In Defense of a Prototype Approach to Emotion Concepts

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Emotion, anger, fear, love, and similar concepts have so far defied classical definition. This article summarizes one analysis of emotion concepts from a prototype perspective and answers criticisms directed at such an analysis. Specifically addressed are 5 claims made by critics: The superordinate concept of emotion is classically defined; basic-level emotion concepts are classically defined; internal structure does not contradict the classical view; evidence of unclear cases, presented here as the cornerstone of the case against the classical view, does not contradict the classical view; and classical definitions for emotion terms, if they do not exist today, will someday be discovered scientifically. Both proponents and opponents of the prototype view may agree on a final assertion: Concepts can be created that are classically defined and that will be useful in the psychology of emotion. This assertion may be what the critics really care about.

Emotion, love, anger, happiness, and anxiety express concepts that influence people's life. We interpret each other's actions and temporary states by means of these concepts and guide our behavior accordingly. An act seen as committed in the heat of emotion has a different legal status than the same act carried out in a calm manner. We wonder, "Is this really love?" and "Do I still love him?" According to Schachter and Singer (1962) and Harré (1987), to have an emotion can depend on how we label ourselves in terms of anger, happiness, and so on. Psychologists use these same words in communicating with patients or subjects and in framing hypotheses for research. Psychologists need to understand our natural language concepts of emotion; these concepts (as distinct from emotion events) are the topic of this article.

An understanding of these concepts, I believe, is advanced today better through a prototype approach than through the classical approach, and a good number of investigators base their work on this assumption. Chaplin, John, and Goldberg (1988), for example, argued that the very distinction between a state, including an emotion, and other psychological concepts such as personality trait is properly understood from a prototype perspective. Prototype theory has given us insights into other concepts central to psychology, including behavioral act (Buss & Craik, 1983), personality trait (Cantor & Mischel, 1979), intelligence (Neisser, 1979), social situation (Cantor, Mischel, & Schwartz, 1982), and environmental setting (Tversky & Hemenway, 1983). In addition, the theory inspired important new approaches to psychiatric diagnosis (Cantor,

Smith, French, & Mezzich, 1980) and personality assessment (Broughton, 1984).

On the other hand, the prototype approach has been the subject of debate (Armstrong, Gleitman, & Gleitman, 1983; Harnad, 1987; Lakoff, 1987; Lysak, Rule, & Dobbs, 1989; Osherson & Smith, 1981), and criticisms specifically of the prototype approach to the study of emotion concepts have been raised (e.g., Clore & Ortony, 1988; Johnson-Laird & Oatley, 1986, 1988, 1989; Ortony, Clore, & Foss, 1987). In this article, I confine myself to emotion concepts. My purpose is to outline one analysis of emotion concepts along prototype lines, to gather together criticisms of the prototype perspective, and to defend the analysis presented here against those criticisms. Ortony et al. (1987) and Johnson-Laird and Oatley (1986, 1988, 1989) presented their criticisms of a prototype approach in the context of presenting analyses of their own. Doing so created the impression of a conflict between these views. In a final section, I suggest that the two sides in this debate may have been speaking at cross-purposes and that they can be reconciled. The focus is therefore on the critics' comments on the prototype approach rather than on their own positive proposals.

The Classical View

The terms definition and classical definition are often used as if everyone understood just what they mean. But different writers may mean something different or may put classical definitions to different uses. I begin by considering the classical view as applied to natural language concepts rather than to technical concepts. Natural language concepts are those that underlie the everyday use of common terms, such as emotion, anger, and love. From the classical view, to know the meaning (the intension) of each such term—to have the concept associated with it—is to know at least implicitly a set of necessary and sufficient features. Common terms each refer to a set of objects or events (the extension), each member of which possesses those features. The object or event is a member of the

category named by the term by virtue of possessing those features.

The classical view concerns what is necessarily true, rather than what happens to be true. For example, grandmothers often have grey hair, but not necessarily. Grandmothers are also mothers of a parent—this is necessarily so and is known by simply knowing the meaning of the terms involved. Thus, knowledge of its defining features allows a speaker to perform certain logical operations with a term.

Markman (1989) states the classical view in these words:

> Classical definitions require that categories have an intension and extension that determine one another. The intension of a category is the set of attributes or features that define the category. It is sometimes viewed as the meaning of a category term. . . . The extension of a category is the set of objects that are members of the category—that is, the set of objects that fulfill the criteria set forth in the intensional definition." (p. 5)

In the discussion to follow, keep in mind a distinction between words and concepts on the one hand and the events to which those words refer on the other. For purposes of the first section of this article, I shall assume that those who attack the prototype view and defend the classical view have in mind the classical view as stated in the last few paragraphs. I shall later consider another possibility in which the classical view concerns not everyday words and their associated concepts, but technical concepts defined by experts in their attempts to understand the events referred to by the everyday words.

Summary of One Prototype Analysis of Emotion Concepts

Despite centuries of effort by philosophers and later by psychologists, the classical approach has yet to yield commonly agreed-on definitions for emotion, anger, love, and the like. Nor do I detect any signs of progress. William James (1902/1929, 1890/1950) expressed skepticism that classical definitions are possible, a skepticism echoed by Duffy (1934, 1941), Kagan (1978), and Averill (1980, 1982). Writers in various disciplines have become skeptical of the classical view in general (Kay & McDaniel, 1978; Labov, 1973; Lakoff, 1987; Zadeh, 1965). Wittgenstein's (1953) philosophical analysis of games is the most famous argument against the classical view, but much psychological research now supplements his arguments (Mervis & Rosch, 1981; Smith & Medin, 1981).

To advocate a prototype view over the classical view is not to say that concepts cannot be defined; concepts are systematic and orderly but are organized along different lines than those assumed by the classical view. Rosch's (1977) proposal of an alternative to the classical view led to a healthy competition among nonclassical accounts (Kahneman & Miller, 1986; Lakoff, 1987; Neisser, 1987; Smith & Medin, 1981). By one account, concepts are not only inherently vague but vary from one person to the next and, for the same person, from one time or context to the next (Barsalou, 1987). My concern in this article is not with the advantages or disadvantages of the various alternatives within the family of nonclassical accounts. (Medin's, 1989, name for this family is "probabalistic"—perhaps more apt than "prototype," which I use in the title of this article.) Instead, I focus on those features that are common to most

nonclassical approaches and that distinguish them from a classical approach.

My colleagues and I have offered one analysis of English emotion words along prototype lines (Bullock & Russell, 1986; Fehr, 1982; 1988; Fehr & Russell, 1984; Fehr, Russell, & Ward, 1982; Russell, 1989; Russell & Bullock, 1986). Other writers as well have found prototype ideas useful in their analyses of emotion concepts (Averill, 1980; Burch & Pishkin, 1984; Conway & Bekerian, 1987; Gurtman, 1987; Horowitz, Wright, Lowenstein, & Parad, 1981; Iaccino, 1989; Lakoff, 1987; Mascolo & Mancuso, 1988; Shaver, Schwartz, Kirson, & O'Connor, 1987; Shields, 1984; Tiller & Harris, 1984). Prototype analyses of emotion lexicons other than that of the English language are just beginning to be done (Bormann-Kischkel, Hildebrand-Pascher, & Stegbauer, 1990; Rombouts, 1988), but the prototype approach does not presuppose that the English language concepts are universal (Lutz, 1985; Russell, 1989).

