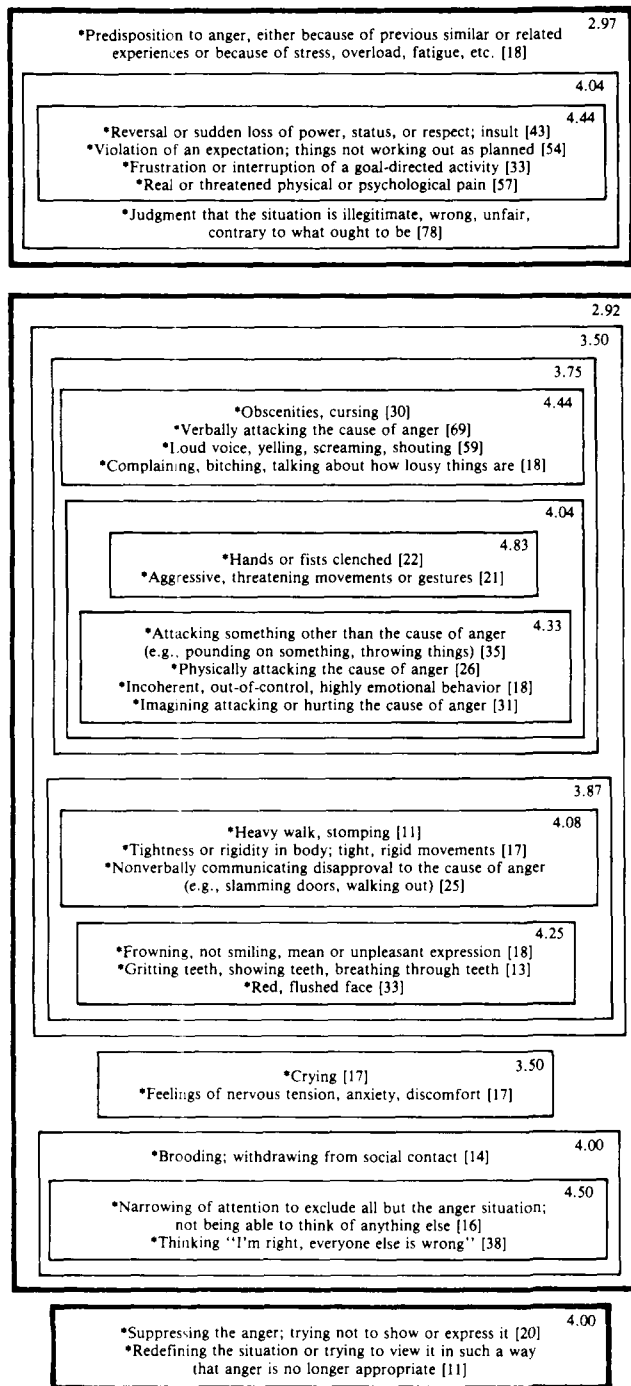


Figure 6. The prototype of anger.

Unlike the fearful person, who tends to flee from the source of danger, and the sad person, who becomes inactive and withdrawn, the angry person reports becoming stronger (higher in potency) and more energized in order to fight or rail against the cause of anger. His or her responses seem designed to rectify injustice—to reassert power or status, to frighten the offending person into compliance, to restore a desired state of affairs. Thus, the angry person reports attacking the cause of anger ver-

bally, in a loud and ferocious voice, and also communicating anger nonverbally (e.g., by walking out and slamming doors). He or she frequently imagines attacking the target physically (e.g., "I thought about slugging him") and sometimes does. Displaced attacks against inanimate objects are also common (pounding on something, throwing things). Anger reports mention several physical signs, most of which seem designed to intimidate the target (frowning, showing teeth, clenching fists, etc.). The most commonly mentioned physical sign is a flushed, red face, probably associated with "blood flow . . . to the head and chest to support threat displays and fighting responses" (Scherer, 1984, p. 47; see Ekman, Levenson, & Friesen, 1983, for evidence that the metaphorical "heat" of anger, sometimes associated with flushing and reddening, is literally measurable by skin-temperature sensors). Like the other emotions, anger has a channeling influence on perceptions and thoughts, often expressed in the angry person's conviction that he or she is right and the rest of the world is wrong. Finally, like those for fear and sadness, the anger prototype includes a self-control component, frequently exhibited in the tendency to suppress expressions of the emotion.

