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Development and Representation of Personality Impressions

Jeffrey W. Sherman and Stanley B. Klein

A developmental model of impression formation was tested. Results indicated that the mental representation of personality impressions depends on the perceiver's degree of experience with the impression target. At low levels of experience, impressions consist primarily of stored behavioral exemplars. However, as experience increases, an abstract impression is formed that is subsequently stored and retrieved independently of the behaviors on which it was based. Experiment 2 demonstrated that impressions continue to evolve once they have become abstract and that behavioral exemplars affect judgments even when they are not directly retrieved for judgment purposes. These findings highlight the importance of applying dynamic approaches to impression-formation research.

The way in which knowledge about social entities is represented in the mind has concerned social psychologists for decades. This concern is perhaps nowhere more evident than in research on impression formation—the study of how knowledge about another person is represented in memory and how its representation influences judgments about that person's characteristics (e.g., Anderson, 1981; Asch, 1946; Carlston & Skowronski, 1986; Hamilton, 1989; Klein & Loftus, 1990a; Klein, Loftus, & Schell, 1994; Srull & Wyer, 1989).

Many recent models of impression formation have been influenced by the distinction between abstract and exemplar-based knowledge. For a given concept, abstract knowledge consists of a summary representation that has been abstracted from experience with multiple exemplars of the concept (e.g., Posner & Keele, 1968; Rosch, 1975), whereas exemplar knowledge consists of separate representations of the concept's known exemplars in memory (e.g., Brooks, 1978; Hintzman, 1986).

This distinction is reflected in three types of impression-formation models. *Abstraction* models propose that an impression of a person consists of summary knowledge abstracted from experience with his or her behavior and that judgments about the person's characteristics are made by accessing the appropriate summary representation (e.g., Anderson & Hubert, 1963; Buss & Craik, 1983, 1984; Cantor, 1980; Cantor & Mischel, 1979; Dreben, Fiske, & Hastie, 1979; Klein, Loftus, & Burton, 1989; Klein, Loftus, & Plog, 1992; Riskey, 1979). *Exemplar* models, by contrast, hold that person impressions are represented exclusively at the level of behavioral exemplars and that responses to questions about a person must be "computed" on the basis of accessing relevant behaviors from memory (e.g., Kahneman & Miller, 1986; Linville, Fischer, & Salovey, 1989; Rywick & Schaye, 1974; Smith, 1990; Smith & Zarate, 1992). Finally, a third class of models falls between these extremes, proposing that person impressions consist of both abstract and exemplar knowledge. According to these *mixed* models, judgments about a person are made either by accessing abstract knowledge directly or through computations performed on relevant behavioral exemplars (e.g., Allen & Ebbesen, 1981; Anderson, 1989; Carlston, 1980; Carlston & Skowronski, 1986; Lingle & Ostrom, 1979; Park, 1989; Wyer & Srull, 1986).

Each of these types of models has achieved some success in accounting for the data from impression-formation studies. However, they share an important limitation. Because they have focused primarily on the end result of the impression-formation process, they have tended to promote a view of impressions as relatively static, unchanging structures in memory. Typically, subjects in an impression-formation experiment receive a fixed amount of information about a target person and then are asked to make a judgment about the person, recall the information, or both. On the basis of subjects' responses to the judgment and recall tasks, researchers infer the mental representation of subjects' impressions. However, because subjects all have equal experience with the target person when judgments are requested, it is impossible to examine the development of the impression as experience with the target grows. As a result, a researcher's conclusion that impressions are based on abstractions (e.g., Anderson & Hubert, 1963; Dreben et al., 1979; Riskey, 1979) or on exemplars (e.g., Rywick & Schaye, 1974) is limited to a single level of subject experience with the target person.

Similarly, research on mixed models of impression formation typically has examined the relative contributions of abstract and exemplar knowledge at a single level of subject experience. This research has identified some of the factors that influence whether impressions will be abstraction- or exemplar-based, including recency of exemplar acquisition (Carlston, 1980), recency of exemplar activation (Carlston & Skowronski, 1986), stimulus valence (Lingle & Ostrom, 1979), encoding conditions

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(Burnstein & Schul, 1983; Schul, 1983), similarity of the abstraction to the required judgment (Schul & Burnstein, 1985), and abstractness of the trait to be judged (Allen & Ebbesen, 1981). However, because subjects within a given experiment have the same amount of experience with the target person, it is not possible to examine the roles of abstractions and exemplars at different stages in the development of the impressions (several of these experiments [e.g., Carlston, 1980; Carlston & Skowronski, 1986; Lingle & Ostrom, 1979; Schul & Burnstein, 1985] have focused on the use of preexisting abstractions; accordingly, they provide little insight into the manner in which abstract knowledge initially develops).

A complete model of the impression-formation process must account not only for the end product of this process but also for the way in which impressions develop with experience of the persons being represented. Although most impression-formation research has neglected the developmental aspects of the impression-formation process, there are some noteworthy exceptions. Fiske and Dyer (1985), for example, examined the evolution of impressions as a function of the degree of initial exposure to impression-relevant stimuli. Subjects in their experiment were shown four items of information and were asked to form an impression on the basis of that information. The number of times subjects were exposed to the information was varied. The results indicated that, with repeated exposure to the information, subjects' impressions changed from being represented as individually stored items of information to "unitized schemas" in memory.

Although this research clearly takes a developmental approach, development is operationalized in terms of how well a given amount of information is learned, not in terms of how much information subjects have learned about the target person. Therefore, this research fails to address the development of impressions as experience with another person grows.

Bargh and Thein (1985) did examine the development of impressions as a function of experience with a target. Their results indicated that under some conditions (when capacity is available, or an appropriate schema is accessible), subjects formed abstract impressions after very little target experience. For these subjects, subsequent judgments relied on the formed abstractions and not on the particular learned exemplars (e.g., Anderson & Hubert, 1963; Hastie & Park, 1986). In other circumstances (when capacity is low and no appropriate schema is accessible), subjects failed to form abstract impressions regardless of level of experience with the target. The judgments of these subjects therefore were based on the particular exemplars they could remember.

Although this research examined exemplar recall at different levels of target experience, it did not examine how exemplars contributed to judgments at different levels of experience. Because judgments were made only one time (after all subjects had received the same amount of information), it is difficult to determine the extent to which judgments would have been abstraction- or exemplar-based at low or intermediate levels of target experience (see also Anderson & Hubert, 1963; Dreben et al., 1979; Riskey, 1979). Recall data are reported that are suggestive as to the nature of judgment processes at different levels of experience, but they do not provide a direct measure of the underlying representation on which the judgment is based.

