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Use of Exemplars and Abstractions in Trait Judgments: A Model of Trait Knowledge About the Self and Others

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According to pure exemplar models, trait judgments about the self and others are accomplished by retrieving from memory trait-exemplifying behaviors and computing the similarity between the trait and the exemplars retrieved. By contrast, pure abstraction models argue that trait judgments are made by directly accessing abstract, summary knowledge of the person's traits. In a series of 4 studies, the role of behavioral exemplars and abstract trait knowledge in trait judgments about others and about the self was examined. The findings show that both types of information are used to make trait judgments but that the relative importance of each type is determined by the amount of trait-exemplifying behavioral experience one has with the person being judged.

How is the knowledge of a person's traits represented in memory? Over the last decade, two different theoretical perspectives on this issue have been advanced, each receiving considerable support. In this article, we review these models of trait knowledge and consider their implications for the processes underlying judgments that are based on that knowledge (i.e., judgments of whether a given trait is descriptive of a particular person). We then present a series of studies, on the basis of which we propose a new model of the representation of trait knowledge, which can account for knowledge about both the self and others.

Two Models of Trait Knowledge

Current models of trait knowledge all share the starting assumption that knowledge of a person's traits is based in large part on memory of that person's past behavior (e.g., Allport, 1937; Buss & Craik, 1980, 1983, 1984; Funder, 1991; Funder & Dobroth, 1987; Hampson, John, & Goldberg, 1986). They disagree, however, about the way in which specific memories of a person's behavior function in the representation of knowledge about his or her traits.

Pure exemplar models state that the separate representations of a person's different behaviors (i.e., exemplars) constitute knowledge of that person's traits (e.g., Bellezza, 1984; Kahneman & Miller, 1986; Locksley & Lenauer, 1981; Matlin, 1989; Rywick & Schaye, 1974; Smith & Zarate, 1992; Warren, Chattin, Thompson, & Tomsky, 1983). According to this view, one determines whether a person possesses a particular trait by retrieving memories of that person's trait-relevant behaviors and comparing the trait to the behaviors retrieved. For example, to decide whether Mark is friendly, one would retrieve from memory behaviors relevant to friendliness and determine whether there is a match between those behaviors and the trait *friendly*.

Pure abstraction models, by contrast, propose that specific behaviors are the source from which trait information is abstracted but that knowledge of a person's traits consists of summary representations of traits that are formed as a result of that abstraction (e.g., Buss & Craik, 1983, 1984; Cantor & Mischel, 1979; Hampson, 1982; Hampson et al., 1986; John, Hampson, & Goldberg, 1991; Klein, Loftus, & Burton, 1989; Klein, Loftus, & Plog, in press). Thus one decides whether a person possesses a particular trait by accessing summary knowledge of his or her traits in memory and determining whether the trait in question is among the traits represented in summary form.

The Mixed Exemplar–Abstraction Model of Trait Knowledge

In this article, we present a third view of trait knowledge, which assumes (a) that both exemplar and abstract trait information can be represented in memory,[1] (b) that both types of information play a role in trait judgments, and (c) that the rela-

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[1] Other social judgment models have shared this assumption as well (e.g., Allen & Ebbesen, 1981; Carlston, 1980; Lingle & Ostrom, 1979), but these models differ from the one we propose in other respects. We consider these differences in the Discussion section of this article.

tive importance of each type of trait information varies with the amount of trait-exemplifying behavioral knowledge one has about the person being judged.

Our model is based on recent theories of category learning that include roles for both specific exemplars and summary representations (e.g., Barsalou, 1987, 1988; Busemeyer, Dewey, & Medin, 1984; Elio & Anderson, 1981; Estes, 1989; Homa, Dunbar, & Nohre, 1991; Homa, Sterling, & Trepel, 1981; Malt, 1989; Ross, Perkins, & Tenpenny, 1990). According to these mixed models, the type of information recruited for a category judgment is determined primarily by the amount of experience one has with the category. During the early stages of learning about a category, judgments must be based on exemplar information in memory, because too few exemplars have been experienced to support the abstraction process (e.g., Homa, Dunbar, & Nohre, 1991; Homa, Sterling, & Trepel, 1981; Ross et al., 1990). As the number of category-relevant experiences increases, an abstract representation of the category evolves (e.g., Homa et al., 1981; Kolodner, 1984; Ross et al., 1990; Schank, 1982), which then serves as the basis for future judgments (e.g., Homa, Dunbar, & Nohre 1991; Homa, Sterling, & Trepel, 1981). Thus, the importance of specific exemplars for category judgments decreases as category experience increases.

Applied to trait knowledge, these ideas imply that the formation of abstract knowledge of a person's traits will require sufficient experience with that person's trait-exemplifying behavior to support the abstraction process. If too few behaviors exemplifying a particular trait have been observed, then knowledge of that person will include information about that trait only at the level of behavioral exemplars in memory. Judging whether the person possesses that trait will require computation on the basis of those specific behaviors. However, with exposure to more trait-exemplifying behaviors, a summary representation of the trait will be formed. Judgments then can be made on the basis of this abstract trait knowledge, and retrieving specific behaviors no longer will be necessary. In fact, given the existence of a summary trait representation, specific behavioral exemplars should play little, if any, role in trait judgments (see also Buss & Craik, 1984; Chaiken & Baldwin, 1981; Epstein, 1979).

Thus, the mixed model proposes that the more knowledge one has about a person's behavior, the more likely one is to have formed summary representations of his or her traits and the less likely one is to base trait judgments about that person on specific behaviors. An advantage of this model is that it may be able to reconcile the apparent conflict between studies showing that people retrieve summary representations to make trait judgments (e.g., Cantor, 1980) and studies showing that people retrieve specific episodes (e.g., Rywick & Schaye, 1974).

Testing Models of Trait Knowledge: The Task Facilitation Paradigm

The main distinction among the models just described is the role they assign to behavioral exemplars in the trait judgment process: Pure exemplar models assume that exemplars are the bases of judgments, pure abstraction models assume that exemplars have no role in judgments, and the mixed model assumes that exemplars will be used in some cases but not in others. Distinguishing among these models, therefore, requires a method that can determine if and when trait judgments require retrieval of behavioral exemplars.

In our research, we have rephrased the question Do trait judgments require retrieval of behavioral exemplars? to Do making a trait judgment and recalling a particular behavior require the same kind of information from memory—behavioral exemplars? We recently reported an experimental procedure, the task facilitation paradigm, that can answer this question (Klein & Loftus, 1990b; Klein et al., 1989, Experiment 2). Our paradigm is based on the following logic: Suppose one performs two tasks in succession. If, in the process of performing the first task, information needed for performing the second task becomes available, then the time one would need to perform the second task should be less than if that information had not become available (e.g., Collins & Quillian, 1970; Macht & O'Brien, 1980). Thus, examining the degree to which performing the first task leads to a reduction in the time needed to perform the second would be a way of assessing the extent to which the two tasks require (and thereby make available) similar information. This facilitation should be greatest when the information overlap between the first and second tasks is largest and should be least when the overlap is smallest.

