4 The Self as a Knowledge Structure

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> *The fact that man is aware of an ego-concept raises him infinitely*
> *above all other creatures living on earth. Because of this, he is a per-*
> *son; and by virtue of his oneness of consciousness, he remains one*
> *and the same person despite all the vicissitudes which may befall him.*
> —I. Kant (1798/1978)
> *Anthropology From a Pragmatic Point of View*

Social cognition is concerned with how people represent knowledge of people, the situations in which they meet, and the behaviors that they exchange; how that knowledge is acquired through the course of social learning through direct experience, precept, and example; and how that knowledge is used in the course of social interaction. By far the most important of these objects of social cognition, however, is the person doing the cognizing. In this chapter, we discuss the place of the self in social cognition, with special emphasis on the self as a knowledge structure.[1]

THE FACT OF THE SELF

Any psychological analysis of the self must begin with the contribution of James, especially as expressed in chapter 10 of *Principles of Psychology* (1890/1981).[2] In point of fact, the self pervades James' psychology. It is present at the very outset of James' discussion of the mind, when he asserted that "*The first fact for us, then, as psychologists, is that thinking of some sort goes on*. I use the word thinking . . . for every form of consciousness indiscriminately" (pp. 219–220; emphasis original). He then went on to state that

> Every thought tends to be part of a personal consciousness . . . the only states of
> consciousness that we naturally deal with are found in personal consciousnesses,
> minds, selves, concrete particular I's and you's [sic]. Each of these minds keeps
> its own thoughts to itself. . . . It seems as if the elementary psychic fact were not
> *thought* or *this thought* or *that thought*, but *my thought*, every thought being *owned*.
> . . . On these terms the personal self rather than the thought might be treated as
> the immediate datum in psychology. The universal conscious fact is not 'feelings
> and thoughts exist' but 'I think' and 'I feel.' No psychology, at any rate, can question
> the *existence* of personal selves. The worst a psychology can do is so to interpret
> the nature of these selves as to rob them of their worth. (James, 1890/1981, pp.
> 220–221)

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[1]For other coverage, see Berkowitz, 1988; Kihlstrom and Hastie, 1990; Markus, 1983; Markus and Cross, 1990; Markus and Sentis, 1982; Markus and Smith, 1981; Markus and Wurf, 1987; Mischel, 1977; Suls, 1982; Suls and Greenwald, 1983, 1986; and Wegner and Vallacher, 1980.

[2]For current appreciations of James on the self, see Markus, 1990; and Myers, 1986; also see Baumgardner, Kaufman, and Cranford, 1990; Cross and Markus, 1990; Knowles and Sibicki, 1990; Lamphere and Leary, 1990; Strube, 1990; and Suls and Marco, 1990.

So there we have it: the self is the unquestionable, elementary, universal fact of mental life, and the fundamental unit of analysis for a science of mental life. It is the problem about which everything else revolves.

James defined the self as "the sum total of all that he CAN call his," and divided the empirical self, or the self as an object of thought, into three constituents. The material self includes the person's body, clothes, family, home, and other personal property, especially that which has come by our own efforts; James argued that these are extensions of the self, part of our identities as individuals. The social self includes the person's understanding of how he or she is viewed by others; it is the person's fame, honor, or reputation. James asserted that we have as many social selves as there are distinct groups of people about whose opinions of us we care; of particular importance is the social self that resides in the mind of the person with whom we are in love. Finally, there is the spiritual self, including the person's understanding of his or her own cognitive, emotional, motivational, and behavioral dispositions.

However, beyond identifying ourselves with our mental faculties, James felt that the spiritual self included "our having become able to think of subjectivity as such, *to think of ourselves as thinkers*" (p. 284). At this more abstract level, the spiritual self is the link to the self as knower, or the central executive. The experience of the spiritual self, of ourselves as thinking, feeling, wanting, doing beings – of the stream of consciousness – is the elementary psychic fact, "I think," that gives rise to psychology in the first place. This elementary psychic fact dispenses with all disputes about whether people have selves at all. James embraced the doctrine of *esse est sentiri*, to be is to be sensed (1890/1980, p. 163; see also Myers, 1986). Because we feel the self, its existence is not to be doubted.

An Ecological Perspective

Almost a century later, and in the same vein, Neisser (1988, 1991, 1992a, 1992c) took a different approach to the constituents of the self, distinguishing among five different kinds of self-knowledge, each having its source in a particular kind of information, and each emerging at a different point in the development of the individual. The *ecological self* refers to the relationship between the person and the physical environment – to be precise, the self as embedded in the physical environment. In large part, it is given by the pattern of optic flow that passes the individual as he or she moves in space, and that, conversely, specifies the position and movement of the person in the environment. It is also given by the correspondence between intentions, or at least agency, and the perceived effects of action on the environment. Similarly, the *interpersonal self* emerges very early in life, as reflected in the subtle choreography of the infant's interactions with his or her caregivers. Partly this is manifest in the baby's appropriate response to others' facial and vocal expressions, partly in the rudiments of turn taking, and partly in making and maintaining eye contact. Just as optic flow locates the

individual in physical space, so these kinds of exchanges locate the individual in interpersonal space.

These aspects of the self emerge very early in infancy, within the first year: the looming reflex indicates that babies respond to optical flow almost as soon as it can be measured; and they also imitate their caregivers' facial expressions. They are also, arguably, present in nonhuman animals. But these aspects of the self are not necessarily objects of conscious thought. Mental representation of the self comes somewhat later, in the development of other aspects of selfhood, as the child attends to those things to which his or her caregiver also attends. These include dogs, cows, and cars; they also include the child him- or herself: thus develops the *conceptual self*, or the self-concept proper. Through a regimen of social learning mediated by experience, precept, and example, the child develops a more or less articulated sense of what he or she is like as a person, physically, mentally, and socially.

The conceptual self sets the stage for the emergence of the final two facets of selfhood: the extended (or remembered) self and the private self. The *extended self* extends back into the past and forward into the future. It consists of the individual's record of autobiographical memory (Brewer, 1986), as well as beliefs about the kind of person one might become, for better or for worse (Markus & Nurius, 1986). Logically, having a concept of what one is, and does, is the prerequisite for having memories of what was (or did) in the past, and what might be, and might do, in the future. Infantile and childhood amnesia may reflect the inability of the young child to encode and retain memories of events (Fivush & Hamond, 1990; Neisser, 1992b; Schacter & Kihlstrom, 1989; White & Pillemer, 1979); but it may also reflect the absence of a self-concept on which these memories can be hung. The self is central to episodic memory (Tulving, 1983): to paraphrase James, one might say that the universal memory is not "this happened," but "*I* did this," or "This happened to *me*." Last, but not least in Neisser's account is the *private self*, which develops as the child realizes that some of his or her experiences and thoughts (e.g., hunger, pain, dreams, and secrets) are essentially inaccessible to other people except through the child's own self-reports.

The Social Intelligence Viewpoint

In the course of developing their social intelligence view of personality (Cantor & Kihlstrom, 1987, 1989; Kihlstrom & Cantor, 1989), Kihlstrom and Cantor defined the self as one's mental representation of one's own personality—what his or her characteristic traits, motives, beliefs, attitudes, and values are. Thus:

> We define the self as one's mental representation of oneself, no different in principle from mental representations that a person has concerning other ideas, objects, and events and their attributes and implications. (Kihlstrom & Cantor, 1984, p. 2)

And:

[T]he self may be construed as a person's mental representation of his or her own personality. . . . Formed through both experience and thought, it is encoded in memory alongside mental representations of other objects, real and imagined, in the physical and social world. The mental representation of the self includes both abstract information about the person's attributes (semantic knowledge) and concrete information about the person's experiences, thoughts, and actions (episodic knowledge). (Kihlstrom et al., 1988, p. 146)

This general view also underlies the present work, but we want to expand it in several ways. First, we wish to clarify that the self represents the sociocultural matrix in which the person lives as well as his or her internal cognitive, emotional, motivational, and behavioral attributes. From the social–cognitive perspective, personality is constructed through, and displayed in, social interaction. It is not possible to separate the intrapsychic from the interpersonal. Put another way, it is not possible to view persons as isolated entities, nor can people view themselves in this manner. Second, self-knowledge represents the person's physical as well as psychosocial attributes; it refers to body as well as to mind. We have an idea of what we look like, as well as what we think, feel, want, and do. Third, the self includes the individual's autobiography: a record of his or her actions and experiences (or, at least the important ones), portrayed from his or her subjective point of view. Part of our repertoire of social intelligence is our personal history, on which we can reflect in the course of ongoing experience, thought, and action. Finally, in general, the self-concept is accessible to introspective phenomenal awareness. Examples of a subconscious self-concept may be found in cases of psychogenic fugue and multiple personality disorder (Kihlstrom, 1992); and there are some people who are remarkably obtuse about themselves. But, as a rule, we assume that we know who we are and what we are like.

Within the social intelligence framework, Kihlstrom and Cantor (1984) described two alternative views of the self: as a memory structure, located at a node in an associative memory network representing declarative knowledge about all sorts of things; or as a conceptual structure, embedded in a hierarchy of concepts having to do with the physical and social world. The two construals are not mutually exclusive, of course. Concepts are encoded in declarative memory, and, depending on one's investigative and theoretical purposes, one can think of the self as either a fragment of memory or a concept.

THE SELF AS CONCEPTUAL STRUCTURE

First, let us be quite literal about the idea of the self-concept, and ask what the self looks like from this point of view. For the most part, this inquiry is guided by recent treatises on the structure of concepts in general (Medin & Smith, 1984; Mervis & Rosch, 1981; Neisser, 1987; Oden, 1987; Rosch & Lloyd, 1978; Smith

& Medin, 1981; for developmental perspectives, see Keil, 1989; Markman, 1989; for the perspective of cognitive linguistics, see Lakoff, 1987).

Proper Set View

Historically, of course, concepts were first viewed as *proper sets*, that is, summary descriptions of entire classes of objects whose features are singly necessary and jointly sufficient to identify an object as an instance of a category, and are perfectly nested in subset–superset relations created by adding or subtracting defining features. Thus, the geometrical figure *rectangle* is a plane with four sides and four equal angles; rectangles are subsets of parallelograms, which do not have four equal angles; and squares are subsets of rectangles with the four sides equal. This classical view of concepts began with Aristotle, and was consolidated in the 20th century by Hull (1920) and Bruner, Goodnow, and Austin (1956).

Self and Other Persons Within Proper Sets.   In the domain of personality, the classical proper set view is represented by the classic fourfold typology originally offered by Hippocrates and Galen, and endorsed by Kant (1798/1978). According to this view, there are only four types of people: melancholics, cholerics, sanguines, and phlegmatics, each displaying a unique set of features. In Hippocrates' original formulation, these types were given by the distribution of the four humors of which every animal was composed: black bile, yellow bile, blood, and phlegm. Kant dropped the biology, but retained the conceptual structure. More recently, psychiatric diagnosis, which, after all, is only a special form of social categorization, was construed in terms of proper sets. For example, according to Bleuler (1911/1950), *schizophrenia* was defined by the "4 As"—the fundamental symptoms of associative disturbance, anhedonia, ambivalence, and autism. All schizophrenics displayed these four symptoms, and everyone who displayed them was a schizophrenic. In the ordinary course of everyday living, we often categorize other people this way. Stereotyping, by its very nature, attributes to the individual all the characteristics imputed to the social group of which he or she is a member, and steadfastly refuses to recognize his or her individuality. Now, if we wish, we can think of the self in this way, too. For example, a person's self-concept could consist merely in identifying him- or herself as an example of a particular social category: For example, "I'm a melancholic sort of person, meaning that I share a set of singly necessary and jointly sufficient defining features with all other melancholics."

So, if the self-concept is going to be structured like a proper set, it must have a set of defining features that represents the uniqueness of the individual. Certainly we construe ourselves in terms of characteristics that we share with others. Humans are social animals, and it should not be surprising if our group memberships are represented in our self-concepts. But our individuality has to be represented there as well. Accordingly, suppose that each individual construes him- or herself in terms of a set of features that are singly necessary and jointly sufficient

to define ourselves as unique (i.e., as a set of features that is shared with no other person). Suppose further that we identify the self-concept with Allport's (1937) central traits. Allport proposed that each person possessed a unique combination of personal traits, and that some 5 or 10 of these were deemed to be of special importance. If one makes the assumption that these traits are accessible to conscious awareness, then they are candidates for inclusion as defining features of the self-concept.