Park (1986) examined more directly the representational structure of impressions at different levels of target experience. She used an open-ended response procedure to examine the representations that subjects formed of acquaintances, starting at the beginning of their acquaintance and continuing until 7 weeks later. Park's findings revealed that, as subjects gained more experience with target persons, their use of abstract trait terms to describe targets increased, whereas their use of specific behaviors decreased. Park concluded from these findings that with increasing experience, our representations of others become increasingly abstract.

More recently, Klein and Loftus and their colleagues (e.g., Klein & Loftus, 1993a, 1993b; Klein, Loftus, Trafton, & Fuhrman, 1992) proposed a general model describing changes in the mental representation of other people as knowledge about the behavior of those people increases. According to Klein and Loftus's model, one's representation of a person varies with the amount of experience one has had with that person. During the early stages of learning about a person, impressions are represented at the level of behavioral exemplars in memory, because too few exemplars have been experienced to support the abstraction process. Judgments about the person, therefore, must be based on the available behavioral exemplars. However, as behavioral information accumulates, summary representations evolve; judgments then may be made by directly accessing the appropriate summary representation. Thus, the model proposes that the more knowledge one has about a person's behavior, the more likely one is to have formed summary representations, and the less likely one is to base judgments of that person on specific behavioral exemplars.

Klein and Loftus tested their model of impression formation by examining the types of information subjects access to make trait-descriptiveness judgments. They developed a procedure for this purpose, called the *task facilitation paradigm* (e.g., Klein & Loftus, 1990b, 1993a, 1993b; Klein et al., 1989; Klein, Loftus, & Sherman, 1993; Klein, Loftus, Trafton, & Fuhrman, 1992). The procedure uses three tasks: a *describes* task, which requires subjects to decide whether a stimulus trait is consistent with their impression of a target person (e.g., "Does the word *kind* describe the person?"); a *recall* task, which requires subjects to retrieve from memory a specific behavioral incident in which the target person manifested the stimulus trait (e.g., "Remember a specific incident in which the target behaved in a kind manner"); and a *define* task, which requires subjects to generate a definition for the stimulus trait (e.g., "Think of the meaning of the word *kind*"). A trial consists of performing two of these tasks—an initial task and a target task—in succession, on the same trait word.

Klein and Loftus (e.g., 1993a, 1993b; Klein, Loftus, Trafton, & Fuhrman, 1992) predicted that if impressions consist solely of the representation in memory of behavioral exemplars, then a describes task should be more facilitating than a define task to the performance of an immediately following recall task. This is because activating an impression to perform the describes task means activating behavioral exemplars, whereas generating a definition does not (see Klein & Loftus, 1993a, 1993c; Klein, Loftus, Trafton, & Fuhrman, 1992, for evidence in support of this assumption). A describes task should therefore be more beneficial to the performance of a subsequent recall task, because retrieving a behavioral exemplar should be faster if exemplars have recently been activated. By contrast, if impressions consist of abstract knowledge and not of behavioral exemplars, then performing a describes task first should not lead to a greater reduction in the time required to perform a recall task than would result from first performing a define task. This is because activating the impression to perform the describes task would not in this case activate behavioral exemplars.

Using the task-facilitation paradigm, Klein and Loftus found evidence consistent with their general model of impression formation. In one study (Klein, Loftus, Trafton, & Fuhrman, 1992; Experiment 1), in which the target person was the subject's mother, each subject first completed a series of task-facilitation trials and then rated each stimulus trait for the degree to which it described his or her mother. Klein et al. found no evidence that a describe task facilitated retrieval of a behavioral exemplar when the trait in question was rated as highly descriptive. However, they found considerable evidence of facilitation when traits were rated medium- or low-descriptive.

To explain these findings, Klein, Loftus, Trafton, & Fuhrman (1992) proposed that traits rated high in mother-descriptiveness were those for which subjects had observed the largest number of behaviors, because highly descriptive traits should be those that are manifested most often. Thus, highly descriptive traits were likely to be those for which subjects had formed summary representations, which could be accessed to perform the describes task. Because behavioral exemplars would not be activated, the describes task would be no more beneficial than a define task to a subsequent recall task, and no difference in facilitation should be observed. By contrast, medium- and low-descriptive traits are likely to be those for which subjects had observed fewer behavioral exemplars. This would decrease the likelihood of an available summary representation and increase the likelihood that performing a describes task would activate behavioral exemplars. A describes task then would be more beneficial than a define task to a subsequent recall task, and greater facilitation following a describes task should then be observed.

In two other studies (Klein, Loftus, Trafton, & Fuhrman, 1992; Experiments 3 and 4), Klein et al. used the task-facilitation paradigm to examine the effect of increased behavioral experience on the type of representation accessed during trait self-descriptiveness judgments. Whereas self-judgments pertaining to contexts with which subjects had relatively little experience were found to rely on the retrieval of specific behaviors, self-judgments pertaining to contexts in which subjects had considerable experience did not (see also Klein & Loftus, 1993b). These data suggested that amount of experience also mediates the representation of trait knowledge about the self: In low-experience contexts, impressions are represented at the level of behavioral exemplars, but in high-experience contexts, impressions consist of summary representations.

The work of Fiske and Dyer (1985), Bargh and Thein (1985), Park (1986), and Klein and his colleagues (e.g., Klein & Loftus, 1993a, 1993b; Klein, Loftus, Trafton, & Fuhrman, 1992) is valuable in its success in bringing a dynamic approach to the study of impression formation. The present research extends this tradition by examining the development of personality impressions as behavioral experience grows. In Experiment 1 we examined how the mental representation of impressions changes as experience increases; in Experiment 2 we examined the continued development of impressions that are already well established.

Although Park (1986) and Klein, Loftus, Trafton, and Fuhrman (1992) were successful in examining the representation of impressions at different levels of experience, neither was directly concerned with how those impressions developed. Klein, Loftus, Trafton, and Fuhrman (1992; see also Klein & Loftus, 1993b) studied trait representations in conditions corresponding to relatively high or low levels of behavioral experience. However, there was no examination of how *particular* trait representations developed as experience increased. Similarly, Park (1986) examined what kinds of information (trait or behavior) were reported at different levels of experience but did not look at how *particular* trait impressions evolved over the course of her experiment.

