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Memory for In-Group and Out-Group Information in a Minimal Group Context: The Self as an Informational Base

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The authors argue that persons derive in-group expectancies from self-knowledge. This implies that perceivers process information about novel in-groups on the basis of the self-congruency of this information and not simply its valence. In Experiment 1, participants recalled more negative self-discrepant behaviors about an in-group than about an out-group. Experiment 2 replicated this effect under low cognitive load but not under high load. Experiment 3 replicated the effect using an idiographic procedure. These findings suggest that perceivers engage in elaborative inconsistency processing when they encounter negative self-discrepant information about an in-group but not when they encounter negative self-congruent information. Participants were also more likely to attribute self-congruent information to the in-group than to the out-group, regardless of information valence. Implications for models of social memory and self-categorization theory are discussed.

Evaluative intergroup bias is a robust finding in social psychological research. With very few exceptions, perceivers rate groups to which they belong (in-groups) more favorably than groups to which they do not belong (out-groups; Brewer & Kramer, 1985; Messick & Mackie, 1989). This effect holds for "minimal groups," in which group membership is determined by an arbitrary or trivial criterion (Tajfel, Billig, Bundy, & Flament, 1971). Even when researchers describe the groups using objectively identical information, perceivers indicate nevertheless that the in-group possesses more favorable attributes than the out-group (Howard & Rothbart, 1980).

The fact that perceivers form biased impressions after being presented with equivalent information about in-groups and out-groups suggests that they process information differently on the basis of group membership. We examined this possibility in the current set of experiments. In addition, we presented the self-as-an-informational-base (SIB) hypothesis to help guide and organize our predictions. Two premises underlie the SIB hypothesis: (a) information about the self informs expectancies about novel in-groups and (b) subsequent information-processing strategies help preserve these expectancies.

The basic notion that the self guides expectancies for novel in-groups is shared by past theorists. Soon after the original research on minimal groups (Rabbie & Horwitz, 1969; Tajfel et al., 1971), researchers speculated that perceivers infer in-group attributes from (presumably positive) self-attributes and that this inference underlies in-group favoritism (Doise & Dann, 1976). Although this notion was never tested directly, Cadinu and Rothbart (1996) recently demonstrated that perceivers' trait inferences about in-groups (but not out-groups) are derived from trait inferences about the self. Very little empirical work, however, has explored how the link between the in-group and the self influences information-processing strategies. We believe that such strategies allow perceivers to transform objectively unbiased contexts into subjective impressions that favor the in-group. The purpose of the present set of experiments was to increase understanding of these processing strategies by examining patterns of intergroup memory.

Social Memory Within the Minimal Group Context

We are aware of only two experiments that have focused on memory as an indicator of processing strategies within a minimal group context. These experiments are similar in important ways. First, the participants were categorized into one of two groups using a minimal group paradigm. Second, the participants were shown equal numbers of positive behaviors about the in-group and out-group, and equal numbers of negative behaviors about each

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Experiments 1 and 2 are based on Richard H. Gramzow's dissertation from the University of North Carolina at Chapel Hill. Portions of this research were presented at the 1996 meetings of the Society of Southeastern Social Psychologists, Virginia Beach, Virginia.

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group. Despite these procedural similarities, the two experiments produced dramatically different results.

In one experiment, participants recognized more of the original in-group positive than in-group negative behaviors (Howard & Rothbart, 1980, Experiment 2). In the other experiment (Schaller & Maass, 1989, Experiment 2), participants who had been categorized into groups recognized more of the original in-group negative behaviors than did participants who had not been categorized. On the basis of their respective findings, each pair of authors suggested that perceivers use expectancy-preserving processing strategies that support the formation of biased impressions. Howard and Rothbart concluded that expectancies favoring the in-group led to *congruency* effects in memory: Positive behaviors, relative to negative behaviors, were overrepresented in perceivers' knowledge about the in-group. Schaller and Maass attributed their findings to *incongruency* effects: In-group negative behaviors were more accessible in memory for categorized participants, relative to uncategorized participants, because of the extensive processing required to reconcile these behaviors with a positive in-group expectancy.

Procedural differences between the two experiments could account for their inconsistent results. First, the tendency to recognize expectancy-incongruent information increases as the proportion of incongruent information decreases (Stangor & McMillan, 1992). Schaller and Maass (1989), who reported an incongruency effect, included a smaller proportion of negative behaviors in the information they provided about each group than did Howard and Rothbart (1980). Second, Schaller and Maass manipulated the total number of behaviors associated with each group, whereas Howard and Rothbart provided the same number of behaviors for the in-group and out-group. Finally, Schaller and Maass intermixed in-group and out-group information, whereas Howard and Rothbart presented behaviors for one group first followed by behaviors for the other group. Any of these methodological differences could account for the disparate findings.

We wish to raise a broader issue, however. Specifically, we dispute an assumption that is common to both experiments and to past research on minimal groups more generally. Most past research has assumed that perceivers expect positive behavior from in-group members and negative behavior from out-group members. Our research examines the possibility that intergroup expectancies are actually based on *self-congruency*. That is, we argue that the processing of intergroup information in the minimal group context is guided by the degree to which this information is congruent with or discrepant from self-knowledge, rather than simply the degree to which it is positive or negative.

The Self as an Informational Base

Our predictions for memorial patterns in the minimal group context are guided by the SIB hypothesis, which is composed of two premises. The first premise is that self-knowledge serves as an informational base when perceivers learn about novel in-groups and out-groups. The link between the self and the in-group results in self-congruent expectancies for that group. Because information about the self is predominantly positive, expectancies for the in-group are also predominantly positive. (As we explain, however, this does not imply that all positive information matches in-group expectancies.) The second premise is that expectancy-preserving strategies guide information processing. Because expectancies about the in-group are predominantly positive (given that they are based on the self), these processing strategies support the formation and maintenance of more favorable impressions of the in-group than the out-group.

Before providing an expanded rationale for each premise, we would like to distinguish the focus of the SIB hypothesis from that of self-categorization theory (SCT; Turner, Hogg, Oakes, Reicher, & Wetherell, 1987). SCT argues that categorization of the self at the level of a specific in-group membership influences self-perception, such that the self becomes depersonalized in the direction of the in-group prototype. The SIB hypothesis, on the other hand, proposes that self-perception influences perception of the in-group, such that expectations for the group are derived from individual self-representation. It is important to note that SIB processes are likely limited to intergroup situations that lack socially shared group stereotypes (i.e., a minimal group situation). The nuances of the SIB and SCT perspectives are considered further and integrated in the General Discussion section.

Premise 1: The Self Guides In-Group Expectancies

The first premise of the SIB hypothesis, namely that the self guides in-group expectancies, derives from four postulates.

Postulate 1: Self-knowledge is activated spontaneously during social judgment. Self-knowledge often is activated spontaneously during social judgments. Perceivers frequently use information about the self as an anchor from which to assess the behavior of others. For example, Dunning and Hayes (1996) demonstrated that perceivers' self-perceptions influence how they evaluate a target person in a given domain. Specifically, participants who considered themselves physically active evaluated a target who participated in athletics for 3 hr a week as less athletic than did physically inactive perceivers. This pattern held only for those participants (71%) who indicated that they compared the target with themselves when making their judgments. Acknowledging that self-activation did not occur in every instance, Dunning and Hayes speculated that self-activation would be more likely when evaluating an in-group than an out-group, because self-knowledge is a more relevant comparison in the case of in-groups.

Postulate 2: The in-group is part of the self. The notion that self-knowledge is particularly relevant when evaluating in-groups is consistent with research demonstrating that representations of one's group memberships become linked to one's representation of the self. Eliot Smith and his colleagues have demonstrated that the self and in-groups are linked cognitively, such that self-reports are facilitated for traits on which the self and in-group are similar, but inhibited for traits on which the self and in-group are dissimilar (e.g., Smith, Coats, & Walling, 1999). Likewise, Park and Judd (1990) reported that perceivers refer more frequently to their own behavior when describing an in-group than when describing an out-group during a "think-aloud" procedure. Finally, as reported earlier, Cadinu and Rothbart (1996) demonstrated using minimal groups that in-group (but not out-group) trait ratings are inferred from ratings of the self.

The link between in-groups and the self suggests that self-attributes will be accessible particularly when processing information about a novel in-group, which may stimulate self-referent information processing. Self-referent processing facilitates recall of social information through increased elaboration and organization of material (Klein & Loftus, 1988), and these processes could lead to superior memory for in-group relative to out-group information. However, there is little evidence that in-group information is better remembered than out-group information (Ostrom, Carpenter, Sedikides, & Li, 1993; Sedikides, 1997). Instead, the link between the self and the in-group implies that memory will be influenced by the degree to which new information about the in-group is self-congruent.

Postulate 3: The self is positive–typical. To demonstrate that self-congruency influences memory for novel in-groups, we must determine the type of information that perceivers consider to be self-congruent. We argued that the self-concept is both positive and typical for most persons. Considerable research demonstrates that the content of the self-concept is predominantly positive (Brown & Dutton, 1995; Kendall, Howard, & Hays, 1989; Ogilvie, 1987; Schwartz, 1986). However, this does not imply that all positive characteristics are considered self-descriptive by the majority of persons. Instead, behaviors that are typical rather than atypical in a population are likely to be perceived as self-descriptive by more persons. We tested this assumption directly in Pilot Study 2. For now, we presume that behaviors that perceivers rate as "typical" are behaviors that are actually characteristic of most persons. In a similar vein, the false consensus effect (Ross, Greene, & House, 1977) suggests that perceivers use the self to estimate the prevalence of a particular attribute in the general population. Therefore, the behaviors that perceivers rate as typical in the population likely will be those that they consider to be self-descriptive.

Postulate 4: Self-knowledge serves as an expectancy for the in-group. So far, we have argued that self-knowledge is activated during social judgment and that self-activation is more likely when processing in-group than out-group information. This implies that self-knowledge serves as an expectancy for the in-group in a minimal group context. We have also argued that self-congruent information is both positive and typical. If so, information that is both positive and typical will be consistent with in-group expectancies. Information that is both negative and atypical will be inconsistent with in-group expectancies, because it is highly self-discrepant.

Premise 2: Information-Processing Strategies Preserve Expectancies

If perceivers expect in-groups to behave in self-congruent ways, how will this expectancy influence the processing of new (and sometimes conflicting) information during an impression-formation task? The second premise of the SIB hypothesis implicates two distinct processing strategies—one focusing on expectancy-congruent information, the other on expectancy-incongruent information.

