

# INFORMATION PROCESSING AND THE STUDY OF THE SELF

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## **I. Introduction**

The self is an important concept in personality and social psychology. As a prefix, the term occurs in a long list of research topics of interest to our community. Consider the following examples: self-awareness, self-concept, self-control, self-disclosure, self-efficacy, self-esteem, self-handicapping, self-image, self-monitoring, self-perception, self-presentation, self-regulation, self-schema, self-serving, self-verification. But just what *is* the self that is involved in all these topics?

William James (1890) argued that a twofold distinction applied to the self. First, there was the *self as object*, referring to one's knowledge about and evaluation of oneself—knowledge about ourselves that is, in principle, analo-

gous to our knowledge of other people. Then there was the *self as agent*, referring to an executive structure within the mental system that monitors and controls experience, thought, and action. While the self as agent is central to the experience of conscious awareness (Hilgard, 1977; Kihlstrom, 1984, 1985a), the self as object comes closer to what psychologists seem to mean when we talk about the self. Still, what may make the self unique among social-cognitive structures is its dual nature as both object and agent.

From the point of view of cognitive personality and social psychology (Cantor & Kihlstrom, 1982, 1985a, b, 1987), the self may be construed as a person's mental representation of his or her own personality (Kihlstrom & Cantor, 1984). 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). From this information-processing perspective, the self can be analyzed with respect to structure, content, and function: What does the self look like? What knowledge does it contain? And how is it involved in various cognitive processes?

## II. Forms of Mental Representation

Anderson (1983) argues that mental representations fall into two broad classes. Those representations that are *perception based* contain details extracted from stimulus information processed by the sensory-perceptual system. Included in this category are spatial images, which preserve the location of objects (or elements of objects) in space, and linear orderings, which preserve the sequence of events in time. Representations that are *meaning based* contain the gist of an object or event, which has been abstracted from stimulus information by higher mental processes. Included in this class are propositions, sentencelike structures that preserve elementary units of meaning, and schemata, structures that combine data derived from other forms of mental representation (including images and orderings) to preserve information concerning the co-occurrences among elementary units. These, then, are the basic forms that can be taken by mental representations of the self.

Although research on mental imagery in the nonsocial domain is far advanced (e.g., Cooper, 1975; Cooper & Shepard, 1984; Finke, 1985; Kosslyn, 1980), not much work has been done on perception-based representations of the self. Psychologists have long referred to the *self-image*, of course. But in everyday parlance this term does not refer to an analog representation of oneself. Rather, it

refers to one's conception of oneself or of one's social role, without implying any commitment to a specific representational format.

It is not clear what a linear ordering representation of the self would look like outside the domain of autobiographical memory (see below). But the idea of a spatial image representation of the self presents some interesting ideas for future research (e.g., Yarmey & Johnson, 1982). Human infants and chimpanzees recognize themselves in mirrors (Gallup & Suarez, 1986), so they must possess some mental representation of what they look like. Although this information need not necessarily be preserved in analogical form (Anderson, 1978; Pylyshyn, 1973), at least one experimental result says that it is, and that the self-image is quite detailed. When asked to rate photographs of themselves and others, people prefer photos of themselves that are reversed left to right, as in a mirror image; by contrast, they prefer *nonreversed* photos of others whom they know well—pictures that match what they actually see when they look at their acquaintances face to face (Mita, Dermer, & Knight, 1977). Anecdotal evidence from the clinic suggests that anorexics and bulimics possess a mental image of themselves as fat—an image that is so strong that it actually biases their perceptions when they examine themselves in a mirror.

Most work on the self as object has concerned meaning-based representations, especially verbal encodings of knowledge about oneself (for a recent comprehensive review, see Markus & Wurf, 1987). An earlier paper (Kihlstrom & Cantor, 1984) distinguished between two forms of such representations. One form is the *self as a list structure*, summarizing features considered characteristic of oneself and organized in a manner similar to that of other social (and nonsocial) categories (Cantor & Mischel, 1979). The second form is the *self as memory structure*, represented as a node in a graph structure linked to other nodes representing (factual) knowledge about oneself encoded in propositional form. Because list structures can be represented in propositional format, there is no theoretical reason to force a choice between these two alternatives. However, thinking about the self as a memory structure permits investigators to employ the concepts and paradigms of contemporary information-processing theory. Therefore, while the 1984 article discussed the self as a concept in some detail, this article focuses on the self as a memory structure (see also Greenwald, 1981; Greenwald & Pratkanis, 1984; Kihlstrom, 1985a, b; Markus & Sentis, 1982).

### III. The Self in the Architecture of Cognition

The basic architecture of the cognitive system consists of several components, as depicted in Fig. 1. The sensory-perceptual system processes inputs from the external and internal environment and encodes traces of input into memory. The

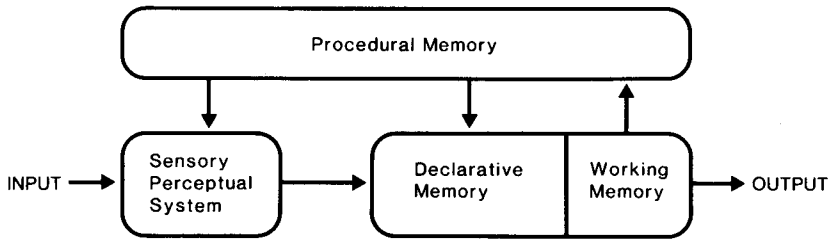


Fig. 1. Schematic diagram of the cognitive system.

memory store itself is subdivided into two components: a declarative memory system, consisting of abstract and concrete factual knowledge, and a procedural memory system, consisting of rules and skills by which declarative knowledge can be manipulated and transformed. A special portion of declarative memory, called working memory, contains activated representations of the person, his or her processing goals, the local environment, and other currently active declarative memory structures. Thus, in structural terms the self as object is a declarative knowledge structure residing in working memory.

Declarative knowledge may be represented as a graph structure with nodes representing concepts and associative links representing the relations between them. These associated nodes form propositions consisting of subjects and predicates, relations and arguments, and the like. Some of these propositions are *semantic* in nature, representing the mental lexicon of categorical knowledge about the world, while other propositions are *episodic* in nature, forming the record of autobiographical memory (Tulving, 1985, 1986). Figure 2 depicts a portion of a hypothetical self (based on Kihlstrom & Cantor, 1984, Fig. 4): a node representing the self is linked to other nodes representing semantic information such as "lives in Ypsilanti" and "likes Stravinsky." It is also linked to nodes representing episodic information such as "helped an old man across the street on Monday" and "returned a lost wallet to its owner on Wednesday." One act is labeled "kind," and the node representing this attribute is directly linked to the self; the other act is labeled "honest," but this node is not linked to the self except indirectly. In other words, this person has a self-schema (Markus, 1977, 1983; Markus & Sentic, 1982) for kindness, but not for honesty, and when asked for a self-description is likely to bring kindness to mind faster than honesty.

This depiction of the self as a single node in a memory network, residing in working memory, may be a little misleading, because it portrays the self as unitary and monolithic, and self-knowledge as subject to immediate access. Indeed, given the uniqueness of personality it is hard to think of the possibility of multiple self-concepts. Yet this is precisely what seems to occur in cases of fugue and multiple personality (Hilgard, 1977; Kihlstrom, 1984). Even within the

normal range of personality, there are grounds for thinking that the self is not a single cognitive structure (see also McGuire, 1987a, b). For example, semantic knowledge about the self is abstracted in large part from the person's perception of his or her own behavior. The person who has engaged in many intelligent acts is likely to think of herself as intelligent. But when she behaves intelligently in some situations and stupidly in others, what is she to think? Contextual flexibility in social behavior seems to be the rule rather than the exception. Therefore, it does not seem far-fetched to propose that people encode knowledge about the flexibility of their own behavior in terms of a hierarchy of context-specific self-concepts, each representing one's impression of oneself in different classes of situations (Kihlstrom & Cantor, 1984).