Furthermore, in neither case was behavioral experience directly manipulated. It may be that trait-descriptiveness (Klein, Loftus, Trafton, & Fuhrman, 1992; Experiment 1) and context-relevant experience (Klein, Loftus, Trafton, & Fuhrman, 1992, Experiments 3 and 4; Klein & Loftus, 1993b; Park, 1986) are correlated with amount of behavioral experience, but these measures are only indirect indicators. We designed the present research to examine explicitly the development of impressions with increasing behavioral experience.

Experiment 1

Overview

After learning either a relatively small or a relatively large amount of behavioral information about a target person, subjects performed two tasks in succession, an initial task and a target task, on the same trait word. For the initial task, subjects performed either a describes task or a define task. For the target task, all subjects performed a recall task. We predicted that if the developmental sequence outlined by Klein, Loftus, Trafton, and Fuhrman (1992) and Park (1986) is correct, then the degree to which trait judgments facilitate subsequent behavioral retrieval should depend on the amount of information subjects have learned about the target person. If, for a particular trait, only a few relevant behaviors have been presented, there should be insufficient information for abstraction, and judging whether or not the trait describes the person should require activation of behavioral exemplars in memory. Therefore, subjects who make initial descriptiveness judgments should be faster than those who generate definitions to subsequently recall a specific trait-relevant behavior.

However, as the number of trait-relevant behaviors performed by the target increases, subjects should be more likely to form summary representations and less likely to rely on behavioral exemplars to judge the descriptiveness of the trait. Without activation of behavioral exemplars, subjects who make descriptiveness judgments should be no faster than subjects who generate definitions to then recall a specific trait-relevant behavior.

Method

Subjects. The 174 subjects were recruited from the University of California, Santa Barbara subject pool and were given partial course credit for their participation. Subjects were tested in groups of 1 to 6.

Materials and design. Subjects read either one block or four blocks of information pertaining to a target person. Each block of information contained two different kind behaviors (e.g., stopped to let another car into the line of traffic), two different intelligent behaviors (e.g., studies photography in his spare time), two behaviors that did not imply either kindness or intelligence (e.g, took a walk around the block after dinner), and four demographic items (e.g., was born in Phoenix, Arizona). The target's name was not presented with the stimulus items. On scales that ranged from 0 to 10, subjects rated the intelligent behaviors as moderately intelligent (M = 6.83), and the kind behaviors were rated as moderately kind (M = 7.42).[1] The assignment of behaviors to the two experience conditions (one and four blocks) was randomly determined. Subjects performed the initial task and recall-target task in reference either to *kind* or to *intelligent.*

In summary, the experiment was a 2 (one block vs. four blocks) × 2 (define vs. describes initial task) × 2 (kind vs. intelligent) between-subjects design.[2]

Procedure. Subjects were told that they would be reading a series of descriptions about a person named Bob. A microcomputer presented the descriptions in a random order, one every 6 s.

After reading the stimuli, subjects were trained to perform the define, describes, and recall tasks, using a close friend as the target person for the latter two tasks. Each practice trial consisted of performing two tasks in succession: an initial task and a target task on a trait unrelated to kindness or intelligence. For the define task, subjects thought of a definition for the trait; for the describes task, subjects decided whether the trait described a close friend; and for the recall task, subjects recalled a behavioral incident in which the same close friend manifested the trait. Subjects performed six different combinations of initial task (describes, recall, or define) and target task (describes, recall, or define).

On completion of the practice trials, subjects performed a single test trial with Bob as the target person. The trial began with the appearance on the screen of one of the following cues for the initial task: DEFINE (define task) or DESCRIBES BOB (describes task). A stimulus trait appeared beneath the task cue 2 s later, and a timer started in the computer. The cue and the stimulus trait remained on the screen until the subject indicated by pressing the space bar that he or she had completed the initial task. At this response, the timer stopped, the subject's latency was recorded, and the initial task cue was removed. After a 2-s pause the cue for the target task, RECALL BOB (recall task), appeared on the screen above the same stimulus trait, reactivating the timer. This cue and the stimulus trait remained on the screen until the subject signaled by pressing the space bar that he or she had completed the recall target task. The trait used in the test trial was either *kind* or *intelligent.*

Immediately after the test trial, subjects were asked to write the specific kind or intelligent behavior they had recalled when performing the recall task. Subjects who failed to report accurately a stimulus behavior were removed from the data set.[3]

Results

We set a cutoff point to exclude from the data set any response latencies over 15 s. This resulted in the removal of 10 subjects. Additionally, 19 subjects who failed to report a stimulus behavior were removed from the data set.[4] The analyses are therefore based on the data from 145 subjects. For purposes of data normalization, all analyses were based on a log transformation of the response latencies. All means are reported in seconds.

Recall target task latencies. We performed a 2 (amount of information: one block vs. four blocks) × 2 (initial task: define vs. describe) × 2 (trait: kind vs. intelligent) between-subjects analysis of variance (ANOVA) on the recall-target-task response latencies. This analysis yielded a marginally significant main effect for amount of information, with recall in the one-block condition (M = 5.38) taking longer than recall in the four-block condition (M = 4.31), $F(1, 129) = 3.50$, $p < .07$. This effect, however, was qualified by a two-way interaction involving amount of information and type of initial task, $F(1, 129) = 4.34$, $p < .05$. Planned comparisons revealed that subjects in the one-block condition took less time to recall a behavior after an initial-describes task (M = 4.53) than after an initial-define task (M = 6.24), $F(1, 69) = 6.57$, $p < .05$. Subjects in the four-block condition, by contrast, took equally long to recall a behavior after a describes task (M = 4.27) and a define task (M = 4.36),

[1] Behaviors that were only moderately indicative of the traits were selected, to decrease the likelihood that subjects would spontaneously draw trait inferences from the first behavior (e. g., Winter & Uleman, 1984). With moderately prototypical behaviors, perceivers should require more substantial evidence before drawing a trait inference (Buss & Craik, 1983, 1984; Trope, 1986; Trope, Cohen, & Alfieri, 1991). We believe that such stimuli more closely reflect real-world behavior than do the extremely diagnostic behaviors that are often used in impression-formation research (e.g., Dreben et al., 1979; Srull, 1981).

[2] In addition to these variables there was a manipulation of instruction set. Half of the subjects formed an impression of the target person as they read the stimulus information, and the other half memorized the information as they read it. This manipulation was designed to influence the degree to which subjects would spontaneously form impressions of the target as they received the stimuli and thus the extent to which judgments would rely on behavioral retrieval. There is some evidence that greater on-line processing occurs under impression than under memory sets (Hamilton, Katz, & Leirer, 1980; Srull, 1981; Srull, Lichtenstein, & Rothbart, 1985). However, other research has demonstrated that on-line assessment can also be achieved under memory sets (e.g., Hastie & Park, 1986; Lichtenstein & Srull, 1987; McConnell, Sherman, & Hamilton, 1994; Winter & Uleman, 1984). In our research, this manipulation had no effect on our results. Therefore, all analyses are collapsed across this variable.