As a thought experiment, recall that Allport and Odbert (1936) found 17,954 terms in the English language that could be used to distinguish one individual from another (actually, they reported 17,953, but someone miscounted; since that time, of course, many new terms have entered the language). Now, as it happens, there are some $_{17,954}C_5 = 1.55 \times 10^{19}$ possible combinations of 17,954 objects taken 5 at a time, and fully 9.57×10^{35} such combinations when taken 10 at a time. That is far more than enough combinations to uniquely characterize every individual who ever walked the surface of the earth in all its history, and probably everyone who will live from now until Armageddon. So it is possible, at least in principle, to construe the self-concept as a proper set of defining features, with one and only one instance in the self-concept. No particular trait will suffice to distinguish oneself from all others, but the entire package will do so.

Probabilistic View

It is possible for theorists to construe the self as a proper set, but why would they want to do it? The problems with the proper set view of categories are well known, and have been summarized in compelling fashion by Smith and Medin (1981) as follows:

Exclusion of functional features.
Existence of disjunctive concepts.
Existence of unclear cases.
Failure to specify defining features.
Typicality effects.
Family resemblance.
Use of nonnecessary features.
Imperfect nesting.

In response to these sorts of criticisms, Rosch (1975; Rosch, Mervis, Gray, Johnson, & Boyes-Brehm, 1976) and others proposed what has come to be known as the *probabilistic view*, which argues that the summary descriptions of category members take the form of some measure of their central tendency with respect to salient features. Actually, there are at least two different versions of the probabilistic view (Smith & Medin, 1981). According to the *featural version*, the central tendency is represented by a list of features that are present in most

members of the category, although these features are not singly necessary nor jointly sufficient to define the concept. Thus, birds tend to fly, sing, and be small, but there are a few large, flightless, songless birds. The category prototype is some instance, real or imagined, that has a large number of these typical features. According to the *dimensional version*, the features in question are represented as continuous dimensions, on which each object has a score. An average score on each dimension is computed for each category member, and the entire set of central tendencies becomes the category prototype. In other words, each member is represented as a point in multidimensional space, and the category prototype lies somewhere in the center of this distribution.

Prototypes of Self and Others. Of course, the dimensional version of the prototype view has a long history in personality psychology, ever since Wundt noticed that some people only partially fit the criteria for Kant's categories, whereas others fit more than one equally well, and intuited that a shift from discrete types to continuous traits would solve the problem. Whether it succeeded or not, the shift was enormously popular. Many of the classic theories of personality, such as those proposed by Guilford, Cattell, and Eysenck, were couched in terms of individual differences in a finite number of traits. Of course, the entire technology of personality assessment, questionnaires and all, has arisen from the attempt to assess individual differences in terms of trait dimensions. Perhaps the modal model of personality structure is the "Big Five" framework (John, 1990), which holds that individual differences in personality can be summarized in terms of five traits of extraversion, neuroticism, agreeableness, conscientiousness, and intellectance (or, alternatively, openness to experience). In theory, each person can be located as a unique point in a multidimensional space defined by these five dimensions.

Cantor adapted Rosch's approach to the problem of both normal (Cantor & Mischel, 1978; see also Lingle, Altom, & Medin, 1984) and abnormal (Cantor & Genero, 1986; see also Morey & McNamara, 1987) personality. However, it should be understood that Cantor's is an approach to person perception, or impressions of personality, rather than to personality per se, as something that has an existence independent of the observer. It is based on what Allport called the biosocial view of personality, rather than the biophysical view preferred by traditional trait theorists. Cantor was interested in the structure of the categories that guide impression formation, and she argued that concepts of persons—labeled by terms like *wonk, nerd, preppie, hippie,* and *jock*—were fuzzy sets of features, each only probabilistically associated with category membership, their constituent instances linked by family resemblance rather than defining features, and imperfectly nested in tangled hierarchies. She argued that when people formed impressions of others' personalities, they matched their salient features to those of category prototypes, and classified people in terms of the prototype that gave the best match.

Again, on the simple assumption that a person's traits are accessible to introspection, both versions of the probabilistic view can provide models of the self-concept. Thus, people might have a more or less clear idea of their standings on each of the traits comprising the structure of personality — which points are theirs in multidimensional trait space (Breckler, Pratkanis, & McCann, 1991). Or, people might have an idea of which personality prototype they most closely resemble. In fact, shortly after Cantor introduced the prototype approach to person perception, Rogers (1981) argued that the self was also structured as a cognitive prototype, consisting of some set of features that are more or less highly correlated with selfhood.

This interpretation was enormously heuristic, in that it led to a large number of novel, interesting experiments concerned with the problem of self-reference in memory and the nature of judgments concerning the self. On the other hand, this particular interpretation may miss some essential features of both the self-concept and the probabilistic view. To begin with, the self-concept is a concept, not an instance. Further, from the probabilistic view (or the classical view, for that matter), concepts provide summary representations of an entire class of objects. So, if the self-concept is a concept, and conceptual prototypes summarize the features of a number of instances, then of what is the self-concept a prototype? What are the instances summarized by the prototype, if there is only one of each of us?

Context-Specific Selves. Taking seriously the probabilistic view of the self-concept forces us to recognize that, in some sense, there is more than one of each of us. Perhaps the self-concept is abstracted from random observations of ourselves. It seems more likely, however, that the self-prototypes are abstracted from systematic observations of ourselves in different situational contexts. The assumptions of trait theory notwithstanding, it has been known since the classic study of honesty by Hartshorne and May (1929) that social behavior is remarkably sensitive to the details of the social situation. People who are extraverted or conscientious in one situation may not be so in another, and the degree of similarity in behavior from one situation to another varies with the perceived similarity among the situations in question. There is no reason to think that people fail to represent these relationships mentally. In fact, the self–other difference in causal attribution — the tendency for people to attribute others' behavior to dispositions, but their own behavior to (perceived) situations (Jones & Nisbett, 1972; see also, Goldberg, 1978, 1981; Kelley & Michaela, 1980; Monson & Snyder, 1977) — suggests that we are quite aware of the contextual specificity of our own behavior.

Accordingly, it seems likely that we possess a large set of context-specific selves, as opposed to a monolithic, unitary self, and that these are organized into a kind of hierarchy representing various levels of abstraction (Martindale, 1980). At the very top of the hierarchy is an extremely abstract representation of the self, valid across many contexts, but not particularly informative about what we

are like in any particular situation. The hierarchy branches into various subsets and sub-subsets representing the self at ever more concrete situations. Perhaps, as Rosch and Cantor argued, there is some middle level in this scheme that functions as a kind of basic level for self-perception, which optimizes the balance between the richness of the representation and degree to which it is differentiated from other categories at the same level of the hierarchy (Murphy & Smith, 1982; Rosch et al., 1976; Tversky & Hemenway, 1984). If so, the basic level in self-categorization is privileged, in the sense that it represents the ways in which we prefer to think about ourselves, or think about ourselves most readily. If there are context-specific self-concepts, perhaps they are to be found here.

Even without considering multiple, context-specific selves, consideration of person categories as prototypes can help one to understand certain aspects of social decision making. For example, Niedenthal, Cantor, and Kihlstrom (1985) assessed the college housing preferences of freshman undergraduates. These preferences were significantly predicted by the similarity between the subjects' self-ratings on a list of representative trait adjectives, and their ratings of the kind of person who was happy and comfortable in each of the available options—a prototype-matching process similar to what underlies social categorization. Similar findings have been obtained by other investigators in a wide variety of contexts, although they did not explicitly adopt a prototype-matching framework (Burke & Reitzes, 1981; Chassin, Presson, Sherman, Corty, & Olshavsky, 1981; Pervin & Rubin, 1967; Schlenk & Holman, 1980; Solomon, 1983). Interestingly, the reverse phenomenon, prototype distancing, occurs in situations involving threat to self-esteem, such as the choice of a psychotherapist (Niedenthal & Mordkoff, 1991).

Exemplar View

The probabilistic view solves many of the problems of the classical view, but it has problems of its own (Medin, 1989). For example, it can be demonstrated that people use information, such as the variability among category members and the intercorrelations among characteristic features, that are not represented in summary prototypes. In response, Medin and Schaffer (1978) argued that concepts do not provide a summary representation of the features of category members. Instead, they proposed that concepts are represented by the instances; in other words, by concrete exemplars, rather than abstract prototypes. This shift from prototypes to exemplars underscores the appeal of the context-specific self; as in the probabilistic view, the instances represent the self as viewed in different situations. Of course, there is no longer any prototype representing the self in the abstract. Instead, there is just a grouping of particular instances. Moreover, there is no longer any basic level of self-categorization, nor any hierarchy of self-concepts.

If there is no hierarchy, no basic level, no prototype, and no super-abstract

superordinate concept, then do any context-specific selves have privileged status, and if so by what right? One hint comes from studies of priming effects, by which structures recently activated through perception and thought remain in a highly accessible state for some period of time (e.g., Meyer & Schvaneveldt, 1971). Another comes from multiple-trace theories of memory (e.g., Hintzman, 1986), which assume that each encounter with an object leaves a separate trace in memory. Thus, frequently encountered objects are represented by multiple traces, and their sheer number makes it more likely that these knowledge structures, as opposed to others, will be accessed during perception and thought—a chronic (as opposed to temporary) state known in the social cognition literature as construct accessibility (Bargh, 1989; Higgins & King, 1981). Taken together, these considerations suggest that those exemplars that have been recently or frequently activated have privileged status in the mental representation of the self.

Perhaps because they retain information that prototypes discard, exemplar models have proved generally superior to prototype models in formal tests (Barsalou & Medin, 1986; Medin & Ross, 1989; Nosofsky, 1988). Nevertheless, it is hard to believe that categories contain no summary information whatsoever. Cantor and Kihlstrom (1987) proposed that people have a mix of exemplar and summary representations of others, shifting between them as needed. The same conclusion might be valid for the self (Klein & Loftus, 1993a, 1993b). Nevertheless, the circumstances under which these shifts might take place are not clear. Perhaps it depends on whether knowledge of the category in question has been acquired directly or vicariously (Lingle et al., 1984). Alternatively, perhaps people shift from exemplar to summary representations as they acquire expertise in a domain (Homa, 1984).

Theory-Based View

Both the prototype and exemplar views, like the classical view that preceded them, explain categorization on the basis of similarity between the features of the object to be categorized and those of the mental representation of the concept. Unfortunately, as Murphy and Medin (1985; Medin, 1989) argued, similarity cannot be the only principle involved in categorization. For one thing, similarity is both extremely flexible and rather arbitrary, and the perception of similarity is distressingly unprincipled (Tversky, 1977). For another, concepts encode information about the relations among features, as well as the features themselves. This fact is not easy to accommodate within similarity-based views of concepts (Armstrong, Gleitman, & Gleitman, 1983). These and similar considerations suggest that similarity is not all there is to categorization.

Accordingly, Murphy and Medin (1985; Medin, 1989) proposed an additional view, the theory-based (or knowledge-based) approach, to explain categorization. According to this view, concepts are organized by theories about the domain they represent, and these theories guide judgments of similarity and define the

relationships between concepts and their constituent features. For example, white hair is perceived as more similar to gray hair than to black hair, because of the judge's intuitive theory of aging. On the other hand, gray clouds are perceived as more similar to black clouds than to white clouds, because of the judge's intuitive theory of the weather (Medin & Shoben, 1988). Thus, concepts are represented by a set of attributes that are correlated with each other, as well as with category membership. However, concepts also are defined by one or more principles that explain these relations. Thus, clouds that are heavy with moisture turn dark, whereas aging hair loses pigment. Classification goes beyond feature matching to posit a theory that explains the links between objects, their features, and the categories to which they belong. Theoretical considerations permit instances to be classified together even when they possess no features in common.