In information-processing theory, the self represents declarative knowledge of those attributes and features of which he or she is aware, at least in principle. As such, the notion of an unconscious self, unavailable to introspection, seems to be a contradiction in terms. This does not mean that all aspects of the self are conscious at any particular time. As McGuire (1987a, b) has shown, contextual factors determine which aspects of personality are brought into focal attention at any particular time (see also McGuire & McGuire, 1981; Markus & Nurius,

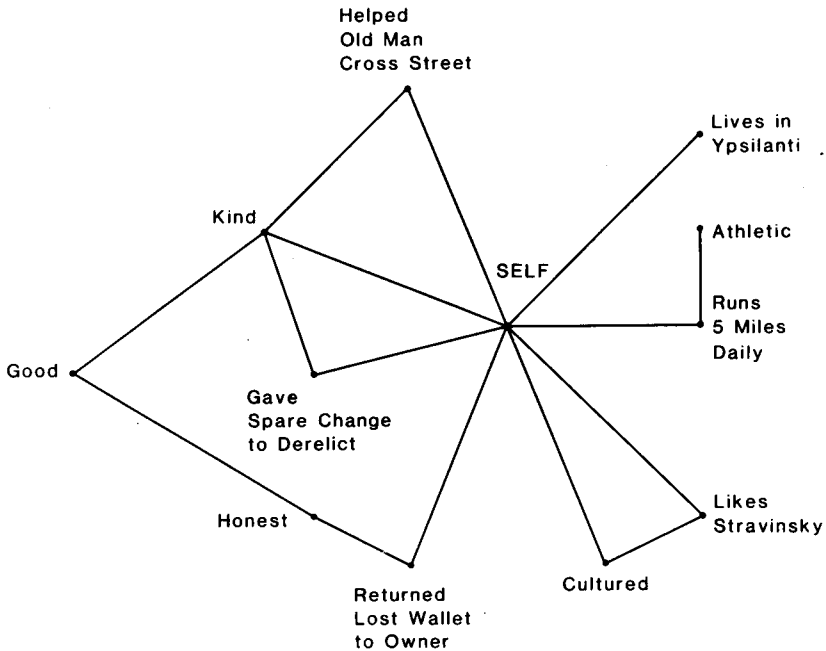


Fig. 2. The self as a node in an associative memory network, linked to semantic and episodic knowledge.

1986). Moreover, there are certain forms of psychopathology, such as fugue and multiple personality, where self-awareness can be radically altered (Kihlstrom, 1984, 1985d, 1987). Thus, some aspects of the self may be thought of as preconscious or subconscious, in that under certain conditions they may be inaccessible to retrieval and conscious introspection.<sup>1</sup> So far, however, most of this is speculation. But one of the most salutary consequences of the importation of information-processing theory into personality and social psychology has been the importation of a variety of new paradigms for the study of social cognition (Hastie, 1986; Hastie & Carlston, 1980).

#### IV. The Self-Reference Effect

If the self is a person's mental representation of his or her own personality, then the amount of information included in the self must be enormous: physical appearance, demographic attributes, dispositions of various sorts, and a wealth of autobiographical memories all must be recorded therein. Of course, considerations of cognitive economy suggest that the self does not include *everything* that is known about oneself. Rather, the self may include only those attributes that serve to distinguish ourselves from other people (McGuire, 1987a, b; McGuire & Padawer-Singer, 1976). Even so, the self may include information concerning our past and future personalities as well as our present one (Markus, 1983; Markus & Nurius, 1986). Especially when one considers the scope of autobiographical memory, it would seem reasonable to conclude that the self is one of the richest, most elaborate knowledge structures stored in memory.

One implication of this conclusion is that stimuli processed for self-reference should be highly memorable. According to the elaborative processing principle of memory functioning ( Craik & Lockhart, 1972; Jacoby & Craik, 1979; Anderson & Reder, 1979), accessibility of a memory is a function of the degree to which stimulus information makes contact with preexisting knowledge during encoding. Elaborate encodings, in which the stimulus event is linked to a number of other traces in memory, permit multiple routes by which the trace can be accessed; in addition, they support inference-based reconstructive processes should retrieval fail completely. The effect of elaborative processing is commonly illustrated in experiments on "depth of processing" (e.g., Hyde & Jenkins, 1973; Craik & Lockhart, 1972; Craik & Tulving, 1975), where words are subject to judgments concerning their physical, acoustic, semantic, or syntac-

<sup>1</sup>Of course, a person may become aware of some aspects of his or her personality that have heretofore operated unconsciously. This sometimes happens during insight-oriented psychotherapy, and when it does that feature can be incorporated into the patient's consciously accessible self-concept.

tic properties. Incidental memory is greatest following semantic judgments—processing that, arguably, fosters a great deal of contact between the item and prior knowledge. The idea is that the semantic encoding task brings the stimulus word into contact with other words stored in the semantic memory network. This, in turn, yields a richer, more elaborate memory trace compared to that left by orthographic and phonemic encoding tasks, which do not provide so much of an opportunity for contact with the semantic network.

In a seminal experiment, Rogers, Kuiper, and Kirker (1977) added a self-reference condition to the canonical depth-of-processing paradigm in an experiment in which trait adjectives served as stimulus materials. In addition to the usual sorts of orthographic, phonemic, and semantic orienting tasks, the subjects were asked to judge whether some traits described themselves. Later, the items presented in the self-reference condition were better recalled than those presented for the other types of judgments. The superior memory for items encoded with respect to the self has been termed the *self-reference effect* (Greenwald, 1980, 1981; Greenwald & Pratkanis, 1984; Kihlstrom, 1981; Kihlstrom & Cantor, 1984). The self-reference effect has been replicated many times (for reviews, see Bargh & Higgins, 1987; Chew & Kihlstrom, 1986a; Klein & Kihlstrom, 1986).

Table I presents comparable data gathered in separate experiments by Klein (Klein & Kihlstrom, 1986, Experiment 1) and by Mross (Mross & Kihlstrom, 1986, Experiment 2). Klein compared three encoding tasks: structural (deciding whether the word was printed in upper or lower case), semantic (deciding whether it was synonymous with another word), or self-referent (deciding whether it described the subject). Across the orthographic, semantic, and self-referent encoding tasks, the probability of recall increased by more than 500%, with self-referent processing showing more than 100% improvement over semantic processing. Mross added a phonemic encoding task, directly paralleling

TABLE I  
PERFORMANCE ON REPEATED RECALL TESTS

Study	Condition	Proportion recalled		
		Trial 1	Trial 2	Trial 3
A <sup>a</sup>	Orthographic	.05	—	—
	Semantic	.13	—	—
	Self-referent	.27	—	—
B <sup>b</sup>	Orthographic	.08	.10	.10
	Phonemic	.11	.13	.12
	Semantic	.16	.17	.20
	Self-referent	.31	.39	.39

<sup>a</sup>Klein & Kihlstrom (1986), Experiment 1.