[3] We did not request that subjects report their responses during the experimental trials; rather, we instructed them to generate responses to the task questions in their heads. Klein & Loftus (1993a) provided a detailed discussion of our reasons for adopting this procedure and presented a considerable body of research demonstrating the efficacy of the technique.

[4] Of the 19 subjects who failed to report a behavior, 12 wrote nothing, and 7 wrote the name of the trait for which information was being requested (e.g., *kind*; these subjects may have misunderstood the instruction to report a particular behavior they had read). Of the 12 subjects who failed to report a behavior in Experiment 2, 5 wrote nothing, and 7 wrote the name of the trait. Separate analyses of the subjects who failed to report a behavior yielded no significant effects for target-task latencies or initial-task latencies in either Experiment 1 or Experiment 2.

[5] The crucial comparisons for this experiment are those within a particular level of behavioral experience. At low levels of experience, describes judgments should involve behavioral retrieval. Therefore, recall should be faster after a describes task than after a define task. At high levels of experience, describes judgments should not involve behavioral retrieval. Therefore, there should be no difference in recall speed after the two initial tasks. However, the fact that recall will be facilitated after a describes task (relative to the define control task) in the low- but not the high-familiarity condition does not mean that recall after a describes task should be faster at low levels of experience than at high levels of experience. a comparison of recall facilitation between levels of behav-

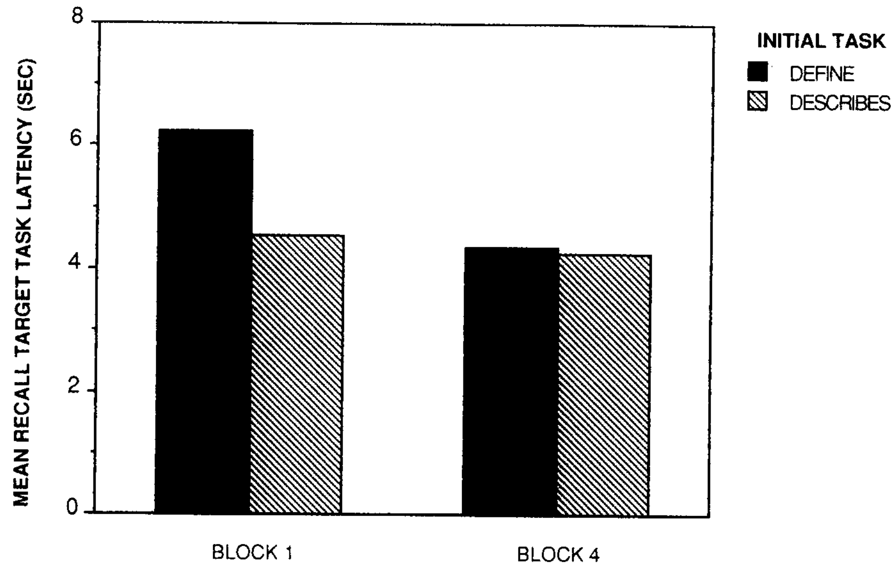

Figure 1. Mean recall target-task latency as a function of initial task and level of familiarity in Experiment 1.

$F < 1.0$.[5] The target-task mean response latencies are presented in Figure 1.

Initial-task response latencies. An additional perspective on the developmental sequence predicted by the mixed model can be obtained by looking at the initial-task latencies. It is generally assumed that exemplar-based (memory-based) judgments take more time than abstraction-based (on-line) judgments (Allen & Ebbesen, 1981; Lingle & Ostrom, 1979; Mackie, Sherman, & Worth, 1993; Park, 1986). If, as we predicted, describes judgments in the one-block condition are exemplar-based, and describes judgments in the four-block condition are abstraction-based, then describes judgments in the four-block condition might be expected to take less time than those in the one-block condition. This effect would show up as a two-way interaction involving amount of information and initial-task type: Latencies for the describes task should decrease as amount of information increases, whereas latencies for the define task (which are unaffected by amount of behavioral information presented; Klein & Loftus, 1993a) should show no change over blocks.

The analysis of initial-task response latencies included 5 additional subjects whose recall-target task, but not initial-task, data were cut off at 15 s. We conducted a 2 (amount of information: one block vs. four blocks) × 2 (initial task: define vs. describes) × 2 (trait: kind vs. intelligent) between-subjects ANOVA on the initial-task response latencies. As expected, describes-task latencies decreased as amount of information increased (one-block M = 4.05, four-block M = 3.44), whereas define-task latencies were equal in the two conditions (one-block M = 3.78, four-block M = 3.87). However, this interaction was not significant, $F(1, 134) = .49, p > .40$.

Discussion

The target-task response latencies offer strong support for our developmental model of impression formation. In the one-block condition, an initial-describes judgment facilitated the subsequent retrieval of a target behavior compared with an initial-define task. This demonstrates that subjects accessed behavioral exemplars in memory to make their trait judgments. However, in the four-block condition, subjects took equally long to recall a behavior after a describes task and a define task. In this case, subjects did not access exemplars as they made their judgments.

These results demonstrate that the mental representation of impressions changes as experience with a target increases. At low levels of experience, impressions are represented at the specific behavioral level. As experience increases, an abstract impression is formed that is stored and retrieved independently of specific behaviors.

Interestingly, even though the pattern of facilitation in our experiment demonstrated that describes judgments were exemplar-based in the one-block condition and abstraction-based in the four-block condition, describes-task latencies did not differ significantly in the two conditions (although the means were in the right direction). The presumption that computing and reporting exemplar-based judgments requires more time than retrieving and reporting a stored abstract judgment may have been overstated in past research (e.g., Allen & Ebbesen, 1981; Lingle & Ostrom, 1979; Mackie et al., 1993). We are not the

ioral experience is confounded by the main effect for amount of information. Our data replicate the findings of many researchers who have demonstrated that, as the number of behaviors exemplifying the same trait increases in memory, the time required to retrieve any one of those behaviors decreases (Klein & Loftus, 1991; Klein, Loftus, Trafton, & Fuhrman, 1992; Myers, O'Brien, Balota, & Toyofuku, 1984; Park, 1989). Therefore, only comparisons within a particular level of experience are meaningful indicators of recall facilitation.

first researchers to make such a suggestion. Park (1986) found that subjects took as long to make judgments involving attributes that were prestored but used infrequently as they did to make computed judgments. Our results are particularly informative because they compare judgment times for judgments that have been experimentally identified as exemplar- or abstraction-based. We suggest that judgment latencies should not be relied on as the sole indicators of mental representation, particularly when those judgments involve low-frequency traits or traits for which subjects have little evidence. Whenever possible, multiple measures should be used to infer the nature of mental representations.