The theory view is relatively recent and has not had time to be incorporated into accounts of social categorization. But the addition of theories to similarity judgments is appealing, because it provides a basis for representing both the various features of objects and the exemplars of the categories to which they belong. Thus, to return to the example of psychiatric diagnosis, the Four As in Bleuler's concept of schizophrenia may be the common consequence of an underlying attentional deficit (Chapman & Chapman, 1973); and the conversion disorders (involving functional deficits in perception and voluntary action) and the dissociative disorders (involving functional deficits in memory and identity) belong together because both involve divisions of consciousness (Kihlstrom, 1992). Similarly, in the domain of social cognition, the existence of theory-based concepts helps explain how two individuals, so different superficially, can be perceived as belonging to the same category. The reason is that the concept is represented by a theory of the essence of the category, rather than by a list of characteristic features or exemplars.

Self-Theory.   With respect to the self-concept, the theory view is especially attractive because it provides a way to organize the relations among exemplars and to explain the particular form that a hierarchy of selves takes. More than 20 years ago, Epstein (1973) identified the self-concept with one's intuitive theory of oneself—a theory that explains why we are what we are, think what we think, feel what we feel, want what we want, and do what we do. As he put it then:

> *The self-concept is a self-theory.* It is a theory that the individual has unwittingly constructed about himself as an experiencing, functioning individual, and it is part of a broader theory which he holds with respect to his entire range of significant experience. (p. 407)

In his view, the notion that the self is a theory offers a resolution to the problem, identified by James, that the self is both a knower and an object of knowledge:

after all, theories both represent existing knowledge and guide the acquisition of new knowledge. Like any scientific theory, the self-theory is subject to test, revision, retest, and expansion, although, as is common in science, the theorist may fight valiantly to retain his or her theory.

Epstein believed that the notion of a self-theory should replace that of the self-concept, which he thought suffered from ineffability and tautology. But it is not necessary to abandon the self-concept in favor of the self-theory. Perhaps concepts were ineffable in 1973, but they are less so now. A great deal is known about how natural concepts are structured, and one can see that it makes sense to think of the self-concept as structured in the same manner as other concepts — as a hierarchically arranged set of prototypes, or as a set of exemplars. Furthermore, the prototype and exemplar views of the self-concept help one understand the context specificity of the self. But just as important, recent developments in cognitive theory give another reason not to abandon the self-concept in favor of the self-theory, because concepts *are* theories.

In Epstein's view, the self-concept optimizes the balance of pleasure and pain over the course of the individual's lifetime, maintains self-esteem, and assimilates and organizes experience. But the theory-based view of concepts suggests yet another, more important, function. People appear to have multiple, context-specific selves. The self-concept consists of a mental representation of attributes that are characteristic of ourselves in each of these contexts, as a set of prototypes or exemplars. But it also consists of a self-theory, lying at the core of the self-concept, which links the various attributes to the self and guides the transition between context-specific selves. Moreover, the self-theory explains the variety of context-specific selves, the relations among them, and the narrative of autobiographical memory to which the self is linked.

ASSESSING THE SELF-CONCEPT

How can a person's self-concept, including whatever context-specific selves he or she may possess, be revealed for study? Most assessments of the self-concept rely on some version of the adjective checklist or rating scale. For example, Rogers (1951) developed a version of Stephenson's Q-sort procedure, in which subjects sorted a set of 100 self-referent statements into a forced-normal distribution according to the degree to which they were true of their actual and ideal selves. Of course, such self-descriptions can be collected by means of any adjective rating scale or self-report questionnaire.

Self-Schematics and Aschematics

On the other hand, as Markus (1977) noted, just because an item is self-descriptive does not mean that it is part of the self-concept. Accordingly, after her subjects rate the degree to which each adjective is self-descriptive, they also rate the degree

to which it is important to their self-concept. Drawing on Bartlett's concept of the schema as an organized mental structure that guides perception and memory, Markus classified subjects as self-schematic for a particular attribute only if they rate it high in terms of both self-descriptiveness and self-importance. They are classified as aschematic for attributes that are rated as moderate in self-descriptiveness and unimportant to the self-concept. Individuals who are self-schematic and aschematic for particular attributes have been shown to perform differently on a wide variety of tasks (for comprehensive reviews, see Markus & Sentis, 1982; Markus & Smith, 1981; Markus & Wurf, 1987). For example, individuals who are self-schematic for independence and dependence are quicker to make judgments about themselves in these domains, are more likely to remember domain-relevant behavior, are more confident in their predictions about future trait-relevant behavior, and are more resistant to information that contradicts their self-concepts (Markus, 1977). Similar findings have been obtained in domains of gender (Crane & Markus, 1982; Markus, Crane, Bernstein, & Siladi, 1982; Markus, Smith, & Moreland, 1985) and extraversion–introversion (Fong & Markus, 1982).

Although these sorts of experiments have demonstrated interesting differences between self-schematic and aschematic subjects, the classification procedure used in studies of self-schemata necessarily confounds the degree to which a trait is self-descriptive with the degree to which it is important to the self-concept (Burke, Kraut, & Dworkin, 1986; Nystedt, Smari, & Boman, 1991). The problem is that, for some characteristics, it may be important to subjects that they lie somewhere in the middle. In fact, Burke et al. (1986) found that, for eight trait dimensions, measures of self-descriptiveness were only very modestly related to measures of importance to the self-concept. Although the vast majority of personality descriptions are heavily loaded with evaluation, such that most individuals probably prefer to perceive themselves as located near the socially desirable pole, there are obviously some cases in which people prefer to be somewhere in the middle: smart, but not a genius; agreeable, but not obsequious; conscientious, but not fastidious; masculine or feminine, but not to the point of caricature; liberal or conservative, but also moderate. As Jones (1964; Jones & Pittman, 1982) noted, one's self-presentation can be too good to be true, and that self-presentation, and thus self-definition as well, should not be excessive. Thus, the desire to be outstanding is dampened by the desire not to be conspicuous. Because it can be important to people that they be, and be perceived to be, moderate on many trait dimensions, what would seem to be really crucial in Markus' procedure is the rating of self-importance.

Possible Selves

More recently, Markus and Nurius (1986) argued that people possess a number of different self-concepts:

> The individual's collection of self-conceptions and self-images can include the good selves (the ones we remember fondly), the bad selves (the ones we would just as soon forget), the hoped-for selves, the feared selves, the not-me selves, the ideal selves, the ought selves. (p. 957)

Thus, in addition to assessing the present self-concept, or what they call the working self-concept, it is also important to consider the individual's *possible selves*, or the specific hopes, fears, and fantasies that the individual has about him or herself (see also Hart, Fegley, & Brengelman, 1993; Markus & Kunda, 1986). As standards against which the current view of self can be evaluated, possible selves have an obvious emotional function; as things to be approached or avoided, their motivation function is also clear. One way in which possible selves can be assessed is with a standard checklist, in terms of which subjects indicate whether each characteristic is part of the present self, whether it was descriptive of them in the past, whether it had ever been considered as a possible self, how probable that possible self was, and how much they would like to possess the attribute in question.

Self-Complexity

Another important aspect of the self-concept is self-complexity, a variant on the cognitive complexity studied in the tradition of Kelly's personal construct theory (Crockett, 1965). Linville (1985, 1987) proposed that there are individual differences in the extent to which people perceive themselves as playing different roles, or behaving in different ways, in different situations. The number of such different selves, and especially the semantic distance between them, is what she means by self-complexity. Self-complexity can be assessed by presenting subjects with a representative set of trait adjectives and asking them to sort them into categories representing different aspects of themselves (traits can be used more than once). Complexity may be quantified by a measure of the dispersion of traits across the categories: a high score indicates that there are many different facets of the self that share relatively few attributes in common. Self-complexity, so measured, is negatively related to the strength of emotional reactions to positive and negative life events (Dixon & Baumeister, 1991; Linville, 1985, 1987). The explanation is that self-complexity prevents emotion elicited in one situation, to which one aspect of the self is related, from spreading to other aspects of the self.

Individual differences in the elaboration of the self-concept also have been studied in the clinical domain. In particular, it has long been speculated that schizophrenics suffer identity confusions and blurring or loss of ego boundaries (for a review, see Gara, Rosenberg, & Cohen, 1987). One empirical approach to this hypothesis has been based on the set theoretic model of self proposed by Rosenberg and Gara (1985). Comparing the self-concept with concepts of other

persons, Gara and his colleagues found that the self-concepts of schizophrenics are much less elaborate than those of normal controls (Gara, Rosenberg, & Mueller, 1989; Robey, Cohen, & Gara, 1989). With respect to concepts of other persons, the trend was in the opposite direction, although the differences were not significant due to extremely high variances. Interestingly, and in apparent contradiction to the findings of Linville (1985, 1987), there was no difference between depressed patients and normal controls in terms of elaboration of the self-concept.

Recently, Niedenthal, Setterlund, and Wherry (1992) combined Markus's concept of possible selves with Linville's notion of self-complexity. Interestingly, complexity of the actual self is not strongly related to the complexity of the possible self. Moreover, although actual self-complexity mediates affective responses to success and failure with respect to current goals, possible self-complexity appears to mediate responses to outcomes with respect to future goals. Similarly, Showers (1992) documented individual differences in compartmentalization, or the tendency to sort the positive and negative aspects of self into separate categories. Compartmentalization is positively related to self-esteem in those for whom the positive aspects of self are most important to them, and negatively in those depressed individuals for whom negative aspects of self are most important.

The Spontaneous Self

One problem with checklists and rating scales is that they are somewhat Procrustean: that is, they force people to characterize themselves in terms of a set of categories that are of interest to the researcher, regardless of whether these terms would be chosen by the people themselves. This raises the danger that subjects and investigators might differ in their definitions of the attributes in question, leading to misrepresentations and misperceptions of the self. But even if the attributes in question could be defined with a high degree of consensus, it seems unfair that, in assessing the self-concept, people should be denied the opportunity to define themselves in their own terms. If any aspect of the personality deserves idiographic assessment, it is the self-concept. Accordingly, some investigators have experimented with free-response procedures (see Kendall & Hollon, 1981).

Early examples of this method are the Twenty Statements Test (Kuhn & McPartland, 1954) and the Who Are You? technique (Bugental, 1964). Along the same lines, Jones, Sensenig, and Haley (1974) gave their subjects 20 minutes to list self-descriptive words and phrases. These were then coded into 97 categories (the number reflecting the limitations of computer memory at the time). Multidimensional scaling revealed four broad dimensions, which Jones et al. argued were the central features of the self-concept: evaluation, impulsiveness–inhibition, masculinity–femininity, and communality with others.

A recent variant on Rogers' distinction between real and ideal self was introduced by Higgins (1987, 1989; Higgins, Bond, Klein, & Strauman, 1986; Higgins, Klein, & Strauman, 1985) and his colleagues. Their Selves Questionnaire asks subjects to list traits and attributes comprising their beliefs about themselves in various domains, or self-states. One such domain is the Actual Self, as represented by the following question: "Your beliefs concerning the attributes or characteristics you think you *actually* possess now"; two other facets of the self, known as self-guides, are the Ideal Self (". . . the attributes or characteristics you would *ideally* like to possess; the type of person you wish, desire, or hope to be") and the Ought Self (". . . the attributes or characteristics you believe you *should* or *ought to* possess; the type of person you believe it is your duty, obligation, or responsibility to be"). These self-states can be assessed from the person's own perspective, but they can also be assessed from the standpoint of significant others, such as the respondent's parents and friends. Interestingly, Higgins, Strauman, and their colleagues showed that discrepancies between the actual self and various self-guides are associated with characteristic moods and vulnerability to emotional distress: actual–ideal discrepancies are associated with dysphoria, whereas actual–ought discrepancies are associated with anxiety (Higgins, 1987; Higgins et al., 1985; Strauman, 1989, 1992). In addition, Strauman (1990, 1992) showed that self-guides are particularly effective cues for the retrieval of autobiographical memories from childhood.