Both classical and prototype analyses of emotion concepts picture that domain as an inclusion hierarchy, as shown in Figure 1. At the topmost, or superordinate, level is the word emotion. At the middle level, emotion is divided into fear, anger, happiness, and so on. Many of the categories at this level may be further divisible, forming a subordinate level. Thus anger is divided into rage, wrath, annoyance, and so on.

According to the classical view, there exists a set number of categories at each level of the hierarchy; on some versions, the categories at a given level are mutually exclusive: Although fear and anger could co-occur, no emotion is both fear and anger.

According to the prototype view, in contrast, this hierarchy is but an approximation to the inclusion relationships that hold within the emotion domain. For example, at the middle level, prototypical emotions shade into less prototypical emotions, which shade into nonemotions with no sharp boundary to be found. This level therefore contains an indeterminate number of categories from anger to zest. For the same reason, the number of subcategories into which middle-level categories can be divided is indeterminate. At a given level, categories are not mutually exclusive but overlapping.

At the heart of the prototype perspective is the idea that membership in a category is determined by resemblance. The notion of resemblance is used here in a broad enough sense to include the knowledge-based view of similarity endorsed by Medin (1989). Particular objects or events are said to be members of a category by sufficient resemblance to what I shall call prototypical exemplars. That is, the mental representation of an actual object or event is compared with the mental representation of exemplars prototypical of the category. Resemblance being a matter of degree, members vary in the extent to which they are members (the category is said to possess internal structure), no sharp boundary separates members from nonmembers (the category has fuzzy boundaries), and members resemble each other in overlapping and crisscrossing ways that vary in kind and number (category members share a family resemblance). Contrast these properties with the classical view in which membership is determined by a set of common features: All members have all the defining features, all members are equal in membership, and members can be precisely distinguished from nonmembers.

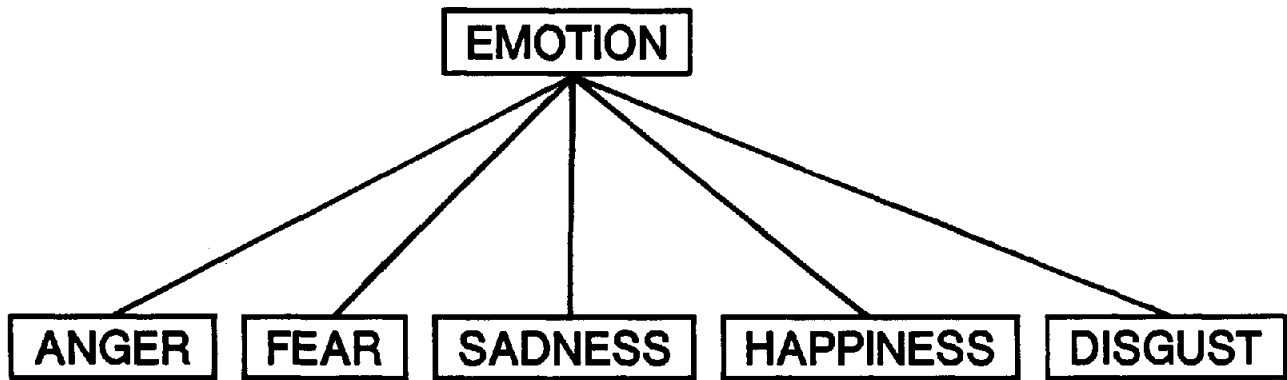Different hypotheses exist within the nonclassical perspec-

Figure 1. An inclusion hierarchy of emotion.

tive as to the nature of the exemplars with which events and objects are compared. On some accounts, events and objects are compared with remembered individual, concrete experiences (Kahneman & Miller, 1986); on other accounts, they are compared with generalized schemata: single hypothetical ideals (Neisser, 1979), average exemplars (Posner & Keele, 1968), or reference points (Rosch, 1977). The words paradigm case, stereotype, and prototype have also been used (see Barsalou, 1985, for a comparison of some of these hypotheses).

For emotion concepts, one possibility is that of a script (Abelson, 1981). A script is to an event what a prototype is to an object. The event is thought of as a sequence of subevents. Although we often speak of an emotion as a thing, a more apt description is a sequence of subevents. In other words, the features that constitute emotion concepts describe the subevents that make up the emotion: causes, beliefs, feelings, physiological changes, desires, overt actions, and vocal and facial expressions. These subevents, described by the concept's features, are ordered in a causal sequence—in much the same way that actions are ordered in a playwright's script. To know the sense of a term like anger, fear, or jealousy is to know a script for that emotion. The present hypothesis is that the meaning of each such term, the concept it expresses, *is* a script.[1] Nevertheless, few or no features of the script are necessary; rather, the more features present, the closer the resemblance and the more appropriate the script label.

Table 1
An Anger Script

Step	Subevent
1	The person is offended. The offense is intentional and harmful. The person is innocent. An injustice has been done.
2	The person glares and scowls at the offender.
3	The person feels internal tension and agitation, as if heat and pressure were rapidly mounting inside. He feels his heart pounding and his muscles tightening.
4	The person desires retribution.
5	The person loses control and strikes out, harming the offender.

Note. This anger script is partly based on Lakoff's (1987) analysis of anger.

As an example, Table 1 gives a possible script for anger. The sequence narrated in Table 1 might never have actually occurred; but for each emotion concept, we know some such sequence. The script is brought to bear on the interpretation of ourselves and others. An actual event is examined as a possible instantiation of the script. The actual event may resemble the script to varying degrees and in various ways. Moreover, each feature of the script has an optimal value (sometimes typical, sometimes ideal) that serves as a default value. Features/subevents of events in the world can resemble the feature values in the script again to varying degrees and in various ways.

The notion of script helps explain why certain cases are non-emotions or borderline emotions despite the presence of features often claimed to be defining. For example, if anger were defined by physiological arousal, a facial scowl, and a tendency to aggress, if fear were defined by physiological arousal, a facial frown, and a tendency to flee, then by definition a boxer would be a clear case of anger and a sprinter a clear case of fear. These athletes are poor examples of these emotions because the typical context and antecedents are missing altogether.

In a series of studies, the feasibility of the prototype approach to emotion concepts was explored empirically (Fehr & Russell, 1984; Fehr et al., 1982; Russell & Bullock, 1986). As

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[1] The script hypothesis appears to have been misconstrued by Johnson-Laird and Oatley (1986, 1988) as a claim that a word such as anger refers to the feature/subevents specified by the script. As I am using the notion of script, anger refers to the whole sequence, and not to the subevents. Thus, anger does not refer to the injustice that is its cause nor to the violence that is its consequence. The script hypothesis claims that causes and consequences, along with other subevents, are nonetheless part of the sense of the word anger. Consider the word grandmother. When you learn that Tina Turner is a grandmother, you automatically learn of the existence of other people (two generations of offspring) and events (births) that are part of the sense of the word grandmother; nevertheless grandmother here refers to Tina Turner and not to her child, nor to her grandchild, nor to anyone's birth. To use Ryle's (1949) example, the word university refers to a collection of colleges, schools, libraries, residences, and so on but does not refer to any particular college, school, and so on. The university is not something in addition to the colleges, and so on. Anger is not something in addition to the injustice, the violence, physiological disturbances, thoughts, feelings, and other parts of the script.

hypothesized, the superordinate category of emotion was found to have what Rosch (1977) called an internal structure: Happiness, love, anger, fear, awe, respect, envy, and other middle-level categories could be reliably ordered from better to poorer examples of emotion. In turn, this goodness-of-example (prototypicality) score for each emotion term was found to predict how readily it comes to mind when subjects are asked to list emotions, how likely it is to be labeled as an emotion when subjects are asked what sort of thing it is, how readily it can be substituted for the word emotion in sentences without their sounding unnatural, the degree to which it resembles other middle-level emotion categories in terms of shared features, and the speed with which subjects can verify that it is indeed a type of emotion. In short, converging sources of evidence showed that the concept of emotion has an internal structure and that the internal structure predicts various indexes of cognitive processing involving emotion concepts.