Experiment 2

The results of Experiment 1 answer some important questions about the development and mental representation of impressions. However, they also raise some important new questions. What happens to impressions after they have become abstract? Are they relatively unchanging structures in memory, or do they continue to evolve as experience increases?

A second, related question is: How are behavioral exemplars processed after an abstract impression has been formed? One possibility is that additional behavioral evidence consistent with the abstraction is seen as redundant and is therefore ignored (Anderson & Hubert, 1963; Bargh & Thein, 1985; Dreben et al., 1979). Experiment 1 showed that once an abstraction has been formed, behaviors no longer are retrieved for judgment purposes. Perhaps then, once abstraction has occurred, additional behavioral evidence plays little role in impressions.

We propose that impressions do continue to evolve after they have become abstract and that behaviors exert an important influence on that evolution. We have developed a model to account for these processes. According to our model, trait abstraction occurs during the encoding of behavioral information. As behaviors are encoded, their trait implications are extracted and used to update an impression (e.g., Klein & Loftus, 1993a; see also Anderson, 1981; Medin & Bettger, 1994; Winter & Uleman, 1984). As information accumulates, this process eventually yields a viable abstract impression that may be retrieved independently of the behaviors on which it was based (as in Experiment 1). However, after an abstraction has been formed the process of extracting trait information from behaviors continues. As this trait information is extracted, the now-abstract impression is updated with this new information. As a result, even though behaviors no longer are retrieved for judgment purposes, newly encountered behaviors continue to exert an influence on the impression as they are encoded (for a related view, see Knowlton & Squire, 1993).

If this trait-extraction process continues after an abstraction has been formed, one might expect the abstract impression to become more accessible as behavioral evidence grows. Because the impression is repeatedly accessed and updated with the presentation of each stimulus behavior, impression retrieval should become procedurally fluent (e.g., Smith, 1990). Such fluency would be demonstrated by a decrease in describes-judgment response latencies with increasing amounts of relevant behavioral information.

Although in Experiment 1 describes judgments did become slightly faster as experience increased, the effect was nonsignificant. However, because judgments in the one-block condition were exemplar-based and judgments in the four-block condition were abstraction-based, it is impossible to tell whether an abstract impression grew more accessible with experience. A comparison of these judgment times is not informative, because the judgments were based on different kinds of information in the two conditions. As a result, the judgment times may have simply reflected the difficulty of retrieving exemplar and abstract information in the respective circumstances.

To test this aspect of our model more carefully, we used a modified version of Experiment 1. For Experiment 1, we carefully chose stimulus behaviors that were only moderately indicative of the traits they represented. This strategy was intended to decrease the likelihood that subjects would immediately draw trait inferences on presentation of the first block of stimulus information. Although this strategy proved successful in many regards, it was not useful for examining the continued development of abstract impressions.

In Experiment 2, subjects were presented with stimulus behaviors that were more extreme in their trait implications. In this case, we predicted that subjects would form abstract impressions as soon as they received the first stimulus information. With such clear evidence, neither judgments after minimal behavioral information nor judgments after more substantial information should rely on exemplar retrieval. There should be no evidence of recall facilitation after performance of an initial describes-judgment task.

Given this outcome, a comparison of judgment times in the low- and high-experience conditions would be informative. Because the judgments in both cases would be abstraction based, the judgment times would reflect only differences in the accessibility of the impression and not differences in the type of representation on which the judgment was based (as in Experiment 1). According to our model, subjects' abstract impressions should become more accessible as target experience increases. Therefore, we predicted that initial-describes judgments would be made more quickly in the high-experience condition than in the low-experience condition. Because neither judgment will have been shown to rely on exemplar retrieval (as indicated by a lack of facilitation for a subsequent recall task), this differential accessibility would reflect the encoding of different numbers of behavioral exemplars in the low- and high-experience conditions. This in turn would suggest that as the behavioral exemplars were encoded their trait implications were extracted and used to update the abstract impression.

A Pure Exemplar Account of the Data

Another goal of Experiment 2 was to examine an alternative explanation of our findings in Experiment 1. Keenan (1993) argued that findings such as ours do not necessarily rule out pure exemplar models of impression formation. According to Keenan, it is possible that judgments in both the one-block condition and the four-block condition were accomplished by retrieving particular stimulus behaviors. Specifically, Keenan's explanation states that facilitation is seen in the one-block condition but not in the four-block condition, because of a fan effect. When the trait judgment is requested in the one-block condition, subjects activate the two trait-relevant behaviors, and the degree of activation that spreads to each of the two items is sufficient to cause facilitation on the subsequent recall task. However, for judgments in the four-block condition, activation must spread to eight trait-relevant behaviors. In this case, each individual item receives relatively little activation, resulting in no demonstrable facilitation on the recall task (see also Anderson & Bower, 1973). Thus, Keenan argued that even though judgments rely on behavior retrieval in both conditions, only one condition produces facilitation.

If Keenan is correct, the highly diagnostic behavioral stimuli presented to subjects in Experiment 2 should produce the same results as Experiment 1. Once again, in the low-experience condition but not in the high-experience condition, behavioral recall should be facilitated after a describes-judgment task. This contrasts with our prediction of no facilitation on the recall task in either the low- or high-experience condition. We believe that the highly diagnostic behaviors will lead subjects to form abstract impressions immediately, which will then form the basis for the judgment task.

Method

Subjects. The 139 subjects were recruited from the University of California, Santa Barbara subject pool and were given partial course credit for their participation. Subjects were tested in groups of 1 to 6.

Materials. Subjects read either one block or six blocks of information pertaining to a target person. Each block of information included four demographic items of information, two trait-irrelevant behaviors, one highly kind behavior (e.g., visited a sick friend in the hospital), and one highly intelligent behavior (e.g., scored 100% on a calculus quiz). Once again, the target's name was not presented with the stimulus items. On scales that ranged from 1 to 10, subjects rated the intelligent behaviors as highly intelligent (M = 8.77) and the kind behaviors as highly kind (M = 8.84). The assignment of behaviors to the two experience conditions (one and six blocks) was randomly determined.