<sup>b</sup>Mross & Kihlstrom (1986), Experiment 2.

the original experiment of Rogers *et al.* (1977). The size of his effect was about the same as that obtained by Klein. In addition, the subjects received a series of three recall trials, with no further opportunity to study the target items. Recall improved across the trials, showing a hypermnesia effect (Erdelyi, 1984). However, hypermnesia was obtained only for items subject to self-referent processing. On the basis of these findings, self-reference appears to be very special indeed.

In the depth-of-processing paradigm, retention is considered to be a function of the degree of elaboration received by a stimulus at encoding—that is, the amount of contact achieved between the stimulus and preexisting material in memory. The semantic task produces more such contact than the orthographic task, yielding more connections to preexisting knowledge and thus more potential cues and paths to retrieval. Because the effect of self-reference is greater than the effect of semantic processing, it could be concluded that self-reference is a uniquely powerful encoding task, involving a highly elaborate form of information processing. Perhaps, in turn, the power of self-referent encoding indicates that the self is a highly elaborated memory structure that, when activated, can form many links between a stimulus and preexisting knowledge (e.g., Rogers, 1981; see also Kihlstrom, 1981; Kuiper & Derry, 1981).

Unfortunately, there is a problem with this interpretation: in the canonical self-reference experiment, self-reference is confounded with organization. In the typical self-reference task, the question is always the same: whether the item is self descriptive. Therefore, the self-reference task is so designed as to encourage the subject to sort the self-reference items into two categories: those that are and those that are not self descriptive. By contrast, in the semantic task a unique judgment is required for each item: the subject must make a judgment about whether two words share the same meaning or whether the stimulus word fits into a sentence frame. However, the comparison word or frame is different for each stimulus item. Thus, categorical organization is prevented from occurring. Because recall is known to be affected by organizational activity (Bower, 1970; Mandler, 1967, 1979; Tulving, 1962), the self-reference effect may be due entirely to the organizational activity induced by the self-reference task rather than to self-reference per se.

In a series of experiments, Klein eliminated the confounding of self-reference with organization in order to test the hypothesis that organization, rather than elaboration, accounts for the self-reference effect (Klein & Kihlstrom, 1986). By judicious choice of stimulus materials and encoding tasks, he was able to unconfound the encoding task and organization and to manipulate each variable orthogonally in a 2 (semantic versus self-referent)  $\times$  2 (unorganized versus organized) factorial design. Table II presents the essential results of these studies. Comparing the two cells of the traditional self-reference paradigm, unorganized semantic and organized self-referent, a strong self-reference effect was



TABLE II  
 RECALL AS A FUNCTION OF ENCODING TASK  
 AND ORGANIZATION<sup>a</sup>

Study	Encoding task	Unorganized	Organized
A <sup>b</sup>	Semantic	.49	.79
	Self-referent	.51	.78
B <sup>c</sup>	Semantic	.50	.78
	Self-referent	.51	.77
C <sup>d</sup>	Semantic	.46	.56
	Self-referent	.49	.55

<sup>a</sup>From Klein & Kihlstrom (1986).

<sup>b</sup>Experiment 2.

<sup>c</sup>Experiment 3.

<sup>d</sup>Experiment 4.

obtained in each study. However, the effect was reversed when the organizational properties of the judgment tasks were also reversed, and it was eliminated completely when the self-referent and semantic orienting tasks were equated in terms of their organizational properties. In these studies organization was the only significant determinant of recall; self-reference did not enter into the picture, even in interactions.

Further research by Klein, still in progress, indicates that organization also plays a central role in the self-referent effect on hypermnnesia. Taken together, these findings undercut the privileged status commonly ascribed to the self as a memory structure or to self-reference as a form of cognitive processing. Although the self (or self-reference) might indeed have special qualities, the self-reference effect per se does not support this conclusion. This is not to say that the self is not a highly elaborate cognitive structure. It almost certainly is, if only because (for most of us at any rate) we are the people we know best. It's just that the self-reference task doesn't provide compelling evidence that this is so. Perhaps other information-processing paradigms, more specifically geared to tapping the structure of stored knowledge, will perform that function.

## V. Self-Referent and Other-Referent Processing

Another approach to this problem compares self-reference to other-reference. In these experiments, stimulus items are processed with respect to memory structures representing either oneself or some other person. Of course, both processing tasks provide the opportunity for organizational activity: for example, traits can be judged to be descriptive or nondescriptive of oneself and descriptive

or nondescriptive of another. If self- and other-reference have different effects on memory, then the self (or self-reference) would retain some privileged status. Table III presents the essential results of the first attack on this problem, by Kuiper and Rogers (1979). Their Experiment 1 compared self- and other-reference conditions to standard orthographic and semantic orienting tasks. In the critical conditions, the subjects were asked to judge whether some trait adjectives were descriptive of themselves; for other adjectives, the question was whether they described the experimenter. Comparisons of incidental recall among the orthographic, semantic, and self-referent tasks revealed the self-reference effect; however, there was no enhancement in the other-referent condition. Taken by itself, this finding would support the conclusion that the self (or self-reference) has privileged status.

Unfortunately, later experiments (2-5) as well as experiments by other investigators failed to obtain consistent differences between self-referent and other-referent conditions (e.g., Keenan & Baillet, 1980; for reviews, see Bargh & Higgins, 1987; Chew & Kihlstrom, 1986a). For example, Bower and Gilligan (1979) found a difference between judgments concerning oneself and Walter Cronkite, but not between oneself and one's mother. Lord (1980, Experiment 1) found a difference between judgments concerning oneself and both one's father and Walter Cronkite; he also found that a self-referent imagery task produced worse memory than a similar task involving father-referent or Cronkite-referent images (1980, Experiment 2)—but this finding has not been replicated (Brown, Keenan, & Potts, 1986). Based on the finding of no difference, Bower and Gilligan (1979) concluded that self-referent processing was not unique and that contact with any rich, elaborate cognitive structure—such as represents any familiar person—produced the same effect.

However, Kuiper and Rogers (1979) did not base their claim of special status for the self on the memory effect alone. Examining response latencies in the judgment task, they found that judgments concerning the self were made more quickly than judgments concerning the experimenter (Experiments 2 and 3).

TABLE III  
PROPORTION OF ITEMS RECALLED AS A FUNCTION  
OF PROCESSING TASK<sup>a</sup>

Processing task	Experiment				
	1	2	3	4	5
Structural	.18	.08	—	.16	.13
Semantic	.15	.16	—	.26	.13
Self-reference	.31	.33	.26	.32	.34
Other-reference	.18	.26	.23	.40	.32

<sup>a</sup>From Kuiper & Rogers (1979).

TABLE IV  
RESPONSE LATENCIES FOR RECALLED AND FORGOTTEN ITEMS<sup>a</sup>

Experiment	Item status	Processing task	
		Other-referent	Self-referent
2	Recalled	3.22	2.38
	Forgotten	2.73	2.56
3	Recalled	4.59	4.03
	Forgotten	3.65	3.30

<sup>a</sup>From Kuiper & Rogers (1979).

While that effect might be attributed to familiarity (at the time of the ratings, the experimenter was virtually unknown to the subjects), Experiment 2 revealed a difference in the relation of response latency in the initial judgment task to subsequent incidental memory in the two conditions. Table IV presents the essential findings. In the other-reference condition, items subsequently recalled were associated with longer response latencies than those subsequently forgotten. In the self referent condition, there was no latency difference between remembered and forgotten items. This finding suggested that in other-reference memory was a function of cognitive effort, whereas in self-reference memory is independent of effort—in other words, that there were qualitative differences between self-referent and other-referent processing (see also Rogers, 1981).