The subjects in these studies also failed to list necessary and sufficient features of emotion. When asked, subjects listed such features as increase in heart rate, perspiration, tears, widening eyes, and obsessive concern with a situation—which are neither necessary nor sufficient: Clear cases of such prototypical emotions as happiness and sadness exist with none of these features.

Also as hypothesized, the concept emotion was found to have fuzzy boundaries. Subjects were asked a series of questions of the form: Is x a type of emotion, where x was replaced with various words thought to denote types of emotion (Fehr & Russell, 1984). Now on the classical view, this should be the easiest of questions. The question would simply be whether the set of features defining, say, pride included the set of features defining emotion. If a person either explicitly or implicitly knew necessary and sufficient features for pride and emotion, there should be no ambiguity in deciding whether pride is a type of emotion —just as there should be no ambiguity for anyone who knows the meanings of the words mother and parent in deciding that a mother is a parent. But, in fact, subjects could not decide whether pride is an emotion. Some decided yes; others decided no. In unpublished studies, we also found fuzzy boundaries for love (Fehr & Russell, in press) and anger (Russell & Fehr, 1989).

These results for love, anger, and emotion pertain to the definitions of the concepts. In another series of studies, we examined how adults use basic-level concepts to categorize the message conveyed by emotional facial expressions (Russell & Bullock, 1986). As predicted, facial expressions varied in their degree of exemplariness. Some expressions were prototypical examples, others were intermediate examples, and still others were very poor examples. There were also borderline cases in which subjects could not decide whether a particular facial expression was or was not a member of a particular category.

Arguments and Replies

Rather than pursue a prototype analysis, I now turn to the question of whether this is even the right direction to be heading. Defense of a classical alternative can be presented as five assertions (I do not mean to imply that all critics of the prototype view accept all five assertions).

The Superordinate Concept of Emotion Is Classically Defined

Johnson-Laird and Oatley (1986) offered a classical definition of emotion, but Ortony et al. (1987) argued only that the failure of the classical view to produce an acceptable definition for emotion "does not establish that the goal is impossible" (p. 344).

Let me first consider Ortony et al.'s (1987) point. I do not believe that a classical definition is a logical self-contradiction. Neither argument nor evidence could therefore establish the impossibility of the classical approach. Rather, the issue here is an empirical one: whether the everyday concept of emotion is, in fact, classically defined. Defenders of the classical view have an obvious means to silence any skepticism on this issue: produce a classical definition for emotion and show that the proposed definition is what people know when they know the meaning of that term. (People need not be aware of the necessary and sufficient features, but they must behave as if those features constituted the meaning of emotion.) To be more than an abstract possibility, the classical approach needs to produce a specific, acceptable definition of emotion. Let us examine some candidates.

Philosophical theories of emotion have often been attempts to state necessary and sufficient conditions for something to be an emotion. Lyons (1980) explicitly took such a statement as his criterion for success of a theory of emotion. Although Lyons was not concerned with the meaning given to emotion in everyday speech, his analysis showed that even experts have failed to provide a satisfactory classical definition. Each account of emotion he considered, from Aristotle to Skinner, was found wanting. In other words, according to Lyons, no one had yet stated an adequate classical definition of emotion.

Lyons (1980) then offered his own: "Something is to be deemed an emotional state if and only if it is a physiologically abnormal state caused by the subject of that state's evaluation of his or her situation" (pp. 57–58).[2] If Lyons is correct, then Izard's (1977) theory that everyone is always in some emotional state would entail that everyone is always in some physiologically abnormal state. By any reasonable definition of abnormal, Izard would not only be wrong, but wrong by definition. If Lyons is correct, then the hypothesis that happiness can occur without physiological change is a contradiction. If Lyons is correct, then all emotions must be caused by an evaluation. An emotion could not by definition be induced chemically or physiologically in a way that bypasses evaluation. Zajonc's (1980) thesis that emotion precedes cognition would therefore be wrong by definition. If Lyons is correct, then by definition any state (including psychosomatic illness, indigestion, lust, hunger, and pain) is an emotion if it is a physiologically abnormal state caused by the subject of that state's evaluation of his or her situation.

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[2] Lyons (1980) did not attempt a classical definition of the concept of emotion but of the concept emotional state. His effort thus leaves open the question whether emotion can be classically defined. Implicitly, Lyons disagrees with Ortony, Clore, and Foss's (1987) assertion that emotion includes state as a defining feature.

Ortony et al. (1987) examined approximately 500 words related to emotion, seeking to isolate those that refer to emotions. They concluded the following:

> The best examples of emotion terms appear to be those that (a) refer to *internal, mental* conditions as opposed to physical or external ones, (b) are clear cases of *states,* and (c) have *affect* as opposed to behavior or cognition as a predominant (rather than incidental) referential focus. Relaxing one or another of these constraints yields poorer examples or nonexamples of emotions; however, this gradedness is not taken as evidence that emotions necessarily defy classical definition. (p. 341)

Ortony et al. (1987) did not attempt to state a classical definition for emotion, nor did their analysis yield a single category containing all and only emotion-denoting terms. Instead, they found gradedness of membership. It might be argued that their analysis could lead to a classical definition. I am skeptical of this possibility, in part because I doubt that much progress would be achieved defining emotion in terms of affect as Ortony et al. analyze that term and because I doubt that the resulting definition could be shown to play a role in the psychological processes that mediate the use of language.

Johnson-Laird and Oatley (1986) offered the following definition of emotion:

> The ordinary concept of emotion is therefore no more than a "place-holder" for a disjunctive set of mental states—specific emotions—that contrast with other sorts of cognitions. (p. 36)

Specifically, emotion is either happiness, sadness, anger, fear, or disgust. These five, in turn, are semantic primitives, lacking semantic features.

Johnson-Laird and Oatley (1986) had their own theoretical reasons for grouping together happiness, sadness, anger, fear and disgust into one category. But they lack an explanation of why ordinary speakers would ever have done so. That is, if happiness, sadness, anger, fear, and disgust lack semantic features, it is unclear on what basis ordinary speakers would have grouped them together, omitting other psychological states, to form the category emotion.

