Two Self-Reference Effects: The Importance of Distinguishing Between Self-Descriptiveness Judgments and Autobiographical Retrieval in Self-Referent Encoding

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This research suggests that difficulties in demonstrating consistent effects of the self on recall and in specifying the processes involved in self-referent encoding stem partly from a failure to distinguish between two self-reference encoding tasks: those requiring Ss to decide if a word describes them and those requiring Ss to retrieve a personal memory involving the word. Studies have treated these tasks as equivalent methods for exploring the memorial properties of self, but the present research shows that this assumed equivalence is in error. The authors show that much of the inconsistency in the self-reference literature is eliminated when studies are segregated on the basis of these two distinct self-reference tasks. The authors conclude that both trait-descriptive and autobiographical information about the self is available in memory, and that each can be addressed independently.

Suppose a friend studying medicine told you that carpal tunnel syndrome is a nerve disorder characterized by weakness, numbness, and tingling in the thumb and first 2 fingers of the hand. You might or might not remember that fact. Suppose, however, that your friend's description of carpal tunnel syndrome reminded you of symptoms you had once experienced. Chances are you would have little difficulty remembering this description in detail. It seems almost self-evident that relating information to the self facilitates memory. Only recently, however, has the mnemonic effectiveness of self-reference been tested empirically.

In one of the first demonstrations that information is well remembered when it is considered in relation to the self, Rogers, Kuiper, and Kirker (1977) used Craik and Tulving's (1975) depth of processing methodology to examine the effects of various encoding strategies on incidental recall. Rogers et al. found that judging trait adjectives for self-descriptiveness ("Describes you?") led to better recall than did structural (e.g., "Printed in capital letters?"), phonemic (e.g., "Rhymes with XXX?"), or semantic (e.g., "Means the same as XXX?") encoding of the same material. The superior recall for words encoded with respect to the self (the self-reference effect, or SRE) generated much interest because it contradicted the prevailing belief among many psychologists (e.g., Craik & Tulving, 1975; Hyde & Jenkins, 1973) that semantic encoding produced optimal retention within the depth of processing framework. In addition, because the recall of self-referentially encoded material was potentially informative about the memorial properties of the self, the Rogers et al. paradigm seemed to offer a method for exploring the role of the self in memory.

The SRE has since been the subject of numerous investigations, many of which have replicated Rogers et al.'s (1977) findings (e.g., Ganellen & Carver, 1985; Kendzierski, 1980; S. B. Klein & Kihlstrom, 1986; Kuiper & Rogers, 1979; McCaul & Maki, 1984). In addition, modifications of the self-reference paradigm have been introduced to explore self-referent encoding under a variety of theoretically interesting conditions. Researchers have examined the mnemonic effectiveness of self-reference as a function of private self-consciousness (e.g., Agatstein & Buchanan, 1984), age (e.g., Mueller, Wonderlich, & Dugan, 1986), creativity (Katz, 1987), sex typing (e.g., Mills, 1983), stimulus material (e.g., S. B. Klein & Loftus, 1988), neuroticism (Young & Martin, 1981), and depression (e.g., Derry & Kuiper, 1981).

Two problems, however, have rendered the self-reference paradigm less theoretically fruitful than it promised to be. First, attempts to extend it have yielded conflicting results. For exam-

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ple, self-referent encoding has been compared with encoding in reference to a well-known other (e.g., one's mother). In some studies self-referent encoding produced higher recall (e.g., Lord, 1980, Experiment 1), but in others it did not (e.g., Bower & Gilligan, 1979, Experiment 2). Similarly, when nouns replaced trait adjectives as stimuli, some investigators reported that self-referent encoding led to greater recall than did semantic encoding (e.g., Warren, Chattin, Thompson, & Tomsky, 1983); however, other investigators have not obtained this effect (e.g., Aboud, 1980). These inconsistencies have led some to question whether there really is a recall advantage for information encoded self-referentially. The conclusion of Higgins and Bargh (1987, p. 392) is typical of this sentiment: "In brief, self-reference is neither necessary nor sufficient for memory of input to be facilitated in comparison to a semantic orientation task."

The second problem is that investigators are unable to agree on the mechanisms mediating the effect. The SRE has been proposed to reflect the operation of a variety of cognitive processes, including elaboration (e.g., Keenan & Baillet, 1980; S. B. Klein & Loftus, 1988; Rogers et al., 1977), organization (S. B. Klein & Kihlstrom, 1986; S. B. Klein & Loftus, 1988), evaluation (Ferguson, Rule, & Carlson, 1983; Zajonc, 1980), cognitive cueing (Bellezza, 1984), and distinctiveness (Bruss, 1986; Friedman & Pullyblank, 1982). None of these proposals has emerged as definitive, partly because of the lack of a consistent pattern of results against which to evaluate them. In the absence of a clear understanding of the SRE, results obtained with the self-reference paradigm have been less useful in explicating the role of the self in memory than was originally expected.

We propose that much of the controversy surrounding self-reference stems from a failure to distinguish between SREs produced in different experimental contexts. Specifically, two different self-referent encoding tasks have been used to produce the SREs reported in the literature: a *descriptive* task, in which subjects decide whether a stimulus word is self-descriptive, and an *autobiographical* task, in which subjects retrieve an autobiographical memory related to a stimulus word. The two tasks are used interchangeably in self-reference studies.

For example, some studies comparing the mnemonic effectiveness of self-reference with other-reference use descriptive tasks (e.g., Ferguson et al., 1983; Kuiper & Rogers, 1979), others use autobiographical tasks (e.g., Brown, Keenan, & Potts, 1986; Miall, 1986), and still others include both tasks in the same experiment (e.g., Bower & Gilligan, 1979; Friedman & Pullyblank, 1982). Similar intermixing of tasks is found among studies investigating the processes mediating the SRE. Some studies rely exclusively on descriptive tasks to explore self-reference (e.g., Ferguson et al., 1983; Kendzierski, 1980; Rogers et al., 1977), some use autobiographical tasks (e.g., Bellezza, 1984; Bruss, 1986; S. B. Klein & Loftus, 1988), and others draw conclusions from studies that include both tasks (e.g., Bower & Gilligan, 1979; S. B. Klein & Kihlstrom, 1986).

We believe that this treatment of descriptive and autobiographical tasks as equivalent methods for studying the SRE is responsible for much of the difficulty both in demonstrating consistent effects of self-reference and in specifying the processes mediating the effect. The interchangeable use of these tasks reflects an assumption that they function similarly, but the only empirical basis for their assumed equivalence is a study by Bower and Gilligan (1979, Experiment 2). For each of a list of trait adjectives, Bower and Gilligan's subjects either decided whether the trait was self-descriptive or searched memory for a personal experience in which they had manifested the trait. The descriptive and autobiographical tasks produced comparable recall enhancement. It is important to note, however, that many factors are known to facilitate recall; thus, it is difficult to argue for process equivalence solely on the basis of recall equivalence.

In this article, we present evidence that descriptive and autobiographical tasks involve different cognitive processes, and we argue that much of the variability in the SRE literature results from a failure to appreciate this difference. We propose that when SRE investigations are segregated on the basis of these two distinct self-reference effects, a clearer picture of the role of the self in memory emerges.