This article describes four experiments that used the task facilitation paradigm to test trait judgment models. Our studies involved trait judgments about people with whom subjects were well acquainted—either their mothers or themselves. The experiments used three tasks: judging whether a trait adjective described that person (*describes* task), recalling a specific instance in which that person manifested the trait adjective (*remember* task), and generating a definition of the trait adjective (*definition* task). A trial consisted of performing two of these tasks in succession, an initial task and a target task, on the same trait word.

After completing the experimental trials, subjects were shown each trait word a second time and were asked to rate it on a scale ranging from *extremely unlike mother (or self)* (1) *irrelevant* (5) to *extremely like mother (or self)* (9). These ratings were used to sort subjects' response latencies into three levels of trait descriptiveness (high, medium, and low). Trait descriptiveness is hypothesized to be an increasing function of the rater's experience with a target person's trait-exemplifying behaviors (e.g., Bruch, Kaflowitz, & Berger, 1988; Buss & Craik, 1984; Lord, Gilbert, & Stanley, 1982; Markus, 1977). For example, if Mary is observed behaving confidently on many occasions, an observer would be likely to rate *confident* as highly descriptive of Mary. We used trait-descriptiveness ratings, therefore, as a measure of a subject's experience with the target person's trait-exemplifying behavior.

Predictions

Pure Exemplar Model

If trait judgments require access to trait-exemplifying behavioral memories, then two things should occur. First, the reduction in time required to perform a remember task should be greater when a describes task is performed first than when a definition task is performed first. This is because the behavioral information required for a remember task will have been made available during the describes task but not during the definition task. Second, the reduction in time required to perform a describes task should be greater when a remember task is performed first than when a definition task is performed first, because the behavioral information required for the describes task will have been made available during the remember task but not during the definition task. These effects should be independent of the descriptiveness of the trait word.

Pure Abstraction Model

By contrast, if trait judgments do not require information about behavioral exemplars, then (a) performing a describes task first should not lead to a greater reduction in the time required to perform a remember task than would result from first performing a definition task and (b) performing a remember task first should not lead to a greater reduction in the time required to perform a describes task than would result from first performing a definition task. These effects should be independent of the descriptiveness of the trait.

Mixed Exemplar–Abstraction Model

Finally, if a mixed exemplar–abstraction model applies, then the degree to which trait judgments will require behavioral exemplars will depend on the descriptiveness of the trait being judged. For highly descriptive traits, the pattern of facilitation should conform to the pattern predicted by the pure abstraction model. This is because traits considered highly descriptive of a person are those that he or she has manifested most frequently and hence are those for which subjects have observed a relatively large number of trait-exemplifying behaviors (e.g., Bruch et al., 1988; Lord et al., 1982; Markus, 1977). Subjects thus should have formed summary representations of these traits, which they can access to make trait-descriptiveness judgments. Because behavioral exemplars are unlikely to be necessary, describes tasks should be no more facilitating than definition tasks to subsequent performance of remember tasks, and remember tasks should be no more facilitating than definition tasks to subsequent performance of describes tasks.

However, judgments for traits rated medium and low in descriptiveness should show a pattern similar to that predicted by the pure exemplar model. This is because subjects will have observed comparatively few behaviors exemplifying these traits (e.g., Bruch et al., 1988; Klein et al., 1989; Lord et al., 1982; Markus, 1977) and therefore will be less likely to have formed abstract representations. Thus, subjects will be more likely to require behavioral exemplars to make descriptiveness judgments, which in turn should make describes tasks more facilitating than definition tasks to subsequent remember tasks and should make remember tasks more facilitating than definition tasks to subsequent describes tasks.

In the next sections, we present four studies that compare these models. Experiment 1 explored judgments about others; Experiments 2–4 examined judgments about the self.

Experiment 1: The Mental Representation of Trait Knowledge of Others

In this experiment, we used the task facilitation paradigm to examine the type of information recruited from memory when making trait judgments about a well-known other, one's mother.

Method

Subjects

Subjects were 23 undergraduates from Trinity University who participated for course credit. They were tested individually in sessions lasting approximately 45 min.

Materials and Design

The stimuli were 90 trait adjectives selected from Kirby and Gardner's (1972) norms. The adjectives used were close to the norm means on the dimensions of familiarity, imagery, and behavioral specificity.

Subjects received 90 trials, 1 trial per trait adjective. A trial consisted of performing an initial task and a target task in succession for each adjective. For the describes task, a subject decided whether the trait adjective described his or her mother; for the remember task, the subject recalled a specific incident in which his or her mother's behavior exemplified the presented trait; and for the definition task, the subject thought of a definition for the trait adjective. The initial tasks (describes, remember, and definition) were factorially combined with two target tasks (describes and remember) to create six initial task–target task pairings. The assignment of stimulus words to initial task–target task pairs (15 words per pair) and the order in which task pairs were presented were randomized across subjects.

Procedure

We told subjects that we were investigating their ability to perform different tasks on stimulus words. We told them that it was important that they perform the tasks accurately and that they should 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 of a cue word for the initial task on a computer screen. The cue was either DESCRIBES (for the describes task), REMEMBER (for the remember task), or DEFINE (for the definition task). After 1 s, a trait adjective appeared below the cue, and a timer was 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. The timer then stopped, response latency was recorded, and the initial-task cue was removed, leaving the stimulus trait on the screen. After a 1 s pause, the cue word for the target task (DESCRIBES or REMEMBER) appeared on the screen, and the timer was reactivated. This cue and the trait adjective 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 a 2 s delay before the beginning of the next trial.

In our instructions, we informed subjects that the ordering of the tasks would be random. We also told them 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; rather, they could simply call the original response to mind a second time. Subjects received six practice trials, one for each possible initial task–target task pair.

After subjects had completed the experimental trials, we again presented them with each trait adjective and asked them to rate it on a 9-point scale ranging from *extremely unlike my mother* (1) to *irrelevant* (5) to *extremely like my mother* (9). These ratings allowed us to sort subjects' response latencies for the 90 stimulus traits into three levels of descriptiveness. For each initial task–target task pair, the 5 traits receiving the highest ratings were placed in the high-descriptive category, the 5 traits receiving the next highest ratings were placed in the medium-descriptive category, and the remaining 5 traits were placed in the low-descriptive category. In the case of ties in which the trait could be assigned to adjacent categories, random assignment was used.

Results

In the following analyses, the mean and median response latencies yielded the same patterns of results. To facilitate comparisons with latency data reported in previous studies of trait judgments about self and others (e.g., Ganellen & Carver, 1985; Keenan & Baillet, 1980; Klein & Kihlstrom, 1986; Kuiper & Rogers, 1979), we present the results of the analyses on the means.

Preliminary Analysis

We first examined the initial-task response latencies. A 3 × 3 (Trait Descriptiveness × Initial Task) repeated measures analysis of variance (ANOVA) on these latencies (shown in Table 1) revealed main effects for both trait descriptiveness, $F(2, 44) = 21.33$, $p < .001$, and initial task, $F(2, 44) = 61.62$, $p < .001$. Both effects were qualified by a significant interaction, $F(4, 88) = 19.76$, $p < .001$.