Their definition of emotion also lacks an explanation of the kind of data summarized earlier (Fehr & Russell, 1984, in press). For example, why would some members of the set be judged as better examples of emotion than others? It would seem especially difficult for Johnson-Laird and Oatley (1986) to explain why subjects would reliably judge love, which is not on their list of five, to be a better example of emotion than is disgust, which is on their list. If the Johnson-Laird and Oatley definition is correct, most subjects when asked to list examples of emotion should quickly list these five; in fact, in Fehr and Russell's (1984) study, only 14% listed disgust, fewer subjects than listed love, hate, anxiety, and depression. In Johnson-Laird and Oatley's hypothesis, to say that disgust is *not* an emotion would be to utter a contradiction. Yet, 6% of Fehr and Russell's (1984) subjects and 26% of Shields's (1984) subjects denied that disgust is an emotion. In presenting his theory of emotion, Panksepp (1982) gave reasons for his doubting that disgust is an emotion. The question here is not whether disgust is or is not an emotion; the question is how anyone, layman or expert, could bring themselves to say so, if disgust is by definition an emo-

tion. To do so would be like denying that a mother is a parent; it would mark you as someone who does not know the meaning of the words you use.

In summary, a classical definition for emotion remains an abstract possibility, but I see no evidence of progress toward achieving one. Even those who accept the classical view do not appear to be converging on a candidate. Of the three candidates considered here, only one was proposed by its author as a classical definition for the natural language concept emotion, and the three differ substantially from each other. Johnson-Laird and Oatley (1986) argued that emotion is defined in terms of fear, anger, happiness, sadness, and disgust, which in turn have no defining features. Lyons (1980) argued that the definition of emotional state includes as a necessary feature reference to a physiological state, whereas Ortony et al. (1987) said that emotion terms refer to a mental state as opposed to a physical state. Therefore there is no agreed-on classical definition of emotion.

Basic-Level Emotion Concepts Are Classically Defined

Ortony et al. (1987) defended the classical approach for basic-level emotion terms on the grounds that Wierzbicka (1972, 1973) had provided definitions for these terms. However, Wierzbicka's were not classical definitions. Wierzbicka (1972) argued against necessary and sufficient features in the definition of emotion terms. Indeed, in another context, Wierzbicka (1984) wrote the following:

> In the case of words describing natural kinds or kinds of human artifacts, to understand the structure of the concept means to describe fully and accurately the idea (not just the visual image) of a typical representative of the kind, i.e. the prototype (p. 213).

Wierzbicka (1973) offered a general scheme for the definition of emotion concepts:

> This general scheme is a comparison: a comparison of an emotion felt by the person spoken about to that which the memory or imagination evokes in ourselves in connection with the description of a situation, a movement of the body or a facial expression, or a physiological reaction. (p. 505)

Wierzbicka's (1973) general scheme is another way of stating the present hypothesis: An event is judged to be a particular emotion by comparing it with a script stored in memory. The script includes the situation, bodily movements, expressions, and physiological reactions typical of that emotion.

Johnson-Laird and Oatley (1989) argued that fear, anger, happiness, sadness, and disgust are semantic primitives and therefore cannot be defined. (Clore and Ortony would disagree with this idea, as would anyone who doubts that these concepts are pancultural, e.g., Lutz, 1985; Russell, 1989, 1990; Wierzbicka, 1973.) As evidence, Johnson-Laird and Oatley pointed out that the following assertion is acceptable: "John feels angry, but does not know why." If such an assertion is acceptable, then knowing why is not a necessary feature of anger. On the script hypothesis, such an assertion is also acceptable, because no one feature of the script is necessary. The telling assertion would be much longer: "John feels angry, but does not know why; he does not believe he was in any way offended or harmed; he perceives no injustice; he does not feel at all tense, agitated, or hot. He is not

glaring or scowling, his heart rate has not changed, nor are his muscles tightening; he does not desire retribution; he does not lose control; indeed he has no aggressive impulses to control; he does not strike out or harm anyone." On the Johnson-Laird and Oatley account, this assertion is acceptable because anger has no defining features. On the script account, it is not acceptable. I would want to ask the speaker of that sentence, "What, then, do you mean in saying that John is angry?"

Other basic-level emotion words are defined by Johnson-Laird and Oatley (1986, 1989) in terms of the basic five. For example, love is defined as follows: To love is "to experience internal happiness in relation to an object, or person, who may also be the object of sexual desire" (p. 116). The command "Love thy neighbor" loses something important when translated as "Experience internal happiness in relation to thy neighbor." From a prototype perspective, happiness is likely to be only one of many features that characterize love. And perhaps not the most characteristic feature, either. Our subjects did not list happiness as one of the features of most types of love (Fehr & Russell, in press). The characteristics shared by most, although not all, types of love were caring, helping, establishing a bond, sharing, feeling free to talk, understanding, respect, and closeness. Johnson-Laird and Oatley's definition implies that if internal happiness in relation to an object or person is experienced, then, by definition, love is experienced. In other words, a loveless but happy relationship would be a contradiction in terms. Their definition also implies that if love is experienced, then happiness must be experienced. In other words, an unhappy love relationship would be a contradiction in terms.

The various proposals considered here do not agree with one another, nor has evidence established a classical definition for any single basic-level term. Indeed, although Johnson-Laird and Oatley (1989) argued that most emotion words can be classically defined, they rejected classical definitions for five key emotion concepts. Therefore, there are no agreed on classical definitions for basic-level terms, even among those who accept the classical view.

Internal Structure Does Not Contradict the Classical View

Much of the evidence gathered from a prototype perspective was aimed at establishing that members vary in their degree of membership. Graded membership is called the internal structure of the concept in question. Both Johnson-Laird and Oatley (1986, 1989) and Ortony et al. (1987) argued that internal structure may be a fact about emotion concepts, indeed about most concepts but that it does not contradict the classical view. Armstrong et al. (1983) showed that such classically definable concepts as odd number and plane geometric figure have an internal structure. For example, subjects reliably rate 3 and 7 as better examples of an odd number than 15 or 427. Because odd number and plane geometric figure are paradigm cases of classically definable concepts, this evidence clearly shows that internal structure and a classical definition are not mutually exclusive possibilities.

Johnson-Laird and Oatley's (1986, 1989) and Ortony et al.'s (1987) argument is misleading because it attacks a position that no one took. Far from claiming that internal structure contradicts the classical view, Fehr and Russell (1984) stated that "ex-

istence of internal structure does not contradict the classical view of concepts. Demonstrating that a concept has an internal structure doesn't mean that it lacks rigid boundaries or criterial features" (p. 474).

In the first place, the case here is an empirical one: The existence of internal structure undermines the classical view by supporting an account of how a person can use and understand a concept without knowing necessary and sufficient features for it. The classical view did not predict and, without ad hoc assumptions, cannot account for internal structure. Internal structure is a significant feature of emotion concepts, indeed most concepts, predicting such aspects of cognitive processing of category members as reaction time, availability, and inductive inference. The prototype perspective predicted these empirical relationships.

Second, Fehr and Russell (1984) distinguished internal structure from fuzzy boundaries and went on to say that it is fuzzy boundaries that contradict the classical view. Thus, the most telling evidence that a concept is not classically defined would be evidence that people cannot tell members from nonmembers. The existence of such unclear cases was therefore presented as the cornerstone of our case against the classical approach to the superordinate concept of emotion (Fehr & Russell, 1984), to the basic-level concepts of anger (Russell & Fehr, 1989) and love (Fehr & Russell, in press), and to our analysis of the categorization of facial expressions of emotion (Russell & Bullock, 1986). This evidence of unclear cases is the topic of the next section.