Joy

The joy prototype is presented in Figure 7. Theory, research, and common sense indicate that joy, or happiness, and sadness are opposite concepts (e.g., de Rivera, 1977; Plutchik, 1962; Russell, 1980), and comparison of the relevant prototypes confirms this. Whereas sadness accounts begin with undesirable outcomes (getting what is not wanted, suffering social rejection, losing a valued relationship), joy accounts begin with positive outcomes—getting something desired or desirable. In contrast to the losses and failures that trigger sadness, the desirable outcome that initiates happiness is frequently a gain or success in the achievement domain (task success, achievement) or in the social domain (receiving esteem or affection).

Reported joy responses contrast sharply with those of sadness. Whereas the sad person is withdrawn and uncommunicative, the happy person is socially outgoing; he or she seeks contact with others (acts friendly, hugs people, etc.) and tends to communicate and share his or her good feelings. Whereas sadness is associated with inactivity and lack of energy, joy is portrayed as energetic, active, and bouncy. Whereas sadness is expressed by crying, whimpering, and not talking, joy is expressed by laughing, smiling, and talking enthusiastically. Finally, whereas the sad person's thoughts are characterized by negativity, by seeing only the dark side of events, the happy person has a positive outlook, focuses on the bright side of things, and feels relatively invulnerable to trouble, worry, or annoyance.

Love

Figure 8 displays the love prototype. Two common antecedents of love illustrate its similarity to joy—the judgment that the loved one provides something the person wants, needs, or likes and the realization that the target person loves, needs, or appreciates the person writing the account. These two antecedents are very much like the joy-eliciting judgments that one has gotten something wanted or desirable and that one is liked or

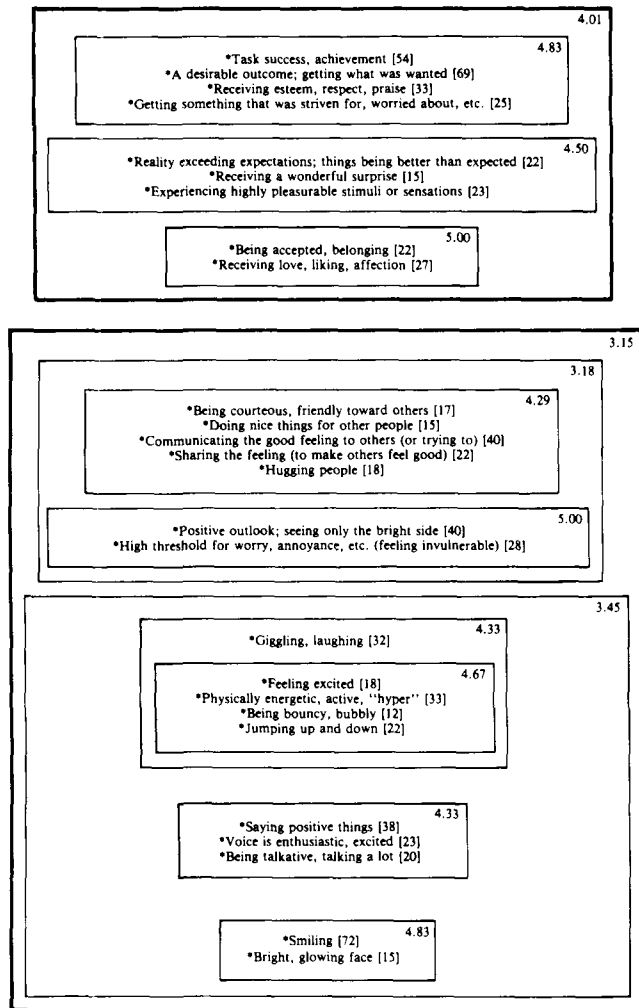


Figure 7. The prototype of joy.

loved. In the joy episodes, these antecedents promote a general sense of well-being; in the case of love, they promote a similar sense of well-being that is personalized (i.e., that is attributed to the presence or existence of the love object). Love is marked by several additional antecedents. According to our subjects, love can occur because one has shared time or special experiences with the other person, because one finds the other physically or psychologically attractive, because one enjoys exceptionally good communication with the other person, or because one feels open and trusting in the person's presence.