These initial-task latencies can help resolve several questions that are important in interpreting the results obtained with the task facilitation paradigm. The first question is whether trait descriptiveness is an appropriate index of experience with trait-exemplifying behaviors. As we mentioned in the introduction, there is in the literature both theoretical work (e.g., Buss & Craik, 1984) and empirical work (e.g., Bruch et al., 1988; Lord et al., 1982; Markus, 1977) consistent with this assumption. The initial-task latencies for our remember task lend further support to this assumption. According to the findings of Park (1989), as the number of behaviors exemplifying the same trait increases in memory, the time required to retrieve any one of those behaviors decreases (see also Myers, O'Brien, Balota, & Toyofuku, 1984). These findings provide a means to evaluate the predicted relation between trait descriptiveness and trait-relevant behavioral experience. Specifically, if trait descriptiveness reflects amount of experience with trait-exemplifying behavior, then subjects should be quickest to retrieve behaviors exemplifying high-descriptive traits and slowest to retrieve behaviors exemplifying low-descriptive traits.

An analysis of the remember initial-task response latencies as a function of trait descriptiveness supported this prediction: A one-way repeated measures ANOVA yielded a significant effect of descriptiveness, $F(2, 44) = 21.97$, $p < .001$. As shown in Table 1, this effect was highly linear, $F(1, 44) = 42.79$, $p < .001$, with Newman-Keuls tests ($p < .05$) revealing that all three means differed significantly.

Table 1
Mean Initial-Task Response Latency as a Function of Trait Descriptiveness: Experiment 1

Initial task	Trait mother descriptiveness: High	Medium	Low
Describes mother	2,553	3,387	2,875
Remember mother	7,893	10,499	15,173
Define	5,204	5,406	5,178

Note. Response latencies are in milliseconds.

The second question concerns our choice of definition generation as the appropriate control task for our study. We assumed in choosing it that performing this task would not involve knowledge about mother, but although this assumption seemed intuitively plausible, we had no direct evidence to support it. Fortunately, the initial-task latencies as a function of trait descriptiveness strongly suggest that we were correct. Consistent with findings reported elsewhere that trait descriptiveness has pronounced effects on latency to perform tasks involving knowledge about others (e.g., Kuiper, 1981; Park, 1986), latencies for both the remember and describes tasks show reliable effects of mother descriptiveness, $F(2, 44) = 21.97$ and 5.78, $p < .01$, for the remember and describes tasks, respectively.[2,3] The defini-

[2] We did not request that subjects report their responses to any of the tasks during the experimental trials; rather, we instructed them to generate responses to the task questions in their heads (a discussion of our reasons for adopting this procedure is detailed in Klein & Loftus, in press). Unfortunately, allowing subjects to keep their responses private left us unable to monitor whether they had performed the tasks as instructed. An examination of initial task latencies as a function of trait descriptiveness, however, provides evidence that subjects did, in fact, perform the tasks. Specifically, the latency functions we obtained are comparable to those obtained by researchers who have collected subjects' responses at the time of task performance. For example, the inverted-U function seen with our describes mother (Table 1) and describes self (Table 4) tasks replicates the results of several studies in which subjects reported their describes self and describes other judgments at the time they made them (e.g., Kuiper, 1981; Lord, Gilbert, & Stanley, 1982). The monotonically increasing functions found for the remember mother (Table 1) and remember self (Table 4) tasks parallel the findings of Klein and Loftus (1991), who asked subjects to describe in detail specific episodes in which either they (Experiment 1) or their mother (Experiment 2) exemplified each of a list of trait adjectives.

[3] It is reasonable to wonder whether the inverted-U functions for the describes mother (Experiment 1) and describes self (Experiment 2) tasks were affected by the social desirability of the traits in question. For example, subjects performing these tasks might simply have adopted a rule of quickly responding yes to desirable traits and no to undesirable traits (e.g., Edwards, 1957; Wiggins, 1973). Such a strategy would produce an inverted-U latency function, but these latencies would not reflect the time required to access trait-relevant knowledge about mother or the self in memory. To examine this possibility, we reanalyzed the initial-task describes mother (Table 1) and describes self (Table 4) data, this time segregating latencies on the basis of social

tion task, however, shows no effect, $F(2, 44) = 1.77$, $p > .10$. Thus, we conclude that definition generation does not require access to knowledge about one's mother and therefore serves as an adequate control.[4]

Target-Task Latencies

The data of primary interest, the joint effects of initial-task and trait descriptiveness on the describes and remember target-task latencies, are shown in Table 2. We conducted separate analyses on the mean response latencies for the two target tasks to test the specific predictions outlined in the introduction.[5,6]

The latencies for the describes target task, segregated by trait descriptiveness, are shown in the top panel of Table 2. The effects of initial task on these latencies can be seen to vary with mother descriptiveness. A two-way repeated measures ANOVA (Trait Descriptiveness × Initial Task: remember and definition) on these latencies yielded main effects for both trait descriptiveness, $F(2, 44) = 4.17$, $p < .05$, and initial task, $F(1, 22) = 12.46$, $p < .01$. Both effects were qualified by a significant interaction, $F(2, 44) = 4.54$, $p < .05$. Simple effects tests revealed that for high-descriptive traits, an initial remember task was no more facilitating than an initial definition task ($F < 1.0$). By contrast, for medium- and low-descriptive traits, subjects were faster to perform the describes task when the initial task was remember than when it was definition, $F(1, 44) = 18.42$ and 6.78, $p < .05$, for medium- and low-descriptive traits, respectively.

The remember target-task latencies, seen in the bottom panel of Table 2, present a similar picture. A two-way repeated measures ANOVA (Trait Descriptiveness × Initial Task: describes and definition) yielded effects of trait descriptiveness, $F(2, 44) = 20.46$, $p < .001$, and initial task, $F(1, 22) = 8.63$, $p < .01$. Once again, there was a significant interaction, $F(2, 44) = 3.35$, $p < .05$, with simple effects tests revealing no differential facilitation for high-descriptive traits ($F < 1.0$). For medium- and low-descriptive traits, however, there was considerable facilitation: Subjects were faster to remember their mother's trait-exemplifying behaviors when they first performed a describes task than when they first performed a definition task, $F(1, 44) = 11.08$ and 7.01, $p < .05$, for medium- and low-descriptive traits, respectively.

Discussion

In this experiment, we found no evidence of facilitation for judgments about traits rated high in descriptiveness, which suggests that these judgments were accomplished without accessing trait-exemplifying behavioral memories. However, for judgments about traits rated medium or low in descriptiveness, we found considerable facilitation, from which we infer that judgments were computed from a consideration of trait-exemplifying behavioral memories. Neither the pure exemplar nor the pure abstraction model can account for these findings. The data are consistent, however, with the mixed exemplar–abstraction model.

Note, however, that judgments for traits rated low in descriptiveness showed less facilitation than did judgments for traits

desirability (Kirby & Gardner, 1972). We placed the five adjectives with the highest normative social desirability ratings in the high-desirability category, the five adjectives with the next-highest ratings in the medium-desirability category, and the remaining five adjectives in the low-desirability category. One-way repeated measures ANOVAs on these data revealed no significant effect of social desirability on describes task latency, $F(2, 44) = 2.21$, $p > .10$, and $F(2, 56) = .42$, $p > .50$, for the describes mother and the describes self tasks, respectively. Thus, in contrast to the inverted-U functions found when describes initial-task latencies are segregated on the basis of subjects' trait-descriptiveness ratings, we found that when latencies are segregated by normative social desirability, the functions are flat. Clearly, then, the latency functions shown in Tables 1 and 4 reflect something other than a tendency to respond to traits simply on the basis of social desirability.