Evidence of Unclear Cases Does Not Contradict the Classical View

Results showing that subjects cannot decide which cases are, and which are not, members of a category were just cited as the strongest evidence that the category is not classically defined. Critics have offered various rebuttals to this evidence.

Smith and Medin. Smith and Medin (1981) suggested two ways of reconciling the classical view with the evidence of unclear cases. Perhaps, they pointed out, one word labels two concepts: an ordinary language concept and a technical concept (e.g., fruit is both an everyday concept and a biological one). Subjects cannot decide whether the tomato is a fruit because they cannot decide whether the word fruit is being used in the everyday sense or the technical sense. This argument holds little promise in the domain of emotion, because pride, anger, and emotion don't have technical senses.

The second possibility they raise is that the subjects have not mastered the concept but possess a faulty or incomplete version. Even if it would save the classical view, this tack would render that view irrelevant to the concepts of most speakers. Rosch (1977) examined what college-educated, native speakers mean by such everyday words as vehicle, vegetable, and sport. My colleagues and I examined what they mean by emotion, love, anger, and the like. The evidence indicated that these people, who surely know the meaning of these words, do not even tacitly know classically defining features for these words. If so, classically defining features do not constitute the meaning of these words.

(Smith and Medin's, 1981, suggestions point out the ambigu-

ity of whether the classical account is to be interpreted as concerned with everyday concepts or technical concepts. In this part of the article, my topic is a classical account of everyday concepts; therefore I have been critical of their suggestions, but I would agree with a slightly reformulated version of the idea behind Smith and Medin's two suggestions. The prototype approach accounts for how ordinary people understand everyday concepts. A classical definition is something achieved by experts for technical concepts. Ordinary people sometimes borrow labels for technical concepts without fully understanding their meaning. Experts sometimes borrow everyday labels for their technical concepts. Technical concepts sometimes grow out of everyday concepts.)

Johnson-Laird and Oatley. Johnson-Laird and Oatley (1986) also suggested two possibilities. First, the argument from unclear cases confuses meaning with identification. A grandmother might be identified by her grey hair, the twinkle in her eye, and her trying to give you chicken soup, but the word grandmother means mother of a parent. Evidence of unclear cases, they argue, shows that the identification function, not the meaning, is fuzzy.

This rebuttal may be relevant to Russell and Bullock's (1986) evidence concerning how people categorize facial expressions of emotion but is irrelevant to Fehr and Russell's (1984) evidence for unclear cases. Subjects were asked to reply yes or no to questions of the form "Is *x* an emotion?" Their inability to agree on an answer speaks to the meaning (intension) of their concepts and has nothing to do with an identification function. To decide whether, for example, pride is an emotion is not to identify proud persons; rather it is to perform the semantic task of deciding whether or not any instance of pride is, by definition, an instance of emotion. One need not be able to identify actual squares to know that a square is a rectangle and need not be able to identify seraphim and cherubim to know that they are angels.

Second, Johnson-Laird and Oatley (1986) argued that words such as pride are homonyms. These words label two concepts, and subjects would have reached a consensus if context had clarified which concept was called for. This idea is similar to Smith and Medin's but argues that words have several everyday senses. To illustrate, Johnson-Laird and Oatley (1986) pointed out the following:

> The noun "pride" is listed in most dictionaries as having several distinct meanings, including: 1. a sense of one's own proper dignity or value. 2. pleasure or satisfaction taken in one's work, achievements, or possessions. (p. 34–35)

Presumably, if subjects were told which of these meanings was intended, then they would agree whether pride is or is not an emotion.

In this argument, Johnson-Laird and Oatley (1986) express the continuing optimism that classical definitions are close at hand and that subjects' semantic difficulties with these words are easily abolished. To test their specific idea, I asked subjects, "Is pride (meaning a sense of one's own proper dignity or value) an emotion?" I asked other subjects, "Is pride (meaning satisfaction or pleasure taken in one's work, achievements, or possessions) an emotion?" As can be seen from the results in Table 2, subjects still failed to reach a consensus.

Table 2
Is Pride an Emotion?

Definition	Response	
	Yes	No
Satisfaction or pleasure taken in one's work, achievements, or possessions	47	14
Sense of one's own proper dignity or value	36	20

Note. Subjects were university students who responded to a brief questionnaire during class time. Subjects were randomly assigned to condition, $\chi^2(1, N = 117) = 2.32$, *ns.*

I believe that subjects continued to have difficulties because pride is not a homonym (leaving aside the meaning of pride as a group of lions). The two meanings Johnson-Laird and Oatley (1986) listed are aspects of the same concept. These two meanings are too closely related for their being labeled with the same word to be a coincidence. (Consider how dissimilar are other cases of homonyms, such as bank: a financial institution and the side of a river.) The prototype of pride consists of both a sense of value and the satisfaction entailed.

More generally, Johnson-Laird and Oatley's (1986) argument from homonyms faces two obstacles. First, many basic-level emotion terms would have to be homonyms. Pride is not the only unclear case; most nonprototypical exemplars produced a lack of agreement (Fehr & Russell, 1984; Shields, 1984). Therefore, Johnson-Laird and Oatley would have to convince us that all these words are homonyms.

Second, they would have to devise a method of testing their idea other than clarification by context. Even though context did not clarify pride in the study here, I do not doubt that context can clarify the intended meaning of any word. The problem is that a demonstration of this effect would not favor a classical account over a prototype account, because context can clarify a fuzzy concept as well as a homonym. Consider the blatantly fuzzy concept of many. In the context of the sentence "there are many hours in the day," many might be said to take on the precise meaning of 24. The point is that by itself, many has no such precise meaning.

Ortony, Clore, and Foss. Ortony et al. (1987) rephrase the issue as follows: To decide whether *x* is or is not a member of category *y* requires two pieces of information: (a) the necessary and sufficient conditions for membership in category *y* and (b) whether *x* has the relevant properties. Therefore, they argue, failure at adjudication could "as well be taken as establishing different degrees of ignorance" (p. 345). To illustrate their point, Ortony et al. imagined asking subjects whether 356,489,132,017 is or is not a prime number. Subjects' failure to agree would not entail that the category of prime number is fuzzy. "It would merely establish that subjects do not know (and could not compute within a reasonable time) whether or not the candidate had the properties that are required for its inclusion in the set of primes" (p. 5).

To decide whether pride is or is not an emotion requires, on Ortony et al.'s (1987) account, knowing two pieces of information: (a) the necessary and sufficient conditions for membership in the category emotion and (b) whether pride has the

relevant properties. Failure at adjudication would indicate igno-rance of either (a) or (b) or both. Ignorance in the first case (a) would be ignorance of the features defining emotion. This is what is meant by saying that people know no classical defini-tion for emotion. Ignorance in the second case (b) would be ignorance of the features defining pride. This is what is meant by saying that people know no classical definition for pride. In either case, the classical view fails—although the evidence can-not tell us for which term.