Although high-behavioral-information subjects received more blocks of information in this experiment than in Experiment 1, each block contained only one trait-relevant behavior for each trait. Thus, subjects in both the low- and high-experience conditions received less trait-relevant information in this experiment than did subjects in the corresponding conditions of Experiment 1.

Design and procedure. Aside from the different number of blocks presented to subjects, the design and procedure of Experiment 2 were identical to those of Experiment 1. The design was a 2 (one block vs. six blocks) × 2 (define vs. describe initial task) × 2 (kind vs. intelligent trait judgment) between-subjects design.[6]

Results

Once again, we set a cutoff point to exclude from the data set any response latencies over 15 s. One subject was eliminated by this criterion. Additionally, 12 subjects who failed to report a stimulus behavior were removed from the data set. The analyses are therefore based on 126 subjects. For purposes of data normalization, all analyses are based on a log transformation of the response latencies. All means are reported in seconds.

Recall-target task latencies. The goal of this experiment was to examine the continued development of abstract impressions. Therefore, we first examined whether subjects' impressions were abstract by the end of the first block of information. If subjects had formed abstractions, then judgments in neither the one-block nor six-block condition would involve the retrieval of behaviors. As a result, recall-task latencies would be the same after the describes task and the define task in both the one-block and the six-block conditions.

We performed a 2 (amount of information: one block vs. six blocks) × 2 (initial task: define vs. describes) × 2 (trait: kind vs. intelligent) between-subjects ANOVA on the recall-target task response latencies. This analysis yielded an unexpected main effect for trait such that intelligent-recall latencies were generally faster (M = 3.11) than kind-recall latencies (M = 3.94), $F(1, 110) = 9.04$, $p < .001$. The only other significant effect was a main effect for block, such that subjects in the six-block condition recalled behaviors more quickly (M = 3.17) than subjects in the one-block condition (M = 3.89), $F(1, 110) = 4.80$, $p < .05$. This replicates our finding from Experiment 1 that, 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 Klein & Loftus, 1991, 1993a; Klein, Loftus, Trafton, & Fuhrman, 1992; Myers et al., 1984; Park, 1989). As predicted, and in contrast to Experiment 1, there was no evidence that the recall-target task was facilitated by a preceding describes-judgment task in either the one-block or the six-block condition, $F(1, 110) = 1.17$, $p > .20$.[7] These data indicate that subjects in both the one-block and six-block conditions possessed abstract impressions.

Initial-task response latencies. Given that impressions were abstract in both the one-block and the six-block conditions, an analysis of initial-task response times provides insight into the relative accessibility of those abstract impressions. We predicted that subjects would continue to update their impressions after they had become abstract. As a result, impressions would become more accessible as experience increased, resulting in faster describes-task judgment latencies in the six-block than one-block condition. Once again, the define tasks acted as a control condition. There is no reason why semantically based define judgments would become faster as exemplar information increases (e.g., Klein & Loftus, 1993a).

The analysis of initial-task response latencies included 1 additional subject whose recall-target task, but not initial-task, data were cut off at 15 s. We performed a 2 (amount of information: one block vs. six blocks) × 2 (initial task: define vs. describes) × 2 (trait: kind vs. intelligent) between-subjects ANOVA on the initial task-response latencies. This analysis yielded a significant main effect for block such that responses in

[6] See Footnote 2.

[7] There is a wealth of evidence attesting to the sensitivity of the task-facilitation paradigm in detecting exemplar retrieval (e.g., Klein & Loftus, 1990b, 1993a, 1993b; Klein, Loftus, Trafton, & Fuhrman, 1992; Klein et al., 1989, 1993; Malt, 1989), including the results of Experiment 1. Many of these experiments reported interactions in which facilitation was observed only in those conditions in which judgments were predicted to rely on exemplar retrieval. Failures to find recall facilitation occur only when predicted. Therefore, an absence of recall facilitation is telling. Although it is possible that our failure to find evidence of recall facilitation in either the one- or the six-block condition reflects a replication failure and not the use of abstract knowledge, we feel that this is highly unlikely given the proven sensitivity of our paradigm.

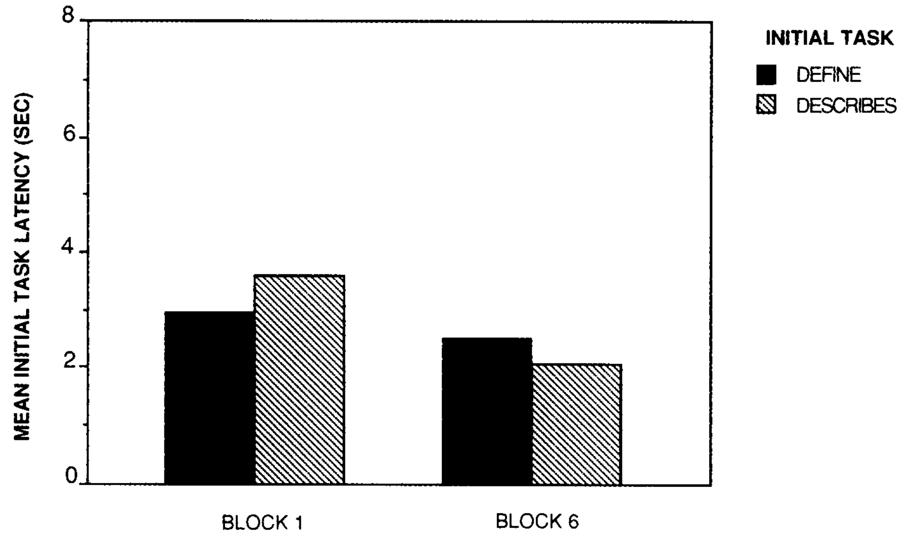

Figure 2. Mean initial-task latency as a function of level of familiarity in Experiment 2.

the six-block condition were faster ($M = 2.43$) than responses in the one-block condition ($M = 3.48$), regardless of the type of task, $F(1, 111) = 10.61, p < .01$. The only other significant effect was a two-way interaction between block and initial task that moderated the main effect. As can be seen in Figure 2, this interaction demonstrates that the tendency for responses to speed up with experience is far greater for the describes task (one-block $M = 3.83$, six-block $M = 2.19$) than for the define task (one-block $M = 3.13$, six-block $M = 2.68$), $F(1, 111) = 3.90, p = .05$. Planned contrasts confirmed that the describes task sped up significantly with experience, $F(1, 61) = 11.07, p < .01$, but that the define task did not, $F(1, 62) = 1.17, p = .28$. This demonstrates that subjects' impressions became more accessible as experience increased.