Another approach was taken by McGuire (1984; McGuire & McGuire, 1981, 1982, 1988), who simply presented their subjects with a blank sheet of paper (or a tape recorder) and gave them the simple instruction, "Tell me about yourself." A content analysis, based on the responses of a group of sixth graders, yielded the following distribution of categories:

Habitual activities (hobbies, sports, and skills), 24%;
Significant others, 20%;
Attitudes, interests, hopes, and preferences, 17%;
School status, 15%;
Demographic information, 12%;
Self-evaluation, 7%;
Physical characteristics, 5%;
Miscellaneous, 1%.

Note the prominence of significant others in the self-concept: in large part, we define ourselves in relation to other people. Note, too, in contrast to the wealth of literature on self-esteem, that evaluative remarks comprise a relatively small portion of what the McGuires call the "spontaneous self" (although that does not mean that self-esteem is unimportant; see Greenwald, Bellezza, & Banaji, 1988; Showers, 1992).

Salience and Distinctiveness.   In an extensive series of studies, the McGuires showed that the content of the spontaneous self-concept is determined, at least partly, by a principle of salience or distinctiveness. That is, for many attributes, children and adults are more likely to list a particular feature as part of the self-concept if they are different from others on that dimension. This tendency is, in turn, related to a general fact of attentional life, which is that when one cannot encode all the information available, attention is selectively focused on those elements that stand out in some way. In particular, when choosing among all the attributes that could be used to describe themselves, people tend to gravitate toward those that set them apart from other people.

For example, subjects who are left-handed are more likely to mention laterality than are those who are right-handed (McGuire & McGuire, 1980). Similar findings are obtained for other physical and demographic characteristics such as height, weight, hair color, eye color, gender, ethnicity, and birthplace (McGuire & McGuire, 1981; McGuire, McGuire, Child, & Fujioka, 1978; McGuire, McGuire, & Winton, 1979; McGuire & Padawer-Singer, 1976). Perhaps because of difficulties involved in assuring equivalence between subjects' and investigators' constructs, the distinctiveness hypothesis has not been tested with respect to personality attributes. However, even within the domain of physical and demographic attributes, the actual frequency with which distinctive features appear in self-descriptions is rather low. For example, in the report by McGuire and McGuire (1988), only 27% of subjects for whom height was a distinctive characteristic actually mentioned height in their self-descriptions; the comparable figure for birthplace was 10%. Thus, although distinctiveness is an important determinant of the self-concept, it seems likely that the actual content of the self reflects a kind of compromise between assimilation and contrast (Brewer, 1991).

The McGuires' demonstration of distinctiveness effects on the spontaneous self-concept implies that the self-concept varies according to the context in which it is accessed. But it is not clear whether they think that it is the self-concept that varies, or merely the accessibility of its elements. Certainly, the subject's attention to various attributes of the self can be affected by context. What is not known is whether the self-concept varies from context to context, yielding a multiplicity of selves (Markus & Kunda, 1986). Something like this happens in psychogenic fugue and multiple personality. Research on the structure of nonsocial concepts suggests that it is meaningful to think of each individual as possessing a number of different, context-specific selves.

PERSPACE

As part of a project supported by the Program on Conscious and Unconscious Mental Processes of the John D. and Catherine T. MacArthur Foundation (M. J. Horowitz, principal investigator), a computer software system has been developed that may prove useful in the idiographic assessment of the context-specific

self-concept (for another approach, see Tunis, Fridhandler, & Horowitz, 1990). The program, known as PERSPACE (now in Version 3.5; Kihlstrom & Cunningham, 1991; Kihlstrom & Olsen, 1992), is inspired by Kelly's (1955) Role Construct Repertory Test for the assessment of personal constructs, and Rosenberg, (1988; Gara & Rosenberg, 1979; Rosenberg & Gara, 1985) set theoretic model for studying the content and organization of the social self (see also Lehrer, 1986).

In one configuration of PERSPACE, the subject begins by typing in a list of targets, such as the important people, situations, or events in his or her life. (For subjects or experimenters who need more concrete cues, PERSPACE also provides a menu of cued-response probes; e.g., the categories of persons used in Kelly's original Rep Test.) After the targets are collected, they are presented individually in random order, and the subject is asked to list features that characterize him- or herself when he or she is with the person or in the situation indicated. These responses provide the basis for assessing context-specific self-concepts, where "context" is defined in terms of the presence of particular people, situations, or events. In the final phase, the attributes listed for each target are merged, edited for redundancy, and collated with the list of targets to form a (potentially rather large) target × descriptor matrix. The cells of this matrix are then randomly presented to the subject, who rates the degree to which the descriptor is characteristic of the target. Thus, for example, if a subject responded "feel nervous" when asked to describe himself in the presence of his grandfather, he would be asked to what extent he feels nervous in the presence of all the other targets on his list. (In the event that the investigator prefers to analyze a particular set of rating scales instead of allowing subjects to generate their own, the descriptor phase can be skipped entirely and the investigator can supply the subject with any of a wide variety of conventional rating schemes.)

After the subject sessions are completed, the target × descriptor matrix is put into a format compatible with the requirements of major data-analysis packages, such as SPSS or BMDP, and submitted to a variety of multivariate statistical analyses, including factor analysis, multidimensional scaling, and cluster analysis. Our preferred mode is cluster analysis, which groups targets together according to similarity of descriptors—or, in the present instance, similarity of self-descriptors. The resulting dendrogram, appropriately partitioned, graphically portrays the conceptual self in context (Kihlstrom & Marchese, in press). For example, it might show that the subject possesses not a unitary, monolithic self-concept, but rather several, each quite different from the others and each tied to the presence of specific people or social situations.

THE DEVELOPMENT OF THE SELF-CONCEPT

The child's understanding of his or her physical world changes over the course of development. This principle applies to the child's understanding of the social world, and of him- or herself as well (for reviews, see Damon, 1983; Damon

& Hart, 1988; Eder, 1989, 1990; Flavell & Ross, 1981; Higgins, Ruble, & Hartup, 1983; Lewis, 1990; for coverage of the literature on self-esteem, see Harter, 1983, 1986, 1988).

Much of the work on the self in infancy has been heavily influenced by psychoanalytic theory, of course, particularly the work of Erik Erikson and Margaret Mahler. Kegan (1982) drew on the theories of Piaget and Kohlberg to produce a cognitive account of the development of selfhood. But there is also empirical work (e.g., Dixon, 1957). First, of course, there is the finding that a majority of infants, by the time they are 18 to 24 months of age, will touch a spot on their faces when it is visible in a mirror (a procedure known as the mark test; see Lewis & Brooks-Gunn, 1979). This suggests that by about 2 years of age, children have acquired a mental representation of themselves that allows them to notice discrepancies between what they see and what they expect to see. This research is particularly interesting, because similar behavior has been observed in chimpanzees or orangutans (Gallup, 1968; Gallup & Suarez, 1986), thus showing some degree of phylogenetic continuity between humans and nonhumans in this respect (for an alternative point of view, see Epstein, Lanza, & Skinner, 1981). Other primate species, including gorillas and pygmy marmosets, appear to fail the mark test, but this does not necessarily mean that they do not have at least rudimentary self-images.

The Self in Language

The ability of children to communicate verbally allows researchers to gather additional evidence concerning the development of the self-concept. For example, by the end of the second year of life, children have begun to make self-descriptive statements (Kagan, 1981). Interview studies by Broughton (1978), Selman (1980), and others indicated that, between ages 2 and 8, children shift their definition of themselves from physical to psychological terms. That is, whereas young children distinguish themselves from others in terms of how they look and what they possess, older children distinguish themselves in terms of what they think and feel. Similarly, Secord and Peevers (1974) found that children's self-descriptions shifted from habitual actions to their comparative action competencies. A focus on psychological constructs shows further development in adolescence (Broughton, 1978; Selman, 1980). Peevers and Secord (1973) noted a number of important changes. First, young adolescents tend to describe themselves in terms of abstract, traitlike qualities; they also speak of themselves in terms of past and future qualities. Later, self-reflection and self-evaluation are added to the repertoire.

Similarly, McGuire and McGuire (1982, 1988; McGuire, McGuire, & Cheever, 1986) analyzed the verbs that appear in self-descriptions. They showed an age shift from verbs of action to verbs of state. Moreover, verbs of state shift from static to dynamic, whereas action verbs shift from overt to covert; overt action

verbs shift from physical actions to social interactions; and emotional reactions are replaced by intellectual ones. The McGuires also discovered two other age trends. First, there is a shift from affirmations to negations. Young children make positive statements about what they are, whereas adolescents increasingly talk about what they are not. Second, there is a contraction of the social space within the self, and a shift from affirmation to negation. It will be recalled that significant others (especially kin and friends, but also nonhuman animals who play important roles in the lives of the subjects) make up a relatively large portion of self-descriptions. But the extent to which significant others appear in children's self-descriptions declines systematically between ages 7 and 17.

A comprehensive model of the development of self-understanding has been proposed by Damon and Hart (1988; see also Hart, Fegley, Chan, Fisher, & Mulvey, 1993). First, they adopted the Jamesian distinction between self as object and self as subject. The self as object consists of the physical self, the active self, the social self, and the psychological self. The self as subject embraces issues of continuity, distinctiveness, and agency. Based on a comprehensive literature review, and their own study of children and adolescents from 1st to 10th grade (involving two structured interviews separated by 18 months), they concluded that, from early childhood to late adolescence, the self shows a pattern of regular development in all seven of these domains: from categorical identifications to comparative assessments to interpersonal concerns to systematic beliefs and plans; each new level incorporates and transforms the earlier one(s). For example, in early childhood, the psychological self is defined in terms of an unintegrated list of typical or salient mental states (e.g., "I don't like to stay on the porch"). The older child compares him- or herself with real or imagined others (e.g., "I read and they don't"). In early adolescence, the focus is on interactions with other people (e.g., "I'm the kind of person who loves being with my friends"); the late adolescent integrates his or her characteristics with systematic beliefs and life plans (e.g., "I am somebody who believes that everybody is created equal. . . . I'm going to be a lawyer and take cases and see that everyone gets rights . . ."). These findings were substantially replicated in a follow-up study of 81 students in Grades 5–11.

THE SELF IN CULTURAL CONTEXT

Every person has a self-concept: the ecological and interpersonal distinction between oneself and others is something that belongs to the species, like consciousness and the capacity for language. But just as individuals in different cultures may speak different languages, they may also have different self-concepts, due to differences in socialization regimes imposed on individuals and differing cultural concepts of personhood. As with most of the rest of scientific psychology, research on the self has proceeded in a largely monocultural manner (Kennedy, Scheier, & Rogers, 1984). This strategy has been enormously successful. There

is little reason to think that there are important cultural differences in the basic mental processes involved in perceiving, remembering, and thinking. However, there have been a number of cases where cross-cultural comparisons have shed important light on basic processes (e.g., the nature of basic emotions or the structure of the mental lexicon). In any event, a monocultural strategy is probably a mistake for personality and social psychology, which takes as one of its central problems the bidirectional relationship between the mental processes internal to the individual and sociocultural processes operating from outside (Shweder & Levine, 1984; Stigler, Shweder, & Herdt, 1991; Triandis & Brislin, 1980).

For example, Hart, Lucca-Irizarry, and Damon (1986) conducted a study of the development of self-understanding in a Puerto Rican fishing village. Their first finding was that a coding manual developed on a sample of middle-class North American children could be applied, with few revisions, to a sample of Puerto Rican children living in an agrarian, rural setting. Moreover, the levels of self-understanding displayed by the two groups showed comparable patterns of distribution by age. There were some differences. For example, Puerto Rican self-descriptions emphasized social attributes, whereas those from North America emphasized psychological characteristics. Moreover, there were interesting differences observable within developmental levels. For example, comparative assessments by Puerto Rican children were less explicitly comparative and more concerned with the reactions of others. The extent to which these kinds of differences reflect differences between cultures, and differences between classes, is not clear. In a study of children in Iceland, Hart and Edelstein (1992a) found a class difference in the self-attribution of psychological characteristics, but few differences between children dwelling in traditional versus modern communities, independent of class (Hart & Edelstein, 1992b).