[4] A potential confound in the design for both Experiments 1 and 2 merits consideration: Because latencies to perform the describes and remember tasks were collected before trait-descriptiveness ratings, it is possible that these latencies, rather than access to self-knowledge, may have determined the subsequent ratings. For example, subjects may simply have based their trait ratings on their memory for the speed with which they previously had made a describes or a remember judgment. We have some data, however, that argue against this possibility. We obtained the same latency functions for describes and remember tasks when we had subjects make trait-descriptiveness ratings 2 weeks before we collected their latencies. Specifically, the describes task latencies formed an inverted U, $F(2, 22) = 10.74$, $p < .01$ (*M*s = 1,981, 2,981, and 2,450 ms for the high-, medium-, and low-descriptive traits, respectively), and the remember task latencies yielded a monotonically increasing function, $F(2, 14) = 3.87$, $p < .05$ (*M*s = 6,237, 7,298, and 8,266 ms for high-, medium-, and low-descriptive traits, respectively).

[5] Although we did not make any predictions comparing describes and remember target-task latencies as a function of initial task and trait descriptiveness, an omnibus ANOVA revealed a significant three-way interaction ($p < .001$). However, because the interaction of treatment comparisons and subjects differed across comparisons (as often is the case in within-subjects designs), the overall interaction mean square error term from this analysis does not provide an accurate estimate of error variance present in the comparisons of interest. As Keppel and others have argued (e.g., Keppel, 1982; Keppel & Zedeck, 1989; Rosenthal & Rosnow, 1985), it is permissible under these circumstances to perform specific a priori comparisons directly without reference to the omnibus F test. Following their recommendations, we conducted specific comparisons using error terms that were based only on the data contributing to the comparisons of interest. These same considerations guided our analyses of the data from Experiment 2.

[6] The finding that conscious retrieval of behaviors (the remember task) requires, on average, 11,188 ms, whereas a trait judgment (the describes task) requires, on average, only 2,939 ms (see Table 1) may appear to preclude any possibility that behavioral exemplars mediate trait judgments. Note, however, that the logic of the task facilitation paradigm does not require that behavioral exemplars be consciously retrieved to exert an influence on subsequent task performance. On the contrary, we share with many exemplar theorists the view that the effects of individual exemplars often will be outside of conscious awareness (e.g., Hintzman, 1986; Kahneman & Miller, 1986; Smith, 1990a). We argue only that if in the process of performing an initial task, behavioral memories are activated, these memories will be more easily accessible for subsequent retrieval or for descriptiveness judgments than if they had not already been activated.

Table 2
Mean Target-Task Response Latency as a Function of Initial Task and Trait Descriptiveness: Experiment 1

Initial task	Trait descriptiveness High	Medium	Low
Describes mother target task			
Define	2,137	3,016	2,425
Remember mother	2,126	2,194	1,927
Difference	11	822	498
Remember mother target task			
Define	8,219	11,324	15,086
Describes mother	8,351	7,882	12,349
Difference	−132	3,442	2,737

Note. Response latencies are in milliseconds.

rated medium. This is surprising if low-descriptive traits were those for which subjects observed the fewest behaviors, because judgments about these traits would be more likely than judgments about medium-descriptive traits to depend on retrieval of behaviors, and they therefore would show more evidence of facilitation.

A possible reason for this unexpected finding is that subjects may have used an alternate strategy in making judgments about low-descriptive traits. Although these traits are less likely than medium-descriptive traits to be represented abstractly, they are more likely than medium traits to be opposites of traits that are represented abstractly (i.e. high-descriptive traits). Therefore, it is possible that the representation of an opposite could be used as the basis for a judgment about a low-descriptive trait (e.g., Klein & Loftus, in press; Park, 1986). For example, in judging whether the trait *stupid* describes his or her mother, a subject might readily access an abstract representation of his or her mother as intelligent and decide on this basis that *stupid* does not describe her. Thus, subjects may have two sources on which to base judgments of low-descriptive traits: memories of relevant behaviors and summary representations of trait opposites. This mixing of response options would dilute the observed facilitation, because only some judgments of low-descriptive traits would use behavioral evidence. By contrast, because medium-descriptive traits are less likely to have opposites explicitly represented (e.g., Kihlstrom et al., 1988; Klein & Loftus, in press; Park, 1986), judgments about them should more consistently require behavioral retrieval. Consequently, they should show greater facilitation than low-descriptive traits.

Some support for this interpretation can be seen in the describes initial-task latencies in Table 1. If judgments about low-descriptive traits are less likely than judgments about medium-descriptive traits to require behavioral exemplars, then judgment latencies for low-descriptive traits should be shorter than those for medium-descriptive traits. This is because responses should be faster when they are based on summary representations than when they must be computed from behavioral exemplars (e.g., Park, 1986). However, although judgments about low-descriptive traits should be faster than those about medium-descriptive traits, they should not be as fast as judgments about high-descriptive traits, because only some judgments of low-descriptive traits will be inferred from representations of their opposites. Analysis of latencies for the describes initial task supported these predictions: Latencies for low-descriptive traits were 513 ms shorter than latencies for medium-descriptive traits, $t(22) = 2.92$, $p < .01$, one-tailed, but 322 ms longer than latencies for high-descriptive traits, $t(22) = 1.84$, $p < .05$, one-tailed.

Experiment 2: Mental Representation of Trait Knowledge of Self

In a recent study, Klein et al. (1989, Experiment 2) used the task facilitation paradigm to compare pure exemplar and pure abstraction models of trait knowledge about the self. They found no evidence that behavioral exemplars are involved in judging traits for self-descriptiveness and concluded, therefore, that a pure abstraction model best captured the mental representation of trait knowledge about the self. Although the Klein et al. (1989) findings clearly argue against a pure exemplar model, they cannot speak to a mixed model because they did not distinguish among judgments for traits varying in level of self-descriptiveness. Behavioral exemplars may, in fact, have mediated some trait judgments in the Klein et al. (1989) study. However, because the results combined all traits without regard to level of self-descriptiveness, the effect of behavioral exemplars would not have been obvious.

Our next study addressed this limitation and tested whether a mixed model could apply to trait knowledge about the self. As in the Klein et al. (1989) study, we used the task facilitation paradigm, but this time we obtained self-descriptiveness ratings as well. Thus, we repeated the procedure described in Experiment 1, using the self rather than one's mother as referent.

We predicted that if a pure abstraction model best describes trait knowledge about the self, then, regardless of trait self-descriptiveness, (a) the time required to perform a describes task would be unaffected by whether the initial task was remember or definition and (b) the time required to perform a remember task would be unaffected by whether the initial task was describes or definition.

If, however, a mixed model applies to trait knowledge about the self, then we would find in this study the same pattern of response latencies that we found in Experiment 1. For medium- or low-descriptive traits, a remember task would be more facilitating than a definition task to the subsequent performance of a describes task, and a describes task would be more facilitating than a definition task to the subsequent performance of a remember task. For high-descriptive traits, however, this would not be the case. Remember and definition initial tasks would be equally facilitating to describes target tasks, and describes and definition tasks would be equally facilitating to remember target tasks.