In a series of studies, we first replicate Bower and Gilligan's (1979) finding that descriptive and autobiographical tasks yield comparable recall. We then present evidence that although autobiographical retrieval is required for the SRE obtained with the autobiographical task, it is not involved in performance of the descriptive task. Finally, we offer evidence against the possibility that descriptive and autobiographical tasks rely on a common process other than autobiographical retrieval to achieve their comparable mnemonic effectiveness.

Experiment 1

This experiment addressed two issues. First, we attempted to replicate the finding that descriptive and autobiographical self-reference tasks produce comparable recall enhancement relative to a semantic task. Second, we tested the hypothesis that autobiographical retrieval is necessary for the recall enhancement found with the autobiographical task (e.g., Bower & Gilligan, 1979; Groninger & Groninger, 1984). It is possible, rather, that the involvement of self-reference, and not autobiographical retrieval per se, is responsible for the high levels of recall found with this task. To test this possibility, Experiment 1 included a third self-reference task (the modified autobiographical task) that did not involve autobiographical retrieval. This task, modeled after the well-documented finding that people can accurately predict the likelihood that they will be able to remember a specified bit of information in memory without having to first retrieve it (e.g., Hart, 1965, 1967a, 1967b; Schacter, 1983), required subjects to estimate how difficult it would be to recall an incident in which they had manifested the presented trait. We stressed that the object of the task was a judgment about the content of autobiographical memory, and that subjects should not attempt actual retrieval of specific incidents in performing the task.

If retrieval of an autobiographical episode is essential for the recall enhancement found with autobiographical tasks, then the modified autobiographical task should be less beneficial to recall than the autobiographical task. If, however, the recall enhancement associated with autobiographical tasks is an example of the general principle that any task involving the self in information processing enhances recall, then the autobiographical and modified autobiographical tasks should be equally facilitating.

Method

Subjects. The subjects were 80 Trinity University undergraduates, who participated for course credit. Subjects were tested individually in sessions lasting approximately 25 min.

Materials and design. Stimuli were 30 trait adjectives randomly selected from a larger list used by Rogers et al. (1977). Each adjective was typed on a separate index card.

There were four between-subjects encoding conditions: descriptive, autobiographical, modified autobiographical, and semantic. We randomly assigned 20 subjects to each condition, and each subject received a different random ordering of the adjectives.

Procedure. We established an incidental learning situation by telling subjects that the study was an investigation of characteristics of common words.

Subjects received a deck of the 30 index cards placed face down and selected cards in succession from the top of the deck. Subjects performed one of four encoding tasks.

1. For the descriptive task, subjects decided whether the word was self-descriptive and indicated their decision by circling *yes* or *no* on a response sheet.
2. For the autobiographical task, subjects first recalled a specific personal experience in which they manifested the trait and then rated the difficulty of retrieving the memory.
3. In the modified autobiographical task, subjects rated how difficult it would be to recall an experience in which they manifested the trait, but did not attempt to retrieve the memory.
4. In the semantic task, subjects thought of a definition for each trait adjective and then rated the difficulty of generating the definition.

All ratings were done on a 5-point scale ranging from 1 (*very easy*) to 5 (*very hard*). Subjects in each condition received practice trials with their respective tasks before beginning the experiment. An experimenter paced subjects through the deck at a rate of 7 s per card.

After completing the encoding tasks, subjects worked for 3 min on a distractor task that required them to determine the correct letter to complete each of a series of letter sequences.

Finally, the experimenter administered an unexpected test of free recall. Subjects had 5 min to write, in any order, as many of the trait words as they could remember.

Results

Table 1 presents the mean number of words recalled for each encoding task. A one-way analysis of variance (ANOVA) revealed an effect of encoding task, $F(3, 76) = 9.12$, $p < .001$. Newman–Keuls analyses confirmed the pattern of recall obtained in previous SRE studies: Both the descriptive and autobiographical tasks produced greater recall than the semantic task ($p < .05$). Also, replicating Bower and Gilligan (1979), the two tasks did not differ in the recall enhancement they produced. Recall for the modified autobiographical task, however, was less than that for the autobiographical and descriptive tasks ($p < .05$) and not different from that for the semantic task.

Table 1
Mean Number of Words Recalled as a Function of Encoding Task: Experiment 1

Encoding task			
Semantic	Autobiographical	Descriptive	Modified autobiographical
8.80_a	11.75_b	12.80_b	9.75_a

Note. Cells sharing a common subscript do not differ significantly by Newman–Keuls testing ($p < .05$).

Discussion

It is clear, then, that the descriptive and autobiographical tasks do indeed produce SREs of comparable magnitude. It is also clear that the SRE associated with the autobiographical task is not produced without autobiographical retrieval. This finding suggests that not every task involving self-reference will produce an SRE. Rather, the descriptive and autobiographical tasks have a particular potency in this regard.

What accounts for the similar recall found with the descriptive and autobiographical tasks? One popular hypothesis is that the two tasks are mediated by a common process, autobiographical retrieval. In Bower and Gilligan's (1979) experiment, subjects performing the descriptive task reported that they often retrieved a specific autobiographical incident to support or refute a trait as self-descriptive. This report, coupled with Bower and Gilligan's finding that descriptive and autobiographical tasks produced comparable recall, suggested to some investigators (e.g., Bellezza, 1984) that autobiographical retrieval was the process that led to SREs obtained with both tasks (similar views can be found in Groninger & Groninger, 1984; Matlin, 1989; Warren et al., 1983). According to this view, the autobiographical information retrieved to corroborate descriptive task judgments produces SREs equal to those produced by autobiographical information made available through performance of an autobiographical task.

Of course, the comparable recall performance associated with the descriptive and autobiographical tasks does not necessarily reflect the involvement of identical processes. An alternate hypothesis is that although the autobiographical task involves autobiographical retrieval (as Experiment 1 confirms), the descriptive task involves a different, although equally powerful, process that makes available different but mnemonically comparable information.

Experiment 2

In Experiment 2, we used a task facilitation paradigm to test whether the descriptive task requires autobiographical retrieval. This experiment's design was based on the following logic. Suppose a subject performs two tasks in succession. If, in the process of performing the first task, information relevant to the second task is made available, then the time needed to perform the second task should be less than if such information were not available (e.g., Collins & Quillian, 1970; Macht & O'Brien, 1980; Macht & Spear, 1977). Thus, one way to assess the degree to which two tasks require, and thereby make available, similar information is to examine the degree to which performing the first task leads to a decreased latency in performing the second. The reduction in time required to perform the second task should be greatest when the information overlap between first and second tasks is relatively large and should be least when the overlap is relatively small. In the extreme case, when the first and second tasks are the same, the reduction in time required to perform the second should be maximal.