Discussion

Evolution of abstract impressions. The results of Experiment 2 make two important points about impression formation. First, abstract impressions continue to evolve as target experience increases. The formation of an abstraction is not the final "goal" of impression formation. Recall-task response times following the describes task and the define task in both the one-block and six-block conditions were equal, suggesting that subjects' impressions had become abstract by the end of the first block of information. However, the impression-formation process did not stop after the first block of information. Subjects continued to update their impressions as new behaviors were encoded. This continued updating was reflected in the increased accessibility of impressions in the six-block condition compared with the one-block condition: Subjects were able to make faster descriptive judgments in the six-block condition than in the one-block condition.

Because the describes judgment in neither the one-block nor the six-block condition involved exemplar retrieval, we conclude that differences in describes-judgment latencies were due to the encoding, not the retrieval, of behavioral evidence. Thus, it appears that as the behavioral exemplars were encoded, their trait implications were extracted and used to update the impressions. Because subjects accessed and repeatedly updated these impressions in the six-block condition, the impressions became more accessible.

Role of behaviors in impression formation. The second important point of Experiment 2 is that behavioral exemplars are important in impression formation, even when they are not the direct, retrieved basis of the impression. In this experiment, behaviors were not retrieved for judgment purposes. Still, the number of behaviors encountered influenced the accessibility of subjects' impressions.

Recently there has been increasing interest in the role of exemplars in social perception (e.g., Smith, 1990; Smith & Zarate, 1992). The focus of these efforts overwhelmingly has been on the contribution of exemplars to categorization and judgment processes during retrieval. However, the results of Experiment 2 indicate that the impact of exemplars goes beyond retrieval effects. Even though describes judgments were not influenced by the retrieval of behavioral exemplars, they were affected by the encoding of exemplars. A successful account of the role of exemplars in social judgments will require an appreciation of the contributions of exemplars at encoding as well as at retrieval.

Fan effect hypothesis. The results from Experiment 2 also indicate that a fan effect cannot explain the data from Experiment 1. If a fan effect were responsible for the results in Experiment 1, Experiment 2 should have produced identical results: Behavioral recall should have been facilitated by a preceding describes-judgment task in the low-experience condition but not high-experience condition. However, in Experiment 2, regardless of the number of behavioral stimuli, recall was not facilitated by a preceding describes-judgment task. There was no indication that judgments were exemplar based, even when subjects received only one trait-relevant behavior in the one-block condition. When subjects were presented with highly diagnostic behavioral stimuli, they were able to form abstract impressions very quickly.

General Discussion

There are two major conclusions to be drawn from these experiments. First, impressions are dynamic structures. Research on impression formation typically has examined impressions as snapshots in time, with little regard for how they initially develop or subsequently evolve. However, the data reported in this article demonstrate that personality impressions are not static structures; rather, they are dynamic representations that vary depending on the perceiver's degree of experience with the subject.

Experiment 1 showed that the representational nature of impressions depends on the amount of experience one has with the person being represented. At low levels of experience, impressions are represented as behavioral exemplars. In this case, judgments about a person are made by retrieving and summarizing behaviors from memory. However, as experience increases, abstract impressions are extracted from the exemplars. These abstractions can then be retrieved independently for judgment purposes. Ironically, the more behavioral information one has about a person, the less likely it is to play a direct role in judgments about the person.

Experiment 2 showed that impressions continue to evolve even after they have become abstract. As behaviors are encoded, inferences are made, and trait impressions are updated. As a result, impressions become more accessible as experience grows.

Together, Experiments 1 and 2 clearly demonstrate the dynamic nature of impressions. In Experiment 1 we see development in the representational structure of the impression. In Experiment 2 we see development in the accessibility of that structure.

The second major conclusion to be drawn from this research is that behavioral exemplars have at least two important roles in impression formation. Experiment 1 demonstrated that sometimes behaviors are the direct basis for impressions. This is particularly likely to be true at low levels of target experience. Experiment 2 showed that behaviors are important even if they are not directly retrieved for judgments. As behaviors are encoded, they continue to influence the accessibility of impressions. Although behavioral information received early in the impression-formation process may be weighted more heavily than later information (e.g., Anderson & Hubert, 1963; Bargh & Thein, 1985; Dreben et al., 1979), our data suggest that later information is not ignored.

Models of Impression Formation

In terms of the different models of impression formation outlined in the introduction, our results support a mixed model of impression formation. The results of Experiment 1 are clearly incompatible with both pure abstraction and pure exemplar models. The fact that impressions were exemplar-based in the one-block condition indicates that impressions are not always represented abstractly. Similarly, the fact that impressions had become abstract by the fourth block of information indicates that impressions are not always represented as exemplars. Impressions may be represented as abstract or exemplar knowledge, depending on the perceiver's level of experience with the person being represented (e.g., Klein & Loftus, 1993a, 1993b; Klein, Loftus, Trafton, & Fuhrman, 1992).

On-Line Versus Memory-Based Processing

The results of Experiment 2 suggest that, in essence, impression formation is an on-line process that occurs during the encoding of behavioral information. However, just because the process occurs on-line doesn't mean that exemplars may not be retrieved and used in subsequent judgments, as in the one-block condition of Experiment 1. Obversely, just because a judgment is based on exemplar retrieval (as in the one-block condition of Experiment 1) doesn't mean that an on-line encoding process hasn't occurred. This formulation contrasts with other social judgment models that have typically presumed that prestored, abstract judgments are the result of on-line processes and that exemplar-based judgments result from a lack of on-line processes (e.g., Hastie & Park, 1986). One reason for this conclusion is that much of the research on social judgments has been primarily concerned with the final output of the process, at which point on-line processes will have generally led to the formation of abstract judgments. However, if one applies a dynamic approach to social perception, it is clear that in some cases (particularly at low levels of target experience) it is important to separate process from structure in psychological models (see Mackie & Asuncion, 1990).

Research Extensions

A number of questions about the impression-formation process remain. One issue concerns the distinction between the existence and the use of abstract impressions. Although Experiment 1 indicated that subjects did not use an abstract impression to respond to the trait judgment, it is unclear whether or not abstract knowledge existed. It is possible that subjects had begun the trait abstraction process but were unable to complete it by the end of Block 1. Alternatively, it is possible that an abstraction existed but that subjects were not confident enough to use it. Finally, it is possible that subjects retrieved behavioral exemplars as additional support of, and not instead of, an abstract impression. The exact status of abstract knowledge is unknown in this case.