Method

Subjects

Twenty-nine undergraduates from Trinity University participated for course credit. They were tested individually in sessions lasting approximately 45 min.

Materials, Design, and Procedure

The stimulus words were the same as in Experiment 1. The design and procedure also were identical to that of Experiment 1, with the following modifications. The referent for the describes and remember tasks was changed from mother to self. Thus, describes task instructions became "decide whether the presented trait adjective describes you," and remember task instructions became "recall a specific incident in which your behavior exemplified the presented trait." The definition task was unchanged. Also, the scale for the descriptiveness ratings was revised to reflect the change in referent: The scale now ranged from *extremely unlike me* (1) to *irrelevant* (5) to *extremely like me* (9).

Results

We first present the results of analyses performed on the target-task latencies ignoring trait self-descriptiveness, to determine whether we replicated the pattern of latencies obtained by Klein et al. (1989). We then present analyses that include trait descriptiveness as a factor.

Replicating Klein et al. (1989)

A 3 $\times$ 2 (Initial Task $\times$ Target Task) repeated measures ANOVA on the target-task mean response latencies (see Table 3) yielded main effects for both target task, $F(1, 28) = 147.60$, $p < .001$, and initial task, $F(2, 56) = 87.93$, $p < .001$. More important, there was a significant interaction of initial and target task, $F(2, 56) = 107.02$, $p < .001$. Consistent with the premise underlying the task facilitation paradigm—that facilitation is an increasing function of the overlap in information required for two successive tasks—Newman-Keuls analysis ($p < .05$) revealed that latencies to perform a target task were shortest when the initial task and target task were the same (i.e., describes–describes and remember–remember).[7] Furthermore, replicating the findings of Klein et al. (1989), simple effects tests revealed that there was no difference in response latency for the remember target task as a function of whether the initial task was describes (M = 6,145 ms) or definition (M = 6,156 ms), nor was there any difference in response latency for the describes target task as a function of whether the initial task was remember (M = 2,217 ms) or definition (M = 2,253 ms; both Fs < 1.0).

Effects of Trait Self-Descriptiveness on Task Latency

Preliminary analysis. A 3 $\times$ 3 (Trait Descriptiveness $\times$ Initial Task) repeated measures ANOVA on the initial-task latencies (shown in Table 4) yielded main effects for trait descriptiveness, $F(2, 56) = 6.36$, $p < .01$, and for initial task, $F(2, 56) = 77.40$, $p < .001$. However, as in Experiment 1, the initial-task response latencies for the three experimental tasks yielded quite different latency functions when latencies were segregated by level of trait descriptiveness, $F(4, 112) = 7.05$, $p < .001$. The remember task once again showed a monotonically increasing function, $F(2, 56) = 8.13$, $p < .01$, with latencies shortest for retrieval of behaviors exemplifying high-descriptive traits and longest for retrieval of behaviors exemplifying low-descriptive traits. A test of linear trend was significant, $F(1, 56) = 15.97$, $p < .001$. By contrast, the describes task latencies formed an inverted-U pattern, $F(2, 56) = 11.18$, $p < .01$, with longer latencies for medium-descriptive traits than for high- or low-descriptive traits (latencies for the high- and low-descriptive traits did not differ). Finally, the definition task gave a flat function, $F(2, 56) = 1.08$, $p > .50$, indicating that the time required to generate definitions was independent of trait self-descriptiveness. All observations were confirmed by Newman-Keuls tests ($p < .05$).

Table 3
Mean Target-Task Response Latency as a Function of Initial Task: Experiment 2

	Initial task		
Target task	Describes	Remember	Define
Describes	1,666	2,217	2,253
Remember	6,145	2,356	6,156

Note. Response latencies are in milliseconds.

Target-task latencies. To evaluate a mixed model of trait self-knowledge, we examined the joint effects of initial task and trait self-descriptiveness on the describes and remember target-task latencies. The top panel of Table 5 shows that regardless of whether the traits fell in the high-, medium-, or low-descriptiveness categories, performance of a remember initial task was no more facilitating than performance of a definition initial task to the subsequent performance of a describes target task, $F(2, 56) = .16$, $p > .50$. Similarly, the bottom panel of Table 5 shows that regardless of level of trait self-descriptiveness, performance of a describes initial task was no more facilitating than performance of a definition initial task to the subsequent performance of a remember target task, $F(2, 56) = .96$, $p > .50$. Thus, our data show no evidence of facilitation, regardless of trait descriptiveness.

In fact, the time required to perform the self target tasks appears completely uninfluenced by the type of task performed initially. In comparing Tables 4 and 5, it can be seen that the latency functions for both of the self-related target tasks are essentially identical to those of their corresponding initial tasks. First, latencies for the remember target task show a monotonically increasing function, $F(2, 56) = 7.88$, $p < .01$, with latencies shortest for retrieval of behaviors exemplifying high-descriptive traits (M = 5,550 ms), intermediate for behaviors exemplifying medium-descriptive traits (M = 6,167 ms), and longest for behaviors exemplifying low-descriptive traits (M =

[7] At first glance, this result might seem to indicate that on trials in which the initial and target tasks were the same, subjects simply pressed the response key without performing the task a second time. We do not think this is what happened, however, for two reasons. First, the mean target-task latencies for these conditions ranged from 1,666 ms to 2,356 ms—much longer than would be expected if subjects had responded immediately without performing a task (e.g., Collins & Quillian, 1970). Second, on trials in which both tasks were remember, the mean response time for the remember target task was 2,356 ms. This latency is comparable to behavioral exemplar reactivation times reported in the literature (e.g., Cornoldi, DeBeni, & PraBaldi, 1989) and suggests, therefore, that subjects did, in fact, bring behavioral exemplars to mind a second time.

Table 4
Mean Initial-Task Response Latency as a Function of Trait Descriptiveness: Experiment 2

	Trait self-descriptiveness		
Initial task	High	Medium	Low
Describes	2,559	3,145	2,721
Remember	5,892	6,341	7,063
Define	4,911	5,052	4,786

Note. Response latencies are in milliseconds.

6,735 ms). Second, describes target-task latencies show an inverted U, $F(2, 56) = 13.99$, $p < .001$, with subjects taking longer to judge traits rated medium in self-descriptiveness ($M = 2,487$ ms) than traits rated high ($M = 2,015$ ms) or low ($M = 2,207$ ms).

Discussion

In Experiment 1, we found evidence supporting a mixed model of trait knowledge about others. For judgments about one's mother, behavioral exemplars were required for medium- or low-descriptive traits, but they were not required for high-descriptive traits. In the present experiment, however, we found no evidence that behavioral exemplars are involved in any trait judgments about the self, regardless of the level of trait descriptiveness. Thus, in contrast to judgments about a well-known other, judgments about the self seem to conform to the predictions of the pure abstraction model proposed by Klein and his colleagues (Klein & Loftus, 1990b; Klein et al., 1989; Klein et al., in press).

Does this mean, as often has been argued, that the self has special properties that distinguish it from other social knowledge bases (e.g., Klein & Loftus, 1988; Kuiper & Rogers, 1979; Lord, 1980; Markus & Sentis, 1982)? Or could it be that the apparent exemption of the self from exemplar-based processing of trait judgments is because, compared with experience with others, experience with oneself is vast (e.g., Baxter & Goldberg, 1987; Chew, 1983; Sande, 1990; Sande, Goethals, & Radloff, 1988; Smith, 1990b)? Perhaps there are few, if any, traits for which one has not had sufficient experience to form abstract trait knowledge about himself or herself.