Postulate 1: Expectancy-congruent strategies. First, we expected perceivers to show a response bias favoring information that is consistent with the expectancy that in-groups behave in self-congruent ways. Research on social memory has indicated that perceivers remember expectancy-congruent information well but that this apparent memory advantage results from the tendency to misremember expectancy-congruent information as having been presented when it was not (Rojahn & Pettigrew, 1992; Stangor & McMillan, 1992). This type of confirmation bias may help maintain the original expectancy (Hamilton & Sherman, 1994).

Postulate 2: Expectancy-incongruent strategies. Second, we expected perceivers to process effortfully information that is inconsistent with the expectancy that in-groups behave in self-congruent ways. When processing capacity is sufficient, expectancy-incongruent material elicits attempts at reconciliation, discounting, or subtyping to preserve the original expectancy (Clary & Tesser, 1983; Hastie, 1984; Sherman & Hamilton, 1994; Stern, Marrs, Millar, & Cole, 1984). This is particularly likely when information is threatening. Threatening information mobilizes cognitive and affective responses in an effort to minimize its impact on the self-concept (Taylor, 1991). For example, when processing information about the self, perceivers are more sensitive to negative feedback that is self-discrepant than to negative feedback that is self-congruent (Sedikides, 1993). Because the self and the in-group are linked, we expected a similar pattern for in-group information.

In effect, then, the SIB hypothesis implicates two expectancy-preserving strategies that seemingly generate incompatible predictions for patterns of intergroup memory. The expectancy-congruent strategy will elicit greater memory for in-group than out-group information that is both positive and self-congruent. The expectancy-incongruent strategy will elicit greater memory for in-group than out-group information that is both negative and self-discrepant. The compatibility of these two predictions hopefully will be evident once we make a key distinction between memory tasks that bear the signature of each processing strategy.

Heuristic and Exhaustive Memory Tasks

The notion of distinct, or parallel, cognitive processes has a long history in psychology, culminating recently in a volume dedicated to "dual-process" theories (Chaiken & Trope, 1999). In developing our predictions, we borrowed from a theoretical framework that specifies the influence of distinct processing strategies on social memory: the twofold retrieval by associative pathways model (TRAP; Garcia-Marques & Hamilton, 1996).[1] The TRAP model builds on previous work on associative networks by Hastie (1980) and Srull and Wyer (1989). An example of the memory structure proposed by the TRAP model is presented in Figure 1. In this model, associative pathways link a target (e.g., astronaut) to nodes representing individual behaviors (e.g., runs 3 miles a day). In addition to these target-behavior pathways, individual behaviors can be associated through interbehavior pathways.

Heuristic Tasks and Congruency Effects

The strength of each target-behavior pathway is determined by the congruency between that behavior and the expectancy for the target. During an impression-formation task, expectancy-congruent behaviors become associated more strongly with the

[1] We rely on the TRAP model to develop our arguments because this model makes specific predictions regarding the influence of expectancy-congruent and expectancy-incongruent processing strategies on different memory tasks during impression formation. In principle, we could have relied on several other dual-process models, but this practice would have required a cumbersome set of assumptions.

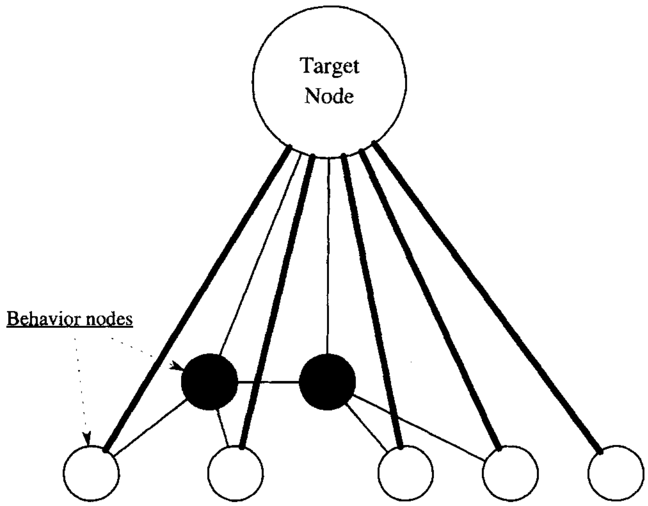

Figure 1. An example of an associative model of the structure of human memory. Shaded behavior nodes represent expectancy-incongruent behaviors; unshaded behavior nodes represent expectancy-congruent behaviors.

target than do expectancy-incongruent behaviors. According to the TRAP model, heuristic memory tasks are influenced by the strength of these target-behavior pathways. In one such task, group-assignment, the original stimulus behaviors are re-presented in a random order, and participants try to identify which of the two target groups performed each behavior originally. For this task, the TRAP model assumes that retrieval begins at the target node and that participants' judgments are influenced by the degree to which a behavior is similar to the expectancy for that group.

Exhaustive Tasks and Incongruency Effects

The number and strength of pathways linking a specific behavior to other behaviors (interbehavior pathways) are determined by the extent of processing elicited by that behavior. The extent of processing, or elaboration, corresponds with the amount of cognitive effort required to incorporate the behavior into the existing target impression or to reconcile that behavior with target expectancies. Thus, through elaboration, expectancy-incongruent behaviors become more strongly and more frequently associated with other behaviors than do expectancy-congruent behaviors. According to the TRAP model, exhaustive memory tasks are influenced by the number and strength of these interbehavior pathways. Free recall is an example of an exhaustive task. During free recall, search for an item starts at the target node and progresses down a strong pathway to an individual behavior. Subsequent retrieval progresses along interbehavior pathways before returning to the target node. Therefore, expectancy-incongruent behaviors will be recalled to the extent that inconsistency-processing has occurred—that is, to the extent that interbehavior links have been formed.

Overview of Research and Predictions

We examined patterns of intergroup memory in three experiments. In each experiment, we categorized participants into minimal groups. Once categorized, they were shown equivalent behavioral information about each group. We constructed the behavior lists for each group using a Valence (½ positive, ½ negative) × Typicality (⅔ typical, ⅓ atypical) within-participants design. That is, we manipulated the valence and typicality of the behaviors orthogonally—a design feature that has not been used previously. Participants also rated the groups along several traits and performed exhaustive (i.e., recall) and heuristic (i.e., group-assignment) memory tasks. Leading into the first experiment, we formulated three main predictions.

Inconsistency Effects and Recall Task

First, we have argued that negative self-discrepant behaviors will be more inconsistent with in-group than out-group expectancies. Unlike previous research, we do not suggest that all negative behaviors performed by the in-group will violate expectancies. This is because not all negative information is highly self-discrepant (Sedikides, 1993). We demonstrated in Pilot Study 2 that information must be both negative and atypical to be highly self-discrepant for most persons. Moreover, the effects of information valence and typicality on perceived self-congruency are multiplicative, rather than additive (i.e., self-discrepancy = Valence × Typicality).

Negative–atypical (highly self-discrepant) information associated with an in-group, like negative self-discrepant feedback about the self, is potentially threatening. Therefore, negative–atypical behaviors will be more likely to elicit elaborative inconsistency-processing when performed by in-group members than when performed by out-group members. According to the TRAP model, exhaustive memory tasks (e.g., recall) are influenced by the degree to which information has been elaboratively processed. Therefore, we predicted that perceivers will recall more negative–atypical behaviors about the in-group than about the out-group.[2] We did not predict intergroup differences in recall across the other three behavior categories (negative–typical, positive–typical, or positive–atypical) because these behaviors will not be sufficiently self-discrepant to elicit inconsistency-processing. In other words, we predicted that group membership (in-group vs. out-group target) will interact with behavior valence and typicality when examining perceivers' recall for intergroup information—a triple interaction prediction.

Congruency Effects and Group-Assignment Task

Second, we have maintained that positive self-congruent behaviors will be more consistent with in-group than out-group expectancies. Again, we do not suggest that all positive behaviors

[2] The impression-formation context simulated in our experimental design possesses characteristics that generally contribute to greater memory for expectancy-congruent than for expectancy-incongruent information: The targets are groups (rather than individuals), and expectancies are not well-formed (Hamilton & Sherman, 1996; Stangor & McMillan, 1992). Therefore, we do not propose that recall for in-group negative–atypical behavior will be greater than recall for other in-group behaviors. Instead, negative–atypical in-group information will activate inconsistency-processing to a greater degree than will negative–atypical out-group information. This differential processing will be reflected in intergroup comparisons for negative–atypical recall, rather than intragroup comparisons between negative–atypical behaviors and the other behavior categories.

performed by the in-group will confirm expectancies. Instead, information must be both positive and typical (i.e., self-congruency = Valence × Typicality; see Pilot Study 2). According to the TRAP model, heuristic memory tasks (e.g., group assignment) rely on the degree to which information matches target expectancies. Therefore, perceivers, relying in part on a representativeness heuristic, will be more likely to attribute positive–typical information to the ingroup than to the outgroup in a group-assignment task. We did not predict intergroup differences in group assignment across the other three behavior categories (positive–atypical, negative–typical, or negative–atypical), because these behaviors will not match in-group expectancies sufficiently. As with the recall data, then, we predicted that group membership will interact with information valence and typicality.

Recall and Evaluative Judgments

Third, the SIB hypothesis also makes specific predictions about the relation between recall and evaluative judgments. Evaluative judgments can be based on memory for specific behaviors (memory-based) or on trait inferences formed prior to judgment (on-line; Hastie & Park, 1986). Previous research has indicated that group-level evaluations are more likely than person-level evaluations to be memory-based (Hamilton & Sherman, 1996), particularly when the groups are novel (Hastie & Park, 1986; Sherman, 1996; Sherman & Klein, 1994). Overall, then, we expect in-group and out-group evaluations in the minimal group context to be memory-based. For example, higher recall for positive in-group behaviors (or negative out-group behaviors) will be related to greater intergroup evaluative bias. Likewise, higher recall for negative in-group behaviors (or positive out-group behaviors) will be related to reduced intergroup evaluative bias. According to the SIB hypothesis, however, perceivers' heightened recall for negative–atypical behaviors performed by the in-group is due to elaborative inconsistency-processing. This processing strategy precludes these behaviors from being integrated into the in-group impressions. Therefore, unlike recall for other behaviors, recall for negative–atypical in-group behaviors will not be related to intergroup evaluations.[3]

Experiment 1

Pilot Study 1: Stimulus Development

Method. In order to present perceivers with equivalent in-group and out-group information, we created two lists of stimulus behaviors. Each list was composed of four behavior categories: six positive–typical behaviors, six negative–typical behaviors, three positive–atypical behaviors, and three negative–atypical behaviors. We selected the behaviors within each category such that valence and typicality varied neither within each list (i.e., valence and typicality were orthogonal) nor between the two lists.