In this experiment, we compared response latencies for descriptive and autobiographical tasks performed following initial performance of a descriptive, autobiographical, or semantic task on the same stimulus word. Given the reasoning we have outlined, we made several predictions. If autobiographical information is required for performance of a descriptive task, then the following should occur: (a) the reduction in time required to perform a descriptive task should be greater when an autobiographical task is performed first than when a semantic task is performed first, because the autobiographical information required for the descriptive task is made available by an autobiographical task but not by a semantic task, and (b) the reduction in time required to perform an autobiographical task should be greater when a descriptive task is performed first than when a semantic task is performed first, because the autobiographical information required for the autobiographical task is provided through performance of a descriptive task.

In contrast, if descriptive and autobiographical tasks make available different types of information, then (a) the time required to perform a descriptive task should be unaffected by whether the initial task is autobiographical or semantic, and (b) the time required to perform an autobiographical task should be unaffected by whether the initial task is descriptive or semantic.

Method

Subjects. The 24 subjects were recruited from the Trinity University subject pool and given course credit for their participation. Subjects were tested individually in sessions lasting about 20 min.

Materials and design. The stimuli were 72 trait adjectives selected from Kirby and Gardner's (1972) norms. The words used were close to the norm means for familiarity, imagery, and behavioral specificity.

Subjects received 72 trials, 1 trial per trait adjective. A trial consisted of performing two tasks in succession, an initial task and a target task, for each trait adjective. The initial and target tasks were both selected from three task types (descriptive, autobiographical, and semantic). The three initial tasks were factorially combined with the three target tasks to create nine initial task–target task pairings. For the descriptive task, subjects decided whether the trait adjective was self-descriptive; for the autobiographical task, subjects recalled an incident in which they manifested the trait; and for the semantic task, subjects thought of a definition for the trait adjective. The assignment of stimulus words to initial task–target task pairs (eight words per pair) and the order in which task pairs were presented were randomized across subjects.

Procedure. Subjects were told that we were investigating their ability to perform different tasks on stimulus material. They were told that it was important to perform the tasks accurately and to indicate immediately when they had completed each task. We then explained the experimental tasks and gave instructions for performing them.

A microcomputer presented stimulus words and recorded response latencies for initial and target tasks. Each trial began with the appearance on the screen of one of the following cues for the initial task: *DESCRIBES* (the descriptive task), *REMEMBER* (the autobiographical task), or *DEFINE* (the semantic task). A stimulus word appeared beneath the task cue 1 s later, and a timer started. The cue and the stimulus word remained on the screen until the subject indicated by pressing a key that he or she had completed the initial task. With this response the timer stopped, the subject's response latency was recorded, and the initial task cue was removed. After a 1-s pause, the cue for the target task (*DESCRIBES, REMEMBER,* or *DEFINE*) appeared on the screen above the stimulus word, reactivating the timer. This cue and the stimulus word remained on the screen until the subject signaled by pressing a key that he or she had completed the target task. The timer then stopped, the target task response latency was recorded, and a row of asterisks appeared across the screen to mark the end of the trial. There was then a 2-s delay before the beginning of the next trial.

Subjects were informed before beginning the experiment that the ordering of the tasks would be random. Thus, they could not have anticipated the initial or the target task on any trial.[1] Subjects also were told that on trials in which the target task was the same as the initial task, they need not generate a new response for the target task; however, they were instructed to call the original response to mind again before signaling completion of the target task. Subjects received nine practice trials, one of each possible initial task–target task pair.

After the experimental trials, the 72 stimulus words were again presented, 1 at a time. Each subject saw the words in the order in which he or she had seen them during the experimental trials. When a trait word appeared on the screen, the subject indicated whether it was self-descriptive by pressing a *YES* or a *NO* response key. This information allowed us to assess the effects of self-descriptiveness on response latency.

Results

We performed separate ANOVAs on the response latency data for initial and target tasks. Separate analyses were required because response latencies for initial tasks were a function only of initial task performed, whereas those for target tasks were a function of both initial task and target task performed.

Analyses of the mean and median response latencies yielded identical patterns of significant results. To facilitate comparisons with latency data reported in previous SRE studies (e.g., Ferguson et al., 1983; Rogers et al., 1977), we present the results of analyses on the means. Mean response latencies for the initial and the target tasks are summarized in Figures 1 and 2, respectively.

Initial task latencies. A one-way repeated measures ANOVA on the initial task mean response latencies yielded an effect of task, $F(2, 46) = 25.56$, $p < .0001$; Newman–Keuls analysis ($p < .05$) revealed that the autobiographical task ($M = 5{,}486$ ms) took longer than the semantic task ($M = 4{,}235$ ms), which in turn took longer than the descriptive task ($M = 2{,}875$ ms).

Target task latencies. A 3 × 3 (Target Task × Initial Task) repeated measures ANOVA on the target task mean response latencies revealed main effects for both target task, $F(2, 46) = 30.50$, $p < .0001$, and initial task, $F(2, 46) = 9.71$, $p < .001$. More important, there was a significant interaction of initial and target task, $F(4, 92) = 27.22$, $p < .0001$.

The differential effects of initial task on target task revealed in the interaction can be compared with those predicted by the two hypotheses presented. The logic underlying our hypotheses is that the greater the overlap between information provided by an initial task and the information required to perform a target task, the more facilitation (as indexed by decreased response latency) the initial task will have on the target task. Consistent

[1] Even though our hypothesis requires examination of only conditions in which initial tasks are followed by descriptive and autobiographical target tasks, we also included conditions in which the semantic task served as the target task. We hoped this would discourage subjects from developing expectancies for a particular target task by making it more difficult to guess which one they would perform.

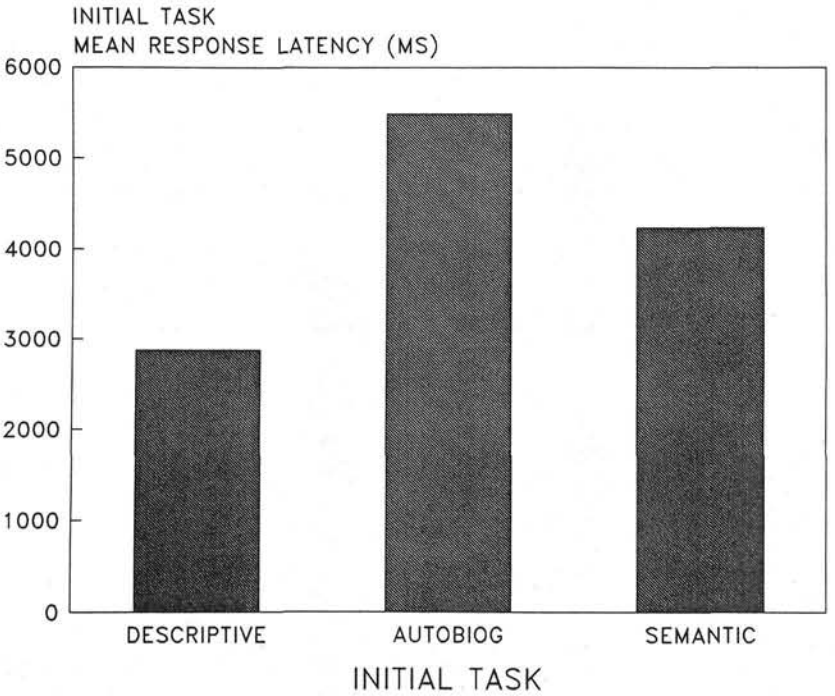

Figure 1. Initial task mean response latencies.

with this logic, Newman–Keuls analysis ($p < .05$) revealed that response latency for the autobiographical target task was fastest when the initial task was also autobiographical; response latency for the descriptive target task was fastest when the initial task was also descriptive; and response latency for the semantic target task was fastest when the initial task was also semantic. (The mean target task response latencies for conditions in which target task was the same as initial task ranged from 1,780 ms to 2,433 ms. Latencies of this magnitude argue against the possibility that, on recognizing that the target task was a repetition of the initial task, subjects simply pushed the response key without performing the task a second time; e.g., Collins & Quillian, 1970.)