The responses that typify love include several prototypical joy responses—for example, smiling and feeling excited and energetic. In addition, the person who is experiencing love reports seeking social contact, but contact of a highly specific nature. Whereas the joyful person's gregariousness is fairly general, the loving person typically wants to see and be near the love object, to hug, kiss, and hold him or her and to communicate loving feelings. That love may be conceptualized as a personalized form of joy is suggested again by subjects' explicit mention of happiness and joy and by cognitive biases similar to those mentioned in joy episodes: In addition to being obsessed with

thoughts of the love object, the loving person tends to see only the positive side of things and feels self-confident and invulnerable, just as the happy person does. Loving subjects also report feeling warm, trusting, and secure when in the presence of (or when thinking about) the loved person. This may explain why love is viewed as somewhat less active than joy, according to Figure 3—contentment and security being placid forms of pleasure.

Observations and Comments

The basic-emotion prototypes suggest some tentative generalizations about the cognitive representation of emotion episodes. Figure 9 presents, in diagram form, the model of emotion that seems to be implicit in subjects' accounts of self and typical

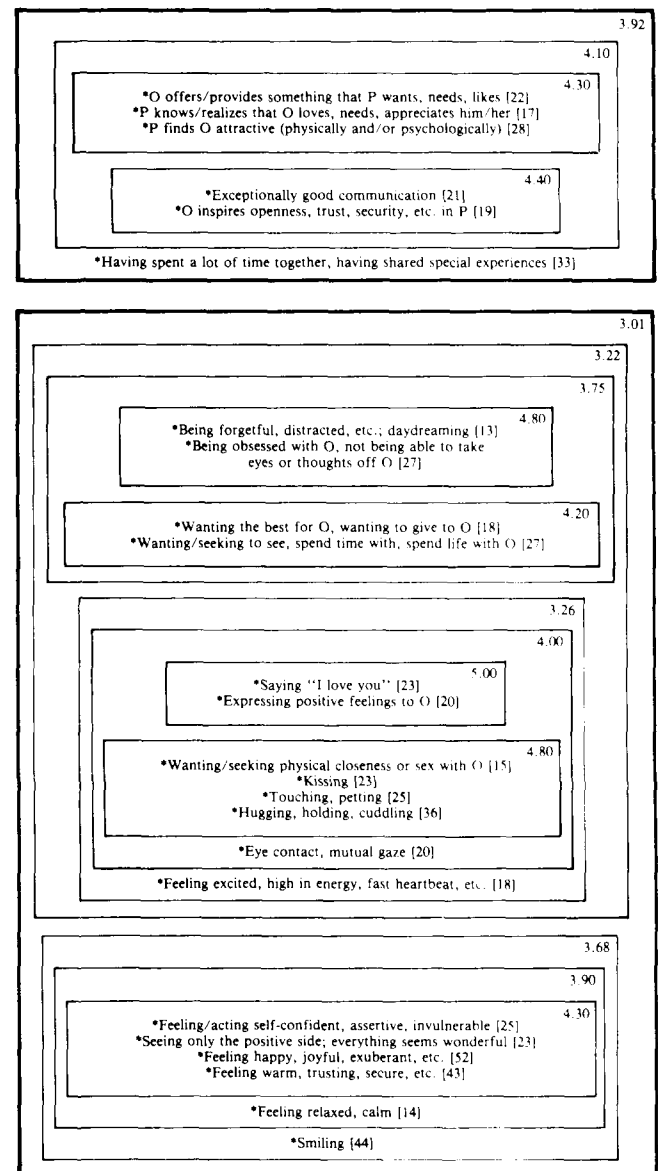


Figure 8. The prototype of love.

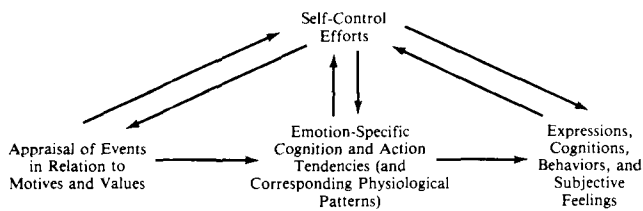


Figure 9. A dynamic model of the emotion process implicit in subjects' accounts of emotion episodes.

emotion episodes. Examination of the antecedent clusters and subclusters of the prototype diagrams (Figures 4–8) reveals that emotions are conceptualized as beginning with appraisals of the way in which circumstances or events bear on a person's motives, goals, values, or desires (Arnold, 1960). In other words, prototypical emotion episodes begin with an interpretation of events as good or bad, helpful or harmful, consistent or inconsistent with a person's motives (cf. Roseman, 1984). We believe this is why emotions and emotion categories—around the world, evidently (e.g., Lutz, 1982; Osgood et al., 1975; Russell, 1983)—are arrayed into good and bad superordinate categories.