Independence and Interdependence

Along much the same line, Markus and Kitayama (1991) identified two rather different construals of self. The independent construal corresponds to a view of the individual "as an independent, self-contained, autonomous entity who (a) comprises a unique configuration of internal attributes (e.g., traits, abilities, motives, and values) and (b) behaves primarily as a consequence of these internal attributes" (p. 224). By contrast, the interdependent construal "entails seeing oneself as part of an encompassing social relationship and recognizing that one's behavior is determined, contingent on, and to a large extent organized by what [one] perceives to be the thoughts, feelings, and actions of *others* in the relationship" (p. 227). The independent self recognizes the social environment, but is primarily concerned with how to be, and express, oneself in social context. Similarly, the interdependent self has a set of internal attributes, but these do not play a powerful role in regulating social behavior.

It is not surprising that the independent construal of self is hypothesized to

be characteristic of individuals raised in Northern European and North American cultures, and that the interdependent construal is hypothesized to be characteristic of individuals raised in Asian, African, Latin American, and Southern European cultures. In fact, a large set of studies summarized by Markus and Kitayama (1991) showed that there are substantial differences in the cognitive, emotional, and motivational aspects of selfhood between American college students on the one hand, and their Indian and Japanese counterparts on the other. For example, Cousins (1989) found that, although American students were more responsive to a version of the Twenty Statements Test that asked for abstract, situation-free self-portraits, Japanese students were more responsive to one that asked for context-specific descriptions of themselves.

Of course, there are important differences among subcultures within each of these cultures. For example, many Africans and Asians might bridle at the suggestion that there is a peculiarly African or Asian culture; discussions of Latin American cultures must make, at the very least, distinctions between Iberian and aboriginal traditions; and discussions of differences among European cultures will have to cope with the fact that the notion of the independent self, ostensibly characteristic of Northern Europe, has its origins in the ancient world of Greece and Rome. The development of a global world culture will probably reduce these differences somewhat. At the same time, the emergence of multiculturalism within ethnically diverse societies, like the United States, will certainly make these differences increasingly difficult to assess. Nevertheless, because the self, like the rest of the personality, is constructed within a sociocultural context, the impact of cultural differences on the self-concept cannot be ignored.

THE SELF AS A MEMORY STRUCTURE

Whether explicitly or implicitly, most of the research reviewed so far has adopted the view that the self is a conceptual structure, providing some kind of list of the salient and characteristic attributes of the person. This perspective links personality and social psychology to one of the great traditions in cognitive psychology, the study of concepts and categories. We turn now to another view, not inconsistent with the first, but one that links personality and social psychology to another great tradition—associative network theories of memory.

Effects on Memory: Self-Reference and Self-Generation

In fact, one of the first formal attempts to develop an information-processing view of the self was inspired by both recent advances in memory research and the prototype approach to concepts and categories (Rogers, 1981; see also Greenwald & Pratkanis, 1984; Kuiper & Derry, 1981). For example, in a series of papers, Rogers (1974a, 1974b, 1978) attempted to analyze response to self-referent

personality items in terms of Sternberg's (1969) memory-search paradigm. Based on an analysis of response latencies, Rogers decomposed the process of self-reference into four stages: the first two, stimulus encoding and stimulus comprehension, and the fourth, response selection, were familiar from Sternberg's original work; the third, involving a self-referent decision, was somewhat new and underscored the need to understand how the self was represented in memory. To this end, Rogers and his colleagues employed both memory and categorization paradigms.

For example, Rogers, Kuiper, and Kirker (1977) initiated a line of research on the self-reference effect. In a variant on the standard depth of processing paradigm popularized by Craik and Lockhart (1972), subjects studied a list of trait adjectives in one of three orienting tasks: structural, semantic, and self-referent. Self-referent processing produced a large advantage in memory over semantic processing, an effect that has been replicated many times (e.g., Bower & Gilligan, 1979; Keenan & Baillet, 1980; for reviews, see Klein & Kihlstrom, 1986; Klein, Loftus, & Burton, 1989). Based on the idea that depth of processing increases the number of associations between an item and preexisting knowledge, Rogers (1981; Rogers et al., 1977) and others concluded that the self is a highly elaborate knowledge structure containing a great deal of information about the self.

Other effects of self on memory also were uncovered. As summarized by Greenwald (1980, 1981; Greenwald & Banaji, 1989; Greenwald & Pratkanis, 1984), these included the self-generation effect (memory is better for actively generated than for passively perceived material; e.g., Slamecka & Graf, 1978) and the ego-involvement effect (memory is better for persisting than for completed tasks; e.g., Zeigarnik, 1927). Later, Greenwald and Banaji (1989) added a fourth effect, the second-generation effect, in which paired associates containing the names of subjects' friends are better recalled than pairs containing unfamiliar names (but see Bellezza & Hoyt, 1992).

Is the Self Unique?   On the other hand, the status of these effects as uniquely involving the self has been challenged. For example, in the self-reference effect, a number of investigators noted that Rogers et al. failed to control for such potentially confounding variables as evaluation and person reference. For example, the self-reference effect might reflect nothing more than the evaluation that must occur when subjects think about themselves. Alternatively, it might be that memory is enhanced equally when subjects make judgments about people other than themselves. In an extensive series of studies, Klein (Klein & Kihlstrom, 1986; see also Klein & Loftus, 1988) showed that the self-reference effect was a product of organizational activity and had little to do with self-reference per se. That is, the typical self-referent task encourages the subject to sort list items into two categories, those that are and those that are not self-descriptive, whereas the typical semantic task does not encourage categorization of any sort. Klein and Kihlstrom showed that organized semantic and self-referent tasks produced equal advan-

tages in recall, compared with their unorganized counterparts. Moreover, the self-reference effect could be reversed when the semantic task encouraged organization, but the self-referent task did not. Although agreeing that the self might be a highly elaborate memory structure, they discounted the self-reference effect as evidence that this was the case.

More recently, Klein and Loftus (1988) and Klein et al. (1989) provided evidence that both organizational and elaborative processes are involved in self-referent recall enhancement, but which process plays the larger role depends on the type of stimulus material being judged. When the relations between stimulus items are obscure (as typically is the case in self-referent studies), the organizational properties of self-referent encoding are found to promote good recall. By contrast, when the stimulus items share obvious relations, the elaborative properties of self-referent encoding can be shown to mediate self-referent recall enhancement. Thus, the memory-enhancing effects of self-reference can be understood in terms of the same cognitive processes—elaboration and organization—long known to mediate memory performance with tasks not involving self-reference.

Greenwald and Banaji (1989) reached similar conclusions about the second-generation effect. They noted that their experimental procedures represented a close variant of the familiar pegword mnemonic system, and that their results could be duplicated by Shiffrin's SAM model of associative memory (Gillund & Shiffrin, 1984; Raaijmakers & Shiffrin, 1981). Thus, adding the self to a conventional memory experiment appeared to require the addition of no new principles. Moreover, as noted by Klein and Kihlstrom (1986) in a different context, the familiarity of a category is correlated with the strength of category-to-member associations (Barsalou, 1983). Thus, it should not be surprising, in an experiment in which items are associated to personal names, that familiar names are better retrieval cues than unfamiliar ones.

The results of these experiments do not mean that the self is not a memory structure. To the contrary, they seem to indicate that the self can be profitably approached as if it were no different from other knowledge structures stored in memory. The differences between the self and other knowledge structures are quantitative, not qualitative. Thus, to review a second series of studies from Rogers and Kuiper, when the self is construed as a conceptual prototype, it seems to behave like other prototypes stored in semantic memory. For example, memory is enhanced for items that are self-descriptive (Kuiper & Rogers, 1979); subjects who receive a recognition test for a list of previously studied trait adjectives tend to give false alarms to items that are, in fact, self-descriptive (Rogers, Rogers, & Kuiper, 1979); and response latencies in self-rating tasks show an inverted-U effect typical of categorization judgments (Kuiper, 1981).

In yet a third series of studies, Rogers and his colleagues made use of research by Holyoak (1978; Holyoak & Gordon, 1983, 1984; Holyoak & Mah, 1981), Shoben (Shoben, Cech, & Schwanenflugel, 1983), and others on comparative judgment. For example, comparisons of the self-descriptiveness of trait adjectives

shows a symbolic distance effect: subjects are faster to judge pairs of traits that are far apart on a dimension of self-descriptiveness than they are those that are close together (Rogers, Kuiper, & Rogers, 1979). Interestingly, however, these investigators did not find a semantic congruity effect in which comparative judgments are faster when the question (e.g., Is X more or less than Y?) matches the magnitudes of the objects in question. This suggested to these investigators that the self is a fixed reference point that cannot be shifted from one point on a judgment scale to another (but see Holyoak & Gordon, 1984). Still, the status of the self as a reference point is confirmed by evidence of asymmetries in comparative judgment (Holyoak & Gordon, 1983; Srull & Gaelick, 1983). Thus, subjects generally judge others to be more similar to themselves than they judge themselves to be similar to others. This difference is reduced when the others are highly familiar, such as one's parents or familiar social stereotypes, but this only means that the self is one among many potential reference points mediating social judgment.

The Taxonomy of Knowledge

There is wide agreement among cognitive psychologists that memory stores two basic types of information: declarative and procedural (Ryle, 1949; Winograd, 1975).[3] Declarative knowledge consists of facts or beliefs about the nature of the world (e.g., that birds have wings and feathers, and that they sing and fly; and that Columbus began the European conquest of the Americas in 1492). Declarative knowledge may be further subdivided into semantic and episodic knowledge (Tulving, 1983). *Semantic knowledge* is the individual's mental lexicon of abstract and categorical information, whereas *episodic knowledge* consists of autobiographical memories. The difference between semantic and episodic knowledge is that episodic memories make reference to events that involve the self and that occurred at a particular (and unique point) in space and time. Thus, one can have semantic knowledge that President Kennedy was assassinated in 1963, and that the space shuttle Challenger blew up in 1986; or one can have episodic memory for the event of learning these facts. The difference between semantic and episodic knowledge is exemplified by the difference between textbook knowledge and flashbulb memories (Brown & Kulik, 1977; Winograd & Neisser, 1992), although not all episodic memories take such dramatic form.

Procedural knowledge consists of the skills, rules, and strategies that are used to manipulate and transform declarative knowledge in the course of perceiving, remembering, thinking, and acting. Procedural knowledge can be further subdivided into cognitive and motor skills: a person can know how to take square

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[3]More recently, Tulving and Schacter (1990) proposed a third memory system, which holds perceptual information about the structure of objects, rather than their meaning. The perceptual memory system appears to underlie some forms of implicit memory in both normal subjects and brain-damaged patients. Because it is not clearly relevant to the self, the perceptual representation system is not discussed further here.

roots in his or her head, and how to tie square knots with his or her fingers. Some procedural knowledge is innate, but much of it is acquired gradually, through repeated practice—a process known as automatization, routinization, or knowledge compilation (Anderson, 1982). Automatic processes are executed without any intention on the part of the person, cannot be controlled once they are engaged, and consume little or no attentional capacity (Logan, 1988; Schneider & Shiffrin, 1977). Within the domain of social cognition, the processes involved in impression formation and causal attribution may be classified as procedural knowledge (see Smith, chapter 3, Volume 1), as can the processes that generate emotional responses to events (Leventhal, 1984).

Conceptually, the difference between declarative and procedural knowledge is the difference between knowing that and knowing how. But empirically, an important difference between declarative and procedural knowledge is that declarative knowledge is consciously accessible, at least in principle, whereas procedural knowledge is not. We have direct introspective access to what we know and what we believe, but we know our procedural knowledge only by inference (or, perhaps, by slowing the process down and taking note of what we are doing). Thus, from the point of view of memory structures, the self consists exclusively of declarative knowledge. As important as they are to mental life, the individual's repertoire of skills, rules, and strategies are not part of the self. However, metaknowledge (Flavell, 1977; Nelson, 1992) of procedures can be linked to the self. People know that they know how to do such things as take square roots and tie square knots, even if they do not know how they do them, and this sort of declarative knowledge can be an important part of the self.