If a descriptive task requires autobiographical information about the word being judged, subjects should be faster to perform a descriptive task that has been preceded by an autobiographical task than one preceded by a semantic task, because autobiographical information is made available during performance of the autobiographical task. Examination of Figure 2, however, reveals that the response latency for the descriptive task was the same regardless of whether it was preceded by an autobiographical or by a semantic task (*M*s = 2,237 and 2,303 ms, respectively).[2] In addition, if descriptive tasks make autobiographical information available, an autobiographical task that has been preceded by a descriptive task should take less time to perform than one preceded by a semantic task. Contrary to this prediction, the time taken to perform an autobiographical task was not differentially influenced by previous performance of a descriptive or a semantic task (*M*s = 5,356 and 5,092 ms, respectively). All observations were confirmed by Newman–Keuls analysis ($p < .05$).

Effects of self-descriptiveness. An additional perspective on the question of whether descriptive tasks involve autobiographical retrieval can be obtained by looking at the effect of trait self-descriptiveness on response latency for the three tasks used in Experiment 2. Kuiper and Rogers (1979) proposed that it is easier to produce behavioral exemplars for traits that one possesses than for those one does not. If this is true, it suggests that tasks requiring autobiographical retrieval should be performed faster for self-descriptive traits than for non-self-descriptive traits. Trait self-descriptiveness would not, however, be expected to have this effect on response latencies for tasks not requiring autobiographical retrieval. Thus, an autobiographical task should be performed faster for self-descriptive trait words than for non-self-descriptive trait words, but the time required for a semantic task should be unrelated to trait self-descriptiveness.

Given these predictions, response latencies for the descriptive task might be informative about the involvement of autobiographical retrieval in this task. If the descriptive task requires autobiographical retrieval, then, like the autobiographical task, it should be performed faster for self-descriptive traits than for non-self-descriptive traits. If autobiographical retrieval is not required, then, as expected for the semantic task, trait self-de-

[2] It is worth noting that these response latency data also argue against the possibility that subjects performing autobiographical tasks spontaneously decide whether a trait is self-descriptive. If this were the case, one would expect that a descriptive task that had been preceded by an autobiographical task should take less time to perform than one that had been preceded by a semantic task. However, the time taken to perform a descriptive task was not differentially facilitated by the previous performance of an autobiographical or a semantic task.

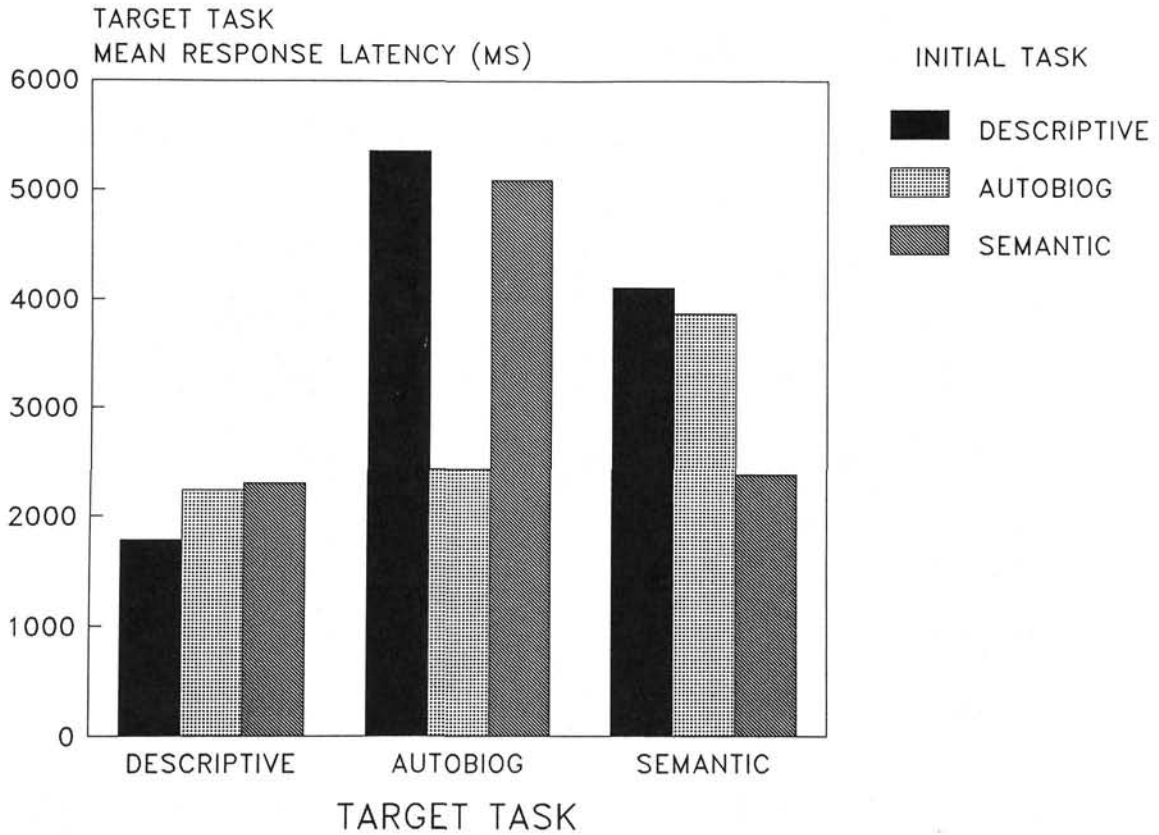

Figure 2. Target task mean response latencies as a function of the target task and initial task performed.

scriptiveness should be unrelated to descriptive task response latency.

Figure 3 presents mean response latencies for initial tasks, broken down by trait self-descriptiveness. A two-way repeated measures ANOVA with the variables task (descriptive, autobiographical, and semantic) and trait self-descriptiveness (descriptive and nondescriptive) revealed main effects for task, $F(2, 46) = 22.77$, $p < .0001$, and self-descriptiveness, $F(1, 23) = 5.89$, $p < .05$. Both effects were qualified by a significant interaction, $F(2, 46) = 6.47$, $p < .01$, with Newman–Keuls ($p < .05$) analysis revealing that, as predicted, response latency was shorter for descriptive than for nondescriptive traits for the autobiographical task (Ms = 5,123 and 6,248 ms, respectively), but was unrelated to trait self-descriptiveness for the semantic task (Ms = 4,269 and 4,226 ms, respectively). Contrary to what would be expected if the descriptive task entailed autobiographical retrieval, response latency for this task did not differ as a function of trait descriptiveness (Ms = 2,887 and 2,867 ms, respectively).