When a situation is judged to be motive-inconsistent, it also seems to be appraised with respect to the potential efficacy of active, forceful responses (Epstein, 1984). The combination of appraisals then determines which set of basic-emotion responses is elicited. (The manner in which the appraisals physically elicit emotional responses is not revealed by subjects' accounts and is one of the areas in which scientific emotion theory must go beyond "folk" conceptions of the emotion process.) Once one of the basic emotions is elicited, its characteristic action tendencies, cognitive biases, and physiological patterns seem to arise automatically unless they are countered by self-control efforts. This automaticity probably accounts for the common opinion (analyzed historically by Averill, 1982) that emotions "overtake," "grab," and "hit" us, even though they are consequences of our own appraisals of situations. Self-control efforts can be initiated at any stage of the emotion process and can be directed at any of the components of emotion. Appraisals can be reevaluated, action tendencies can be stifled or suppressed, and subjective feelings can be denied, distorted, or disattended. Often, however, an emotion unfolds before control can be successfully exerted.

An emotion episode, then, is more comprehensive, in perceivers' minds at least, than many contemporary theories of emotion suggest. For example, Schachter (1971) focused on physiological arousal and post hoc cognitive labels; Roseman (1984) and Smith and Ellsworth (1985) on cognitive antecedents; Ekman (1984) and Izard (1977) on facial expressions; and Bower (e.g., Bower & Cohen, 1982) and Isen (1984) on cognitive biases caused by emotional states. The basic-emotion prototypes suggest that all of these different facets of emotion are included in ordinary people's organized representations of emotion episodes. Emotion theories will probably seem more lifelike when they, too, become comprehensive.

When people judge the similarity or distinctiveness of two emotions, say frustration and anger, it seems likely to us that

they do so in terms of prototypical features rather than positions on abstract dimensions such as evaluation, potency, and activity, although this matter obviously requires study in its own right. For the moment, we suspect that the three abstract dimensions of emotion are emergent properties of emotion prototypes, not active elements in everyday processing of emotional information. When subjects in an emotion-sorting or similarity-rating study compare two emotions, or two mental representations of emotions, they may think about antecedents, responses, self-control efforts, or all three. It may be a mistake, therefore, to think of the abstract dimensions of emotion—evaluation, potency, and activity—as properties of appraisals or responses or subjective experiences, or of any other single aspect of emotion.

Certain basic emotions are closely connected in Figure 1 because some subjects placed terms from more than one category in a single pile when sorting them for similarity. It seems likely that the similarity of certain forms of sadness and fear is due primarily to their common antecedents: real or threatened harm, loss, rejection, and the inability to control or rectify these. In contrast, the response components of the two emotions are quite distinct because fear mobilizes a person to cope with or escape from a threatening situation, whereas sadness is immobilizing. Thus, fear and sadness are reactions to similar situations, but situations that differ enough to produce highly dissimilar responses. Love and joy are similar, as we mentioned, in many of their antecedents and responses. These examples point to the complexity of the similarity judgments made by subjects in Study 1 and give reason for wariness concerning emotion theories that try to explain the structure of emotion solely in terms of antecedents or expressions or subjective feelings.

Self Versus Typical Perspectives

Out of 127 feature-by-feature comparisons between self and typical accounts, 66 were significant at the .05 level or less. Of these, 20 had significance levels less than .01 but greater than .001, and 34 had significance levels less than .001 (see Table 3). Given the large number of analyses performed, the weaker differences should be interpreted with caution.

A few interesting patterns can be noted in the results of these comparisons. First, cognitive biases and distortions (e.g., negative outlook and giving up in the sadness prototype, narrowing of attention and thinking "I'm right, everyone else is wrong" in the anger prototype, positive outlook and high threshold for worry in the joy prototype, being forgetful and distracted in the love prototype) were mentioned more frequently in typical than in self accounts, suggesting that people are not very aware of their own narrow focus and cognitive biases when describing personal experiences of emotion. When someone else is angry, we easily notice his or her one-sidedness, proneness to distortion, and bullheadedness; when we are angry we tend to see only the virtues of our own position, and this difference shows up in people's emotion accounts. This is one of two major kinds of self-typical differences discovered in the data, both of which are related to the well-known actor–observer distinction (Jones & Nisbett, 1972; Storms, 1973).