Experiment 3: Effect of Experience on Trait Judgments About the Self—Could a Mixed Model Apply to the Self?

In our next experiment, we attempted to answer this question by creating a condition in which subjects' experience with their own behavior might be sufficiently limited that they would not have had enough experience to form summary trait representations. We did this by limiting the time period to which subjects were instructed to refer when performing self-related tasks. Subjects in this study all were lst-year undergraduates who had been on campus for less than 2 months. Thus, for tasks performed in the low-experience context, subjects were instructed to refer only to the time period since they had entered college. We also had a high-experience context, for which subjects were instructed to refer to the entire time period before their arrival at college. We thus were able to compare response latencies for trait judgments made with reference to the low-experience context with those made with reference to the high-experience context.

If a mixed model of trait knowledge can apply to the self but was not supported in Experiment 2 because of the large amount of experience subjects had with their own behavior, then the low-experience context would allow this to become evident. In this context, behavioral exemplars would be important for trait judgments about the self. Judgments made within the high-experience context, however, would show the same results that were observed in Experiment 2: Behavioral exemplars would play little, if any, role in the trait judgment process.

Method

Subjects

Twenty-four undergraduates from the University of California at Santa Barbara in their first college quarter were recruited from the psychology subject pool. They were tested individually in sessions lasting approximately 40 min.

Materials and Design

A subset of 84 trait adjectives was randomly selected from the list used in Experiments 1 and 2. The experimental design was identical to that used in Experiment 2, with two modifications: First, our describes and remember tasks now included a second cue to specify the context to which subjects would refer when performing the task. The cue for the low-experience context was SCHOOL, which referred to subjects' experience since coming to college, and the cue for the high-experience context was HOME, which referred to subjects' experience before coming to college. The two self tasks (describes and remember) were factorially combined with the low- and high-context cues to create four task–context pairings: (a) REMEMBER SCHOOL cued subjects to retrieve behavioral exemplars that had occurred since they came to college, (b) REMEMBER HOME cued subjects to retrieve behavioral exemplars that had occurred before they came to college, (c) DESCRIBES SCHOOL cued subjects to judge whether the presented trait described how they saw themselves since entering college, and (d) DESCRIBES

Table 5
Mean Target-Task Response Latency as a Function of Initial Task and Trait Descriptiveness: Experiment 2

	Trait self-descriptiveness		
Initial task	High	Medium	Low
	Describes target task		
Define	2,004	2,512	2,235
Remember	2,026	2,461	2,179
Difference	−22	51	56
	Remember target task		
Define	5,378	6,129	6,961
Describes	5,721	6,204	6,509
Difference	−343	−75	452

Note. Response latencies are in milliseconds.

HOME cued subjects to judge whether the presented trait described the way they were before they came to college.

Because of the addition of experience as a factor, we made a second change in our design to reduce the number of experimental cells: In this experiment, the remember tasks were performed only as initial tasks, and describes tasks were performed only as target tasks.

These changes resulted in a 3 × 2 factorial design, with initial task (definition, remember home, and remember school) and target task (describes home and describes school) both varied within subjects. The assignment of trait words to the initial task–target task pairs and the order in which the task pairs were presented were randomized across subjects.

Procedure

The procedure was identical to that used in Experiment 2.

Predictions of the Mixed Model

A mixed model of self-judgments makes the following predictions about response latencies for the describes target task:

1. When the judgment context is home, there should be no difference in response latency as a function of initial task. This is because experience of the self at home should be sufficient to have supported formation of abstract trait knowledge and with this knowledge available, self-descriptiveness judgments should be made without reference to behavioral exemplars. With no need for exemplars, remember home and remember school initial tasks should be no more facilitating than a definition initial task to performance of a describes home target task.

2. When the judgment context is school, however, response latencies should be shorter when the initial task is remember school than when it is either remember home or definition. This is because subjects will have had fewer trait-exemplifying experiences since coming to college, so they should be less likely to have formed abstract trait knowledge pertaining to the school context. They therefore will be more likely to rely on memories of their behavior at school to decide if traits are self-descriptive. Of the three initial tasks, only the remember school task provides behavioral information about the self at school. Therefore, the remember school task should be more facilitating than either the remember home or the definition task. Furthermore, because behavioral exemplars retrieved for a remember home task should be irrelevant to a describes school judgment, the remember home task should be no more facilitating than the definition task.

Results

The results are found in Table 6. A two-way repeated measures ANOVA (Initial Task × Target Task) on the target-task mean response latencies showed no effect of either initial task, $F(2, 46) = .43$, $p > .50$, or target task, $F(1, 23) = 2.20$, $p > .10$. There was, however an Initial Task × Target Task interaction, $F(2, 46) = 7.01$, $p < .01$. As predicted by the mixed model, simple effects tests revealed that the describes school target task was performed faster when preceded by a remember school task than when preceded by either a remember home task, $F(1, 46) = 9.65$, $p < .01$, or a definition task, $F(1, 46) = 11.84$, $p < .01$. By contrast, the time required to perform the describes home task was not differentially affected by the previous performance of a remember home, remember school, or definition task (all Fs < 1.0).

Discussion

From Experiment 3, we conclude that when amount of behavioral experience is manipulated, trait-descriptiveness judgments about the self correspond to a mixed model. If amount of experience is high, subjects can judge traits for self-descriptiveness by accessing abstract trait knowledge. If amount of experience is low, subjects are more likely to refer to behavioral exemplars.

This conclusion, however, rests on the assumption that the critical difference between the self at home and the self at school was a temporal one. Clearly, having been at college for only a few months, our subjects had far less experience at school than they had at home. But there are other differences between these two social contexts, and it is by no means clear that the temporal difference alone accounts for our findings. A study by McGuire, McGuire, and Cheever (1986), for example, found that students had very different perceptions of the social environments at home and at school and that they had corresponding differences in their views of themselves in the two contexts. Thus, it is possible that our findings in Experiment 3 were due to qualitative, rather than quantitative, differences in subjects' experience at home and school.

Experiment 4: Unconfounding Type and Amount of Experience Associated With a Context

In our next experiment, we tested whether amount of experience was responsible for our results in Experiment 3. If it was the critical factor, then eliminating the difference in amount of experience between the two task contexts should eliminate the difference in facilitation we found between the describes home and describes school target tasks. If, however, other differences between the two contexts were responsible for our results, then removing the difference in amount of experience would not have an effect—we still would see a difference in facilitation.

In this study, we eliminated the difference in amount of experience between the home and school contexts by specifying the same time period for each. The study was identical to Experiment 3, except that we changed the instructions for the context cues so that *home* referred to subjects' experience at home dur-

Table 6
Mean Describes Target-Task Response Latency as a Function of Initial Task and Context (Home or School): Experiment 3

	Initial task		
Target task	Define	Remember home	Remember school
Describes home	2,649	2,727	2,881
Describes school	2,809	2,758	2,280

Note. Response latencies are in milliseconds.

ing their 4 years of high school and *school* referred to subjects' experience at school during the same 4-year period.