Let us now consider Ortony et al.'s (1987) example of adjudi-cating prime numbers. Being a prime (or not, as the case may be) is entailed by the definition of, but is not part of the defini-tion of, 356,489,132,017; thus calculations have to be per-formed. Prime number is a technical, not an everyday, concept. We know that the category prime number is classically defined because those who know the meaning of that phrase can specify necessary and sufficient features. Furthermore, 356,489,132,017 either is or is not a prime number. All experts, given the opportunity to work through the problem, would agree on the answer. (Indeed, given enough time and incentive, anyone who knows the meaning of prime number should agree on the right answer.) I see no reason to suppose this is the case for emotion. Although philosophers and psychologists have tried for centuries, no one has listed features for emotion that are commonly accepted as necessary and sufficient. One telling indication here is that experts disagree over specific cases. Al-though Hume (1739–40/1978) analyzed pride as a paradigm case of emotion, several of my colleagues have denied that pride is an emotion. Ekman, Friesen, and Simons (1985) wrote an article entitled "Is the Startle Reaction an Emotion?" a question on which, they point out, "emotion theorists have disagreed" (p. 1416). After arguing that startle is not an emotion, they ac-knowledge that "S. S. Tomkins does not regard our findings as a challenge to his claim that startle is an emotion" (p. 1424). Love was rated by subjects as among the most prototypical of emo-tions (Fehr & Russell, 1984), and yet colleagues have denied that love is an emotion, and lists of the emotions often omit love. These same lists often include surprise, guilt, and interest, and yet Clore and Ortony (1988) voiced their suspicion that these "far from being basic emotions may not even be emo-tions" (p. 368). So, whether pride, startle, love, surprise, guilt, and interest are emotions cannot be decided by the meanings of the terms emotion, pride, startle, and so forth, even if we rely on the meanings given the terms by the experts.

Classical Definitions for Emotion, Anger, and the Like Will Someday Be Discovered Scientifically

Even if today's speakers know no classical definitions for emotion, anger, love, and the like, might not their necessary and sufficient features be uncovered through scientific investi-gation of actual instances of emotion? Clore and Ortony (1988) held out the hope that common features will someday be discov-ered in the events themselves. I believe this is possible but un-likely.

First, notice that this is a partial abandonment of the classi-cal view under consideration here, which held both that the criterial features exist in the events categorized (the extension) and that the criterial features are tacitly known to anyone who

knows the meaning (intension) of the category name, for the set of features constitutes the meaning of the category name. Dis-connecting these two elements makes the discovery of criterial features in the events categorized a coincidence: A category of events (e.g., emotions) selected on the basis of one set of criteria (such as resemblance to a family of prototypes) would have to possess, unbeknownst to the selector, another set of features that are common to all instances and that together are unique to that set. We have no reason to suppose this is so once we've abandoned the idea that speakers use those defining features to select the cases.

Moreover, which events the scientist is to investigate is un-clear, because scientists do not agree which events are, and which are not, emotions. Should the scientist investigate pride or startle? Clore and Ortony (1988) suggested that researchers can concentrate on the clear cases, the prototypes, and leave the borderline cases for later adjudication. (First find the necessary and sufficient features of anger, fear, and other clear cases. If pride has those features, then it is an emotion; if not, then it isn't.) But again, I believe the same arguments apply. No one has stated necessary and sufficient features even for the prototypi-cal emotions, and it would be coincidence if they exist. What's more, prototypicality is graded. Scientists do not agree on a clear border between prototypical emotions and not-so-proto-typical emotions. They don't know whether to include love, disgust, interest, guilt, and surprise, or not. Moreover, even if everyone agreed that, say, anger and fear at least are clear cases of emotion, anger and fear themselves are fuzzy concepts. Therefore it is unclear which specific cases of anger and fear the scientist is to investigate.

These problems aside, let us suppose the scientist finds sev-eral features common to all clear cases of fear and anger (e.g., abnormal levels of specific hormones and increased activity in certain nerves). Would these common features then define emotion? These features might not exist in many events that many people consider emotions. These features would not be the features by virtue of which ordinary speakers understand or use the word emotion. These features would not explain or pre-dict the inductive inferences, availability from memory, or judgments of competent speakers about emotions. Neverthe-less, the newly discovered features might be useful in creating new, technical concepts for the psychology of emotion. This topic is pursued in the next section.

Toward a Reconciliation

The possibility remains that the classical view can be con-strued in other ways. The defenders of the classical view may have been talking about how psychologists could better con-ceptualize emotions. They may have been motivated by the belief that concepts should be defined classically. They may have believed that they needed to defend the classical view (and to criticize the prototype view) to justify creating classically defined concepts for scientific use. If so, disagreement may have arisen from a misunderstanding and from speaking at cross-purposes. Here I suggest a possible reconciliation by dis-tinguishing between descriptive and prescriptive uses of a clas-sical definition.

Let me call descriptive the use of a classical definition as an

empirical account of the way in which ordinary speakers currently understand a word they use. In this use, the classical definition would have to have psychological reality. This is the use of a classical definition presupposed in the discussion so far.

Let me call *prescriptive* the use of a classical definition as a goal to be achieved by experts. The classically defined concept would be created through scientific analysis of the events so conceptualized. On this interpretation, Johnson-Laird and Oatley would be saying something like, we psychologists would do well to define for scientific use a sharply bounded category consisting of a disjunctive set of five discrete brain states (to be determined empirically by cross-cultural physiological evidence). Ortony and Clore would be saying that we psychologists would do well to define for scientific use a sharply bounded category of internal, mental states whose focus is affect. Lyons would be saying we would do well to define a category of abnormal physiological states caused in a certain way.

Nothing I've said in this article disagrees with their proposals stated in this way. Nothing here prevents classically defined concepts from being created. Put in this way, their proposals in no way disagree with any analysis of everyday concepts nor do they disagree with each other. Prescriptive proposals are courses of action to be evaluated by their usefulness to science. They are not evaluated by whether they agree or disagree with folk psychology or with the everyday meaning of words.

I don't know if these authors would want to restrict themselves to a prescriptive interpretation. Some passages in their writings suggest interpreting them as prescribing classical definitions.[3] On the other hand, the acceptability of sentences, the analysis of the emotion lexicon, and linguistic tests for the meanings of words are not criteria against which to evaluate prescriptive analyses of the events to which emotion words refer.

Scientists can define new concepts in any way they want and attach to them any label they want. Nevertheless, how the new concepts are labeled does not determine their relationship to our current concepts. However labeled, concepts defined by necessary and sufficient features will not be the same concepts as those today expressed by the words emotion, anger, and the like. If today's concept is fuzzy, and tomorrow's sharply bounded, then they're not the same. New concepts do not define the old ones with which we are familiar. It is therefore misleading to think that emotion (or anger, or any of the others) as we understand those terms will someday be classically defined. The label attached to a new, sharply bounded concept is irrelevant, but I would think that confusion could result from using labels like emotion, anger, and so on. Neither the intension nor extension of the new concepts is likely to coincide with the intension or extension of the concepts today labeled emotion, anger, and so on.