To select these behaviors, we collected an initial set of 100 behaviors, primarily from Fuhrman, Bodenhausen, and Lichtenstein (1989). Twenty-nine participants rated each behavior twice, once for valence and once for typicality. The order in which participants completed each rating type (valence or typicality) was counterbalanced, as was the order in which the behaviors were presented. Participants rated valence on an 11-point scale (0 = *extremely negative;* 5 = *neither positive nor negative;* 10 = *extremely positive*). For typicality ratings, participants estimated "the percentage of people (0 to 100) who might behave in a manner similar to each description in any given year."

Table 1
Pilot Study 1: Mean Valence and Typicality Ratings for Each Behavior Category in List A and List B (N = 29)

Behavior category and statistic	Valence		Typicality	
	List A	List B	List A	List B
Positive–typical				
M	7.39	7.23	57.53	58.59
SD	0.92	1.07	11.32	11.03
Negative–typical				
M	2.80	2.80	54.89	54.30
SD	0.82	0.63	16.15	15.09
Positive–atypical				
M	7.48	7.37	18.83	17.89
SD	1.06	0.94	10.20	9.44
Negative–atypical				
M	2.93	2.68	17.48	16.68
SD	1.16	0.92	11.24	11.16

Results. We constructed the two lists (List A and List B) based on these ratings. To be a candidate for one of the lists, a positive behavior required a mean rating of 7 or higher on the valence scale, and a negative behavior required a mean rating of 4 or lower. A typical behavior required a mean rating of 50% or higher on the typicality scale, and an atypical behavior required a mean rating of 25% or lower. The items retained for each list are displayed in the Appendix. The mean valence and typicality ratings for each behavior category in each list are shown in Table 1.

To ensure that the behavior categories did not differ within or between the two lists, we entered the mean ratings for each category (see Table 1) into a Valence (positive, negative) × Typicality (typical, atypical) × List (List A, List B) repeated-measures analysis of variance (ANOVA). We analyzed the valence and typicality ratings separately. For the valence ratings, the valence main effect was significant, $F(1, 28) = 492.80$, $p < .001$, and no other main effects or interactions were significant. Thus, valence ratings did not differ between the two lists or across the typicality categories. For the typicality ratings, the typicality main effect was significant, $F(1, 28) = 476.96$, $p < .001$, and no other main effects or interactions were significant. Thus, typicality ratings did not differ between the two lists or across the valence categories.

Still, subtle pairwise differences could be masked in the presence of such large main effects. Therefore, 48 pairwise comparisons examined potential differences between specific behavior categories that needed to be similar in valence (e.g., positive–typical–List A vs. positive–atypical–List B) or in typicality (e.g., negative–atypical–List A vs. positive–atypical–List B). As required, none of these comparisons was significant.

[3] There are virtually no published data on the relation between memory and evaluation during the formation of novel intergroup impressions. The intergroup context of the present research is an important consideration because relations between memory and evaluations for the in-group and out-group are likely to be interdependent (Brewer, 1988). For example, recalling positive behaviors performed by the in-group may affect evaluations of both the in-group and out-group. Therefore, we report the difference between in-group and out-group evaluations (i.e., the intergroup evaluation) when examining relations between recall and evaluation.

Pilot Study 2: Self-Similarity Ratings

The SIB hypothesis maintains that positive–typical behaviors are self-congruent and negative–atypical behaviors are self-discrepant. To test this assumption, a separate sample of 32 participants rated the self-congruence of the 100 behaviors from Pilot Study 1. Participants rated self-similarity on an 11-point scale (0 = *extremely dissimilar;* 5 = *neither similar nor dissimilar;* 10 = *extremely similar*). Means for these ratings in each of the four behavior categories are presented in Figure 2. A Valence (positive, negative) × Typicality (typical, atypical) repeated-measures ANOVA revealed a valence main effect, $F(1, 31) = 83.53$, $p < .001$, indicating that participants perceived positive behaviors to be more similar to the self than negative behaviors. The typicality main effect was also significant, $F(1, 31) = 184.41$, $p < .001$, indicating that participants perceived typical behaviors to be more similar to the self than atypical behaviors. The Valence × Typicality effect was significant, $F(1, 31) = 11.10$, $p < .002$. All pairwise comparisons were significant ($ps < .05$), except for the comparison between negative–typical and positive–atypical behaviors ($p < .19$). Thus, participants perceived positive–typical behaviors to be most similar to the self, and they perceived negative–atypical behaviors to be most discrepant from the self.

Main Experiment: Method

Participants. Ninety-three female and 52 male participants were tested. Participants in each pilot study and experiment were undergraduates at the University of North Carolina at Chapel Hill. They participated for partial fulfillment of a course option in introductory psychology. Participants' ages ranged from 17 to 42 years ($M = 19.75$). The reported ethnicity of the sample was 13% African American and 79% Caucasian. Participation occurred in groups of 2–9 persons.

Perceptual judgment test. The perceptual judgment test provided a plausible basis for categorizing participants into groups. This procedure has been used frequently in minimal group research (e.g., Brewer & Weber, 1994; Tajfel et al., 1971). Participants (seated in individual cubicles) estimated the number of times that a target symbol appeared on a computer screen. After 12 trials, participants received false feedback indicating that they tended either to overestimate or underestimate the frequency of target presentation. In reality, participants were assigned randomly to receive overestimator or underestimator feedback.

Participants then learned that transcripts from interviews with other persons classified as "overestimators" or "underestimators" were available to the research team. Participants were asked to review behaviors extracted from these interviews and to form a unique impression of each group.

Presentation of behaviors. Participants were shown the 18 behaviors for one group, given 20 s to "finish forming" their impressions of that group, and then shown the 18 behaviors for the second group. Each behavior was displayed for 8 s. Participants reviewed the behaviors according to one of eight counterbalancing orders determined by an In-Group Label (overestimator, underestimator) × Group Order (overestimators first, underestimators first) × List Order (List A first, List B first) between-participants design.

Dependent measures. Following a 3-min distractor task, participants performed three tasks, which yielded the dependent measures. First, participants recalled as many of the behaviors as they could for each group. They did this separately for each group, starting with the group to which they had been first exposed.

Second, participants evaluated each group on 20 trait terms. Fifteen of these traits represented two attributes (agreeableness and abrasiveness) that are important in social interactions (Hoyle, Pinkley, & Insko, 1989). The seven agreeableness traits included the items *cooperative, trustworthy,* and *kind* (in-group $\alpha = .83$; out-group $\alpha = .86$). The eight abrasiveness traits included the items *overconfident, boastful,* and *domineering* (in-group $\alpha = .88$; out-group $\alpha = .90$). Three additional traits represented intelligence, which (in addition to the social dimension) is a basic dimension along which person impressions are formed (Rosenburg, Nelson, & Vivekanathan, 1968). The intelligence items were *smart, unintelligent* (reverse-scored), and *competent* (in-group $\alpha = .68$; out-group $\alpha = .72$). Finally, two traits (*likable* and *positive*) assessed a global evaluation (in-group $\alpha = .57$; out-group $\alpha = .72$). Participants made trait ratings on a 9-point scale (1 = *not at all* to 9 = *extremely*).

Third, participants performed a group-assignment task in which the original 36 behaviors were presented one-by-one in a random order. For each behavior, participants indicated whether it originally had been performed by an overestimator or an underestimator.

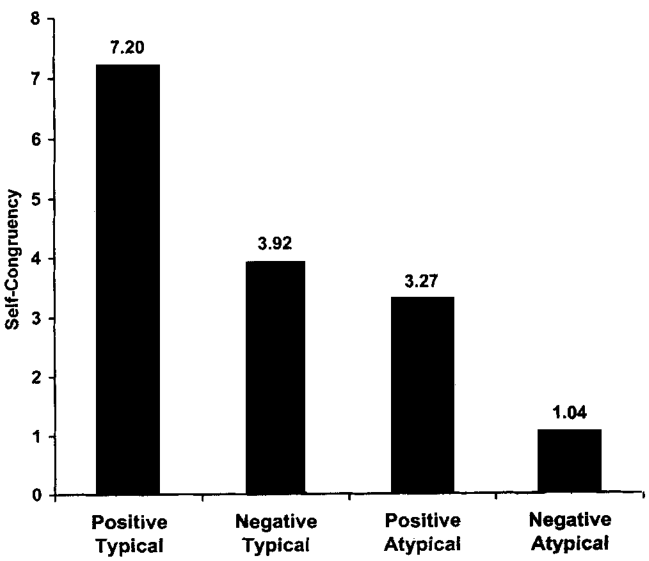

Figure 2. Pilot Study 2: Mean self-congruency ratings in each behavior category ($N = 32$).

Main Experiment: Results

Evaluative ratings. Mean evaluative ratings are displayed in Figure 3. First, we examined the possible influence of participant gender, in-group label (overestimator, underestimator), group order (overestimator first, underestimator first), and list order (List A first, List B first) on evaluative ratings. There were no significant effects involving these variables. Therefore, we dropped them from subsequent analyses. Next, we conducted four separate repeated-measures ANOVAs examining the group membership effect (in-group vs. out-group) for each evaluative dimension. Participants rated the in-group as more agreeable than the out-group, $F(1, 144) = 8.97$, $p < .004$; more intelligent, $F(1, 144) = 17.74$, $p < .002$; and more globally positive $F(1, 144) = 11.07$, $p < .001$. There was no intergroup difference on abrasiveness, $F(1, 144) < 1$.

Recall. A rater, who was unaware of experimental condition, applied a gist criterion to score the recalled behaviors. Credit for correct recall was given if a response retained the original meaning of a behavior and if the response identified clearly a single behavior from either list. Five participants failed to follow instructions (e.g., by writing trait terms rather than actual behaviors). Overall,

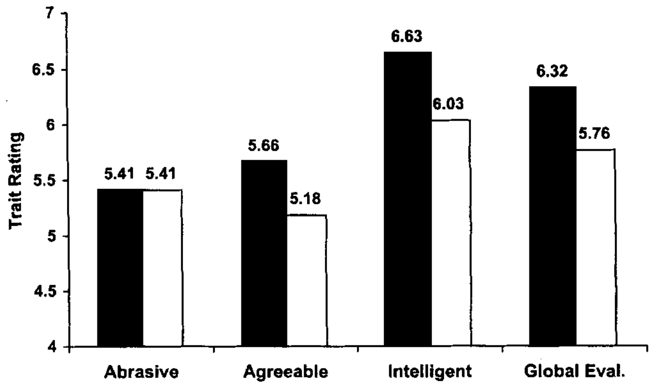

Figure 3. Experiment 1: Mean in-group and out-group ratings on the four evaluative dimensions ($N = 145$). A shaded bar represents in-group ratings; an unshaded bar represents out-group ratings. Eval. = evaluation.

the mean proportion of correctly recalled behaviors was .253 ($SD = .101$). We conducted a Group Membership (ingroup, outgroup) × Valence (positive, negative) × Typicality (typical, atypical) repeated-measures ANOVA on the mean proportion of behaviors recalled correctly in each behavior category. We performed arcsine transformations on these proportions prior to the ANOVA analysis. Means for recall proportions (prior to arcsine transformation) are displayed in Figure 4.