We predicted that defining both *home* and *school* as 4-year periods would increase the likelihood that subjects would have abstract trait knowledge about themselves in both the home and school contexts. Subjects therefore would be able to make self-descriptiveness judgments in either context without requiring behavioral exemplars. Thus, neither the describes home nor the describes school target task would show evidence of facilitation.

However, if the results of Experiment 3 were due to differences in the types of experience associated with *home* and *school* (e.g., McGuire et al., 1986), then equating the amount of experience in each context would have no effect. As in Experiment 3, we again would see facilitation for the describes school target task but not for the describes home target task.

Method

Subjects

Twenty-three first-quarter undergraduates from the University of California at Santa Barbara were recruited from the psychology subject pool. Subjects were tested individually in sessions lasting approximately 40 min.

Material and Design

The stimulus words and design were the same as in Experiment 3, except that subjects were told that the context cue HOME referred to their experience at home during their 4 years of high school and that the cue SCHOOL referred to their experience at school during the same 4-year period.

Procedure

The procedure was identical to that of Experiment 3.

Results and Discussion

A two-way repeated measures ANOVA on the target-task mean response latencies failed to reveal any significant effects (all Fs < 2.25, $ps > .10$). As shown in Table 7, neither target task showed evidence of exemplar-based facilitation. This suggests that in Experiment 3, the facilitation found for the describes school task was due to subjects' low levels of self-relevant experience rather than to some other difference between the home and school contexts.

These findings support our contention that the facilitation found in Experiment 3 reflected quantitative rather than qualitative differences in subjects' experiences of home and school. However, an interpretive ambiguity arises from the fact that what was meant by *school* was altered across studies: In Experiment 3 *school* referred to college, whereas in Experiment 4 it referred to high school. It is likely that there are greater qualitative differences between the home and college contexts than between home and high school. Thus, it is possible in Experiment 4 that by changing the school context from college to high school, we not only eliminated the difference in amount of experience between the home and school contexts but we also minimized qualitative differences between the two contexts that may have accounted for the difference in facilitation in Experiment 3. A study in which context was held constant while experience was varied would provide more definitive evidence for the role we have claimed for trait-relevant experience.

There are, however, some data that suggest that changing the school context to high school did not compromise our findings. As part of a larger study, Klein and Loftus (1991) used college as the school context and recorded the time college seniors needed to perform a describes school target task when it followed either a remember school or a define initial task. If the facilitation observed in Experiment 3 is attributable to the type of experience associated with college, then seniors should show facilitation similar to that obtained with 1st-year college students: A remember school task should be more facilitating than a define task to the subsequent performance of a describes school task. By contrast, if the facilitation was due to amount of experience, then seniors should perform similarly to subjects in Experiment 4: A remember school task should be no more facilitating than a define task to the subsequent performance of a describes school task. Our findings revealed that the time required to perform a describes school target task was not differentially facilitated by the initial performance of a remember school or a define task, $t(16) = 1.32$, $p > .10$.

Thus, it appears that amount, not type, of experience is the primary factor determining whether behavioral exemplars will facilitate trait self-descriptiveness judgments. When conditions are adjusted to control for the comparatively large amount of information one has about one's own behavior, trait self-knowledge can be seen to operate like knowledge about familiar others: according to the predictions of a mixed model.

General Discussion

Pure exemplar models assert that trait knowledge is represented exclusively at the level of behavioral exemplars and that trait-descriptiveness judgments require accessing relevant behavioral exemplars. Pure abstraction models, by contrast, assert that trait knowledge is represented in abstract, summary form and that summary representations, not behavioral exemplars, are the basis of trait judgments. The data reported in this article, however, indicate that both models are partially correct: At low levels of relevant experience, trait knowledge is represented only at the level of behavioral exemplars, but with sufficient experience, trait knowledge will be abstracted from exemplars and represented in summary form.

Table 7
Mean Describes Target-Task Response Latency as a Function of Initial Task and Context (Home or School): Experiment 4

	Initial task		
Target task	Define	Remember home	Remember school
Describes home	3,006	2,675	2,855
Describes school	2,680	2,953	2,757

Note. Response latencies are in milliseconds.

A General Model of Trait Knowledge About the Self and Others

We have argued that this pattern of findings is best accounted for by a mixed exemplar–abstraction model of trait knowledge. According to this model, one's mental representation of a person's traits should vary with the amount of trait-relevant experience one has had with that person. If the amount of experience is not sufficient to support abstraction, then trait knowledge will be represented only at the level of behavioral exemplars. But as the amount of experience becomes sufficiently large, trait knowledge is increasingly likely to be abstracted and represented in summary form.

For trait judgments, then, the type of knowledge retrieved will depend on the amount of trait-relevant experience in memory. Behavioral exemplars will be retrieved only when experience is low, and therefore an appropriate summary representation is not available. However, if summary trait knowledge is available, our research suggests that it will be retrieved in favor of behavioral exemplars (see also Anderson, 1989; Carlston, 1980). In fact, once a summary representation has been formed, the specific exemplars that led to that representation appear to play no part in the trait judgment process: Describes task latencies were unaffected by performance of an initial remember task when the amount of trait-relevant experience was large.

In addition to the data we have presented, there is other evidence in the literature to support our conclusion that with increasing experience, representations of trait knowledge become increasingly abstract. For example, in a recent study, Park (1986) examined the representations subjects formed of acquaintances, starting at the beginning of their aquaintance and continuing until 7 weeks later. Her findings revealed that as subjects gained experience with target persons, subjects' use of abstract trait terms to describe targets increased, whereas their use of specific behaviors decreased (see also Hampson, 1983; Harter, 1986; Rosenberg, 1986; Secord & Peevers, 1974).

Independence of Trait Abstractions and Behavioral Exemplars

In a more speculative vein, our research has led us to propose that abstract trait knowledge is stored and addressed separately from behavioral exemplars. Our data offer two arguments in favor of independence. First, under conditions in which our model predicts that trait knowledge will be represented in both summary and exemplar form (e.g., self-knowledge when experience is not restricted; high-descriptive traits for mother), we have found that accessing one of these representations does not affect subsequent performance on a task that accesses the other. Specifically, retrieving trait-exemplifying behaviors does not affect latency to judge traits for target descriptiveness, and judging traits for target descriptiveness does not affect latency to retrieve trait-exemplifying behaviors.

Second, the tasks that access the two types of representations show markedly different effects of the same variable: trait descriptiveness. Retrieval of behavioral exemplars produces a monotonically increasing response latency function when plotted against trait descriptiveness, whereas judging traits for descriptiveness produces an inverted U (see Tables 1 and 4).

Of course, neither of these findings alone constitutes definitive evidence for a functional distinction between abstract and exemplar-based trait knowledge. As has been widely discussed (e.g., Kihlstrom, 1984; Neely, 1988; Tulving, 1983), there are interpretive problems inherent in trying to infer functional independence of mental representations on the basis of a single set of experimental tasks. However, we believe that our data should prompt serious consideration of the possibility that summary knowledge of a person's traits is represented and accessed independent of knowledge of that person's behaviors (similar views can be found in the work of Anderson, 1989; Dreben, Fiske, & Hastie, 1979; Klein & Loftus, 1990a; Klein & Loftus, 1990b; Klein et al., 1989; Lichtenstein & Srull, 1987).