Actors and observers have different perspectives on actors' ex-

periences and behavior. Actors have access to privileged information concerning their own desires, perceptions, thoughts, and intentions (Andersen, 1984; Bem, 1972; Wilson & Stone, 1985), whereas observers have privileged access to certain features of the actors' appearance and behavior. In the case of emotion, as can be seen in Table 3, subjects asked to write about personal examples more often mentioned their predispositions (e.g., predisposition to anger), interpretations of events (e.g., reversal or loss of power, violation of expectation, and judgment of illegitimacy in the anger prototype; task success, receiving esteem, and getting something striven for in the joy prototype) and self-control efforts (e.g., taking action, becoming active in the sadness prototype; redefining the situation in the anger prototype), all of which can be present without necessarily manifesting themselves in behavior. Subjects asked to write about typical emotion episodes more often mentioned expressions and reactions manifested in the person's physical appearance and overt behavior (e.g., eyes darting, fleeing, and hiding in the fear prototype; sitting or lying around, slow or shuffling movements, slumped posture, and saying sad things in the sadness prototype; yelling and screaming, aggressive gestures, and red, flushed face in the anger prototype; being bouncy, saying positive things, and smiling in the joy prototype). These generalizations regarding actor-observer effects do not describe every one of the 66 comparisons that reached the .05 significance level, but nearly all of the differences fit this pattern. Despite these differences, both groups of subjects frequently revealed the gap-filling, schematic nature of emotion prototypes by saying such things as "Probably my face was red," "I suppose I turned pale," or "Probably the person thinks, 'This isn't fair.'"

General Discussion

The results of Studies 1 and 2 indicate, in line with suggestions by several authors and research by Fehr and Russell (1984), that a prototype approach provides useful ways to probe and represent adults' emotion knowledge. Study 1 revealed that hierarchical cluster analysis, a method suggested by the prototype approach, yields a rather different picture of the domain of emotion knowledge than that provided by the more commonly used multidimensional scaling method. Cluster analysis of emotion-similarity sorts produced a multilevel hierarchy, the top level of which distinguished positive from negative emotions and the middle level of which distinguished among love, joy, surprise, anger, sadness, and fear. These emotion categories, which we hypothesize are the basic-level concepts in most people's emotion lexicons, correspond to the ones that Fehr and Russell's subjects named most readily as examples of the emotion category. They are similar to Bretherton and Beeghly's (1982) list of emotion terms learned first in early childhood, and they overlap extensively with various theorists' lists of basic or primary emotions. Surprise was considered questionable as a basic-level category because of its small size and poor showing in previous studies. Below what we interpreted as the basic level were 25 subordinate-level categories, with tentative names such as affection, lust, cheerfulness, pride, irritation, rage, disappointment, shame, horror, and nervousness. Within each basic-level category, one subcluster, containing the basic-level term, appeared to designate a generic or core form of the emotion

in question, whereas the other subclusters seemed to designate more specialized forms. Words in the core subclusters were shown to be more representative of their basic-level categories and more prototypical examples of the category *emotion* than their noncore counterparts. We suggested that subordinate-level categories within each basic-level category are designed primarily to distinguish levels of intensity and details of eliciting context.

Multidimensional scaling analyses of the data used for the hierarchical cluster analysis indicated that a three-dimensional solution fit the similarity matrix well. The three dimensions were the ones that previous investigators have found by using similar methods: evaluation, potency, and activity. Within the three-dimensional space, the five basic-level emotion categories could be seen to differ from one another in systematic ways. Thus, both hierarchical and dimensional representations can be used to shed light on the structure of emotion concepts.

Study 2 was an initial attempt to derive prototypical features of basic-level emotion scripts from two kinds of protocols: subjects' descriptions of typical emotion episodes and of personal (self) examples of these same emotions. Results from the two different kinds of accounts were very similar, suggesting either that basic-level emotion prototypes are derived from personal experiences similar to the ones subjects reported, that prototypes guide memory and reporting of personal experiences, or both. Whichever the case, there seems to be a generic scriptlike representation of each of the basic-level emotions. The content of these prototypes helps to explain the similarity judgments made by subjects in Study 1; fear and sadness were seen as more similar than sadness and anger, for example, and this seems attributable to the substantial overlap between the antecedents of fear and sadness.

We believe that the prototypes are compatible with an implicit model of emotion processes, according to which emotions begin with appraisals of events in relation to motives or preferences. The various patterns of appraisal, then, elicit one or more sets of basic-level emotional responses, each including expressions, action tendencies, subjective feelings, and associated physiological states. An emotion may or may not be manifested directly in behavior, depending on the application of self-control efforts. Not surprisingly, this model, implicit in ordinary people's representation of emotion episodes, is paralleled by several contemporary scientific theories (e.g., Lazarus, 1985; Roseman, 1984; Scherer, 1984; Smith & Ellsworth, 1985; Weiner, 1985) and by much earlier philosophical theories of emotion (e.g., those of Aristotle and Spinoza).