MEANING-BASED REPRESENTATIONS OF THE SELF

Traditional associative-network theories of memory have focused almost entirely on *meaning-based representations*, which encode information about the semantic relations among objects, events, and their features (Anderson, 1976, 1983; for a historical review, see Anderson & Bower, 1973).[4] In the simplest versions of

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[4]Although propositions and images represent particular objects, persons, situations, and events, another form of knowledge structure, the schema, is used to represent general categories of things, their characteristic features, and the interrelations among them (for reviews of the schema concept, see Brewer & Nakamura, 1984; Hastie, 1981; Rumelhart, 1984; Taylor & Crocker, 1981). Schemata contain both perception-based and meaning-based information, but this information is more abstract, consisting of a set of slots representing typical attributes and the values that these attributes typically take. Schemata, then, are concepts representing categories. As such, the self-schema may be thought of as a more or less abstract mental representation of the self, representing his or her typical features or attributes and the relations among them. Thus, the self-schema of a certain professor may contain the information that when he is in the office during the academic year he is generally shaved, and wears tweed slacks, shoes and socks, a long-sleeved shirt, and a tie; but that at home, or in the office during the summer, that same person may be found in jeans, a T-shirt, and boat shoes. As such, the self-schema may represent the situation-specific expectations associated with one's repertoire of concept-specific selves.

these theories, like Anderson and Bower's (1973) HAM model, basic concepts are represented by nodes in a graph structure, whereas associative links represent the relations between these concepts. More complex versions of associative network theory, like Anderson's (1983) ACT* model, represent declarative knowledge in terms of abstract propositions, or sentencelike primitive units of meaning consisting of subjects, agents, experiencers, relations, objects, and time, but leaving out much concrete perceptual detail. Such propositions are linked to each other in an extensive, tangled web of factual knowledge known as a propositional network. Network representations make a further distinction between types, or general classes, and tokens, or specific instances, permitting the same verbal label to refer to two different persons, objects, or events. Finally, propositional representations can be organized hierarchically, with one proposition serving as a unit for yet another proposition. Thus, a set of interlocking propositions can specify the spatiotemporal context in which an event occurred, or the causal relationship between two facts, and the like.

Associative-Network Models of Person Memory

Associative networks have served as a popular format for modeling aspects of social cognition, especially person memory, or one's knowledge about particular individuals. Thus, one's knowledge about a particular person (e.g., Jimmy Carter) can be represented as a set of propositions in which that individual serves as either the subject or the object of a number of factual statements.[5] These propositions can represent abstract trait knowledge about the individual (e.g., altruistic, conciliatory), and concrete behavioral information (e.g., renovated slum housing in New York, negotiated with Sadat and Begin at Camp David) — corresponding to semantic and episodic memory, respectively. Within the domain of person memory, research has focused on three general models for the representation of semantic and episodic information about persons (for reviews, see Hastie et al., 1980; Hastie, Park, & Weber, 1984; Kihlstrom & Hastie, in press; Klein & Loftus, 1993a, 1993b; Srull, 1984; Wyer & Gordon, 1984; Wyer & Srull, 1989a, 1989b; see also Wyer & Carlston, chapter 2, Volume 1).

Based on work on categorical organization in verbal learning, Hamilton (1989; Hamilton, Driscoll, & Worth, 1990; Hamilton, Katz, & Leirer, 1980), Ostrom

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[5]Social memory is not just about persons, and associative networks can represent information about events and behaviors as well as people (and other living things). Moreover, associative networks operating according to a principle of spreading activation are not the only medium in which theories of person memory have been written. For example, Wyer and Carlston (1979) and Wyer and Srull (1989a) proposed that information about persons, including oneself (as well as events and other social objects), is stored in content-addressable bins structured as push-down stacks, and thus operating according to a principle of last in, first out. Each format has its assets and liabilities, discussion of which is far beyond the scope of this chapter. But the two formats are not necessarily incompatible. For example, Wyer and his colleagues indicated that individual items stored in bins may be represented as fragments of a network.

(Ostrom, Lingle, Pryor, & Geva, 1980; Ostrom, Pryor, & Simpson, 1981), and others have proposed a hierarchical model in which episodic information about a person's experiences and behaviors is organized according to semantic information about that person's traits and attitudes. In terms of a generic associative-network model of memory, this situation would be represented by nodes representing traits that fan off a central node representing the person, and in turn collect nodes representing behaviors exemplifying these traits.

An alternative view, stimulated by general computer simulation models of memory such as HAM (Anderson & Bower, 1973) and ACT* (Anderson, 1976, 1983), was proposed by Hastie (1980, 1988; Hastie & Kumar, 1979; Hastie & Park, 1986), Srull (1981; Srull, Lichtenstein, & Rothbart, 1983), and Klein and Loftus (1990a). In general terms, these network models assume that every item of information about a topic has its own link to a central node representing that topic. Once formed, associative links are permanent. When applied to person memory, these models imply that individuals are represented by a content-free, but addressable person node, closely linked to nodes representing the person's name and physical appearance, and also linked to other nodes representing items of semantic (e.g., trait) and episodic (e.g., behavioral) information about that person. Both trait and behavior nodes fan off the central person node, but they are unconnected (or only weakly connected) to each other. Thus, traits and behaviors are represented independently in person memory. Specifically, there is little or no clustering of behaviors by traits, and access to behaviors does not depend on access to the traits they exemplify (nor, for that matter, vice versa).

A third view holds that person memory represents only episodic information (Keenan, 1993; Locksley & Lenauer, 1981). Whereas the trait-based and independent-storage models assume that abstract descriptors are retrieved directly from the memory representation, the pure episodic model asserts that abstract descriptions are inferred from behavioral information retrieved from the representation, in a manner analogous to self-perception theory (Bem, 1967, 1972). Thus, no semantic information pertaining to traits or other generic characteristics is associated directly with the person node.

An alternative representational format has been proposed by Wyer and his colleagues, using a bin metaphor for the organization of memory (Wyer & Srull, 1986, 1989a, 1989b; see also Wyer & Carlston, chapter 2, Volume 1). According to this model, information about people is deposited in permanent, unlimited-capacity, content-addressable storage bins, each labeled by a header that denotes its referent. Bins can contain propositions about a person and his or her traits and behaviors, but they also can contain other kinds of representations, such as images or temporal strings denoting sequences of events. Bins organize information in a push-down stack. That is, representations are stored in bins in the order they are formed and are retrieved by means of a probabilistic, top-down search. Aside from this principle of "last in, first out," bin contents are unorganized. Thus, as in the Hastie-Srull model, each item of information, whether semantic

or episodic, might be stored independently of every other item. In addition, several different bins can be formed pertaining to the same individual in different situations or social roles. The contents of one context-specific bin can be stored and retrieved independently of the contents of others.
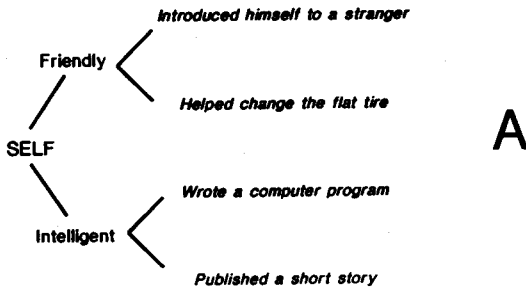
Associative-Network Models of the Self

Of course, each of these structural models can be applied to the mental representation of one's self in memory. Figure 4.1 shows a schematic representation of each of the three associative-network models. (Wyer & Srull [1986] have also proposed a bin model of the self, which is not depicted here.) Each model is centered on a single node representing the self. In Panel A, derived from the theories of Hamilton and Ostrom, only nodes representing trait information are directly linked to the central self-node; these, in turn, collect information about relevant behaviors. In Panel B, derived from Hastie and Srull, nodes representing trait and behavioral information are independently linked to the self. In Panel C, only nodes representing behaviors are linked to the self, but each behavior is indirectly (i.e., by inference) linked to a node representing the trait it exemplifies.
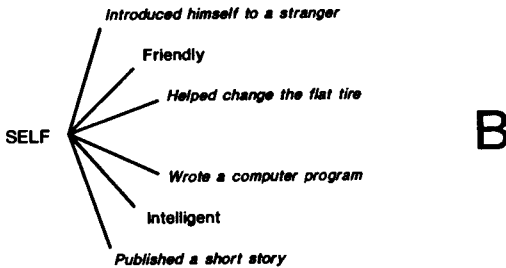
The question is which one is correct? A series of studies by Klein, Loftus, and their colleagues has shed new light on this question. Their research made use of a priming paradigm (Meyer & Schvaneveldt, 1971), in which processing of a probe facilitates (or, in the case of negative priming, impairs; Roediger & Neely, 1982) processing of a subsequently presented target. The pattern of priming observed serves as the basis for inferences about cognitive structure. Thus, in a lexical decision task, processing of the probe "bread" facilitates subsequent processing of the semantically related target "butter," compared with trials where the probe and target are not related semantically.

Klein and Loftus (1993a, 1993b; see also Klein, Loftus, & Sherman, 1993; Klein, Loftus, Trafton, & Fuhrman, 1992) developed a new priming paradigm comparing three tasks: a descriptive task asked subjects to decide whether a word (e.g., a trait adjective) describes themselves; an autobiographical task required them to retrieve a personal memory associated with the word; and a define task asked the subjects to generate a definition of the word. If self-descriptiveness judgments are mediated by the retrieval of autobiographical memory, then performance of the autobiographical task on a stimulus word should facilitate subsequent performance of the descriptive task on that word. By the same token, if episodes in autobiographical memory are organized by their trait implications, then performance of the descriptive task should facilitate performance on the autobiographical task.
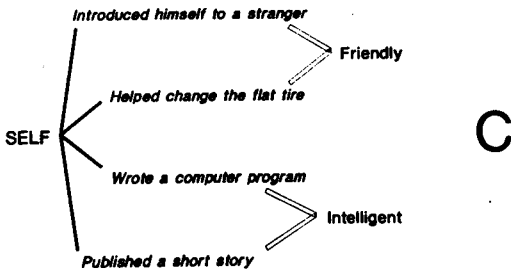
In their first priming study, Klein et al. (1989, Experiment 2) asked subjects to perform two of these tasks successively, generating nine possible task combinations. So, on one trial, a subject might perform the descriptive and autobio-

Friendly
- Introduced himself to a stranger
- Helped change the flat tire

SELF

Intelligent
- Wrote a computer program
- Published a short story

A

SELF
- Introduced himself to a stranger
- Friendly
- Helped change the flat tire
- Wrote a computer program
- Intelligent
- Published a short story

B

SELF
- Introduced himself to a stranger → Friendly
- Helped change the flat tire
- Wrote a computer program
- Published a short story → Intelligent

C

FIG. 4.1

graphical tasks with respect to a particular word; on the next trial, with a new word, he or she might perform the autobiographical and define tasks. Priming was observed in all three cases where the initial and subsequent tasks were of the same type. But the most important results were that, compared with the effects of an initial define task, an initial autobiographical task did not prime performance on a subsequent descriptive task; nor did an initial descriptive task prime performance on a subsequent autobiographical task. Thus, contrary to the trait-based view, descriptive information is not activated in the process of retrieving behavioral information. Contrary to the pure episodic model, retrieving behavioral information has no impact on making descriptive judgments. Apparently, trait

(semantic) and behavioral (episodic) knowledge are independent from each other in the mental representation of oneself.

A subsequent experiment (Klein et al., 1992, Experiment 2; see also Experiments 3 and 4) provided a clearer test of these competing hypotheses. It could be that autobiographical retrieval is more important for some trait judgments than others. For example, some theorists have suggested that judgments about traits that are not central to one's self-concept are more likely to depend on autobiographical retrieval than are judgments about traits that are central to one's self-concept (e.g., Bower & Gilligan, 1979; Kihlstrom & Cantor, 1984; Klein & Loftus, 1990b; Wyer & Srull, 1989a). If such a difference exists, it would not be apparent in the data from Klein et al. (1989, Experiment 2), because that study combined all traits without regard to level of self-descriptiveness. Accordingly, subjects in Klein et al. (1992, Experiment 2) rated the self-descriptiveness of each trait presented in the main task. Regardless of the self-descriptiveness of the trait being judged, no priming was observed between the descriptive and autobiographical tasks.