In addition to our data, there is also evidence in the clinical literature on amnesia that is consistent with an independence of abstract trait knowledge and behavioral exemplars. The first piece of evidence comes from the literature on functional retrograde amnesia. The initial phase of this amnesia (termed the *fugue state*) is marked by the victim's nearly total loss of the ability to remember incidents from his or her personal past (e.g., Schacter & Kihlstrom, 1989). The amnesic episode ends with the victim recovering memory for his or her past life but becoming amnesic for the events of the fugue state.

The question of interest regarding this amnesia is whether a person in a fugue state, despite having lost the ability to remember any events from his or her life, could still have knowledge of his or her traits. If trait self-knowledge is dependent on knowledge of one's behaviors, then it should be affected by the loss of such memories.

There is little data relevant to this topic, but there is one case, reported by Schacter, Wang, Tulving, and Freedman (1982), that suggests that a person in a fugue state can access trait self-knowledge. These investigators administered a Minnesota Multiphasic Personality Inventory to a patient both during and after his fugue state, and the patient's profile was largely unchanged for the majority of subscales across testings. Because his responses when he could access behavioral memories were consistent with his responses when he could not, it appears that the loss of behavioral memories did not greatly affect the availability of trait self-knowledge.

The second source of amnesia evidence comes from the case of patient K.C., who, as the result of a severe brain injury, no longer can bring to mind a single behavioral memory from any point in his life (e.g., Tulving, 1989a, 1989b; Tulving, Schacter, McLachlan, & Moscovitch, 1988). Although there are numerous reports of patients who have lost portions of their personal pasts (for a review, see Parkin, 1987), K.C. is the only reported case of complete amnesia for personal experiences.

If we are correct that questions regarding one's traits may be answered directly by accessing abstract trait representations, then K. C., despite his inability to recall any trait-relevant behavioral memories, should be able to judge a list of trait adjectives for self-descriptiveness. Tulving (in press) recently has tested K. C. to evaluate exactly this hypothesis.[8] Tulving asked K. C.

[8] The trait adjectives were the same ones used in Klein, Loftus, and Burton (1989).

on two separate occasions to judge a list of 72 trait adjectives for self-descriptiveness. Tulving also asked K.C.'s mother to rate K.C. on the same traits. Tulving's findings revealed that K.C.'s ratings were both reliable (K.C.'s trait self-judgments showed 78% agreement across sessions) and consistent with the way he is perceived by others (there was 73% agreement between K.C.'s and his mother's ratings of K.C.'s traits). K.C. thus appears to have detailed and accurate trait self-knowledge despite the fact that he has no access to any behavioral memories from which he could infer this knowledge. These findings are consistent with our proposal that within the realm of long-term self-knowledge, knowledge of one's traits is represented and accessed independent of knowledge of one's trait-relevant behaviors.

Conclusions and Limitations

Whether trait knowledge is inseparable from memory for past behaviors has stimulated debate among both philosophers (e.g., Grice, 1941; Hume, 1739/1817; Locke, 1690/1731; Shoemaker, 1963) and psychologists (e.g., Buss & Craik, 1983; James, 1890; Locksley & Lenauer, 1981) for more than 300 years. Unfortunately, as evidenced by the number of years debate on this topic has persisted, an answer to this question has proven elusive. The present research makes a modest contribution to this debate by showing that the dependence of trait knowledge on the retrieval of behavioral memories is a decreasing function of the amount of trait-relevant behavioral experience one has with the person being judged.

Although we have focused on the role of behavioral experience in the acquisition of trait knowledge, we do not mean to suggest that behavior is the only source of trait knowledge. Trait labels also may be conveyed by others, for example, as in the case of a parent praising a child (e.g., James, 1890; Lord, Desforges, Chacon, Pere, & Clubb, 1992; Mead, 1934; Nelson, in press). The principal contribution of our research, however, is in demonstrating that once abstract trait knowledge is acquired, people tend to rely on these abstractions when making trait judgments.

Although ours is not the only model to posit roles for both behaviors and abstractions in the representation of trait knowledge (e.g., Allen & Ebbesen, 1981; Anderson, 1989; Anderson & Hubert, 1963; Bower & Gilligan, 1979; Carlston, 1980; Carlston & Skowronski, 1986; Dreben et al., 1979; Keenan & Baillet, 1980; Kihlstrom & Cantor, 1984; Kihlstrom et al., 1988; Klein & Loftus, 1990a; Lingle, 1983; Lingle & Ostrom, 1979; Wyer & Srull, 1986, 1989), our model combines several features that make it particularly useful in studying trait knowledge. First, drawing on recent models of category learning (e.g., Homa et al., 1991; Ross et al., 1990), we specify amount of trait-exemplifying experience as a principal determinant of whether trait knowledge is represented abstractly or at the level of behavioral exemplars. Second, we offer a specific proposal about the rules governing the use of summary representations and behavioral exemplars in trait judgments. If a summary representation is available, it will be used; otherwise, exemplars will be retrieved. Third, our model is a general model of trait knowledge that can account for trait judgments about others (Experiment 1) as well as judgments about the self (Experiments 2, 3, and 4). Fourth, and perhaps most important, our studies have examined the representation of preexperimental long-term knowledge about real people: one's mother and oneself. Typically, long-term social knowledge is extensive, acquired in a variety of contexts, and retained over long intervals; these features have important consequences for the way in which knowledge is represented in memory (e.g., Klein & Loftus, in press; Linton, 1982). Thus, it is important that they be incorporated into social cognition research.

A number of questions about trait knowledge and trait judgments remain. For example, although we have provided evidence for the type of information people recruit when making trait judgments about themselves and others, the specific processes mediating these judgments remain unspecified. Also, although we have discussed the formation of summary representations, our research does not directly address the nature of these representations—that is, how are they represented in memory—(as prototypes? [e.g., Cantor & Mischel, 1979], as categories? [e.g., Buss & Craik, 1984], as generic knowledge structures? [e.g., Barsalou, 1988]). Another important question is whether our findings apply to other types of social judgments. For example, do people answer questions about their social preferences (e.g., Do you like to go to parties?) on the basis of abstract knowledge, behavioral memories, or perhaps some other type of personal knowledge? Additional research clearly is needed to determine whether the model we have proposed generalizes to other social judgment domains.

On a more positive note, we are especially encouraged by our finding that it is not necessary to posit separate representational principles for knowledge about the self and knowledge about others (see also Bower & Gilligan, 1979; Kihlstrom et al., 1988; Prentice, 1990). These findings have reinforced in us the belief that the factors that contribute to the quality and quantity of our knowledge of self—continual input of rich information over time—are the same factors that tend to characterize social experience in general. Thus, we applaud the recent efforts of several investigators to shift the focus of research on the representation of social knowledge to pay more attention to these factors by examining real knowledge about real people (e.g., Andersen & Cole, 1990; Aron, Aron, Tudor, & Nelson, 1991; Baldwin & Holmes, 1987; Fiske, Halsam, & Fiske, 1991; Prentice, 1990). Although a shift from artificial social knowledge to real-world knowledge requires that we give up experimental control over the acquisition of knowledge, it has the great advantage of allowing us to test the kind of social knowledge we ultimately seek to understand.

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