In this article, I have argued that the descriptive use of classical definitions for such English words as emotion, anger, love, and so on has been unsuccessful as an account of what we ordinarily understand by these words. The classical approach has not produced a set of viable definitions, has not predicted subjects' behavior, and has not provided a clear explanation of the available data. I do not believe that a classical definition is a logical self-contradiction and have not tried to establish the impossibility of the classical approach. My case is an empirical one. The classical view is a legitimate hypothesis, but the prototype view provides a more promising account of the evidence available. Pointing out that it is possible to create classical definitions in the study of emotion is irrelevant to the hypothesis that ordinary emotion concepts are prototypically rather than classically organized. The next task is to explore some of the various nonclassical alternatives. For example, Conway (1990) and Conway and Bekerian (1987) argued convincingly for a complex, heterogeneous representation of emotion concepts that includes scripts, autobiographical memories, prototypical scenes, and various culturally transmitted propositions.

The topic of a prototype analysis is therefore concepts and not the events so conceptualized. One reason for studying the concepts of emotion, anger, and the like is their widespread use in psychology. Another reason is that these concepts are psychological processes (and therefore worthy of study) and that they interact with other psychological processes. Consider the concepts of witches and ghosts. Some people today, and many people in earlier times, perceived their social world in terms of witches, ghosts, and related categories. To understand their perceptions, emotions, cognitions, and actions—their lives and deaths—requires that we understand these concepts. Likewise, to understand the perceptions, cognitions, emotions, and actions of members of the English-speaking culture of today requires that we understand the concepts of emotion, anger, and so forth. And that is what a prototype analysis is about.

Such understanding need not tell us, however, how to analyze scientifically the events to which those words refer. An importantly different task is to prescribe concepts for the scientific analysis of the events referred to as emotion. Prototypically organized concepts may prove useful in this task. Yet, I also agree with Oatley, Johnson-Laird, Ortony, Clore, Foss, and other critics of the prototype approach if they mean to suggest that we can create classically defined concepts that may prove useful in this task.

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[3] For example, Clore and Ortony (1988) wrote, "The goal, however, must not be to define emotion words, but to discover the structure of the psychological conditions to which such words apply" (p. 391). On the other hand, Clore and Ortony also wrote, "Ours is not in any sense a new concept of emotion, but an explication of what is assumed to be inherent in the existing meanings of emotion terms" (p. 391).

Summary

I don't know whether proponents of a classical view for emotion concepts meant to use a classical definition in a descriptive or a prescriptive way. If their use is descriptive (or both descriptive and prescriptive), then we continue to disagree; if their use is prescriptive, then our disagreement may evaporate.

References

Abelson, R. P. (1981). Psychological status of the script concept. *American Psychologist, 36,* 715–729.

Armstrong, S. L., Gleitman, H., & Gleitman, L. R. (1983). What some concepts might not be. *Cognition, 13,* 263–308.

Averill, J. R. (1980). A constructivist view of emotion. In R. Plutchik &

H. Kellerman (Eds.), *Theories of emotion* (Vol. 1, pp. 305–340). San Diego, CA: Academic Press.

Averill, J. R. (1982). *Anger and aggression: An essay on emotion.* West Berlin, Federal Republic of Germany: Springer-Verlag.

Barsalou, L. W. (1985). Ideals, central tendency, and frequency of instantiation as determinants of graded structure in categories. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 11,* 629–654.

Barsalou, L. W. (1987). The instability of graded structure: Implications for the nature of concepts. In U. Neisser (Ed.), *Concepts and conceptual development: Ecological and intellectual factors in categorization* (pp. 101–140). Cambridge, England: Cambridge University Press.

Bormann-Kischkel, C., Hildebrand-Pascher, S., & Stegbauer, G. (1990). The development of emotion concepts: A replication with a German sample. Unpublished manuscript, Max Planck Institute for Psychiatry, Munich, Federal Republic of Germany.

Broughton, R. (1984). A prototype strategy for construction of personality scales. *Journal of Personality and Social Psychology, 47,* 1334–1346.

Bullock, M., & Russell, J. A. (1986). Concepts of emotion in developmental psychology. In C. E. Izard & P. B. Read (Eds.), *Measuring emotions in infants and children* (Vol. 2, pp. 203–237). Cambridge, England: Cambridge University Press.

Burch, J. W., & Pishkin, V. (1984). Family resemblance—Category structure of joy and shame. *Journal of Clinical Psychology, 40,* 1136–1143.

Buss, D. M., & Craik, K. H. (1983). The act frequency approach to personality. *Psychological Review, 90,* 105–126.

Cantor, N., & Mischel, W. (1979). Prototypes in person perception. *Advances in Experimental Social Psychology, 12,* 38–48.

Cantor, N., Mischel, W., & Schwartz, J. C. (1982). A prototype analysis of psychological situations. *Cognitive Psychology, 14,* 45–77.

Cantor, N., Smith, E. E., French, R. D., & Mezzich, J. (1980). Psychiatric diagnosis as prototype categorization. *Journal of Abnormal Psychology, 89,* 181–193.

Chaplin, W. F., John, O. P., & Goldberg, L. R. (1988). Conceptions of states and traits: Dimensional attributes with ideals as prototypes. *Journal of Personality and Social Psychology, 54,* 541–557.

Clore, G. L., & Ortony, A. (1988). The semantics of the affective lexicon. In V. Hamilton, G. H. Bower, & N. H. Frijda (Eds.), *Cognitive perspectives on emotion and motivation* (pp. 367–397). Norwell, MA: Kluwer Academic.

Conway, M. A. (1990). Conceptual representation of emotions: The role of autobiographical memories. In K. J. Gilhooly, M. T. G. Keane, R. H. Logie, & G. Erbos (Eds.), *Lines of thinking: Reflections on the psychology of thought* (pp. 133–143). New York: Wiley.

Conway, M. A., & Bekerian, D. A. (1987). Situational knowledge and emotions. *Cognition and Emotion, 1,* 145–191.

Duffy, E. (1934). Emotion: An example of the need for reorientation in psychology. *Psychological Review, 41,* 184–198.

Duffy, E. (1941). An explanation of "emotional" phenomena without the use of the concept "emotion." *The Journal of General Psychology, 25,* 283–293.

Ekman, P., Friesen, W. V., & Simons, R. C. (1985). Is the startle reaction an emotion? *Journal of Personality and Social Psychology, 49,* 1416–1426.

Fehr, B. (1982). *Prototype categorization of emotion.* Unpublished master's thesis, University of British Columbia, Vancouver, British Columbia, Canada.

Fehr, B. (1988). Prototype analysis of the concepts of love and commitment. *Journal of Personality and Social Psychology, 55,* 557–579.

Fehr, B., & Russell, J. A. (1984). Concept of emotion viewed from a prototype perspective. *Journal of Experimental Psychology: General, 113,* 464–486.

Fehr, B., & Russell, J. A. (in press). The concept of love viewed from a prototype perspective. *Journal of Personality and Social Psychology.*

Fehr, B., & Russell, J. A., & Ward, L. M. (1982). Prototypicality of emotions: A reaction time study. *Bulletin of the Psychonomic Society, 20,* 253–254.

Gurtman, M. B. (1987, August). *What is an affective prototype?* Paper presented at the 95th Annual Convention of the American Psychological Association, New York.

Harnad, S. (1987). Category induction and representation. In S. Harnad (Ed.), *Categorical perception* (pp. 535–565). Cambridge, England: Cambridge University Press.

Harré, R. (1987). *The social construction of emotions.* Oxford, England: Basil Blackwell.