Each of the main effects was significant. The main effect for group membership, $F(1, 139) = 5.96$, $p < .016$, indicates that recall was higher for in-group than out-group behaviors. The main effect for valence, $F(1, 139) = 10.17$, $p < .002$, indicates that recall was higher for positive than negative behaviors. Finally, the main effect for typicality, $F(1, 139) = 39.61$, $p < .001$, indicates that recall was higher for typical than atypical behaviors.

The SIB hypothesis predicted a group membership effect for recall of negative–atypical behaviors, but not within the other three behavior categories. Consistent with this prediction, the three-way interaction was significant, $F(1, 139) = 4.03$, $p < .047$. We examined more precisely whether the pattern of this interaction matched our prediction by specifying an interaction contrast (Abelson & Prentice, 1997). Our a priori contrast applied weights, respectively, to the positive–typical, negative–typical, positive–atypical, and negative–atypical means for the in-group (1, 1, 1, −3) and for the out-group (−1, −1, −1, 3) that were specific to this prediction. Note that this contrast is orthogonal to the main effects. This interaction contrast was significant, $F(1, 139) = 6.63$, $p < .012$, indicating that perceivers specifically recalled a greater proportion of negative–atypical behaviors associated with the in-group than the out-group, relative to recall within the other behavior categories (i.e., positive–typical, negative–typical, and positive–atypical).

Group assignment. During the group-assignment task, participants were presented the original 36 stimulus behaviors one at a time (in a random order) and asked to indicate which group had performed each behavior. Overall, the mean proportion of behaviors that participants assigned correctly was .814 ($SD = .142$). Group-assignment data for one participant were lost as a result of computer error. Means for each behavior category are displayed in Figure 5. As in the recall analysis, we conducted a Group Membership (in-group, out-group) × Valence (positive, negative) × Typicality (typical, atypical) repeated-measures ANOVA on the mean proportion of correctly assigned behaviors, following arcsine transformation.

The group-membership main effect was significant, $F(1, 143) = 6.82$, $p < .010$, indicating that participants identified in-group behaviors more accurately than out-group behaviors. The main effect for typicality was also significant, $F(1, 143) = 22.97$, $p < .001$, indicating that participants assigned atypical behaviors more accurately than typical behaviors. The Valence × Typicality interaction was significant, $F(1, 143) = 16.38$, $p < .001$. Follow-up tests revealed that participants assigned negative–atypical behaviors more accurately than negative–typical behaviors, $F(1, 143) = 33.87$, $p < .001$. However, participants assigned positive–atypical and positive–typical behaviors with an essentially equal degree of accuracy, $F(1, 143) < 1$.

We predicted a group-membership effect for assignment of positive–typical behaviors, but not for the other three behavior categories. Consistent with this prediction, the Group Membership × Valence × Typicality interaction was significant, $F(1, 143) = 3.91$, $p < .050$. We tested an a priori contrast to examine whether the pattern of this interaction matched our prediction. This interaction contrast was not significant, $F(1, 143) < 1$. To isolate

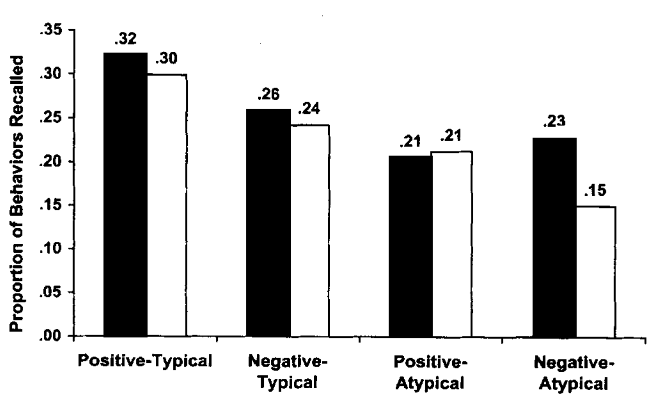

Figure 4. Experiment 1: Mean proportion of behaviors correctly recalled by behavior category and group membership ($N = 140$). Shaded bars represent in-group ratings; unshaded bars represent out-group ratings.

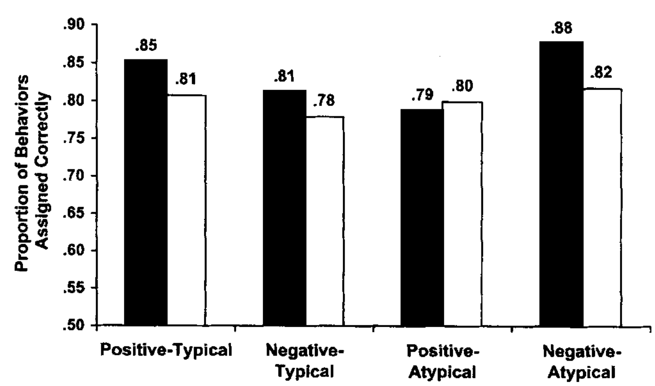

Figure 5. Experiment 1: Mean proportion of behaviors correctly assigned by behavior category and group membership ($N = 144$). Shaded bars represent in-group ratings; unshaded bars represent out-group ratings.

where group membership differences did occur, we examined pairwise comparisons within each behavior category. Consistent with our prediction, perceivers were more accurate in assigning in-group than out-group positive–typical behaviors, $F(1, 143) = 5.40$, $p < .022$. There were no significant group-membership differences for positive–atypical behaviors, $F(1, 143) < 1$, or negative–typical behaviors, $F(1, 143) = 2.36$, $p < .127$. Unexpectedly, perceivers correctly assigned more negative–atypical in-group than out-group behaviors, $F(1, 143) = 5.95$, $p < .016$ (see Figure 5).

Relation between recall and evaluative ratings. To establish whether patterns of intergroup memory were associated with intergroup differences in trait evaluations, we created a difference score for each evaluative judgment dimension (i.e., abrasiveness, agreeableness, intelligence, and global evaluation). In all cases, we subtracted out-group values from in-group values. We entered these difference scores as criterion variables in four separate multiple regression analyses, with recall for in-group and out-group information in each behavior category (positive–typical, negative–typical, positive–atypical, negative–atypical) as the eight predictor variables. This analysis tested whether recall overall, as well as recall within each behavior category, was related to intergroup bias.

Before examining the multiple regression results, we performed a multivariate regression to ensure that there were significant recall–evaluation relations across the four evaluative trait dimensions. A significant multivariate test would provide justification for examining the univariate results. This effect was significant, Wilk's $\Lambda = .614$, $F(32, 469.948) = 2.08$, $p < .001$.

Table 2 contains parameter estimates from the multiple regression analyses involving each evaluative dimension. As a set, the recall measures significantly predicted intergroup differences in agreeableness, intelligence, and global evaluation (but not abrasiveness). For agreeableness, in-group negative–typical recall was the strongest unique predictor, such that participants who recalled more negative–typical in-group behaviors evidenced less evaluative intergroup bias. Several other memory scores were also significant or marginal predictors of the degree of difference between in-group and out-group agreeableness ratings (see Table 2). For intelligence, participants who recalled more negative–typical out-group behaviors evidenced greater evaluative bias. For global evaluation, greater recall for positive–typical in-group behaviors

Table 2
Experiment 1: Predicting Evaluative Differences (In-Group–Out-Group) From In-Group and Out-Group Recall (N = 139)

Dimension	R^2	$p <$	B	SE	β	$p <$
Abrasiveness difference	.050	.462				
In-group positive–typical			−0.51	1.04	−.046	.622
Out-group positive–typical			0.23	1.00	.021	.818
In-group negative–typical			1.46	1.21	.108	.231
Out-group negative–typical			−1.93	1.17	−.149	.104
In-group positive–atypical			0.32	0.93	.031	.731
Out-group positive–atypical			1.49	0.96	.136	.124
In-group negative–atypical			0.39	0.85	.041	.646
Out-group negative–atypical			0.98	1.15	.080	.396
Agreeableness difference	.145	.008				
In-group positive–typical			1.31	0.74	.156	.079
Out-group positive–typical			−1.08	0.71	−.130	.132
In-group negative–typical			−2.55	0.86	−.251	.004
Out-group negative–typical			1.50	0.83	.155	.074
In-group positive–atypical			1.18	0.66	.151	.078
Out-group positive–atypical			−1.41	0.68	−.173	.041
In-group negative–atypical			−0.48	0.60	−.067	.430
Out-group negative–atypical			0.29	0.82	.032	.721
Intelligence difference	.116	.039				
In-group positive–typical			0.29	0.65	.039	.663
Out-group positive–typical			0.52	0.63	.072	.412
In-group negative–typical			−0.39	0.76	−.044	.610
Out-group negative–typical			2.36	0.74	.280	.002
In-group positive–atypical			0.39	0.59	.058	.507
Out-group positive–atypical			−0.41	0.61	−.057	.502
In-group negative–atypical			−0.84	0.53	−.134	.118
Out-group negative–atypical			−0.28	0.73	−.035	.696
Global evaluation difference	.143	.009				
In-group positive–typical			2.41	0.78	.274	.003
Out-group positive–typical			−1.34	0.75	−.154	.076
In-group negative–typical			−0.87	0.91	−.081	.342
Out-group negative–typical			2.45	0.88	.241	.006
In-group positive–atypical			0.21	0.70	.026	.763
Out-group positive–atypical			−1.17	0.72	−.136	.106
In-group negative–atypical			−0.66	0.63	−.088	.299
Out-group negative–atypical			−0.49	0.86	−.051	.568

and for negative–typical out-group behaviors predicted greater evaluative bias.

It is important to note that the proportion of negative–atypical behaviors recalled was not a significant predictor for any of the evaluative dimensions. This finding supports the prediction that negative–atypical behaviors are not integrated into the overall impression and that participants' greater recall for these behaviors when performed by the in-group, relative to the out-group, is the result of inconsistency processing.

Discussion

In line with previous research using minimal groups (Howard & Rothbart, 1980; Schaller & Maass, 1989), participants reported in-group-favoring impressions despite being presented with identical information about the in-group and out-group. Participants perceived the in-group to be globally more positive and likable, more agreeable, and more intelligent than the out-group. There was no intergroup difference on the negative dimension, abrasiveness.