As stated, however, this conclusion is somewhat tenuous. Bower and Gilligan (1979) and Lord (1980) did not collect response latencies in their experiments. In a partial replication of their procedure, Kuiper and Rogers (1979, Experiment 3) failed to confirm a two-way interaction between reference and recall status on reaction time in the judgment task. Although they did find a significant three-way interaction on response latency involving reference (self or other), response (yes or no), and memory (recalled or forgotten), this interaction apparently was not obtained in the earlier study, and none of their remaining studies recorded response latencies. Furthermore, although Kuiper and Rogers tentatively offered a process model of self- and other-referent processing incorporating differences in familiarity of the other, response latencies were not collected in the two experiments in which the other was familiar to the subjects.

A more definitive comparison of self- and other-referent processing has been carried out by Chew (1983; Chew & Kihlstrom, 1986a), who systematically varied the familiarity of the target person in the other-referent condition. Experiment 1 was a conceptual replication of Kuiper and Rogers (1979), in which the subjects decided whether trait adjectives were descriptive of themselves, the experimenter (an unfamiliar other), or the typical student (a generic stereotype). Table V shows the proportion of items recalled in each of these conditions. There

TABLE V  
PROPORTION OF ITEMS RECALLED AS A  
FUNCTION OF TARGET<sup>a</sup>

Target	Experiment		
	1	2	3
Typical student	.35	—	—
Experimenter	.31	.32	—
Acquaintance	—	.30	—
Close friend	—	.33	.27
Self	.50	.41	.28

<sup>a</sup>From Chew & Kihlstrom (1986a).

is a clear and significant advantage for self-reference compared with the two other-referent conditions, replicating the essential findings of Kuiper and Rogers (1979, Experiment 1).

In Chew's Experiment 2, the subjects were presented with a four-point familiarity scale, with one pole labeled "self" and the other pole labeled "experimenter." The subjects had no previous acquaintance with the experimenter, and they were asked to nominate acquaintances who could be placed at the two intermediate points: a close friend, approximately one-third the distance between self and experimenter, and a casual acquaintance, approximately halfway between the close friend and the experimenter. These four individuals then served as referents in the processing tasks. Table V also presents these results. Again, items referred to the self show an advantage in recall compared to items referred to the experimenter. However, there were no recall differences among the three other-referent conditions, although the targets varied widely in familiarity.

In Chew's Experiment 3, there were only two targets, self and close friend. For half the trait adjectives, the subject was asked whether the word was descriptive of the person; for the remainder, the subject was asked to recall an episode in which the target displayed the characteristic named in the trait word. There were no recall differences between self- and other-referent conditions, regardless of processing task. Therefore, in terms of recall, there was no consistent evidence either for a difference between self- and other-referent processing or for a familiarity effect in other-reference.

But, as noted earlier, the Kuiper-Rogers claim of a self-other difference in information processing rests largely on the relation between recall and response latency in the judgment task rather than on recall per se. Table VI shows the latency results from Chew's three experiments. There was a consistent trend for judgments about the self to be faster than judgments about the other. This might reflect familiarity, but there was no effect of familiarity on latency within the three other-referent conditions of Experiment 2. More to the point, the critical

two-way interaction between referent and recall status did not appear in any of the three experiments, nor did the three-way interaction involving referent, recall, and response. Thus, there were no consistent differences between self- and other-reference, with respect either to memory or to the relation between processing effort and memory.

## VI. Retrieving Autobiographical Memories

As noted earlier, the self contains episodic as well as semantic knowledge of oneself. That is to say, the self is linked to a vast body of autobiographical memory, including some degree of introspective knowledge of one's own thoughts, goals, and emotions during the events and experiences recorded there. Obviously, we possess biographical knowledge of other people, as well. One quantitative difference between self and other is in the size of this knowledge base; one qualitative difference is that we possess introspective knowledge of our own subjective experiences that is denied to other people. Thus, it seems appropriate to focus on episodic as well as semantic aspects of the self and to inquire into the structure and processing of autobiographical memory.

Currently, information-processing theorists are engaged in a sharp debate over whether episodic and semantic memory are essentially different. Tulving (1985) has argued strongly that this is so, but McKoon and her colleagues (among others) have found Tulving's evidence unconvincing (McKoon, Ratcliff, & Dell, 1986; but see Tulving, 1986). However, there is a clear distinction between episodic and semantic memory *tasks*: the former require the subject to remember a particular event, while the latter do not. Similarly, while both episodic and semantic memories may be represented in the same propositional network (and thus interact; see, e.g., Kihlstrom, 1980, 1985c), episodic memories preserve, in accessible form, information concerning the spatiotemporal context in which

TABLE VI  
RESPONSE LATENCIES FOR RECALLED AND FORGOTTEN ITEMS<sup>a</sup>

Experiment	Item status	Experimenter	Acquaintance	Friend	Self
1	Recalled	3.30	—	—	3.25
	Forgotten	3.18	—	—	2.67
2	Recalled	3.35	3.36	3.22	2.38
	Forgotten	3.29	3.34	2.71	2.56
3	Recalled	—	—	4.59	4.03
	Forgotten	—	—	3.65	3.30

<sup>a</sup>From Chew & Kihlstrom (1986a).

events occurred as well as some reference to the self as the agent or experiencer of that event (Kihlstrom, 1984, 1985a b). Where such episodic information has been encoded and available in storage, we may say there exists an episodic memory trace; if access to the strictly episodic information has been interfered with somehow, what remains is closer to semantic memory (Kihlstrom, 1980).

It seems likely that individual units of autobiographical memory—individual episodic memories—can be represented in propositional networks, just like other factual information stored in memory. However, as in Fig. 2, each of these elements will be linked to a mental representation of the self in such a manner as to denote agency or experience: *I did* something, or something happened *to me*. In addition, each of these knowledge structures, at least in principle, will contain information about the time and place in which the event occurred, as well as other information such as the individual's internal state (including motivational and emotional state) at the time.

It seems unlikely that the individual episodes comprising the corpus of autobiographical memory are stored in isolation from each other. Therefore, it is relevant to ask how all of this information concerning one's personal past is organized into some sort of schematic structure. Information-processing theorists have developed a variety of techniques for analyzing the organizational structure of memory, but with autobiographical memory some of these are inconvenient (consider the amount of time required to elicit free recall of a person's accessible autobiographical memories), while others (for example, recognition tests) are made difficult by the typical investigators' ignorance concerning their subjects' life histories. As an alternative, Crovitz (e.g., Crovitz & Quina-Holland, 1976; Crovitz & Schiffman, 1974) and Robinson (1976) have proposed a cued-recall paradigm, originated by Sir Francis Galton, in which subjects are presented with a word, which serves as a retrieval cue, and are asked to retrieve a personal experience conceptually related to that stimulus. Response latencies in this task can be analyzed as a function of the properties of both the cues and the memories recovered by them.

Early research by Robinson (1976) indicated that response latency in the cued-recall task was related to the age of the memory by an inverted U-shaped function, such that very recent and very remote memories were retrieved equally fast, with memories from intermediate epochs retrieved more slowly. However, the epochs from which the memories were retrieved were not under experimental control, raising the possibility that an unrepresentative sample of very salient remote memories was sampled by the procedure. That is, particularly salient remote memories may be easily retrievable, but this may not be the case for remote memories as a group.