Two limitations of the methods used in Study 2 deserve mention. First, the information about basic-emotion prototypes was elicited by a series of questionnaire prompts. We know from pilot studies in which subjects were simply asked, without specific prompting, to describe actual or typical emotion episodes that such accounts tend to be vague and sketchy. Only when specifically instructed, "Tell in detail what happened to cause you to feel . . .," "Tell . . . what you said, if anything, and how you said it," and so forth, do most subjects provide the kind of detail needed to construct rich and reliable prototypes. Unfortunately, the prompts may have contributed to the narrative structure subsequently derived from subjects' accounts and summarized in Figure 9. Subjects seemed to find the narrative

structure implicit in the questionnaire natural and comfortable, but that may be due as much to the generality of story grammars (Mandler, 1984) as to the particular organization of emotion knowledge. In other words, we cannot be sure that natural emotion accounts have a predictable antecedents/responses/self-control structure independent of our questioning procedure. This obviously deserves further study.

Second, we encountered some difficulty in determining the appropriate level of abstraction at which to code particular features of emotion accounts. We noticed, after gaining some experience with our methods, that we were coding antecedents at a fairly abstract level, whereas we were coding behavioral responses, facial expressions, and physiological reactions more concretely. Evidently, there are many more ways for an environmental event to bear on a person's motives than there are of expressing emotional reactions. If we were to code every specific source of joy, sadness, anger, fear, and love in its own terms, we would have a nearly infinite list of all of life's experiences. Because such a list would be impossible to compile, investigators are forced to impose abstract coding categories on the specific elements mentioned in subjects' accounts. Comparisons of results from different studies would be greatly facilitated if the studies were similar in the level of abstraction adopted when coding protocols. One goal of future research, then, should be to develop explicit guidelines regarding the most appropriate levels of abstraction to be used in coding various features.

Extensions and Applications

Future research on the prototype approach to emotion knowledge might proceed in several directions, four of which we will mention here.

Emotion Blends

The prototype approach suggests that prototypes of subordinate-level emotions are more similar to the basic-level prototype with which they are associated than to any of the other basic-level prototypes. This is a testable implication of the approach. We anticipate, however, that certain subordinate-level emotions—the ones that facial expression researchers have called *blends* (e.g., Ekman et al., 1982b)—will prove related to more than one basic-level prototype.

The emotion *hurt*, for example, although it appears within the sadness cluster in Figure 1, seems to be a blend of sadness and anger. (We say this on the basis of its appearance in descriptions of both sadness and anger in Study 2 and on the basis of a pilot study of hurt itself.) A person feels hurt, according to subjects' accounts, when he or she has been wronged in a way that warrants anger (i.e., in a way that is unfair, inappropriate given agreed-upon roles or rules) but believes that the offender does not care enough to rectify matters, even if a reasonable objection were to be raised (cf. de Rivera, 1977). Not surprisingly, hurt is an emotion mentioned more frequently by people who perceive themselves to be the weaker (less potent) party in a relationship.

Longing and sympathy, two more examples of blended emotion categories, seem to refer to mixtures of sadness and love—in one case, a painful feeling related to separation from a loved

one; in the other, a feeling of sadness for a person we care about. In other words, these emotion categories share antecedents—and perhaps responses as well—with both love and sadness.

Similar analyses could be made of states such as jealousy and envy, which appear in the anger cluster in Figure 1 but have been defined by researchers as mixed emotions that occur in certain kinds of relationship situations (e.g., Bringle & Buunk, 1985). Prototype methods should prove useful in delineating the precise blended composition of mental representations of such states.

Cognitive Processing of Emotional Experiences and Events

A prototype analysis of emotion knowledge may have implications for models of everyday processing of emotion-related information. Prototype researchers have already shown, in a variety of content domains, that both the vertical and the horizontal dimensions of category hierarchies have predictable effects on information processing.