The memory results were largely consistent with predictions derived from the SIB hypothesis. Patterns of intergroup recall were consistent with the prediction that perceivers would process negative–atypical information differentially on the basis of group membership. Participants recalled, on average, more positive than negative behaviors and more typical than atypical behaviors. The sole intergroup difference, however, was participants' greater recall for in-group than out-group negative–atypical behaviors. For the outgroup, the pattern of recall closely matched self-congruency ratings from Pilot Study 2 (as a comparison of Figures 2 and 4 would reveal), with participants recalling the highest proportion of positive–typical behaviors and the lowest proportion of negative–atypical behaviors. For the in-group, the pattern was similar, with the exception of a comparatively elevated level of negative–atypical recall.

The results from the group-assignment task were less supportive of our predictions. On one hand, perceivers attributed more positive–typical behaviors to the in-group than the out-group. This pattern was consistent with the prediction that these behaviors are more expectancy-congruent and that a heuristic memory measure reflects expectancy-congruent processes. However, participants also assigned correctly more negative–atypical in-group than out-group behaviors. This effect was not predicted, but suggests that detailed processing of expectancy-incongruent in-group information may lead to more accurate memory for this information, regardless of the specific memory measure used (i.e., recall based or recognition based).

Finally, the memory-judgment analyses revealed that intergroup evaluative bias was related to patterns of in-group and out-group recall. This relation was evident for the three evaluative dimensions on which participants showed in-group favoritism (agreeableness, intelligence, and global evaluation), but not for abrasiveness (for which participants' mean in-group and out-group ratings were equivalent). Unlike the other three behavior categories, negative–atypical recall was not associated with intergroup evaluations, suggesting that negative–atypical behaviors were not integrated into participants' overall impressions. This finding is consistent with the notion that heightened recall for in-group negative–atypical behavior resulted from elaborative inconsistency-processing.

Experiment 2

Overview

The SIB hypothesis argues that perceivers attempt to reconcile negative–atypical behaviors performed by in-group members with an expectancy that ingroups behave in self-congruent ways. Such elaborative processing is cognitively demanding (Macrae, Hewstone, & Griffiths, 1993; Srull, Lictenstein, & Rothbart, 1985; Stangor & Duan, 1991). Likewise, the TRAP model argues that the degree to which interbehavior pathways are established depends in part on the degree to which task conditions support detailed cognitive processing. Exhaustive memory tasks, such as recall, will only reflect inconsistency-processing when cognitive capacity is sufficient (Garcia-Marques & Hamilton, 1996). Therefore, we predict that reducing cognitive capacity, using a cognitive load manipulation, will eliminate intergroup differences in recall for negative–atypical behaviors by disrupting elaborative inconsistency processing.

Cognitive load manipulations have a limited effect on relatively effortless cognitive tasks (Bargh & Tota, 1988; Gilbert & Osborne, 1989). Therefore, if responses during the group-assignment task are influenced by a heuristic-guided response bias that is minimally affected by strategies used during processing, the tendency to attribute self-congruent behaviors to the in-group (more than the out-group) will persist under high cognitive load.

Method

Participants. We tested 160 female participants, whose ages ranged from 17 to 21 years (M = 18.59). The reported ethnicity of the sample was 12.5% African American and 83% Caucasian. Participation occurred in groups of 3–9 persons.

Procedure. The procedure was identical to that used in Experiment 1, except for the addition of the cognitive load manipulation. All participants read the following: "We are interested in multitasking—that is, how well people can do two tasks at the same time." Participants in the high cognitive load condition rehearsed an eight-digit number while viewing the group behaviors. These participants were asked to reproduce this number following the presentation of the behaviors for the first group. They rehearsed a new number while viewing the behaviors for the second group. Participants in the low cognitive load condition were presented with a simple series-completion problem prior to viewing the behaviors for each group. They were asked to solve the problem before moving on to the display of group behaviors. These participants answered a different series-completion problem for each group. Seventeen participants entered an incorrect response for a rehearsal (high load condition) or series-completion (low load condition) problem. To ensure that participants included in both conditions had followed instructions, we dropped these participants from subsequent analyses.

Results

Evaluative ratings. Mean evaluative ratings are displayed in Figure 6. We conducted four separate Group Membership (in-group, out-group) × Cognitive Load (high, low) repeated-measures ANOVAs, with the second factor being between-participants. The in-group was rated significantly more agreeable than the out-group, $F(1, 141) = 10.06, p < .002$; more intelligent,

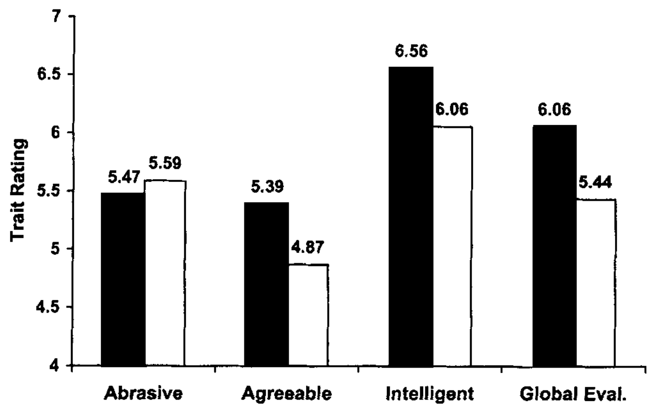

Figure 6. Experiment 2: Mean in-group and out-group ratings on the four evaluative dimensions ($N = 143$). Shaded bars represent in-group ratings; unshaded bars represent out-group ratings. Eval. = evaluation.

$F(1, 141) = 12.67$, $p < .001$; and more globally positive, $F(1, 141) = 12.79$, $p < .001$. There was no difference between ratings of the in-group and the out-group on abrasiveness, $F(1, 141) < 1$. In addition, neither the cognitive load main effect nor the Group Membership × Cognitive Load interaction was significant for any of the evaluative dimensions.

Recall. Overall, the mean proportion of correctly recalled behaviors was .233 ($SD = .110$). We conducted a Group Membership (in-group, out-group) × Valence (positive, negative) × Typicality (typical, atypical) × Cognitive Load (high, load) repeated-measures ANOVA on the mean proportion of behaviors recalled correctly (following arcsine transformation). Cognitive load was a between-participants variable. Means (prior to arcsine transformation) for each behavior category are displayed in Figure 7.

A significant group membership main effect, $F(1, 141) = 5.69$, $p < .019$, indicated that recall was higher for in-group than out-group behaviors. The typicality main effect, $F(1, 141) = 25.86$, $p < .001$, indicated that recall was higher for typical than atypical behaviors. The Group Membership × Valence × Cognitive Load effect was also significant, $F(1, 141) = 7.39$, $p < .008$.

The above effects were qualified by a significant Group Membership × Valence × Typicality × Cognitive Load interaction, $F(1, 141) = 5.05$, $p < .027$. According to the SIB hypothesis, low cognitive load participants will recall more negative–atypical in-group than out-group behaviors. High cognitive load participants will not show this effect. (We did not formulate a specific prediction for patterns within the high load condition.) Therefore, we predicted that the a priori contrast that we tested in Experiment 1 will interact with cognitive load. Collapsing across the two load conditions, the contrast was not significant, $F(1, 141) < 1$. Instead, and consistent with our predictions, there was a significant interaction between the interaction contrast and cognitive load, $F(1, 141) = 7.14$, $p < .009$.

To isolate significant group-membership differences in recall, we examined pairwise comparisons within each behavior category at each level of cognitive load. As predicted, low cognitive load participants recalled more negative–atypical in-group than out-group behaviors, $F(1, 68) = 6.04$, $p < .012$. Low load participants did not differentially recall in-group and out-group negative–typical, positive–typical, or positive–atypical behaviors ($ps > .17$). High load participants displayed a dramatically different pattern of recall. They recalled more in-group than out-group positive–atypical behaviors, $F(1, 73) = 5.29$, $p < .025$, and positive–typical behaviors, $F(1, 73) = 3.50$, $p < .066$. High load participants did not recall different amounts of in-group and out-group negative–atypical or negative–typical behaviors ($ps > .29$).

Group assignment. The overall mean proportion of behaviors that participants assigned correctly was .815 ($SD = .132$). Means for each behavior category are displayed in Figure 8 (prior to arcsine transformation). We conducted a Group Membership (in-group, out-group) × Valence (positive, negative) × Typicality (typical, atypical) × Cognitive Load (high, low) repeated-measures ANOVA on the mean proportion of behaviors assigned correctly, following arcsine transformation.

The group membership main effect was significant, $F(1, 141) = 4.76$, $p < .031$, indicating that participants correctly assigned more in-group than out-group behaviors. The valence

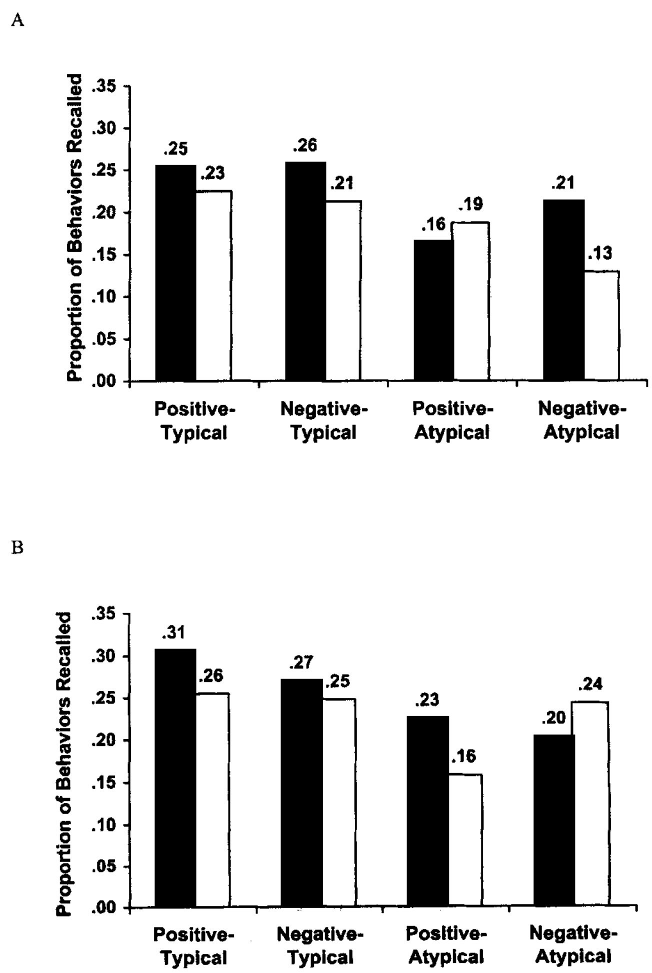

Figure 7. Experiment 2: Mean proportion of behaviors correctly recalled by behavior category, group membership, and cognitive load ($N = 143$). Panel A represents low cognitive load, and Panel B represents high cognitive load. Shaded bars represent in-group ratings; unshaded bars represent out-group ratings.