Chew (1979; Chew & Kihlstrom, 1986b) repeated Robinson's experiment, except that she controlled both the properties of the retrieval cues and the epochs from which the memories were retrieved. The recent epoch comprised the most

recent 7 years of the subject's life (roughly, since the start of junior high school); the remote epoch was defined as the 7 years beginning with his or her earliest memory (roughly, ages 3 to 10; see Kihlstrom & Harackiewicz, 1982). The retrieval cues were familiar nouns and verbs, classified as high and low in imagery value. Table VII displays the principal results. There was a significant main effect of cue imagery, with high-imagery cues associated with shorter latencies than low-imagery ones. There was also a significant main effect of target epoch, with recent memories retrieved more quickly than remote ones. Response latencies were especially large when low-imagery cues were used to retrieve remote memories.

Chew's findings indicate that autobiographical memory is organized temporally. Furthermore, the distribution of memories within the recent epoch showed a J function, such that the vast majority of memories from that time period came from the most recent days and weeks. Within that epoch, at least, search appears to begin with the most recent event and work backward in a self-terminating manner. One might speculate that in the unconstrained case, such as in Robinson's experiment, search also begins at the most recent epoch, and works backward until a cue-relevant memory is found—except, of course, in those cases where the cue matches a particularly salient autobiographical memory. However, the search pattern adopted may well depend on subtle features of task demands. When hypnotized subjects are asked to recall the events that transpired since hypnosis began they strongly tend to begin at the beginning of the session and work their way to the end—unless, that is, the organization of recall has been disrupted by processes such as posthypnotic amnesia (Kihlstrom, 1985d). And when subjects learn a list of words presented in a standard serial order, recall of the list strongly tends to proceed from the beginning to the end (Kihlstrom & Wilson, 1984; Mandler & Dean, 1969). Similarly, one would expect a serial order of recall if subjects were asked to recount their lives since birth (or any other convenient entry point).

But it would be unreasonable to suggest that the retrieval of autobiographical memory always entails a strict serial search, forward or backward. There are a

TABLE VII  
RESPONSE LATENCIES IN RETRIEVAL OF  
AUTOBIOGRAPHICAL MEMORY<sup>a</sup>

Epoch	Cue-imagery value	
	Low	High
Remote	28.90	14.00
Recent	15.80	11.50

<sup>a</sup>From Chew & Kihlstrom (1986b).

variety of other modes of organization available in memory besides linear orderings, and there is no reason to think that autobiographical memory does not partake of at least some of them. For example, autobiographical memories could be linked to semantic memory nodes specifying the dispositional or emotional connotations of the event (or of the memory of the event, which is not quite the same thing; see Chew & Kihlstrom, 1986b), as Bower (1981) and Isen (1984) have proposed. Such a situation is depicted in Fig. 2, where some autobiographical memories are linked directly to summary trait adjectives. Trait and state adjectives have their own categorical structure (Goldberg, 1981; Russell, 1980; Wiggins, 1979), and so it is possible that autobiographical memories also have a hierarchical structure following the semantic relations among the traits and states that they exemplify.

One empirical approach to this problem is illustrated by data gathered by Albright as part of a study of causal attribution in autobiographical memory (Albright & Kihlstrom, 1986; see below). Albright used trait adjectives derived from Wiggins' (1979) circumplex of interpersonal traits to cue the retrieval of memories in which the subjects displayed some trait-related behavior. Wiggins' circumplex represents interpersonal traits as vectors in a two-dimensional space and represents their semantic relatedness in terms of the angular distance between vectors. Thus, the traits *ambitious* and *dominant*, which are highly redundant, are separated by an angle of  $0^\circ$ . A trait like *gregarious*, which is positively correlated with *ambitious*, is separated from it by an angle of  $45^\circ$ ; the unrelated trait *warm* by an angle of  $90^\circ$ ; a moderately contradictory trait such as *modest* by an angle of  $135^\circ$ ; and the antonym *lazy* is separated from it by an angle of  $180^\circ$ . In Albright's Experiment 1, the 16 major interpersonal traits (2 at each of 8 positions around the circumplex) were presented as retrieval cues; in her Experiment 2, only one term was used from each position.

Albright's data may be examined for evidence of semantic priming effects in response latency. That is, if autobiographical memory is organized hierarchically in terms of the trait implications of the events, it would be expected that retrieval would be facilitated by the immediately prior retrieval of an event exemplifying a closely related trait term. Table VIII presents the average response latencies in the memory-retrieval task, classified according to the angular distance on the circumplex between the trait adjective used as a retrieval cue on the instant trial and that employed in the immediately preceding trial. In both experiments, there is some evidence of priming by antonyms: the latency is shortest when  $180^\circ$  separates the  $n$ th and  $(n-1)$ st cues. But there is no consistent evidence of priming by synonyms or other positively correlated trait terms, except where traits are preceded by their polar opposites.

These experiments, then, suggest that autobiographical memory is not primarily organized by the hierarchical semantic relations among the trait and state terms implied by episodic memories. Interestingly, there is little of such seman-



TABLE VIII  
PRIMING IN RETRIEVAL OF AUTOBIOGRAPHICAL  
MEMORIES<sup>a</sup>

Study	Angle between vectors: Trait $n$ vs. trait $n - 1$	Mean latency
1	0	25.72
	45	19.20
	90	18.86
	135	21.37
	180	9.30
2	0	—
	45	25.74
	90	31.87
	135	36.39
	180	21.50

<sup>a</sup>Unpublished data from Albright & Kihlstrom (1986).

tic organization in our biographical memories of other people. For example, studies of person memory show very little organization of memory for behavioral information by personality traits or similar categories (e.g., Hamilton, Katz, & Leirer, 1980; Ostrom, Lingle, Pryor, & Geva, 1980; for a review, see Hastie, Park, & Weber, 1985; Srull, 1984). Although there is little doubt that personality trait information features in mental representations of other people and affects the encoding of episodic memories of other people's experiences and actions (Hastie, 1980, 1981, 1983), retrieval does not seem to be mediated by direct associative links between nodes representing semantic information and those representing episodic information about either ourselves or others (Kihlstrom, 1985c).

Perhaps, though, another type of hierarchical structure *is* important—one that is superimposed on the serial organization of autobiographical memory. Some linear orderings also have a clear hierarchical structure: the "Alphabet Song" familiar to all English-speaking children is one example (Anderson, 1985). Klahr and his associates (Klahr, Chase, & Lovelace, 1983) investigated the organization of the English alphabet in memory with a probe-generation task in which subjects were given one letter and had to respond as quickly as possible with the next. Response latencies were faster at the beginning of a chunk and got slower toward the end, suggesting that letter search proceeded in a forward fashion within each chunk.

Perhaps something similar occurs in autobiographical memory. As Erikson (1950), Neisser (1962), and many others have noted, the psychosocial environment provides natural boundaries for various epochs in a person's life: the beginning of school, the transition from junior to senior high, from college to a career, from single to married status, the birth of one's child, promotion and

move to a new post, retirement, death of one's spouse, etc. Perhaps autobiographical memory is entered at the beginning or end of an epoch and search continues in a sequential fashion until a relevant memory is found. A major task for research on autobiographical memory is to establish what these epochs (or "chunks" of autobiographical memory) are. This task may well be complicated by social structures that impose different life scripts on individuals differing in age, gender, social class, and the like; even within such groups, it is possible that epochal organization will vary widely from one individual to another. Still, once these epochs are established (even if on a strictly individual basis), it may be possible to use Klahr's technique to probe for individual memories within and between epochs and to determine how autobiographical memory is structured (Wyer, Shoben, Fuhrman, & Bodenhausen, 1985).