Discussion

One explanation for the comparable recall results obtained in self-reference experiments using autobiographical and descriptive tasks contends that the two tasks share a common process—autobiographical retrieval. In Experiment 2, we demonstrated that this is not the case by showing that the descriptive task does not require autobiographical retrieval.

The proposal that the descriptive task requires autobiographical retrieval implies that subjects should perform a descriptive task faster when it is preceded by an autobiographical task than when it is preceded by a semantic task, because performing the autobiographical task would provide the autobiographical information needed for the descriptive task. Also, by similar reasoning, autobiographical information made available during performance of a descriptive task should enable subjects to perform a subsequent autobiographical task more quickly than if the initial task were semantic.

The data contradict both predictions: An autobiographical task was no more facilitating than a semantic task to performance of a subsequent descriptive task, and a descriptive task was no more facilitating than a semantic task to subsequent performance of an autobiographical task.[3]

[3] Our test of the autobiographical retrieval hypothesis assumes that if descriptive tasks entail autobiographical retrieval, then subjects will retrieve the same memory for both the descriptive and the autobiographical tasks. An alternate interpretation of this hypothesis assumes that this will be true only for self-descriptive traits. For non-self-descriptive traits, subjects would base descriptive task judgments on retrieval of a disconfirming incident (e.g., a selfish subject, deciding whether *unselfish* is self-descriptive, readily thinks of an incident in which she or he was selfish and decides *unselfish* is not descriptive; e.g., Chew, 1983). The same subject performing the autobiographical task retrieves an incident in which he or she was unselfish. Thus, two different incidents

Additional evidence inconsistent with the argument that the descriptive task requires autobiographical retrieval was found when response latencies for the initial tasks were compared. These data indicate that an explicitly requested autobiographical retrieval (the autobiographical task) takes nearly twice as long to perform as a descriptive task. Finally, in the analysis of response latency as a function of trait self-descriptiveness, self-descriptiveness was shown to affect response latency for the autobiographical task, but not for the descriptive task. This finding again argues against autobiographical retrieval as the basis of SREs obtained with descriptive tasks.

In sum, these response latency data strongly support the view that autobiographical retrieval is not required for the descriptive task, and therefore cannot be the process underlying the recall results found with both descriptive and autobiographical tasks.

Experiment 3

Although the response latency data from Experiment 2 suggest that autobiographical retrieval is not responsible for the recall performance of the descriptive task in Experiment 1, a possible problem in Experiment 1's design needs consideration. Following Bower and Gilligan (1979), an experimenter paced subjects in Experiment 1 through the deck at the rate of 7 s per word. The data from Experiment 2, however, show that less than 3 s are required for a descriptiveness decision. Thus, it is possible that in the 4 s remaining after performing descriptive tasks, subjects in Experiment 1 retrieved incidents in which they behaved in the manner denoted by the trait. Recall in the descriptive condition, therefore, may have been mediated by autobiographical information retrieved after completion of the encoding task.

To control for this possibility, we attempted to replicate Experiment 1 under self-paced, rather than experimenter-paced, conditions. Subjects in Experiment 3 proceeded to the next trial as soon as they completed each encoding task.

Method

Subjects. We recruited 54 undergraduates from the Trinity University subject pool. Subjects were tested individually in sessions lasting about 20 min.

Materials and design. The stimulus words and design were the same as in Experiment 1, except that the modified autobiographical task was eliminated. We randomly assigned 18 subjects to each of the three task conditions (descriptive, autobiographical, and semantic).

Procedure. The procedure was identical to that of Experiment 1, except that trials were self-paced rather than experimenter-paced. On each trial the subject took a card from the top of the deck, judged the word, and recorded his or her judgment. He or she then placed the card face down and proceeded immediately to the next trial.

Results and Discussion

An ANOVA yielded a main effect of encoding task, $F(2, 51) = 8.82$, $p < .001$. Newman–Keuls analysis revealed that subjects recalled more words in both the descriptive ($M = 12.39$) and the autobiographical ($M = 11.94$) conditions than in the semantic ($M = 8.72$) condition ($p < .05$); the difference between the descriptive and autobiographical conditions was not significant. Thus, the pattern of recall obtained in Experiment 1 was replicated when stimulus presentation was self-paced.

Experiment 4

Together, the results of Experiments 2 and 3 argue strongly against the hypothesis that autobiographical retrieval is responsible for SREs obtained with the descriptive task. It remains possible, however, that some other process common to the descriptive and autobiographical tasks, but not captured by the response latency data of Experiment 2, mediates their comparable recall enhancement. We tested this possibility in Experiment 4.

There is evidence that if the processes underlying two encoding tasks make available distinct types of information, then performing both tasks during a single presentation of a word will produce better recall than will performing either task individually (e.g., Hunt & Einstein, 1981; K. Klein & Saltz, 1976). There is also evidence that if two tasks provide redundant information, then performing them both on a word will be no more beneficial to recall than performing either one alone (K. Klein & Saltz, 1976, Experiment 2; S. B. Klein & Loftus, 1987).

These findings suggest a means for testing whether the descriptive and autobiographical tasks rely on a common process to facilitate recall. In Experiment 4, we compared the recall of subjects performing either a descriptive or an autobiographical task with that of subjects performing both tasks during a single presentation of a word. If different processes mediate the recall found with the descriptive and autobiographical tasks, then performing both tasks (the descriptive–autobiographical condition) on each word should produce better recall than performing either task alone. If, however, the same process underlies both tasks, then combining the two should be no more beneficial to recall than performing either individual task.

The recall results obtained with the combined tasks could, however, be due to an increase in processing time over that required to perform a single task rather than being due to the combined effects of two different types of processing. To control for this possibility, we included two conditions in which subjects performed the same encoding task twice on each word (either two descriptive or two autobiographical tasks). If processing time is responsible for the recall produced in the descriptive–

are retrieved for this trait. This interpretation of the autobiographical retrieval hypothesis predicts that, relative to a semantic task, descriptive tasks should facilitate performance of autobiographical tasks (and vice versa) for self-descriptive traits, but not for non-self-descriptive traits.

To address this possibility, we examined target task response latency for only those traits rated as self-descriptive to determine whether facilitating effects could be found. The time required to perform an autobiographical task was not differentially influenced by the previous performance of a descriptive ($M = 4{,}826$ ms) or a semantic ($M = 4{,}608$ ms) task, $t(23) = .66$, $p > .50$. Similarly, the time required to perform a descriptive task preceded by an autobiographical task ($M = 2{,}259$ ms) was nearly the same as that for a descriptive task preceded by a semantic task ($M = 2{,}291$ ms), $t(23) = .21$, $p > .50$. These analyses provide no support for the argument that descriptive tasks entail autobiographical retrieval.