A related issue concerns the distinction between the activation and the use of information for judgment purposes. The recall facilitation exhibited in the one-block condition in Experiment 1 demonstrates that subjects had accessed behavioral exemplars from memory when performing the judgment task. However, it is uncertain whether or not those behaviors were the direct basis for subjects' judgments. It is possible that behavior activation is merely epiphenomenal to the judgment process. Although it is unclear why such an epiphenomenon would occur at low but not high levels of experience, reasonable hypotheses can be generated. For instance, under conditions of low experience, subjects may retrieve exemplars as evidential support for uncertain impressions without necessarily basing their judgments on the exemplars retrieved. The answers to these questions await further research.

Another important issue for future research is whether our findings apply to other types of social judgments. For instance, does abstract knowledge about social groups develop in the same manner as personality impressions? Stereotypes have traditionally been defined as abstract trait knowledge about social groups, or as group impressions. However, an exemplar model of stereotypes (Smith & Zarate, 1992) has recently challenged this conceptualization. Specifying the representational structure of stereotypes is important, because the different models provide different answers to important questions about stereotypes. How do stereotypes develop and change over time? How do stereotypes affect judgment and behavior? What functions do stereotypes serve? How might we decrease the impact of stereotypes in social perception? The answers to all of these questions depend in large part on how a stereotype is represented in memory.

Our understanding of the out-group homogeneity effect (OHE) could also benefit from the type of analysis we have presented. The OHE is defined as the tendency for people to perceive in-groups as relatively heterogeneous in comparison to out-groups. Perceived variability has been shown to affect many aspects of intergroup perception, including perceivers' willingness to apply stereotypes to targets, their willingness to generalize from a single group member to the whole group, and stereotype change (Park, Judd, & Ryan, 1991). Research in this area has focused on how different representational bases of in-group and out-group variability judgments may cause the OHE. For instance, one prominent model suggests that in-group judgments are exemplar based but that out-group judgments are abstraction based, producing a greater degree of variability in in-group judgments (Judd & Park, 1988; Park & Judd, 1990). Another model suggests that both in-group and out-group judgments are exemplar based and that differences in the number of available in-group and out-group exemplars drive the OHE (Linville et al., 1989). Clearly, this line of research would benefit from the type of experimental paradigm presented here.

Conclusion

The results reported in this article demonstrate the importance of applying dynamic approaches to the study of impression formation. Experiment 1 demonstrated that the representational structure of an impression may change as experience increases. Experiment 2 highlighted the processes that lead to that change and showed that the accessibility of an abstract impression may increase as experience increases. Impressions are dynamic representations that respond to novel behavioral evidence.

These results add to a growing body of evidence that supports our mixed model of impression formation (Klein & Loftus, 1993a, 1993b; Klein, Loftus, Trafton, & Fuhrman, 1992; Park, 1986). This model has a number of advantages over other models of impression formation. First, the model is developmental and as such provides a much richer conception of impressions than models that are concerned only with the end result of the impression-formation process. Second, the model addresses both the representation of impressions and the processes by which impressions are formed. Third, the model has demonstrated its ability to account for both long-term impressions of real people (one's mother and oneself) and experimentally created impressions. Finally, the model is a general model of social perception that has shown its usefulness in accounting for judgments about others (Klein & Loftus, 1993a; Klein, Loftus, Trafton, & Fuhrman, 1992, Experiment 1; the present research) and about the self (Klein & Loftus, 1993a, 1993b; Klein, Loftus, Trafton, & Fuhrman, 1992, Experiments 2, 3, and 4). There is no reason to believe that the model would be any less effective in accounting for other aspects of social perception, including those that pertain to groups.

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Call for Nominations

The Publications and Communications Board has opened nominations for the editorships of the *Journal of Consulting and Clinical Psychology*, the *Journal of Educational Psychology*, the Interpersonal Relations and Group Processes section of the *Journal of Personality and Social Psychology*, *Neuropsychology*, and *Psychological Bulletin* for the years 1997–2002. Larry E. Beutler, PhD; Joel R. Levin, PhD; Norman Miller, PhD; Nelson Butters, PhD; and Robert J. Sternberg, PhD, respectively, are the incumbent editors. Candidates must be members of APA and should be available to start receiving manuscripts in early 1996 to prepare for issues published in 1997. Please note that the P&C Board encourages participation by members of underrepresented groups in the publication process and would particularly welcome such nominees. To nominate candidates, prepare a statement of one page or less in support of each candidate.

- For the *Journal of Consulting and Clinical Psychology*, submit nominations to Hans H. Strupp, PhD, Department of Psychology, Wilson Hall, Vanderbilt University, Nashville, TN 37240, to FAX number (615) 343-8449, or to STRUPPHH@CTRVAX.VANDERBILT.EDU. Members of the search committee are Marvin R. Goldfried, PhD; Kenneth I. Howard, PhD; and Karla Moras, PhD.

- For the *Journal of Educational Psychology*, submit nominations to Carl E. Thoresen, PhD, School of Education, Stanford University, Stanford, CA 94305-3096, to FAX number (414) 725-7412, or to CTHOR@LELAND.STANFORD.EDU. Members of the search committee are Robert C. Calfee, PhD; Penelope L. Peterson, PhD; and Joanna P. Williams, PhD.

- For the Interpersonal Relations and Group Processes section of the *Journal of Personality and Social Psychology*, submit nominations to Judith P. Worell, PhD, Department of Educational and Counseling Psychology, 235 Dickey Hall, University of Kentucky, Lexington, KY 40506-0017, to FAX number (606) 257-5662, or to CPDJUDYW@UKCC.UKY.EDU. Members of the search committee are Norbert L. Kerr, PhD; Harry T. Reis, PhD; Caryl E. Rusbult, PhD; and Harry C. Triandis, PhD.

- For *Neuropsychology*, submit nominations to Martha A. Storandt, PhD, Psychology Department, Box 1125, Washington University, 1 Brookings Drive, St. Louis, MO 63130, or call (314) 935-6508. Members of the search committee are Martha Farah, PhD; Sandra Koffler, PhD; Arthur P. Schimamura, PhD; and Barbara C. Wilson, PhD.

- For *Psychological Bulletin*, submit nominations to Richard M. Suinn, PhD, Department of Psychology, Colorado State University, Fort Collins, CO 80523-0001, or to RICHARD_SUINN.PSYCH@CNSMAIL.MSO.COLOSTATE.EDU. Members of the search committee are Frances D. Horowitz, PhD; Walter Kintsch, PhD; Nancy Felipe Russo, PhD; and Karen M. Zager, PhD.

First review of nominations will begin December 15, 1994.