### VII. Autobiographical Memory and Judgment about the Self

Autobiographical memory is interesting in and of itself, but it also may be able to shed important light on various other aspects of information processing about the self. Consider, for example, the well-known self-other difference in causal attribution. In a now-classic paper, Jones and Nisbett (1972) argued that "there is a pervasive tendency for actors to attribute their actions to situational requirements, whereas observers tend to attribute these same actions to stable personal dispositions" (p. 80). Although early evidence on the self-other difference was conflicting (e.g., Jones, 1979), it now appears to be fairly well established (for a review, see Watson, 1982). At least, individuals appear more likely to make situational attributions for their own behavior than for the observed behavior of others. Debate persists, however, concerning the mechanisms underlying this effect. Jones and Nisbett (1972) considered three different hypotheses: According to a *motivational* hypothesis, the self-other difference reflects the desire to enhance self-esteem by taking personal responsibility for positive outcomes but declining to do so for negative ones; according to the *perceptual* hypothesis, it reflects the fact that the situation comprises the actor's entire perceptual field, whereas the actor serves as a large element in the field of the observer; according to the *informational* hypothesis, it reflects the fact that people have available more information about the situational variability of their own behavior than they do about that of others.

This theoretical question was addressed in Albright's experiment on autobiographical memory retrieval, described earlier (Albright & Kihlstrom, 1986). The memories targeted in this experiment were all for past interpersonal events—i.e., those involving both a self and an other. At the end of the experimental session, the subjects were asked to rate, on a six-point scale, the causal

importance of both dispositional and situational factors in the behavior of both parties to the interaction. It was expected that the self–other difference in causal attribution would emerge in these ratings. The retrieval cues were all personality trait adjectives, half desirable and half undesirable, and the subjects were asked to rate the desirability of the outcome of the event retrieved in response to each cue. These elements in the design permitted a test of the motivational hypothesis concerning this difference. The self–other difference should be greatest for those episodes retrieved in response to negative cues, or those which led to memories for events with bad outcomes.

In addition, Albright's experiment capitalized on a "perceptual" feature commonly found in autobiographical memory (Kihlstrom & Harackiewicz, 1982; Nigro & Neisser, 1983). Some personal recollections are "field" memories, in which the individual reconstructs the event with the same view of the environment as that obtaining at the time the event occurred; others are "observer" memories, in which the reconstructed view includes the actor him- or herself, as seen by an external observer. In Albright's studies, the subjects' memories were distributed approximately evenly between field and observer memories. From the point of view of the perceptual hypothesis, the self–other difference should be greatest for field memories and minimized for observer memories.

Table IX presents the basic results of Albright's two experiments. Overall, neither study yielded a clear self–other difference in causal attribution. However disconcerting, this negative finding is of some importance, because few studies of causal attribution have dealt with subjects' personal experiences in the real world as opposed to contrived events occurring in the laboratory or hypothetical

TABLE IX  
RATED CAUSAL IMPORTANCE OF SITUATIONAL AND  
DISPOSITIONAL FACTORS<sup>a</sup>

Study	Memory	Target	Causal attribution	
			Situations	Dispositions
1	All	Self	3.89	3.73
		Other	3.36	3.60
	Observer	Self	3.62	3.34
		Other	3.02	3.27
	Field	Self	3.98	3.73
		Other	3.68	3.67
2	All	Self	3.43	3.72
		Other	3.15	3.49
	Observer	Self	2.63	2.70
		Other	2.19	2.43
	Field	Self	3.35	3.64
		Other	3.15	3.61

<sup>a</sup>After Albright & Kihlstrom (1986).

ones posed on paper-and-pencil questionnaires. Interestingly, however, both situational and dispositional causes were rated as more important to the behavior of the self than of the other. This consistent finding may simply reflect a self–other difference in the confidence with which causal attributions are made. But the fact that within each target situational and dispositional causes were rated equal in importance implies that today’s subjects are true interactionists, recognizing the coequal (and possibly interdependent) influence of the two factors in causing their own and others’ behaviors.

Even though the self–other difference was not obtained overall, Albright’s experiment still permitted at least a weak test of the perceptual and motivational hypotheses. That is, the perceptual hypothesis would seem to predict that subjects would be more likely to make situational attributions for their own behavior in incidents remembered from a field perspective compared to those remembered from an observer perspective. In the same way, the motivational hypothesis would seem to predict that subjects would be more likely to make situational attributions for their own behavior in negatively toned situations. Neither experiment gave consistent evidence favoring the perceptual hypothesis. That is, the self–other difference was no greater for field than for observer memories. Situational attributions concerning the self were no stronger with field memories, where the subjects did not view themselves in their memories, and dispositional attributions concerning the self were no stronger with observer memories, where they did. However, both of Albright’s experiments did give consistent, if weak, support for the motivational hypothesis: the self–other difference was more apparent in the explanations given for events retrieved in response to negative cues and for events associated with bad outcomes. That is, events retrieved by negative cues, or eventuating in negative outcomes, were more likely to be attributed to situational causes with respect to the subjects themselves and dispositional causes with respect to others.

Albright’s design did not permit a direct test of the informational hypothesis. However, given the vast amount of episodic information stored in autobiographical memory, it seems reasonable to speculate that while perceptual effects are weak (Taylor & Fiske, 1978), informational effects may complement motivational ones to produce any self–other differences in causal attribution that may be observed.

Albright’s findings are congruent with other suggestions (e.g., Showers & Cantor, 1985) that the most unique aspect of the self as a cognitive structure may lie in its connection to motivation. The self as object stores information that represents past, present, and future selves. It is the structure that must be construed as good, protected against insult, and perceived as temporally stable and contextually consistent. The motivational aspects of selfhood have been explored in studies of the relation between self-descriptions on the one hand and emotional states and self-regulatory behavior on the other. Some of these investigations

indicate that the connection between self-knowledge and motivation may be illuminated by considering not only autobiographical memory, but also the person's thoughts about possibilities for the self in the future.

### VIII. Representations of Oneself in the Future

In addition to the episodic self-memory that forms a basis for representations of current and past selves, individuals also possess representations of potential selves, or selves of the possible future (James, 1910; Schutz, 1964). Included in the knowledge repertoire about the self are attributes and images of the "ideal" and "ought-to-be" selves (Higgins, Klein, & Strauman, 1985; Higgins, Bond, Klein, & Strauman, 1986)—or, more generally, of "possible" selves (Markus & Nurius, 1986).

Such representations may derive from present and past self-concepts. For example, consider the ideal "bilingual self" based on a memory of oneself 10 years ago, a native English speaker with a fluent command of Italian; or the possible "depressed self" constructed from memories of past failure experiences. Future selves may be derived from the past in less obvious ways as well. For example, a person's "ought-self as religious" may be based on an early identification with a devout grandparent. In addition, representations of future selves may be indirectly associated with representations of current selves. Future potential selves imply present bases and suggest the distance to be covered, or changes to be made, before they are realized (Markus & Nurius, 1986). Compare, for example, one's present "self as medical student" with a possible future "self as Nobel laureate in medicine."