Results from other sorts of studies also support the independent storage of semantic and episodic knowledge about oneself. For example, Klein, Loftus, and Plog (1992) made use of the phenomenon of transfer-appropriate processing (Roediger & Blaxton, 1987; Roediger, Weldon, & Challis, 1989), a variant on the encoding-specificity paradigm of Tulving and Thompson (1973). Basically, the principle of transfer-appropriate processing holds that retention is best when the operations performed at the time of retrieval recapitulate those performed at the time of initial encoding. Thus, retention should be best when subjects perform a descriptive or autobiographical task at both study and test. But if self-description requires autobiographical retrieval, then retention should be relatively good when the subject performs the autobiographical task at encoding, but the descriptive task at retrieval. In a study session, Klein et al. (1992) asked subjects to perform descriptive, autobiographical, or define tasks on a set of trait adjectives. In a test session 2 weeks later, the subjects performed one of the tasks on these same items and a list of distractors, and then were asked to recognize the old items. Recognition was best when the same task was performed at encoding and retrieval, as expected by virtue of transfer-appropriate processing. But, consistent with the notion of independent storage, for trait adjectives subjected to an autobiographical study task, a descriptive task was no more effective as a retrieval context than was a define task.

These conclusions were supported by a study by Klein et al. (1989, Experiment 4), which capitalized on the principle of encoding variability. This principle states that the memorability of an item is a function of the number of different ways it is processed, because each task makes available a different type of trace information (Bower, 1972; Estes, 1959; Martin, 1972). Memory was best when subjects performed both descriptive and autobiographical tasks on items,

compared with the single or repeated performance of either task by itself. Thus, the autobiographical and descriptive tasks each make available new information, which is not ordinarily processed in the course of the other.

Neuropsychological Evidence

Perhaps the most dramatic evidence for the independent storage of semantic and episodic self-knowledge comes from the organic and functional disorders of memory. On the organic side, bilateral damage to the medial temporal lobe (including the hippocampus) or the diencephalon (including the mammillary bodies) produces a gross anterograde amnesia, meaning that the person is incapable of remembering events that occurred since the onset of his or her illness, and often premorbid events as well (Kopelman, Wilson, & Baddeley, 1989; Squire, 1987). On the functional side, cases of psychogenic fugue involve a complete loss of autobiographical memory, and sometimes of identity as well (Kihlstrom, 1992; Schacter & Kihlstrom, 1989).

Nevertheless, such patients can describe their personalities accurately. For example, in case of psychogenic fugue, Schacter, Wang, Tulving, and Freedman (1982) asked the patient to complete the Minnesota Multiphasic Personality Inventory (MMPI) both during his fugue and after it was resolved: the two profiles were essentially identical. Assuming that the post-recovery profile was valid, then, it appears that accurate self-description does not require access to autobiographical memories. Most recently, Tulving (1993), testing a speculation by Klein and Loftus (1993a), found that the patient K.C., who lost his entire fund of episodic memory (and underwent a marked personality change) following a motorcycle accident, was able to describe his postmorbid personality with considerable accuracy (with his mother's ratings serving as the criterion). Thus, K.C. was able to acquire accurate knowledge of his new personality without being able to retain information about any of the episodes through which that knowledge was gained.

Results such as these represent a serious challenge to both the trait-based and pure episodic models of self-knowledge. If traits are not automatically activated on the way to behaviors, and if semantic knowledge of self can be accessed without reference to specific episodes, the two types of information must be stored separately. Still, there has to be some connection between semantic and episodic knowledge: Perception of an event is constructed against a background of knowledge stored in semantic memory, and semantic knowledge has its origins in specific learning experiences. Perhaps episodic and semantic knowledge are connected at another level in the tangled network of stored knowledge. For example, episodes may be linked directly to the self and the traits they exemplify. Alternatively, traits associated with an individual may be tokens of more abstract types. These types may be linked to types of characteristic behaviors, with these types linked to tokens representing particular episodes in the lives of specific individuals, self, and others.

PERCEPTION-BASED REPRESENTATIONS
OF THE SELF

In addition to propositional representations based on meaning, more recent state-
ments of associative-network theories of memory (e.g., Anderson, 1983, 1990)
expanded the list of available forms of mental representation to include perception-
based representations. Perception-based representations store one's knowledge
of the perceptual structure of objects and events, and they come in at least two
forms. *Spatial images* represent information about the configuration, or relative
position (with respect to the viewer and each other), of objects or features in mul-
tidimensional space. For example, they encode information about whether some-
thing is above or below something else, to the left or the right, and in front or
behind. Spatial images are involved in such tasks as mental rotation (Shepard
& Cooper, 1983) and image scanning (Kosslyn, 1980).

Spatial images need not be visual, because they may preserve information about
spatial configuration without also preserving information about visual appearance
(the same point applies to other sensory modalities, such as sound and touch).
But this information is also preserved, in the form of strictly visual images that
contain information on appearance details such as form, color, and perspective.
Conceptually, spatial and visual images are quite different. In fact, there is some
neuropsychological and brain-imaging evidence that performance on verbal, spa-
tial, and visual tasks is mediated by different brain systems (Farah, 1988; Koss-
lyn & Koenig, 1992; Sergeant, 1990). Put briefly, it appears that performance
on spatial tasks is mediated by the parietal lobes, whereas performance on ex-
pressly visual tasks is mediated by the temporal lobes. Although the existence
of imagistic as well as propositional codes in memory has been a matter of some
debate (Anderson, 1978; Kosslyn & Pomerantz, 1977; Paivio, 1986; Pylyshyn,
1981), the neuropsychological evidence strongly suggests that we make room for
a second category of perception-based representation, the visual image.

Images of Others

Perception-based representations have not received much attention in the social
cognition literature, but they are clearly important (McArthur & Baron, 1983).
For example, we can conjure fairly clear visual and auditory images of the faces
and voices of those we know. We can make a wide variety of social judgments
based on visual stereotypes: age, from changes in head shape and body propor-
tions (Pittenger & Todd, 1983; Shaw & Pittenger, 1977); gender, from gait in
walking (Kozlowski & Cutting, 1977); and power, from "babyfacedness" or a
receding hairline (McArthur, 1982; Keating, Mazur, & Seagall, 1981). Most of
us recognize the voices of our friends when they call on the telephone; we can also
recognize them by their gait alone (Kozlowski & Cutting, 1977). Prosopag-
nosic patients, who cannot name familiar faces, are able to recognize friends and

family by the sound of their voices or their style of walk (Damasio & Damasio, 1986). The symbolic distance effect appears to be mediated by a kind of linear ordering of the people to be compared (Holyoak, 1978). The scripts that guide interpersonal behavior encode the canonical sequence of the various events in a social exchange (Abelson, 1981; Schank & Abelson, 1977).

The Self-Image

Much the same point can be made about perception-based mental representations of the self. We have them, but we have not studied them as much as we have studied verbal knowledge encoded in associative networks. Still, some interesting beginnings have been made. For example, consider the research implications of taking the notion of self-image as literally as the idea of self-concept. Do we really have a mental image of what we look like, in terms of surface features, height, width, depth, posture, and gait? Head (1926) defined the body schema as a postural model of the body by which we maintain stability and adjust to environmental stimulation. It is this body schema that is distorted in prism-adaptation experiments. Similarly, Schilder (1938) referred to the body-image as "the picture of our own body which we form in our mind, that is to say, the way in which the body appears to ourselves" (p. 11), and argued that it was important in maintaining the distinction between self and other. On the other hand, Fisher and Cleveland (1958) argued that the body image is influenced both by the actual perceptual properties of the body surface and the individual's attitudes and expectancies.

A vast amount of clinical evidence has suggested that there is an internal representation of the body and its parts that is independent of immediate sensory stimulation. For example, schizophrenics in the acute stage of their illness often complain of changes in their perceptions of their own bodies (Chapman, Chapman, & Raulin, 1978). Patients with eating disorders such as anorexia and bulimia make it abundantly clear that they have mental images of their own bodies that are widely at variance from objective fact. In body dysmorphic disorder (formerly known as dysmorphophobia), patients with normal physical appearance complain of bodily defects such as wrinkled or spotted skin, enlarged or shrinking hands or feet, excessive facial hair, or misshapen facial features (Phillips, 1991; Rosen, Srebnik, Saltzberg, & Wendt, 1991). In cases of phantom limb, amputees continue to perceive lost arms or legs as if they were still integral parts of their bodies (Melzack, 1989). A similar phenomenon is sometimes observed, albeit temporarily, in cases of spinal anesthesia for orthopedic surgery or caesarian section.

Within clinical psychology, the body image is often studied by means of the Draw-a-Person Test (DAP). Unfortunately, the DAP asks the subject to draw a person, not him or herself. At any rate, the procedure confounds the individuals self-image with his or her ability to draw. However, the more recent literature

on eating disorders has provided a set of instruments that can be used to evaluate the person's body-image. For example, Chapman et al. (1978) developed a self-report Body-Image Aberration Scale consisting of a series of questions tapping the feelings of unclear body boundaries, unreality or estrangement of body parts, bodily deterioration, changes in size, proportions, spatial relationships of body parts, and changes in appearance of the body. More recently, Fallon and Rozin (1985; Rozin & Fallon, 1988; see also Zellner, Harner, & Adler, 1989) introduced a set of nine figure drawings of swimsuit-clad males and females which subjects can use to rate their current figure, ideal figure, figure most attractive to the opposite (or, for that matter, the same) gender, and the figure they themselves find most attractive. A related procedure is the Body-Image Assessment (Williamson, Davis, Goreczny, & Blouin, 1989). A common finding is that eating-disordered individuals perceive themselves as heavier or bigger than normal controls, which is indirect evidence that they have inaccurate body images.

In addition, a wide variety of experimental techniques have been adapted to study the self-image and its distortions. In an early line of research, Traub, Orbach, and their colleagues performed a series of experiments with an adjustable body-distorting mirror, not unlike those found in carnival fun houses (Traub & Orbach, 1964; Orbach, Traub, & Olson, 1966; Traub, Olson, Orbach, & Cardone, 1967). In their main experiment, they placed normal subjects in front of a distorting mirror and asked then to adjust the device until their appearance was correct. Based on departures from a perfectly flat mirror, they observed that subjects accepted a wide range of deviations as accurate reflects of their own bodies, suggesting that the self-image is somewhat imprecise. By the same token, a group of chronic schizophrenics showed a much wider range of acceptability than normal controls. However, the patients also showed a wide range of acceptability when viewing distorted reflections of an inanimate object. Thus, although it is fairly clear that normal people have a fairly accurate mental representation of their own appearance, the perceptual distortions shown by schizophrenics may not be unique to the self-image.

Other studies have pursued this question by means of photographs. Thus, Orbach et al. (1966) found that subjects who are shown a range of photographs are able to pick the undistorted one quite reliably, with a small range of acceptance. The difference between this outcome and that obtained in the case of the distorting mirror is that subjects did not have the opportunity to view themselves in an undistorted mirror before making their adjustments. Perhaps, as Orbach et al. (1966) suggested, accurate self-images need to be anchored by an undistorted external reference point. Later research by Yarmey (1979; Yarmey & Johnson, 1982), obtained with photographs the same sort of false alarms effect found by Rogers et al. (1979) in recognition memory for self-descriptive trait adjectives. Perhaps the most compelling evidence for the existence of a memory-based, internal representation of one's own appearance is provided by a study of preferences for photographs of subjects and their friends (Mita, Dermer, & Knight, 1977).

On test trials, subjects were presented with pairs of photographs composed of an original and its mirror reversal. When viewing photos of their friends, subjects preferred the original—how their friends appeared through the lens of a camera. But when viewing photographs of themselves, the same subjects preferred the mirror-reversed version—how they appeared to themselves when they brushed their teeth and combed their hair.

Although these studies comprise a useful beginning to the study of perception-based representations of the self, we are struck by the fact that the field has not yet drawn on the experimental paradigms developed in the study of spatial and visual images (e.g., Kosslyn, 1980; Shepard & Cooper, 1983). For example, we wonder if people show mental rotation effects for depictions of their own bodies, or difficulties in identifying themselves from unusual perspectives, or image scanning effects for landmarks on the surface of their bodies, similar to those found in the domain of nonsocial objects. Furthermore, we wonder if pathologies of body image, such as those found in eating disorders or body dysmorphic disorder, are reflected in individual differences in the performance of such tasks. To take a concrete example, will a bulimic woman who perceives her body to be fatter than it actually is take longer to scan between relevant landmarks (e.g., on the abdomen, arms, or legs) than a normal control?