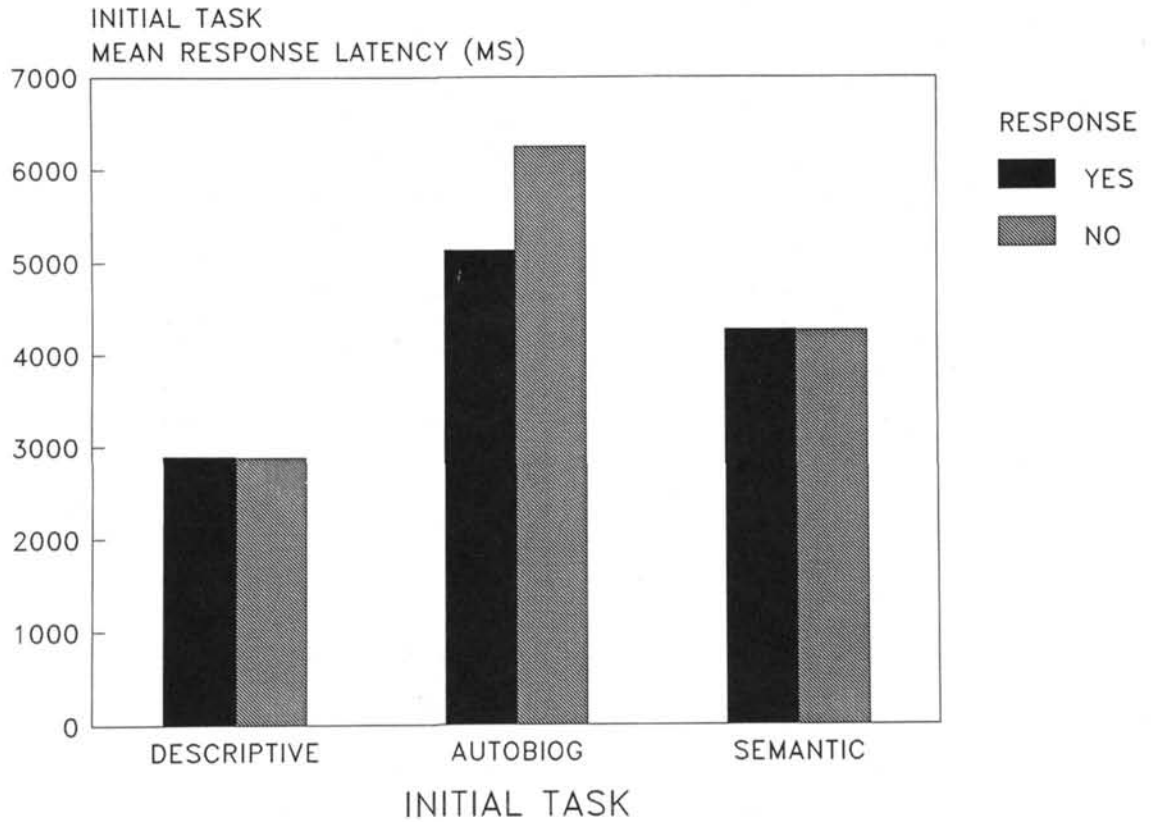

Figure 3. Initial task mean response latency as a function of trait self-descriptiveness (*yes* = adjectives rated as self-descriptive; *no* = adjectives rated as non-self-descriptive).

autobiographical condition, then the repeated-task conditions (descriptive–descriptive and autobiographical–autobiographical) should produce recall similar to that found with the descriptive–autobiographical condition.

Method

Subjects. We recruited 80 undergraduates from the Trinity University subject pool. Subjects were tested individually in sessions lasting approximately 25 min.

Materials and design. The stimulus words were the same as those used in Experiment 1. The order in which the stimulus words were presented was randomized across subjects.

There were five between-subjects conditions: 2 single-task conditions (descriptive and autobiographical), two repeated-task conditions (descriptive–descriptive and autobiographical–autobiographical), and one combined-task condition (descriptive–autobiographical). We randomly assigned 16 subjects to each condition. Half the subjects in the descriptive–autobiographical condition performed the autobiographical task first and half performed the descriptive task first.

Procedure. The procedure was identical to that of Experiment 1, except that subjects in the repeated-task and combined-task conditions performed two encoding tasks during a single presentation of the stimulus word. Subjects in these conditions were paced through the deck by the experimenter at the rate of 14 s per word. During this interval they were signaled after 7 s to perform the second task in the pair. In the descriptive–descriptive and autobiographical–autobiographical conditions, subjects were asked to "think about the word again" and judge its self-descriptiveness or perform an autobiographical retrieval a second time.

Results

Preliminary analysis indicated that the order of task performance in the descriptive–autobiographical conditions had no effect on recall (Ms = 14.50 and 14.25 for autobiographical–descriptive and descriptive–autobiographical, respectively, $t < 1$). Consequently, we ignored performance order in the following analyses.

The mean number of words recalled for each condition are shown in Table 2. An ANOVA on these means revealed an effect of encoding condition, $F(4, 75) = 5.16$, $p < .005$. Newman–Keuls analysis revealed that more words were recalled in the descriptive–autobiographical condition than in any of the other four conditions ($p < .05$). The single-task and repeated-task conditions did not differ significantly.

Discussion

The combined descriptive and autobiographical encoding condition produced higher recall than did conditions designed to encourage only one type of encoding. In addition, recall in this condition (M = 14.38) appears to exceed performance in the single self-reference task conditions of Experiments 1 and 3

Table 2
Mean Number of Words Recalled as a Function of Encoding Task: Experiment 4

Encoding task				
Auto	Desc	Auto–auto	Desc–desc	Desc–auto
11.88_a	11.25_a	10.94_a	10.62_a	14.38_b

Note. Auto = autobiographical; desc = descriptive. Cells sharing a common subscript do not differ significantly by Newman–Keuls testing ($p < .05$).

(average recall for the descriptive and autobiographical tasks was 12.60 and 11.85, respectively). These findings support the hypothesis that descriptive and autobiographical tasks rely on different processes to enhance recall. Apparently, the superior recall of those performing the descriptive–autobiographical task in comparison to both those in single and those in repeated self-reference tasks reflects the combined effects of two qualitatively different types of self-referent information.

We believe that the results found with the descriptive–autobiographical task cannot be attributed simply to more processing, because performing the same self-reference task twice (the descriptive–descriptive and autobiographical–autobiographical conditions) was not nearly as beneficial to recall. However, it is difficult to ascertain whether repeating a task during a single presentation of a stimulus requires the same amount of processing as performing two different tasks. Although a definitive answer to this question may not be possible, several lines of evidence argue against an exclusively quantitative interpretation of the combined effects of descriptive and autobiographical encoding.

First, a large body of SRE research suggests that the nature of the processing, rather than amount of time spent processing, determines retention (e.g., Keenan & Baillet, 1980; S. B. Klein & Kihlstrom, 1986; Kuiper & Rogers, 1979; Rogers et al., 1977). Second, performing two different encoding tasks has been shown to be no more beneficial than performing either one alone when the two tasks make available similar information (K. Klein & Saltz, 1976, Experiment 2; S. B. Klein & Loftus, 1987).