This projection of the self into the future may indeed be a special aspect of the self. What is special, however, is probably not strictly the structure of the self or the processes involved in its use. After all, individuals certainly carry around notions of possible significant others as well as possible selves. The mother of the medical student, for instance, is likely to possess a rich and emotionally meaningful image of the famous researcher her son might possibly be. That image, of course, may differ somewhat from the image her son holds of his own potential. For one thing, the mother has a very different biographical context from which her image of her son as a possible medical researcher was derived. Moreover, the representation of her son's possible future is likely to be closely associated with one of her own possible selves—her possible self as the mother of a famous medical researcher, basking in reflected glory.

These potential differences in content between possible selves and possible others still require empirical investigation. Meanwhile, extant research on possible selves points to a more critical point of distinction between the futures we

hold for ourselves and those we hold for others—that of their special motivational function (Showers & Cantor, 1985). Since representations of future selves include the individual's aspirations and fears, they may be assumed to exert a significant influence on the individual's emotional and motivational states—and vice-versa (Higgins et al., 1985, 1986; Markus & Nurius, 1986).

The self as object—that is, the store of attributes and images that represent past, present, and future selves, provides the data base for operations of the self as agent. The self as object is the structure that must (under ordinary circumstances) be construed as good, protected against insult, and perceived as internally consistent. The role of self-representations in motivated thought and action has been explored in investigations that relate the content of self-description to emotional states and self-regulatory behavior. These investigations demonstrate that the connection between self-knowledge and motivation may be illuminated by considering not only semantic and episodic memory about the current self, but also those mental representations that contain ideas about the possibilities for the self in the future.

### **IX. The Self in Personal Decision-Making and Self-Regulation**

In addition to analyzing the structure of mental representations of the self, information-processing concepts may be useful in the study of the involvement of the self in social judgment and behavior. An example is provided by recent work by Niedenthal (Niedenthal *et al.*, 1985). She reasoned that many judgments and choices are mediated by a particular kind of social comparison: specifically, that people compare themselves to others who have made a particular choice. For example, when confronted with the task of buying a new car, one must ask oneself, at some level, if he or she is really the kind of person who would own a bright red Cadillac Eldorado convertible with ostrich leather seats. In cognitive terms, people match their concepts of themselves with their concepts of people who have selected various options that are available to them—a process of prototype matching.

Niedenthal studied the prototype-matching process in a group of college freshmen who were, at that time, searching for campus housing for the next academic year. The subjects completed a number of questionnaires and described themselves on a list of 100 trait adjectives. They used the same list to describe the "typical person who would be happy and comfortable living in" a number of settings, including an apartment, a single-sex dormitory, a co-residential dormitory, a fraternity or sorority, and a house shared with other people. Then, each subject's self-ratings were matched to his or her own descriptions of each of the

types generated by the other-rating task, yielding a "distance" measure of similarity, and the options were ranked for each subject on self-to-prototype distance. She then calculated, for each subject, the rank-order correlation between the distance from self to each of the others, and the preference for each of the housing options.

Table X shows the essential results. The subjects were classified in two ways. First, some subjects had highly distinctive self-concepts, meaning that they rated relatively few traits as descriptive or true of themselves; others reported that they possessed almost every trait in the list to some degree. Second, some subjects had interpersonal goals in seeking housing, meaning that they hoped that their choice would help them achieve certain social objectives; other subjects were primarily motivated by such practical considerations as rental rates or proximity to campus. It can be seen that for subjects with highly distinctive self-concepts, who also have interpersonal goals, the match between self and prototypical other is a strong predictor of housing preference.

Prototype matching may be a general strategy for making personal and social judgments. This appears to be the case in a wide range of contexts, from the hypnosis laboratory to adolescent social groups. When subjects report how "deeply" they have been hypnotized (Kihlstrom & Orne, 1986), for example, they may retrieve a mental representation of the "prototypical" (perhaps stereotypical) hypnotic experience from memory and compare it to their own experiences. Or, when they are asked to predict how they will respond to hypnosis in the future (Shor, Pistole, Easton, & Kihlstrom, 1984), they may compare their self-concepts to the features of a prototypical (or, again, stereotypical) hypnotizable subject. Such decision-making processes are implicated in the findings of research by Chassin and his colleagues, who found that overlap between adolescent subjects' self-concepts and the consensual prototype of a smoker predicts the subject's declared intention to smoke in the future (Chassin, Presson, Sherman, Corty, & Olshavsky, 1981).

The comparison process in which one's self-attributes are matched to some ideal or prototypic conception undoubtedly is involved in decision making and

TABLE X  
SELF-TO-PROTOTYPE MATCH AND  
HOUSING PREFERENCE<sup>a</sup>

Self-perception	Goals	
	Interpersonal	Practical
Distinctive	.52	.25
Nondistinctive	.29	.40

<sup>a</sup>After Niendenthal *et al.* (1985).

self-regulation in many spheres of social life. As noted earlier, individuals quite frequently reflect on their possible future selves and take note of the discrepancy between those ideal selves and their current or "actual" selves. Therefore, the prototype-matching process may be relevant to the comparisons between actual and ideal self-concepts that seem to arise in the course of goal-directed problem solving (Cantor, Markus, Niedenthal, & Nurius, 1986).

Some support for this notion comes from an ongoing longitudinal study of personality adaptation in the transition to college life (Cantor, Niedenthal, & Brower, 1985). As college students make the transition from home and family life to the independence and demands of college life, they often set new life-task goals for themselves in hopes of actualizing some of their ideal self-concepts. Therefore, this transition provides an excellent opportunity to observe the function that future selves play in guiding individuals in their choices of activities, allocation of time and effort, and strategies for solving problems encountered in real life.

This particular longitudinal project is directed primarily toward explicating the relations between three aspects of the transition to college life: the life tasks and self-goals that students set for themselves in interpersonal and academic domains of college life, the problem-solving strategies that they embrace in those life-task domains, and the performance and stress outcomes that they experience over time (for a more comprehensive report see Cantor, Norem, Niedenthal, Langston, & Brower, 1986).

As part of the project, students in the Honors College at the University of Michigan have reported on their life-task goals, self-ideals, plans for handling various task-relevant situations, and performance and stress outcomes in academic and social domains at three successive time periods: Time 1, Fall Quarter of freshman year; Time 2, Spring Quarter of Freshman year; and Time 3, Spring Quarter of sophomore year. Additionally, subsamples of students drawn from this survey sample have participated in intensive studies of their behavior on campus, at social events, and in various academic settings.

A series of data analyses has examined the impact of task-specific self-concept discrepancy—the discrepancy between the students' descriptions of their current academic and social selves and their ideal selves in these two domains—on perceived academic and interpersonal stress as recorded over a 2-year period. The first analysis was drawn from 147 students' descriptions of their current and ideal academic selves at Time 1 and their self-reports of academic stress and difficulty at Time 2. The subjects were classified into those for whom there was relatively little overlap between their current and ideal academic selves (High Discrepancy) and those with relatively more current-ideal congruence in that domain (Low Discrepancy).

The High-Discrepancy group experienced significantly more life stress than their Low-Discrepancy counterparts. Moreover, while all students experienced a



diminution of difficulty and stress between Time 1 and Time 3, the High-Discrepancy group found academic tasks to be more difficult and stressful, and they reported spending more time on them. Interestingly, while their subjective experiences of academic life were clearly different, these groups did not differ in actual academic performance in any of the three time periods. Self-concept discrepancy in the academic domain takes an emotional toll and induces considerable self-regulatory activity without necessarily affecting objective performance outcomes. These findings seem quite consistent with the prevalent view of the detrimental impact of self-concept discrepancy on stress and coping (e.g., Higgins *et al.*, 1986).