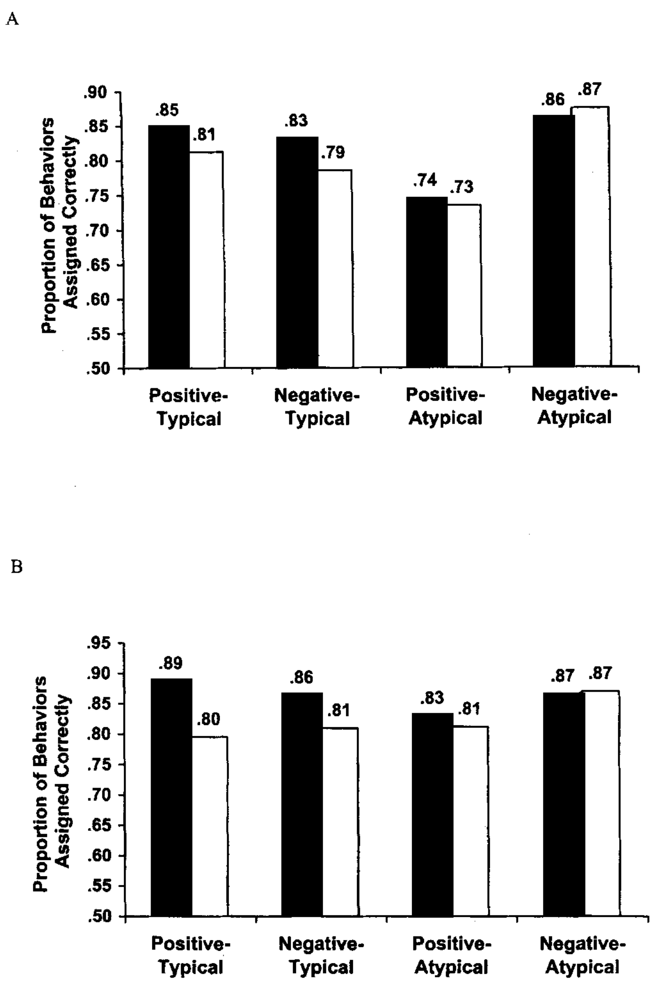

Figure 8. Experiment 2: Mean proportion of behaviors correctly assigned by behavior category, group membership, and cognitive load (N = 143). Panel A represents low cognitive load, and Panel B represents high cognitive load. Shaded bars represent in-group ratings; unshaded bars represent out-group ratings.

main effect also was significant, $F(1, 141) = 16.14, p < .001$. Participants correctly assigned group membership more often for negative than positive behaviors. Also, the typicality main effect was significant, $F(1, 141) = 9.20, p < .003$, indicating that participants correctly assigned typical behaviors more often than atypical behaviors. In addition, a significant Valence × Typicality interaction, $F(1, 141) = 19.06, p < .001$, was qualified by a significant Valence × Typicality × Cognitive Load interaction, $F(1, 141) = 6.35, p < .013$. We considered these interactions to be of limited substantive interest.

The significant Group Membership × Typicality interaction, $F(1, 141) = 7.59, p < .007$, was more relevant to our focus on intergroup differences in memory. Participants correctly assigned more in-group than out-group typical behaviors, $F(1, 141) = 15.40, p < .001$, but assigned essentially equal proportions of in-group and out-group atypical behaviors, $F(1, 141) < 1$.

Unlike Experiment 1, the Group Membership × Typicality × Valence effect was not significant, $F(1, 141) < 1$. According to the SIB hypothesis, participants in both cognitive load conditions will be more accurate in identifying in-group than out-group positive–typical behaviors. The a priori contrast testing this prediction was marginal, $F(1, 141) = 3.03, p < .084$, and did not interact with cognitive load, $F(1, 141) < 1$. For purposes of comparison with Experiment 1, we examined the group-membership effect within each level of valence and typicality (collapsing across load conditions). The patterns for positive behaviors were consistent with our prediction and with findings from Experiment 1. Perceivers correctly assigned more positive–typical in-group than out-group behaviors, $F(1, 141) = 9.89, p < .002$. There was no significant ingroup–outgroup difference in assignment for positive–atypical behaviors, $F(1, 141) < 1$. The assignment patterns for negative behaviors were not consistent with our prediction or with findings from Experiment 1. In Experiment 1, participants correctly assigned more negative–atypical in-group than out-group behaviors. This effect did not replicate in Experiment 2, $F(1, 141) < 1$. Instead, participants correctly assigned more negative–typical in-group than out-group behaviors, $F(1, 141) = 3.95, p < .049$. Note that none of the four pairwise comparisons was qualified by cognitive load.

Discussion

In Experiment 2, participants formed more positive evaluations of the in-group than the out-group. As in Experiment 1, intergroup evaluative bias occurred on three positive trait dimensions (agreeableness, intelligence, and global evaluation), but not on the negative dimension (abrasiveness). These patterns generalized across levels of cognitive load.

The primary purpose of Experiment 2 was to examine the effect of cognitive load on memory for in-group and out-group behavior. Consistent with predictions, participants under low cognitive load recalled more negative–atypical in-group than out-group behaviors. This finding replicates that of Experiment 1 and suggests that negative–atypical behaviors elicit more elaborative processing when performed by an in-group than by an out-group. By contrast, participants under high cognitive load recalled more positive in-group than out-group behaviors. Thus, when cognitive capacity was restricted, participants did not recall more negative–atypical in-group than out-group behaviors. These findings bolster the argument that superior recall for negative–atypical in-group information (observed in Experiment 1 and under low load in Experiment 2) requires the capacity for effortful information processing.

The group-assignment data partially confirmed our predictions. As in Experiment 1, Experiment 2 participants in both cognitive load conditions correctly assigned more positive–typical behaviors to the in-group than the out-group. This finding is in line with the SIB argument that positive–typical (i.e., self-congruent) information matches expectancies for the in-group more so than for the out-group.

However, participants also correctly assigned more negative–typical behaviors to the in-group than the out-group. We did not predict this effect, and it was not significant in the first experiment. Instead, Experiment 1 participants correctly assigned more in-group than out-group negative–atypical behaviors. It is difficult, therefore, to interpret the group-assignment results involving negative behaviors. In the General Discussion, we combine results from both experiments in order to identify the behavior categories with robust group-membership effects.

Experiment 3

Overview and Predictions

The central thesis guiding this research is that the self serves as an informational base for perceivers forming impressions within a novel intergroup context. According to the SIB hypothesis, in-group behaviors that are both negative and self-discrepant elicit elaborative inconsistency processing. This elaborative processing is reflected in higher recall for these behaviors when performed by the in-group relative to the out-group. In support of this argument, perceivers in the first two experiments recalled a greater proportion of negative–atypical (highly self-discrepant) in-group than out-group behaviors. It could be argued, however, that these results do not demonstrate directly the relevance of the self-concept. We cannot be certain that the effect was driven by self-discrepancy per se, because we relied on a nomothetic rather than an idiographic definition of self-discrepancy.

In Experiment 3, we adopted an idiographic procedure to assess directly the relation between the self-concept and patterns of intergroup recall. Participants rated the self-congruency of each stimulus behavior in an initial experimental session. These ratings allowed us to identify those behaviors that were self-congruent and those that were self-discrepant for each participant. Information that is both negative and self-discrepant is threatening to the self-concept, whereas information that is simply negative or simply self-discrepant is not (Sedikides, 1993). Because the ingroup is linked to the self, negative self-discrepant information about the in-group will also be threatening. Perceivers elaboratively process these behaviors in order to reconcile them with the expectancy that in-groups behave in positive self-congruent ways. We predicted, therefore, that perceivers will recall a greater proportion of negative self-discrepant behaviors associated with the in-group than the out-group.

We also asked participants to complete a self-esteem measure. We used this measure to examine whether the positivity of the self-concept predicted patterns of intergroup memory. As noted previously, ingroups are represented as extensions of the self (Smith et al., 1999). In other research, we have demonstrated that persons with positive self-concepts extend this positive evaluation to novel in-groups but not to novel out-groups (Gramzow, 1999). Persons with positive self-concepts, therefore, should have more positive implicit expectancies for in-groups than should persons with neutral self-concepts (see also Greenwald & Banaji, 1995). Thus, negative self-discrepant behaviors associated with the in-group will be particularly likely to elicit inconsistency processing among persons with positive self-concepts. We predicted, therefore, that the positivity of the self-concept will be associated with greater recall of negative self-discrepant in-group behaviors.

Method

Participants. We tested 139 participants, 55 men and 84 women. Information on age and ethnicity was not available; however, the sample was recruited in an identical fashion as in Experiments 1 and 2. Participation occurred in groups of 3–8 persons.

Procedure. The procedure was identical to that used in Experiment 1, except for the addition of an initial experimental session. One to two weeks before the intergroup impression-formation session, all participants completed a behavior-rating task and a questionnaire packet. During the behavior-rating task, participants were shown each of the 36 stimulus behaviors used in Experiments 1 and 2. For each item, they indicated whether the behavior was self-congruent ("me") or self-discrepant ("not me"). The questionnaire packet included the 10-item Self-Esteem Scale (Rosenberg, 1965).

We used each participant's ratings to determine the specific stimulus behaviors that were self-congruent or self-discrepant for that participant. For example, if a participant indicated in Session 1 that "rips articles out of library journals" was self-congruent, this behavior was included in the pool of behaviors used to determine the proportion of negative self-congruent behaviors recalled by that participant in Session 2. Unlike in the first two experiments, the number of behaviors within each behavior category (positive–congruent; positive–discrepant; negative–congruent; negative–discrepant) varied across participants. In fact, some participants ($n = 19$) rated all of the negative behaviors within either List A or List B as self-discrepant in Session 1. For these participants, a proportion could not be calculated for the number of negative–congruent behaviors they recalled from that list in Session 2. Therefore, the proportion of recall was constrained to 0 in these instances.[4]

Results

Self-congruency and recall. An undergraduate research assistant, who was unaware of experimental condition, scored the recall data using a gist criterion. Five participants did not follow instructions (e.g., by writing traits rather than behaviors). Overall, the mean proportion of correctly recalled behaviors was .25 (SD = .091). We conducted a Group Membership (in-group, out-group) × Valence (positive, negative) × Self-Congruency (congruent, discrepant) repeated-measures ANOVA on the mean proportion of behaviors recalled correctly, following arcsine transformation. Means prior to arcsine transformation are displayed in Figure 9.