Linear Orderings and Temporal Strings

Another type of perceptual representation is the *linear ordering*, which contains information about the relative ordering of objects or events along some dimension (e.g., smaller to larger or smaller to bigger). A special case of the linear ordering is the *temporal string*, which marks the progression, sequential order, or temporal succession of a set of objects and events (e.g., first to last, remote to recent, or earlier to later; Underwood, 1977). Although linear orderings and temporal strings do not preserve spatial configuration or sensory detail, they are classified as perception-based, because the linear or temporal relations that they record between objects and events have nothing to do with the meaning of those items.

Temporal Sequencing.   One extremely important aspect of the mental representation of self is the person's set of consciously accessible autobiographical memories.[6] Temporal strings may be especially important in the representation of such knowledge. One's personal experiences have an intrinsic temporal structure. In principle, every episodic memory is associated with a unique temporal marker—at least, every episode in a person's life occurred at a distinct moment

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[6]Coverage of the extensive literature on autobiographical memory is beyond the scope of this chapter. For comprehensive reviews, see Rubin (1986), Neisser and Winograd (1988), and Cohen (1989).

in time. While we may not remember the precise moments at which events occurred in our lives, we do tend to remember which followed which; the entire set of such memories represents a narrative of the individual's life. Although temporal organization is important to episodic memory, it seems highly unlikely that an individual's entire biography is laid out in a single linear string. Rather, intuitively it seems that one's autobiographical record possesses a kind of phrase structure (Anderson, 1983), in which smaller sequences of memories are recorded as strings within strings; recall of any element in a phrase unit increases the likelihood that all the elements in that unit will be recalled. Within each phrase unit, access is easiest to the first element in the string, and recall proceeds naturally from one item to the next until the end.

An early demonstration of the role of temporal organization in autobiographical memory was a series of studies of posthypnotic amnesia conducted by Kihlstrom and his colleagues (for a review, see Kihlstrom, 1985). In one series of studies, Kihlstrom and Evans (Evans & Kihlstrom, 1973; Kihlstrom & Evans, 1979) examined the order in which subjects recalled the test suggestions administered in the course of a standardized hypnotic procedure. In the absence of suggestions for amnesia, recall tends to be temporally ordered, beginning with the first item and proceeding through to the end. However, when an amnesia suggestion is administered, hypnotizable subjects, who tend to be responsive to such suggestions, show a disruption of temporal sequencing, including a reduced tendency to recall the first item first. Insusceptible subjects who did not experience amnesia showed no such effect. The difference between hypnotizable and insusceptible subjects is observed even when subjects are reminded to recall the items in temporal sequence. Kihlstrom and Wilson (1984) confirmed this effect in a study of serial organization in recall of items in a wordlist. One of the mechanisms for posthypnotic amnesia appears to be a disruption in the temporal tagging of memories and/or the organization of these memories in a temporal sequence, which makes it difficult for the subject to enter the search set and retrieve relevant items.

Temporal organization is also important in memory for other sorts of personal experiences. As noted earlier, people appear to possess scripts for many different types of events, consisting of a set of characteristic events and actions arranged in a sequence that represents the temporal and causal relations among them (Abelson, 1981; Schank & Abelson, 1977). Scripts not only guide the process of categorizing and navigating social interactions; they also help people to remember these interactions later. Thus, when Bower, Black, and Turner (1979) asked subjects to read and recall stories depicting familiar events, they found that the memory reports included (a) intrusions from the generic script that were not in the actual story, (b) confusions among different stories following the same general script, and (c) a tendency to rearrange the events in the story to follow the canonical sequence represented in the script. Similar results were obtained by Wyer and his colleagues (Wyer & Bodenhausen, 1985; Wyer, Shoben, Fuhrman, & Bodenhausen, 1985), who also found a symbolic distance effect in judgments of temporal order.

These findings were obtained in an artificial laboratory situation, but there is good reason to think that memory for actual personal experiences shows the same sort of effects (Fuhrman & Wyer, 1988; Nakamura, Graesser, Zimmerman, & Riha, 1985). In fact, Barsalou (1988) found that chronological order was the highest level of organization observed in autobiographical recall. In describing the events of a particular summer, subjects generally began at the beginning and ended at the end. After describing an extended event (such as a trip to Europe), subjects often returned to the beginning of the epoch in question and recalled another extended event following a parallel time track before turning their attention to another epoch entirely. Barsalou also noted evidence of *pivoting*, or switching from one organizational rubric to another. For example, in the midst of recalling events from a particular time period, subjects switched to recalling memories associated with a particular participant, location, or activity encountered in one of the events.

Temporal Chunking.   Although linear orderings and temporal strings are continuous representations, it is also clear that a hierarchical structure can be superimposed on them, breaking them up into categorical chunks (Huttenlocher, Hedges, & Prohaska, 1988). For example, human height is a continuous dimension, but, by any standard, Danny DeVito and Linda Hunt are short, whereas Magic Johnson and Kareem Abdul Jabar are tall. Similarly, historical time is a continuous dimension, but it is conveniently broken up into chunks such as the Renaissance, the Enlightenment, the 1960s, and the 1970s. Moreover, some means is necessary to represent the causal or enabling relationships among events (Gergen & Gergen, 1988; Mandler, 1984; Pennington & Hastie, 1992; Ross, 1989). The life course of an individual may be conveniently divided into a series of epochs, analogous to Erikson's "eight ages of man": infancy, childhood, adolescence, young adulthood, middle age, old age, and the like; according to one's educational and occupational history; or changes in one's family status. When subjects search autobiographical memory for particular events and experiences, they may enter the time line at the beginning and search forward, or at the end and search backward; or, alternatively, they may begin search at the beginning or end of one of the subordinate epochs.

The temporal organization of autobiographical memory also is revealed by studies of subjects' attempts to date, or judge the relative order of, personal experiences or public events occurring within their own lifetimes. In a series of studies, Brown, Rips, and Shevell (1985; Brown, Shevell, & Rips, 1986) showed that, in the absence of simple fact retrieval, dates are estimated by a means of an accessibility principle: the more easily an event is retrieved and the more knowledge a person has about the event, the more recent it is judged to have occurred. But this is not simply a variant on Tversky & Kahneman's (1973) availability heuristic. Rather, people appear to use whatever information they can remember about the event to locate it in terms of the course of their own lives,

and thus produce a valid estimate. Accessibility does bias dating, but it also makes it more likely that subjects will retrieve enough information to permit them to make a decent estimate (Loftus & Marburger, 1983).

Organization of Autobiographical Memory

Barsalou's (1983, 1988) findings showed that autobiographical memory is not organized exclusively according to temporal principles. In an extension of script theory, Schank (1982) proposed that event memory is organized around two higher order conceptual structures: Memory Organization Packets (MOPs) and Thematic Organization Points (TOPs). The mental representation of any particular episode draws on a number of MOPs representing elements that are parts of a number of different scripts, as well as a script containing information peculiar to the class of event in question. Similarly, TOPs are general themes that unite, and give a kind of coherence to, events that might seem wildly different from each other. Interestingly, a study by Reiser, Black, and Abelson (1985) indicated that MOP-like cues are not as effective retrieval cues as script elements, presumably because they relate to too many different memories, producing a kind of fan or cue-overload effect. Kolodner (1984) successfully employed MOP-like structures in CYRUS, a computer simulation of Cyrus Vance's autobiographical memory for his years as secretary of state.

Reiser's results, and the success of Kolodner's model, suggested that autobiographical memory is also organized around activities or event types, although there is some ambiguity about precisely which level of description is the most effective organizer. Similarly, a case study by Wagenaar (1986) found that *what* cues were more effective at retrieving memories than those associated with *where*, *who*, and *when*. However, Barsalou (1988) found that activity cues had no privileged status, compared to participants, locations, or times.

Perhaps reflecting his earlier emphasis on ad-hoc categories, Barsalou (1988) proposed a general scheme for the organization of autobiographical memory that emphasized superordinate temporal structures, but permitted the person to move flexibly among a number of different organizational schemes. The primary organizers of autobiographical memory are *extended time lines*, which are arranged chronologically and hierarchically. Thus, an individual's autobiographical memory may contain a time line representing school, which is a partonomy consisting of elementary school, high school, and college; another representing work, consisting of afterschool jobs, summer employment during college, first job, and present job; and another representing social life, consisting of living at home, dating, first marriage, and second marriage. Each of these local time lines are also partonomies, distinguishing between freshman and senior year, entry-level and final positions, romance and breakup, and the like. These partonomies run in parallel, so that any particular segment of historical time may include aspects of several time lines.

Nested within extended time lines are *summarized events*, which represent events that occurred frequently during a particular period of time. Summarized events are constructed from *specific events*, which are episodic memories in the strict sense. However, this construction process does not require a repetition of a particular event. Rather, it only requires that an event activate a new combination of preexisting generic concepts; if the event activates a conceptual combination that already exists, then it is absorbed into the corresponding summarized event already available in memory.

Extended time lines summarize as well as organize the individual's life history and provide reference points for dating events. They also show interesting developmental trends, in that they are subject to revision at various points in the life cycle. Young children do not have extended time lines, which may account for the difficulty people have in remembering events from early childhood (Crovitz & Quina-Holland, 1976; Kihlstrom & Harackiewicz, 1982; Neisser, 1992b; Wetzler & Sweeney, 1986; White & Pillemer, 1979). However, the elderly, with the benefit of hindsight, may construct extended time lines that are quite different from those they possessed in adolescence or middle age.

In the present context, it is important to note, with Barsalou (1988), that the particular set of time lines represented in an individual's memory may be an important part of his or her self-concept. Viewed objectively, every life is a complex set of overlapping time lines that represent the progress of school, work, personal life, and the like. Which particular time line occupies the highest position in the organization of the individual's memory says a lot about that individual. Adults who become parents often date events around benchmarks in the lives of their children. The man who constantly forgets his wife's birthday and his wedding anniversary does not have his marriage uppermost in his mind. Long ago, Adler (1937) noted that what a person remembers reveals a lot about his or her personality and lifestyle. The same might be said about how people organize their memories. In the final analysis, the organization and content of autobiographical memory may be the clearest expression of oneself (Kihlstrom, 1981).

I AND ME

As James (1890/1981) noted, there is an intimate relationship between the self and consciousness: "The universal conscious fact is . . . 'I think' and 'I feel' " (p. 221). In his view, consciousness comes when we inject ourselves into our thoughts, feelings, and desires; when we take possession of them and own them; and when we experience and acknowledge them as ours. This relation between the self and consciousness raises the issue of the self as knower. Despite Rozin's (1976) photographic evidence of its existence, scientific psychology still disdains the homunculus. Unfortunately, it has proved difficult to know precisely how to construe the self as knower. James grappled with, and ultimately rejected as

unsatisfactory, three different approaches: the theory of the soul; the associationistic theories of Locke, Hume, and the Mills; and the transcendentalist theory of Kant. But aside from identifying the I with thought itself, he was unable to make any positive progress.

After struggling with the problem for an entire career, Allport (1943, 1961) simply threw up his hands:

> This puzzling problem arises when we ask, "Who is the I who knows the bodily me, who has an image of myself and sense of identity over time, who knows that I have propriate strivings?" I know all these things and, what is more, I know that I know them. But who is it who has this perspectival grasp? (Allport, 1961, p. 128)

Allport (1961) went on to note that "Philosophers beyond count have racked their brains with this problem. It is beyond our present scope to enter into the argument" (p. 129). We are inclined to agree. But perhaps James was right simply to identify the self as knower with thought itself, and be content. From this point of view, the self as knower is simply the individual mind that is capable of representing the person who embodies it as well as objects and events in the external world. If so, then the self, as both knower and object of knowledge is the point at which cognitive, personality, and social psychology meet.

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HANDBOOK OF SOCIAL COGNITION

Second Edition

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Basic Processes

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