Horowitz, L. M., Wright, J. C., Lowenstein, E., & Parad, H. W. (1981). The prototype as a construct in abnormal psychology: I. A method for deriving prototypes. *Journal of Abnormal Psychology, 90,* 586–574.

Hume, D. (1978). *A treatise of human nature.* (L. A. Selby-Bigge, Ed.), Oxford, England: Oxford University Press. (Original work published 1739–40)

Iaccino, V. (1989). *Understanding the concept emotion: Support for a prototype perspective.* (Report No.). *ERIC-CAPS: Office of Educational Research and Improvement, Communication and Reading Skills Database,* (ERIC Document Reproduction Service No. ED 299 637). Lisle: Illinois Benedictine College, Department of Sociology-Psychology.

Izard, C. E. (1977). *Human emotions.* New York: Plenum Press.

James, W. (1929). *The varieties of religious experience: A study in human nature.* New York: Longmans, Green & Co. (Original work published 1902)

James, W. (1950). *The principles of psychology.* New York: Dover. (Original work published 1890)

Johnson-Laird, P. N., & Oatley, K. (1986). *The meaning of emotions: A cognitive theory and a semantic analysis.* Unpublished manuscript, Cambridge University, Cambridge, England.

Johnson-Laird, P. N., & Oatley, K. (1988). Il significato delle emozioni: Una teoria e un'analisi semantica [The meaning of emotions: A cognitive theory and a semantic analysis] In V. D'Urso & R. Trentin (Eds.), *Psioologia delle emozioni* (pp. 119–158). Bologna, Italy: Il Mulino.

Johnson-Laird, P. N., & Oatley, K. (1989). The language of emotions: An analysis of a semantic field. *Cognition and Emotion, 3,* 81–123.

Kagan J. (1978). On emotion and its development: A working paper. In M. Lewis & L. A. Rosenblum (Eds.), *The development of affect* (pp. 11–42). New York: Plenum Press.

Kahneman, D., & Miller, D. T. (1986). Norm theory: Comparing reality to its alternatives. *Psychological Review, 93,* 136–153.

Kay, P., & McDaniel, C. (1978). The linguistic significance of the meanings of basic color terms. *Language, 54,* 610–646.

Labov, W. (1973). The boundaries of words and their meanings. In C. J. N. Bailey & R. W. Shuy (Eds.), *New ways of analyzing variation in English* (pp. 340–373). Washington, DC: Georgetown University Press.

Lakoff, G. (1987). *Women, fire, and dangerous things: What categories reveal about the mind.* Chicago: University of Chicago Press.

Lutz, C. (1985). Cultural patterns and individual differences in the child's emotional meaning system. In M. Lewis & C. Saarni (Eds.), *The socialization of emotions* (pp. 37–53). New York: Plenum Press.

Lyons, W. (1980). *Emotion.* Cambridge, England: Cambridge University Press.

Lysak, H., Rule, B. G., & Dobbs, A. R. (1989). Conceptions of aggres-

sion: Prototype or defining features? *Personality and Social Psychology Bulletin, 15,* 233–243.

Markman, E. M. (1989). *Categorization and naming in children: Problems of induction.* Cambridge, Mass.: MIT Press.

Mascolo, M. F., & Mancuso, J. C. (1988). *The structure and content of emotion knowledge: A prototype approach.* Manuscript submitted for publication.

Medin, D. L. (1989). Concepts and conceptual structure. *American Psychologist, 44,* 1469–1481.

Mervis, C. B., & Rosch, E. (1981). Categorization of natural objects. *Annual Review of Psychology, 32,* 89–115.

Neisser, U. (1979). The concept of intelligence. *Intelligence, 3,* 217–227.

Neisser, U. (1987). *Concepts and conceptual development: Ecological and intellectual factors in categorization.* Cambridge, England: Cambridge University Press.

Ortony, A., Clore, G. L., & Foss, M. A. (1987). The referential structure of the affective lexicon. *Cognitive Science, 11,* 341–364.

Osherson, D. N., & Smith, E. E. (1981). On the adequacy of prototype theory as a theory of concepts. *Cognition, 9,* 35–58.

Panksepp, V. (1982). Toward a general psychobiological theory of emotions. *Behavioral and Brain Sciences, 5,* 407–467.

Posner, M. I., & Keele, S. W. (1968). On the genesis of abstract ideas. *Journal of Experimental Psychology, 77,* 353–363.

Rombouts, H. (1988). Emoties gezien vanuit een prototype-perspectief [Emotion concepts viewed from a prototype perspective]. In G. Mulder & R. J. Takens (Eds.), *Nederlands Psychologisch Onderzoek I: Bijdragen aan de klinische psychologie en het emotie-onderzoek* (pp. 37–50). Lisse, The Netherlands: Swets & Zeitlinger.

Rosch, R. (1977). Human categorization. In N. Warren (Ed.), *Studies in cross-cultural psychology* (pp. 1–49). San Diego, CA: Academic Press.

Russell, J. A. (1989). Culture, scripts, and children's understanding of emotion. In C. Saarni & P. Harris (Eds.), *Children's understanding of emotion* (pp. 293–318). Cambridge, England: Cambridge University Press.

Russell, J. A. (1990). *Culture and the categorization of emotion.* Manuscript submitted for publication.

Russell, J. A., & Bullock, M. (1986). Fuzzy concepts and the perception of emotion in facial expressions. *Social Cognition, 4,* 309–341.

Russell, J. A., & Fehr, B. (1989). *The concept of anger viewed from a prototype perspective.* Unpublished manuscript, University of British Columbia, Department of Psychology, Vancouver, British Columbia, Canada.

Ryle, G. (1949). *The concept of mind.* New York: Penguin Books.

Schachter, S., & Singer, J. E. (1962). Cognitive, social, and physiological determinants of emotional state. *Psychological Review, 69,* 379–399.

Shaver, P., Schwartz, J., Kirson, D., & O'Connor, C. (1987). Emotion knowledge: Further exploration of a prototype approach. *Journal of Personality and Social Psychology, 52,* 1061–1086.

Shields, S. A. (1984). Distinguishing between emotion and nonemotion: Judgments about experience. *Motivation and Emotion, 8,* 335–369.

Smith, E. E., & Medin, D. L. (1981). *Categories and concepts.* Cambridge, MA: Harvard University Press.

Tiller, D. K., & Harris, P. L. (1984). *Prototypicality of emotion concepts: A discussion of normative data.* Unpublished manuscript, University of Oxford, Department of Experimental Psychology, Oxford, England.

Tversky, B., & Hemenway, K. (1983). Categories of environmental scenes. *Cognitive Psychology, 15,* 121–149.

Wierzbicka, A. (1972). *Semantic primitives.* New York: Athenum.

Wierzbicka, A. (1973). The semantic structure of words for emotions. In R. Jakobson, C. H. van Schooneveld, & D. S. Worth (Eds.), *Slavic poetics: Essays in honor of Kiril Taranovsky.* The Hague: Mouton.

Wierzbicka, A. (1984). Cups and mugs: Lexicography and conceptual analysis. *Australian Journal of Linguistics, 4,* 205–255.

Wittgenstein, L. (1953). *Philosophical investigations.* New York: Macmillan.

Zadeh, L. A. (1965). Fuzzy sets. *Information and control, 8,* 338–353.

Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist, 35,* 151–175.