Finally, the response latency data from Experiment 2 offer evidence against a processing time explanation. These data indicate that the time required to perform the descriptive–autobiographical task is not longer than that required to perform the autobiographical–autobiographical task. When a descriptive task (M = 2,875 ms) is followed by an autobiographical task (M = 5,356 ms), 8,231 ms is required, whereas when an autobiographical task (M = 5,486 ms) is followed by a descriptive task (M = 2,237 ms), 7,723 ms is required. Neither of these estimates differs greatly from the 7,919 ms that is needed when an autobiographical task (M = 5,486 ms) is followed by an autobiographical task (M = 2,433 ms). Yet, despite the fact that approximately the same amount of time is spent processing in the descriptive–autobiographical condition as in the autobiographical–autobiographical condition, recall in the descriptive–autobiographical task is superior.

General Discussion

We began this article by noting that descriptive and autobiographical self-reference tasks frequently have been considered equivalent methods for studying self-referent encoding. This treatment is due partly to the assumption that the two tasks involve the same processes (e.g., Bellezza, 1984; Groninger & Groninger, 1984; Warren et al., 1983; however, see Greenwald & Pratkanis, 1984). The present series of studies provides converging evidence that this is not the case; rather, these two tasks rely on different processes to facilitate memory. Experiment 1 replicated Bower and Gilligan's (1979) finding that the descriptive and autobiographical tasks produce similar recall enhancement. Experiment 2 demonstrated with a task facilitation paradigm that this similarity could not be attributed to the operation of autobiographical retrieval in both tasks. Finally, Experiment 4 tested the possibility that some other process common to the two tasks, not captured by the task facilitation paradigm, might account for their comparable mnemonic effectiveness. No evidence of a common process was found.

We believe that much of the controversy surrounding self-reference is the result of a failure to distinguish between SREs produced by descriptive tasks and SREs produced by autobiographical tasks. In the next two sections we suggest how an appreciation of this difference resolves some of the problems that have been encountered both in specifying the processes mediating the SRE and in demonstrating consistent effects of the phenomenon.

Theories of the Self-Reference Effect

Most investigators have attempted to explain the effects of self-reference on recall in terms of a single process. This approach, however, has not been successful in accounting for the variety of findings obtained with the self-reference paradigm (for recent reviews, see Greenwald & Pratkanis, 1984; Higgins & Bargh, 1987; Kihlstrom et al., 1988). The inability to explicate the basis of self-referent encoding has hampered efforts by those hoping to gain insight from SRE research into the role of the self in memory. However, given that different processes are involved in the two tasks used to produce SREs, it is not surprising that single-process models have proved theoretically unsatisfactory.[4] We propose that some of the deficiencies of self-reference models can be eliminated when the models are evaluated against results obtained with just one task or the other.

Consider, for example, the elaborative processing model of self-referent recall enhancement. Elaborative processing is the formation of associations between a word and extralist material in memory (e.g., Bellezza, Cheesman, & Reddy, 1977; S. B. Klein & Kihlstrom, 1986). The process of drawing on extralist material in memory to embellish the encoded representation of a word benefits recall by creating additional routes for retrieval; in addition, it supports inferenced-based reconstruction should retrieval efforts fail (e.g., Anderson, 1983).

[4] In fact, recent research shows that this approach may be too limited even to account for results obtained with only one self-reference task. S. B. Klein and Loftus (1988), for example, demonstrated that autobiographical tasks involve both elaborative and organizational processing.

According to this model, tasks that result in the best retention are those that promote the greatest amount of trace elaboration during encoding (e.g., Anderson & Reder, 1979; Craik & Tulving, 1975). The recall superiority of self-referent encoding over structural and semantic encoding is thus interpreted as indicating that self-reference surpasses these tasks in creating an elaborate memory trace (e.g., Keenan & Baillet, 1980; Rogers et al., 1977).

Although this explanation of the SRE is favored by many investigators (e.g., Brown et al., 1986; Gannellen & Carver, 1985; Katz, 1987; Keenan & Baillet, 1980; Kuiper & Rogers, 1979; Markus & Smith, 1981), some problems with the model have been identified (e.g., Greenwald & Pratkanis, 1984). The main difficulty involves the time required to perform self-referent encoding tasks. Most versions of the elaborative processing model predict that self-reference tasks should take longer to perform than semantic tasks (e.g., Greenwald & Pratkanis, 1984; Lapsley & Quintana, 1985; Rogers, 1981, 1983). Until now, the only response latency data available were from experiments using descriptive tasks, and these data contradicted the model's prediction: Self-referent and semantic response latencies rarely differed (e.g., Kuiper & Rogers, 1979; Rogers et al., 1977).

The data we presented in Experiment 2 show that, in fact, autobiographical tasks take considerably longer to perform than semantic tasks. Thus, although less general than originally believed, the elaborative processing model may be a viable explanation for SREs obtained with autobiographical tasks. Evidence indicates that personal experiences retrieved during performance of these tasks become linked to stimulus words (Bellezza, 1984; Bruss, 1986); autobiographical information thus may serve as the basis for trace elaboration. Consistent with this view, S. B. Klein and Loftus (1988) tested the elaborative processing model using autobiographical self-reference tasks and found strong evidence for elaborative processing during self-referent encoding.

Other models of self-referent encoding, although not contradicted by experimental evidence, are insufficient in that the predictions they make address research involving only one task or the other. The self-as-prototype model (e.g., Greenwald & Pratkanis, 1984; Kihlstrom & Cantor, 1984; Kuiper, 1981; Rogers, 1981), for example, is one that focuses on the descriptive task. This model proposes that the self can be viewed as a cognitive prototype that becomes active when subjects judge information for its personal descriptiveness. Information that resembles or "fits" the prototype will be more easily integrated into the prototype and hence better remembered. Consequently, items judged as self-descriptive should be better recalled than items judged as non-self-descriptive. Two additional predictions of the model are the following: (a) The time required to make self-descriptiveness judgments should vary as a function of the self-descriptiveness of the items being judged; highly self-descriptive and highly non-self-descriptive items should be judged faster than moderately self-descriptive items (e.g., Kuiper, 1981), and (b) the commission of "false alarms" in a recognition memory test (identifying a previously unpresented stimulus item as one previously presented) will increase as the degree of self-descriptiveness of the unpresented items increases (e.g., Rogers, Rogers, & Kuiper, 1979).

Although considerable support for the self-as-prototype model is available (e.g., Derry & Kuiper, 1981; Kuiper, 1981; Nasby, 1985; Rogers et al., 1977; Rogers et al., 1979), Greenwald and Pratkanis (1984) have pointed out that it is not easily generalizable to research using autobiographical tasks. However, given the clear difference between the descriptive and autobiographical tasks, and between the SREs they produce, the limited applicability of this model to experiments using descriptive tasks should perhaps be viewed as entirely appropriate.