Regarding the vertical dimension, the claim that the emotion hierarchy contains a basic level implies that perception, cognition, and communication tend to occur at this level, unless there are special reasons for being either more detailed or more general. It should be possible to show that the basic level of emotion knowledge is the level of choice for maximizing information about an emotional event while maintaining cognitive and communicational economy (Cantor & Mischel, 1979a; Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976). Moreover, stimuli described in basic-level terms (e.g., "an angry person") should prove more cognitively vivid or imaginable than those described in superordinate terms (e.g., "a person who is experiencing negative emotion") (Rosch, 1978). Rosch, Mervis, Gray, Johnson, and Boyes-Braem (1976) found that basic-level, but not superordinate, categories are associated with scripted or programmed sequences of actions (motor programs). Thus, people can probably say how they typically feel and act in response to another's anger, fear, or happiness (e.g., by protecting the self, protecting or comforting the fearful person, or joining the fun, respectively), but they cannot do so for more abstract levels of the emotion hierarchy.

Rosch (1978) suggested that "objects may be first seen or recognized as members of their basic category, and . . . only with the aid of additional processing can they be identified as members of their superordinate or subordinate category" (p. 35). When people encounter an emotional person in real life, fiction, or film, they are likely to notice first that the person is angry, sad, or whatever, and then only with additional cognitive work realize that the person is actually annoyed, disappointed, and so forth. Regarding memory, a subject who hears or reads about someone's dejection, panic, or delight might be expected to recall later that the person was sad, afraid, or happy.

Regarding the horizontal dimension, prototypicality has been shown to affect "virtually all of the major dependent variables used as measures in psychological research" (Rosch, 1978, p. 38). Items are judged to be category members faster, more frequently, and with greater certainty the more prototypical they are (e.g., McCloskey & Glucksberg, 1978; Rosch, Simpson, & Miller, 1976). In the emotion domain, therefore, subjects

should be quicker and more confident in judging that the emotion experienced by a fictional character is sadness, for example, if the story contains features that are highly prototypical of the sadness category than if the elements of the story are less prototypical. Moreover, when a perceiver has incomplete information about a person or event that has been identified as a category member, he or she often fills gaps in the available information by inserting features contained in the category prototype (e.g., Bartlett, 1932; Cantor & Mischel, 1977, 1979b; Schank & Abelson, 1977). In the emotion domain we would expect unrepresented but prototypical features of a particular emotion category to intrude into subjects' recall or recognition memory for information about an episode in which that emotion was experienced.

Cross-Cultural Comparisons of Everyday Conceptions of Emotion

Psychologists have documented the cross-cultural universality of facial expressions associated with certain emotions, including fear, sadness, anger, surprise, and happiness (e.g., Ekman et al., 1982a), and the pervasiveness, if not universality, of the two- or three-dimensional structure that seems to underlie or characterize similarity ratings of various emotions. Despite these hints that fundamental characteristics of emotion knowledge, and of emotions themselves, are quite similar across cultures, some social scientists have argued that emotions are "socially constructed" (Averill, 1982) or, at least, that conceptions of emotion differ substantially across cultures (Lutz, 1982). Kagan (1984), for example, reasoned that

Because each emotional name is a classification category, the extraordinary diversity among cultures in presuppositions and values should be accompanied by differences in how feeling states are categorized. . . . The influence of culture on the choice of emotional terms is nicely illustrated in C. Lutz's (1982) study of the emotion words used by the approximately five hundred people living on the small island atoll of Ifaluk, located in the Western Caroline Islands of Micronesia. (p. 166)

Careful study of Lutz's data indicates, however, that her results, based on similarity sorts of 31 words by only 15 natives of Ifaluk, are remarkably similar to those summarized in Figure 1. Hierarchical cluster analysis of her data yielded five basic-level categories (although she did not use that term), four of which clearly parallel ours. Her first cluster, *emotions of good fortune*, is very similar to a combination of our love and joy clusters; she translated words in this category as pride/love, playful happiness, happiness/excitement, and liking, for example. Lutz's second cluster, *emotions of danger*, clearly corresponds to our fear cluster. The third, *emotions of connection and loss*, corresponds to many of the terms in our sadness cluster. Her fourth cluster contains words translated as hate, irritation, short-temper, justified anger, frustration/grief, and jealousy/competitiveness, among others; clearly, this corresponds to our anger cluster. Only Lutz's fifth cluster, which she called *emotions of inability*, fails to correspond to one of ours, but it is also, by her account, the least "unified" and so may prove unreliable.