The main effect for valence was significant, $F(1, 133) = 6.86$, $p < .010$. Participants recalled correctly more positive than negative behaviors overall. The self-congruency main effect also was significant, $F(1, 133) = 6.91$, $p < .010$. Participants recalled correctly more self-congruent than self-discrepant behaviors overall. These main effects were qualified by a significant Valence × Self-Congruency interaction, $F(1, 133) = 9.63$, $p < .003$. Participants recalled more positive–congruent behaviors than positive–discrepant behaviors, whereas recall was equivalent for negative–congruent and negative–discrepant behaviors.

Based on the SIB hypothesis, we predicted a group-membership effect for recall of negative–discrepant behaviors, but not for recall

[4] We conducted parallel analyses using two alternative scoring strategies. First, we included in the analysis only those participants who reported at least one negative behavior in both List A and List B as self-congruent ($n = 115$). Second, we set the value for participants who reported no negative behaviors in a specific list as self-congruent to the mean for that behavior category (rather than 0). Using each of these strategies, the pattern of recall was nearly identical to the pattern reported as the primary analysis: Participants recalled significantly more negative–discrepant in-group than out-group behaviors but recalled essentially equal proportions of in-group and out-group behaviors within the negative–congruent, positive–congruent, and positive–discrepant categories.

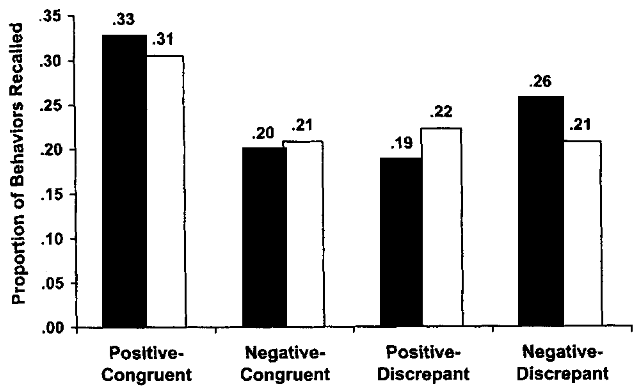

Figure 9. Experiment 3: Mean proportion of behaviors correctly recalled by behavior category and group membership (N = 134). Shaded bars represent in-group ratings; unshaded bars represent out-group ratings.

of the other behavior categories. Consistent with this prediction, the three-way interaction was marginal, $F(1, 133) = 2.79$, $p < .097$. We next examined the a priori interaction contrast, which was also marginal, $F(1, 133) = 3.02$, $p < .085$. When we examined group-membership differences within each behavior category, only the comparison for negative–discrepant behaviors was significant, $F(1, 133) = 3.90$, $p < .050$. There were no significant intergroup differences in recall for positive–congruent, positive–discrepant, or negative–congruent behaviors ($ps > .216$). Thus, perceivers recalled specifically a greater proportion of the negative–atypical behaviors associated with the in-group than the out-group.

Positivity of self-concept and recall. Finally, we examined correlations between self-esteem and the proportion of behaviors recalled correctly within each behavior category. Contrary to prediction, overall self-esteem was not associated with heightened recall for negative–discrepant in-group behaviors ($r = .13$, $p < .140$). Research has suggested that the Rosenberg scale is multidimensional, however, with positively and negatively phrased items representing separate factors (Dobson, Goudy, Keith, & Powers, 1979; Shahani, Dipboye, & Phillips, 1990). When self-esteem scores were separated into two scales on the basis of the valence of the items, the predicted pattern emerged. Persons who denied negative statements about the self were particularly likely to recall negative self-discrepant behaviors engaged in by in-group members ($r = .19$, $p < .027$). This was not true for persons who endorsed positive statements about the self ($r = .01$, $p < .903$). Self-esteem (overall, positive items only, and negative items only) was not associated with recall for negative–discrepant out-group behaviors, nor with recall for in-group or out-group information within the other behavior categories ($rs < |.10|$, $ps > .248$).

General Discussion

This research examined perceivers' information-processing strategies during the formation of biased intergroup evaluations. We developed the SIB hypothesis to help organize our predictions. The first premise of the SIB hypothesis states that self-knowledge guides expectancies for novel in-groups. This implies that expectancies for the in-group, like expectancies for the self, are predominantly positive. It is important, however, that not all positive information is self-congruent. Thus, information must be both positive and self-congruent to be congruent with in-group expectancies. Likewise, information must be both negative and self-discrepant to be discrepant with in-group expectancies. In Pilot Study 2, we determined that self-congruency is a multiplicative function of behavior valence and typicality, such that the most self-congruent behaviors are positive–typical and the most self-discrepant behaviors are negative–atypical.

The second premise states that perceivers use expectancy-preserving strategies when processing information in the minimal group context. We argued that perceivers use both expectancy-congruent and expectancy-incongruent strategies and that memory can reflect either strategy depending on perceivers' ability to engage in detailed processing and the measure used to assess memory. Below, we discuss our findings regarding each strategy.

Expectancy-Incongruent Information

The SIB hypothesis maintains that perceivers in a minimal group context are more likely to engage in effortful inconsistency-processing when they encounter negative self-discrepant behaviors performed by the in-group, relative to when they encounter similar behaviors performed by the out-group. The present set of experiments provides three sources of support for this argument: (a) the patterns of recall for in-group versus out-group information, (b) analyses suggesting that these patterns are due to effortful processing, and (c) analyses suggesting that these patterns are due to inconsistency processing. We address each issue below.

Patterns of recall. Pilot Study 2 demonstrated that negative–atypical behaviors are reported by most persons to be highly self-discrepant. Because the in-group is an extension of the self, such behaviors will be expectancy-incongruent for the in-group. According to the TRAP model (Garcia-Marques & Hamilton, 1996), cognitive elaboration of incongruent information corresponds with the formation of interbehavior pathways in memory that are relied on in free-recall tasks. Previous research on intergroup memory in the minimal group context had regarded any negative information to be expectancy-incongruent for the in-group. The SIB hypothesis is more specific, arguing that behaviors must be negative and self-discrepant (atypical) to instigate inconsistency-processing. Therefore, the SIB hypothesis predicted that perceivers would recall more negative–atypical in-group than out-group behaviors but that there would be no significant intergroup differences in memory for negative–typical, positive–typical, or positive–atypical behaviors. This precise pattern was found in Experiment 1 and Experiment 2 (under the low cognitive load condition). In Experiment 3, we used an idiographic procedure to determine the specific stimulus behaviors that were self-discrepant for each participant. As predicted, participants in this experiment recalled more negative–discrepant behaviors about the in-group than about the out-group, but they did not differ in their recall for negative–congruent, positive–congruent, or positive–discrepant behaviors for the in-group and out-group.

Effortful processing. Although these patterns are consistent with the SIB hypothesis, they offer no direct evidence that recall for negative–atypical in-group behaviors was due to effortful inconsistency processing. To bolster this argument, we relied on past research demonstrating that elaboration of expectancy-incongruent material is cognitively demanding (Macrae et al., 1993; Srull et al., 1985; Stangor & Duan, 1991). We predicted that a processing context that diminished the capacity to engage in effortful processing would eliminate the intergroup recall effect. Indeed, participants in Experiment 2 whose cognitive capacities were restricted recalled essentially equal proportions of negative–atypical behaviors for the two groups.

It is interesting to note that participants under high cognitive load recalled more positive information about the in-group than about the out-group. This indicates that these participants processed information based on valence rather than self-congruency. This finding parallels research on the processing of self-relevant information under high cognitive load. For example, Swann, Hixon, Stein, and Gilbert (1990) demonstrated that perceivers are less able to retrieve information about the self under cognitively demanding conditions and, therefore, that their responses to feedback about the self are guided by whether this feedback is positive or negative. In other words, valence is a more rudimentary basis on which to filter one's acceptance of self-relevant information, whereas consideration of the information's self-congruency requires a greater depth of analysis (see also Brown, Collins, & Schmidt, 1988; Jussim, Yen, & Aiello, 1995; Sedikides, 1993; Sedikides & Strube, 1997). Our recall findings under high cognitive load, then, suggest that this depth-of-processing perspective may apply to the interpretation of in-group-relevant as well as self-relevant information. Given sufficient processing capacity, perceivers are sensitive to the self-discrepant nature of novel in-group information, but, with restricted cognitive capacity, they process in-group information primarily on the basis of its valence.

Inconsistency processing. Demonstrating that a process is effortful, however, does not mean that it necessarily involves inconsistency processing. To bolster the notion that recall for negative–atypical in-group behaviors results from inconsistency processing, we presented memory-judgment associations in Experiment 1. Unlike recall for positive–typical, negative–typical, and positive–atypical behaviors, recall for negative–atypical in-group behaviors was unrelated to intergroup evaluations. This suggests that this information was differentiated from the overall in-group impression—that it was not used as a basis for evaluating the in-group.

Finally, other research has indicated that persons with positive self-views extend this positive evaluation to novel groups linked to the self (Gramzow, 1999). Therefore, negative self-discrepant in-group information is particularly expectancy incongruent for persons with high self-esteem and, thus, is especially likely to elicit elaborative inconsistency processing among high self-esteem persons. Indeed, higher levels of self-esteem were associated with greater recall for negative self-discrepant in-group (but not out-group) behaviors in Experiment 3. This effect emerged only when focusing on negatively worded items from the self-esteem scale (e.g., "At times, I think I am no good at all"). That is, perceivers who disagreed more with negative statements about the self also recalled more negative self-discrepant behaviors engaged in by the in-group. Thus, we observed an interesting parallel between a self-evaluation process (denying negative statements about the self) and an in-group impression-formation process (elaboratively processing negative self-discrepant information about the in-group).

Expectancy-Congruent Information

The SIB hypothesis predicted that positive–typical (highly self-congruent) behaviors would be congruent with expectancies for the in-group. According to the TRAP model (Garcia-Marques & Hamilton, 1996), the congruency between a behavior and the expectancy for the target group facilitates memory on heuristic tasks, such as the group-assignment task we used in Experiments 1 and 2. In these two experiments, participants correctly assigned more positive–typical in-group than out-group behaviors. In other words, when reexposed to positive–typical information, perceivers were more likely to attribute these behaviors to the in-group than to the out-group. In Experiment 2, high cognitive load did not interfere with this pattern of response, suggesting that this tendency is largely unaffected by cognitive capacity at the time of processing. This finding is consistent with the notion that the effect results from an automatic inference (a heuristic-guided response) that is based in part on the degree to which behavior is representative of the in-group expectancy.

However, it is important to note that there were several inconsistencies in the group-assignment data. Perceivers assigned correctly more negative–atypical in-group than out-group information in Experiment 1, whereas they correctly assigned more negative–typical in-group than out-group information in Experiment 2. Because of these inconsistencies, we computed a combined effect size estimate examining group membership effects within each behavior category across both experiments (Table 3). We used a formula for computing Cohen's effect size estimate (d) that is specific to data from repeated-measures designs (Dunlap, Cortina, Vaslow, & Burke, 1996).