These initial analyses of self-concept discrepancy and self-regulation suggest that when one's self-ideal prototype is too distant from the currently active self in some domain, individuals may experience negative affect in that arena of life. This suggestion of negative motivation in coping is at odds with some formulations of positive motivation in striving after some ideal (James, 1890; Rogers, 1951). However, the nature of the relation between self-concept discrepancy and coping outcomes may depend on the individuals' perceptions of the relevant life-task domain (Ruffins, Niedenthal, & Cantor, 1986). For example, the stressful side of self-ideal discrepancy was observed in the academic domain—one that all students perceived as more difficult and threatening than the equally important social domain. Perhaps the positive side of self-ideal discrepancy is apparent in life-task domains that are generally perceived as easy and rewarding.

Accordingly, Ruffins *et al.* (1986) analyzed data from a subsample of 29 subjects who provided in-depth information on performance and outcomes in on-campus social events. This group did not differ from the full sample on any background or achievement variables, such as GPA, SAT scores, or satisfaction with college social life. First, the students' self-concepts in the academic and social life domains were compared. Table XI shows that these two "selves" were quite distinct from each other. Furthermore, they mirror the differences in perceptions of the two life tasks in the sample as a whole. Clearly the students viewed themselves as very different people in these differentially threatening, though similarly valued, domains of life.

With this content analysis as a background, Ruffins *et al.* (1986) found that self-ideal discrepancy served a positive motivational function in the social (rather than the academic) life of this subsample. Again, the students were divided into high- and low-discrepancy groups based on the overlap between their current and ideal social selves. At Time 1, the High-Discrepancy group reported that they took more initiative in, felt less stress about, and were less concerned with others' views of their progress in, interpersonal life tasks. Moreover, when these subjects were interviewed during Time 2 about their feelings surrounding an on-campus social event, the High-Discrepancy group experienced lower levels of stress, threat, and social pressure during the party. Similarly, at Time 3 self-ideal

TABLE XI  
 PROTOTYPICAL ACTUAL AND IDEAL "STUDENT" AND  
 "SOCIAL" SELVES<sup>a</sup>

Actual	Ideal
<i>Student selves</i>	
Hard-working (18)	Studios (20)
Friendly (15)	Outgoing (12)
Grade-conscious (13)	Self-confident (10)
Conscientious (13)	Involved in extracurricular activities (10)
Interested in learning (11)	Assertive in expressing opinions (10)
Procrastinating (10)	Happy (9)
Tense (7)	Not concerned about grades (9)
Intelligent (7)	Relaxed (7)
Intimidated (6)	Independent (7)
Confused (6)	Have firm goals (7)
<i>Social selves</i>	
Intelligent (12)	Self-confident (14)
Sense of humor (11)	Outgoing (13)
Conversationalist or listener (11)	Caring (11)
Open-minded (10)	Intelligent (10)
Friendly (9)	Open with feelings (9)
Caring (9)	Assertive (7)
Honest (9)	Motivated (7)
Understanding (6)	Good-looking (5)
Easygoing (6)	Sense of humor (4)
Sensitive (6)	Modest (4)

<sup>a</sup>Parentheses indicate number of respondents listing attribute (maximum = 29).

discrepancy was positively correlated with satisfaction with friendships and social functions in general. In this domain of college life, and for this subsample of students, self-ideal discrepancy seems to serve a positive function.

Together, the effects of self-ideal discrepancy in academic and social domains indicate that representations of future and ideal selves play a special role in self-regulation. Niedenthal's prototype-matching strategy obviously can be extended to include comparisons between current and ideal self in goal-directed life-task activities. In some contexts, as in the academic domain, the strategy seems to function as it did in housing choice: a substantial mismatch between current and ideal self-concepts (prototypes) serves as a negative incentive for future activity in that life arena. However, in contexts where the individual perceives more potential for success, as in the social domain, then the effects may be reversed, with higher discrepancies affording positive incentives for behavior.

In other words, an ideal self-representation can serve as the standard of com-

parison that, in the context of a prototype-matching strategy, can guide the course of decision making and self-regulation. The emotional consequences of perceived self-ideal discrepancy set the tone for the motivated behavior. However, these consequences may also depend on the individual's construal of the demands of the domain in which the current self is found lacking. Whether self-ideal discrepancy creates positive or negative incentives for life-task activity, mental representations of future selves serve as powerful motivators of social behavior. It seems likely that the same information-processing strategies that have helped reveal the structure of memory representations of current selves can perform the same function with respect to future selves.

### **X. Conscious and Nonconscious Aspects of Selfhood**

In a more speculative vein, it may be that information-processing strategies will shed light on an ancient problem in personality: whether it is sensible to think of aspects of oneself of which the person is not aware. At first, the notion of a nonconscious self would seem to be a contradiction in terms (Kihlstrom, 1985a). Rogers (1951), for example, included in the self all of those characteristics of a person of which he or she is aware; similarly, Allport (1955) defined the proprium as those features regarded by the person as central to his or her own personality. On the other hand, many clinicians (and others whose theories have been influenced by the syndromes of psychopathology) have found the idea of a nonconscious self desirable, if not necessary. The positions of Freud and Jung are well known in this regard. Less well known are the phenomena of fugue and multiple personality, which indicate that extensive portions of self-knowledge can be dissociated from conscious awareness (Hilgard, 1977; Kihlstrom, 1984, 1985a). This theoretical possibility is of considerable methodological importance, because most investigations of the structure and processing of self-knowledge rely exclusively on those aspects of the self that are accessible to direct introspective awareness.

However, the information-processing effects of consciously accessible self-schematic information may be turned into techniques for revealing information that is closely linked to the self but of which the person is not consciously aware. Consider, for example, Markus' (1977) finding that subjects make faster self-ratings on trait dimensions that are self-schematic than on those that are not. Therefore, all other considerations being equal, items that are quickly rated may be highly self-schematic, regardless of whether they are consciously acknowledged as such. This might be especially true for subjects who show reaction-time asymmetries, quickly accepting or denying one pole of a trait dimension while taking more time to respond to the other.

Similarly, consider Bargh's (1982) finding that words related to highly self-

descriptive dimensions intrude on dichotic listening performance. If the same holds true for self-schematic (as opposed to merely self-descriptive) attributes, again all things being equal, other terms that consume attentional capacity may be regarded as potentially self-schematic—again, even if the person denies this when asked. By turning dependent variables into independent ones, we may be able to develop a sophisticated information-processing technology for the assessment of preconscious and subconscious aspects of selfhood (Kihlstrom, 1984, 1985a, b; Kihlstrom & Nasby, 1980; Nasby & Kihlstrom, 1985).

Even if this promise never is fulfilled, however, the prospects look good for the application of the information-processing paradigm to the study of the self. It is important to make clear, however, that the information-processing approach is not the *only* paradigm suitable to this purpose. Indeed, much has been learned from research conducted within more conventional attribution-theory and self-perception paradigms. But information-processing paradigms have two special advantages. First, they are specifically geared to answering questions about mental structures and processes, including aspects of these matters that are hidden from introspective awareness. Equally important, although vigorous theoretical controversies persist, a high degree of consensus surrounds these procedures and the meanings of experimental outcomes derived from them. When social and nonsocial psychologists use the same paradigms to explore related questions of structure and process, each domain can benefit from the achievements and errors of the other, and we come closer to a unified theory of self, in mind and in action.

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