In sum, our results offer a new perspective from which to view the proposed accounts of the effects of self-reference on recall. In attempting to understand the processes mediating the SRE, the type of self-reference task used to produce the effect is an important consideration. Because the same process is not always involved in producing SREs, the failure of the proposed models to identify a specific cognitive process by which self-reference operates may now be considered a less serious problem. Furthermore, the inability of any of the current models to account for all the available data should be interpreted not as a lack of understanding, but as a reflection of the fact that there is more than one self-reference effect requiring explanation.

Toward Resolving Inconsistencies in Self-Reference Research

Although the Rogers et al. (1977) self-reference paradigm has yielded reliable results in a number of studies (e.g., Kendzierski, 1980; S. B. Klein & Kihlstrom, 1986; Kuiper & Rogers, 1979), attempts to extend the paradigm have been less successful. In this section we discuss two lines of research that have failed to show a consistent effect of self-reference: studies comparing self-reference with other-reference and studies examining self-referent recall for nouns. We then show how an appreciation of the difference between SREs produced by descriptive and autobiographical tasks helps clarify some of the apparent inconsistency.

Following their original exploration of the SRE, Rogers et al. (1977) concluded that self-reference was especially effective in facilitating recall. They neglected, however, to control for the possibility that *any* person-referent encoding task might have an equally facilitating effect. Initial tests of this hypothesis (e.g., Bower & Gilligan, 1979; Kuiper & Rogers, 1979) found that judgments made with reference to well-known others (e.g., mother, father, best friend) produced recall levels comparable to those attained with self-reference. This raised the possibility that self-reference was simply one instance of a general principle that memory for words is enhanced by using a familiar person as a referent during encoding (e.g., Bower & Gilligan, 1979). Subsequent tests of this proposal have been inconclusive, however, with some studies providing support (e.g., Miall, 1986) and others failing to do so (e.g., Lord, 1980, Experiment 1).

A far more consistent picture of the literature on self- versus other-reference can be seen when the studies are grouped according to the task used in the investigation. In every study in which encoding in reference to a well-known other has involved autobiographical retrieval (e.g., "Recall an incident in which your mother exemplified this trait"), other-reference has produced recall comparable to that obtained with self-reference (Bower & Gilligan, 1979, Experiment 2; Brown et al., 1986,

Experiment 5; Chew, 1983, Experiment 3; Miall, 1986). In contrast, with a few exceptions (Friedman & Pullyblank, 1982, Experiment 1; Kuiper & Rogers, 1979; Maki & McCaul, 1985) the use of descriptive tasks for making judgments about well-known others (e.g., "Does this trait describe your mother?") has produced recall inferior to that found with self-reference (Bradley & Mathews, 1983; Chew, 1983, Experiment 2; Ferguson et al., 1983; Friedman & Pullyblank, 1982, Experiments 2 and 3; Karylowski & Buczek, 1984, Experiment 1; Kuiper & Derry, 1982, Experiment 2; Lord, 1980, Experiment 1).

A lack of consistency also has plagued studies testing whether self-reference enhances memory for nouns. Early demonstrations of the SRE (e.g., Kuiper & Rogers, 1979; Rogers et al., 1977) used trait adjectives as stimulus material. Attempts to obtain the effect using nouns, however, have produced discrepant results. Some studies have replicated the SRE with nouns (e.g., S. B. Klein & Kihlstrom, 1986; Warren et al., 1983), but others have not (e.g., Aboud, 1980; Maki & McCaul, 1985).

Grouping these studies according to the task used also introduces greater consistency into the literature. The SREs with nouns typically are obtained with self-reference tasks promoting autobiographical retrieval (Banaji & Greenwald, 1984; Brown et al., 1986, Experiments 5 and 6; S. B. Klein & Kihlstrom, 1986; S. B. Klein & Loftus, 1988; Warren et al., 1983; but see Bellezza, 1984, 1986). Studies failing to obtain SREs, however, have used self-reference tasks not requiring autobiographical retrieval, such as descriptive tasks (Aboud, 1980; S. B. Klein & Kihlstrom, 1986) and tasks in which subjects create a mental image of themselves interacting with the noun (Karylowski & Buczek, 1984, Experiment 2; Lord, 1980, 1987; Maki & McCaul, 1985, Experiment 2; Pressley, Levin, Kuiper, Bryant, & Michener, 1982, Experiment 2).

Thus, although there are some exceptions, a more coherent picture of SRE research emerges when the findings are separated into those resulting from autobiographical tasks and those resulting from descriptive tasks. Although this classification scheme does not serve as an explanation for the differential effects of these tasks on other-referent and noun recall, the order it introduces into a research literature that has appeared unpredictable should provide direction to the theoretical understanding of these phenomena.

Representation of the Self in Memory

The self-reference effect has been influential in stimulating interest in the mental representation of self. However, although there has been no shortage of speculation about the structure of the self in memory (e.g., Bower & Gilligan, 1979; Kihlstrom & Cantor, 1984; Kihlstrom et al., 1988; Markus & Sentis, 1982), little has been done to test these models empirically.

The present series of studies has important implications for one popular model. A number of investigators (e.g., Cantor & Kihlstrom, 1987; Kihlstrom & Cantor, 1984; Markus, 1977, 1980; Markus & Smith, 1981; Rogers et al., 1977) have argued that the self is represented in memory by specific autobiographical episodes (e.g., "I told the policeman I caused the accident," "I refused to look at the exposed test answers") as well as by traits derived from categorizing and evaluating these episodes across situations and occasions (e.g., "I am honest"). Consistent with this model, our findings indicate that both specific autobiographical episodes and general traits can be accessed during self-referent encoding, and more important, that judgments of the self-descriptiveness of trait adjectives are made without reference to autobiographical episodes exemplifying the traits. This independence suggests that both types of information about the self are available in memory, and that each can be addressed separately (a fuller discussion of this idea can be found in S. B. Klein & Loftus; in press).

This model of the self has much in common with recent formulations of the mental representation of information about other people. Ebbesen and his colleagues (e.g., Allen & Ebbesen, 1981; Cohen & Ebbesen, 1979; Ebbesen, 1980), for example, have proposed that these representations include both trait and behavioral information, and, moreover, that each type of information is stored and addressed independently. The similarity between these models implies that the same cognitive principles that have been useful in explaining the mental representation of others may also be applicable to the self.

Conclusions

Although the distinction between SREs based on descriptive tasks and SREs based on autobiographical tasks is an important step toward understanding the role of the self in memory, a number of questions remain. Most important is that although we show that descriptive and autobiographical tasks rely on different processes to enhance recall, our experiments do not address the nature of these differences. Several promising models are available, however. S. B. Klein and Loftus's (1988) elaborative–organizational processing model and Bellezza's (1984) cognitive cueing model provide reasonable accounts of SREs obtained with autobiographical tasks, and the self-as-prototype model (e.g., Kuiper, 1981; Rogers, 1981) seems well suited to explain findings obtained with descriptive tasks. A goal of future research should be to examine these as well as other models in light of the distinction between autobiographical and descriptive SREs. Explication of the processes underlying these SREs should not only facilitate understanding of the differential effects of autobiographical and descriptive tasks in extensions of the self-reference paradigm, but also help clarify the roles of trait and autobiographical information in the mental representation of self.

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