These analyses indicate that the combined group-membership effect was significant for positive–typical behaviors ($d = .306$) and negative–typical behaviors ($d = .197$) but was not significant for negative–atypical ($d = .088$) or positive–atypical ($d = -.007$) behaviors. In short, perceivers assigned correctly more in-group-typical than out-group-typical information across the two experiments. This pattern was not predicted initially. However, it is in line with the notion that self-congruency, more so than information valence, guides expectancies for novel in-groups. Recall that par-

Table 3
Group-Assignment Task: Effect Size Estimates and 95% Confidence Intervals for Group-Membership Effects by Trait Valence and Typicality

	Typical		Atypical	
Experiment	Positive	Negative	Positive	Negative
Experiment 1				
Cohen's d	.265	.158	−.038	.264
95% CI	±.233	±.231	±.231	±.233
Experiment 2				
Cohen's d	.349	.240	.026	−.096
95% CI	±.241	±.239	±.238	±.238
Combined effect				
Cohen's d	.306	.197	−.007	.088
95% CI	±.168	±.166	±.166	±.166

Note. d = difference between proportion of in-group and out-group behaviors correctly assigned (Dunlap et al., 1996); CI = confidence interval.

ticipants in Pilot Study 2 rated typical behaviors to be more self-congruent than atypical behaviors. The finding that perceivers attributed typical behaviors to the in-group more than the out-group (within both the positive and negative conditions) may be because these behaviors are more self-congruent, relative to atypical behaviors.

As a reminder, the group-assignment task followed the recall and evaluative judgment tasks in both experiments. Participants' responses during this task may have been influenced by the information they had recalled earlier or by their previous evaluations of the two groups. Neither influence can be ruled out. However, the patterns of group assignment do not match responses in the other two tasks: Participants attributed more typical behaviors to the in-group, despite having recalled essentially equivalent proportions of in-group and out-group typical behavior; likewise, participants attributed more negative–typical behaviors to the in-group, despite having evaluated the in-group more favorably than the out-group.

Integration of SIB With Other Perspectives

These patterns of intergroup memory occurred within a context in which perceivers formed biased intergroup evaluations. Perceivers rated the in-group as more agreeable, more intelligent, and more globally positive than the out-group, despite being shown equivalent information about each group. These findings join numerous others in demonstrating evaluative intergroup bias in the minimal group context, dating back to Rabbie and Horwitz (1969). Perceivers did not rate the out-group as more abrasive than the in-group, which is consistent with the notion that intergroup bias is largely a function of bolstering the in-group rather than debasing the out-group (e.g., Brewer, 1979). This positive–negative asymmetry also has been emphasized by Mummendey and her colleagues (Mummendey & Otten, 1998). We believe that the processes outlined by the SIB hypothesis complement existing research and theory involving minimal groups, and intergroup relations and social information processing more generally.

Memory for minimal groups. In part, we developed this research in response to inconsistencies in the memory literature involving minimal groups. Howard and Rothbart (1980) found support for congruency effects, whereas Schaller and Maass (1989) found support for incongruency effects. The SIB hypothesis builds on this previous work in two ways. First, it identifies the self as the source of expectancies about novel in-groups, rather than equating intergroup expectancies with valence. Second, it isolates ways in which both expectancy-congruent and expectancy-incongruent processing strategies can influence memory patterns.

Memory for preexisting groups. In apparent contrast to conclusions from the present research, other researchers have reported that perceivers are more attentive to expectancy-incongruent information about the out-group than about the in-group (Bardach & Park, 1996; Wänke & Wyer, 1996). For example, Vonk and van Knippenberg (1995) reported that reading times were longer for stereotype-inconsistent than for stereotype-consistent behaviors when the target was an out-group member, but not when the target was an in-group member. These authors maintained that perceivers have a greater cognitive tolerance for inconsistent in-group information because they expect more within-person and within-group variability for the in-group than the out-group. This interpretation is based on the out-group homogeneity effect, whereby out-group members are perceived to be more similar to one another than are in-group members (for a review, see Linville & Fischer, 1998). Our research, however, was guided by the argument that perceivers are particularly attentive to deviation on the part of in-group members.

A key aspect of our research that differs from the research described above is our focus on novel rather than preexisting groups. Out-group homogeneity effects occur more reliably for preexisting than for minimal (novel) groups (Ostrom & Sedikides, 1992). Simon (1992) reviewed aspects of the intergroup context that lead to the perception of in-group homogeneity, such as when the evaluative dimension is highly relevant to the perceiver's social identity. Findings of in-group homogeneity suggest that the tolerance for variability is not always greater for the in-group than the out-group. Instead, expectancies for in-group or out-group homogeneity are moderated by the particular dimension of judgment and the processing context. According to the SIB hypothesis, self-congruency would represent a dimension on which perceivers are more sensitive to in-group than out-group deviance during the formation of impressions within a minimal group context. This specific possibility is consistent with research on in-group homogeneity, but has yet to be examined directly.

The social identity and self-categorization perspectives. According to social identity theory (SIT; Tajfel, 1978; Tajfel & Turner, 1986), a motivation toward positive distinctiveness underlies intergroup impression formation. Simply put, a person's self-esteem is derived in part from the positivity of his or her social identifications. A positive social identity is obtained by differentiating an internalized in-group from a relevant out-group in a way that is in-group favoring. The explanation for evaluative intergroup bias offered by SIT is motivational: perceivers are motivated to maintain positive collective self-esteem. The SIB hypothesis does not propose directly that perceivers are motivated toward positive distinctiveness, but it does specify information-processing strategies that are consistent with this motivation. These strategies are the elaboration and discounting of negative self-discrepant in-group information and the attribution of self-congruent information (which is usually positive) to the in-group.

Self-categorization theory (SCT; Turner et al., 1987) emerged from the social identity tradition with an explicit emphasis on psychological group formation. Like the present SIB hypothesis, SCT was developed, in part, to explain the cognitive mechanisms that give rise to positive distinctiveness. There is one important difference, however, between these two perspectives. The SIB hypothesis maintains that perceivers use personal self-knowledge to interpret group-relevant information. SCT, by contrast, maintains that perceivers derive prototypes of the in-group and the out-group, and, through a process of depersonalization, position the self accordingly (i.e., as an in-group or out-group member). Thus, the two perspectives make opposing predictions regarding the direction of causation. According to the SIB hypothesis, the direction is from self-knowledge to group impression. According to SCT, the direction is from group knowledge to self-impression (i.e., "self-stereotyping").

Despite this difference, it may be possible to integrate the two perspectives using the language of SCT. In the initial process of forming an in-group prototype, knowledge about the personal self may function as the basis for what SCT terms "meta-contrast."

Meta-contrast involves the self being drawn perceptually toward the in-group in an intergroup context (and the in-group being drawn away from the out-group). This process could lead the perceiver to notice discrepancies between personal self-knowledge and incoming knowledge about the in-group and, therefore, to be particularly likely to recall these discrepancies. In effect, the mechanisms described by the SIB hypothesis may be antecedent to the mechanisms of depersonalization and self-stereotyping described by SCT. The SIB hypothesis addresses a perceiver's orientation toward information regarding a novel in-group about which he or she knows only that the group is link to the self. In this context, knowledge about the personal self may guide processing of group-level information. After a stable in-group prototype has been constructed, however, self-stereotyping may occur within intergroup contexts in the manner described by SCT. Consistent with this notion, the self-aspect model suggests that positive and important aspects of the individual self are used to form the basis for the collective self (Simon & Hastedt, 1999).

Black sheep effect. Also within the social identity tradition, research on the black sheep effect may be relevant to the present findings. Like the SIB hypothesis, this work has suggested that perceivers are sensitive to behaviors that violate in-group expectancies. Marques and Paez (1994) reviewed six studies demonstrating that persons who violate in-group norms ("black sheep") receive especially negative reactions from fellow in-group members. They argued that pressures toward in-group uniformity make in-group deviants especially threatening when this deviance occurs on a dimension that is relevant to social differentiation. According to the SIB hypothesis, self-congruency provides a meaningful dimension on which to differentiate novel in-groups and out-groups. Therefore, consistent with the black sheep effect, in-group behaviors that are negative and self-discrepant will draw special attention in the minimal group context, because these behaviors represent deviation from a relevant dimension for intergroup differentiation.

Summary and Conclusion

We developed the SIB hypothesis to predict patterns of social memory in the minimal group context. Because perceivers form biased intergroup impressions in this context (even when presented with equivalent information about the two groups), we reasoned that they are likely to process in-group and out-group information differently. We traced the source of positive in-group expectancies to the self and specified two information-processing strategies that may help preserve a positive in-group expectancy. Results from a recall task suggested that perceivers are sensitive to negative self-discrepant in-group behavior more so than negative self-discrepant out-group behavior. Results from a group-assignment task suggested that perceivers are more likely to associate the in-group than the out-group with self-congruent behaviors. Each of these processes—the elaborative processing of negative self-discrepant in-group behavior and the matching of the in-group with self-congruent behavior—underlie the formation and maintenance of more favorable in-group than out-group impressions.

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Appendix

Stimulus Behaviors

List A	List B
Positive–Atypical	Positive–Atypical
Managed the local campaign for a presidential candidate	Brushes teeth after each meal
Fixed a leaky faucet	Helped the neighbors move their piano
Put money in the meter for an unknown driver	Read an epic novel over spring vacation
Positive–Typical	Positive–Typical
Hit the ball at a softball game	Told a funny joke at a party
Complimented coworkers on their clothing and appearance	Went for walk on the first warm day in March
Tried to involve a shy friend in social activities	Planted flowers around the home
Went for a picnic in the park	Enjoyed star-gazing on clear summer nights
Goes to church on a regular basis	Doesn't smoke in other people's apartments
Stopped to let another car into the line of traffic	Went to the mountains for a vacation
Negative–Atypical	Negative–Atypical
Picked up several hitch-hikers	Asked the same question in class three times
Refused to loan class notes to a friend who had been ill	Tricked housewife into paying for magazine
Cut out articles from library journals	Could not add numbers without a calculator
Negative–Typical	Negative–Typical
Pushed someone during a concert	Ridicules people behind their backs
Didn't return borrowed money	Looked through belongings w/o permission
Didn't complete an important assignment on time	Lied to romantic partner about dating others
Often uses incorrect grammar	Told someone the end of a movie
Didn't leave an important phone message for roommate	Laughed at a person who tripped on a curb
Went back on a promise to parents	Unable to name senators from home state

Note. w/o = without.

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