Lutz's mistake was to compare a cluster analysis of her Ifaluk data with conclusions drawn from multidimensional scaling studies done in Western societies. As we have shown in relation

to Study 1, these two methods produce different-looking results even when the same data are used. If cross-cultural studies were done with sufficiently large samples of emotion terms and subjects, and if the data were analyzed by both hierarchical cluster analysis and multidimensional scaling, it would be more feasible to draw valid conclusions about cross-cultural similarities and differences. We expect that the basic level of the emotion hierarchy will look more or less the same across cultures, whereas the subordinate level will look rather different. To the extent that basic-level emotions are biologically based, they should be the same everywhere (although self-control rules may vary); subordinate-level emotion concepts, in contrast, because they seem designed to designate intensity levels and fairly specific situational antecedents, could differ substantially across cultures. (For relevant data, see Scherer et al., 1983.)

Development of Emotion Knowledge

Knowledge about emotions develops dramatically between birth and adulthood. By early childhood, children establish a rudimentary emotion vocabulary (Bretherton & Beeghly, 1982), can recognize and label emotions based on photographed facial expressions (Reichenbach & Masters, 1983), and know something about both the situational antecedents of some of the basic emotions (Harter, personal communication, 1985; Masters & Carlson, 1984) and about methods for controlling the expression of negative emotions (Masters & Carlson, 1984; Saarni, 1979, 1984). They also know, as early as 8 years of age, how to sort emotion words in ways that produce the ubiquitous evaluation and intensity dimensions (Russell & Ridgeway, 1983). With age, these areas of knowledge expand, and older children become capable of inferring the interpretations that a person must have made of a situation in order to have reacted emotionally in a particular way (Masters & Carlson, 1984).

Developmental research (e.g., Anglin, 1977; Blewitt & Durkin, 1982; Mervis & Crisafi, 1982; Rosch, Mervis, Gray, Johnson, & Boyes-Braem, 1976) indicates that the usual sequence of acquiring knowledge about categorization hierarchies is basic level first, superordinate and subordinate levels later. As mentioned earlier, there is evidence in a recent article by Bretherton and Beeghly (1982) that what we have identified as basic-level emotion terms are acquired first. We expect, therefore, that a more complete developmental study would reveal that the emotion lexicon grows with age as children (and possibly adults) learn to use more, and more subtly nuanced, subordinate-level terms and more abstract superordinate terms (e.g., feeling good) but that the underlying basic-level structure remains the same.

Harter and her colleagues (personal communication, 1985) have interviewed children between the ages of 4 and 12, asking them which emotions they can name and what causes these emotions. The 4-year-olds spontaneously mentioned only happy, sad, mad, and scared, but could talk about love if asked to, although they did not usually mention it themselves. What is most striking about the children's descriptions of emotion antecedents is how conceptually similar they are across the age range studied by the Harter group, and between their subjects and our own. Specifics change with age: Broken toys, monsters, and being tickled or bitten give way to social and achievement

failures and successes and to perceived injustices of various kinds. Viewed in terms of abstractly conceptualized antecedents, however, continuity is more evident than change.

Other research indicates that young children first learn to identify others' emotional states from facial expressions and only gradually learn to infer them from knowledge of antecedents (Reichenbach & Masters, 1983). Moreover, very young children seem to have little explicit knowledge of procedures for controlling emotional responses, but by early elementary school age they can talk about controlling feelings by taking direct action (e.g., "wipe the tears off," "just hold the mad feelings in," "cuddle against my dolly"), and by age 10 or 12 by altering their own appraisals (e.g., "think to myself that [the situation] is not that bad," "think about what you're doing—why you're sad and how not to be that way"; Johnson, 1983). It seems likely, therefore, that children must in some sense know about particular emotion components—first expressions and, later, interpretive antecedents—before being able to exercise self-control over them (Saarni, 1984).

Conclusion

The prototype approach to emotion knowledge promises to contribute in several ways to the understanding of emotion representation in everyday life. Results of the two studies reported here are highly compatible with the approach; the emotion lexicon can be reasonably portrayed as a hierarchy with a basic level, and both typical and actual emotion episodes can be meaningfully characterized in terms of basic-emotion prototypes. The many subordinate-level emotion terms seem to specify the eliciting context and intensity level of one of the five or six basic-level emotions or to indicate blends of basic-level emotions. The prototype approach should be useful in determining how emotion-related information is processed in a variety of real-life situations, including social interactions. It should also clarify and provide a means of integrating findings concerning cross-age and cross-cultural similarities and differences in emotion concepts. As further research is conducted on ordinary people's implicit models of emotion processes, these models may provide new and valuable clues about the nature of emotion itself.

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