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Automatic Activation of Impression Formation and Memorization Goals: Nonconscious Goal Priming Reproduces Effects of Explicit Task Instructions

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According to the auto-motive model (J. A. Bargh, 1990), intentions and goals are represented mentally and, as representations, should be capable of nonconscious activation by the environmental context (i.e., "priming"). To test this hypothesis, the authors replicated 2 well-known experiments that had demonstrated differential effects of varying the information-processing goal (impression formation or memorization) on processing the identical behavioral information. However, instead of giving participants the goals via explicit instructions, as had been done in the original studies, the authors primed the impression formation or memorization goal. In both cases, the original pattern of results was reproduced. The findings thus support the hypothesis that the effect of activated goals is the same whether the activation is nonconscious or through an act of will.

One's current intentions and goals affect not only what one considers important enough to pay attention to, but also how one uses, interprets, and subsequently remembers that information. Although that is a noncontroversial statement today, it was a radical departure from the dominant view of perception when Bruner and Postman (1948) originally proposed it. To claim that motivation influences perception was a major break with the then-dominant view that perception and judgment were entirely stimulus-driven (Stevens, 1951). The result of their claim that needs and motivations influence perception was the "New Look"—a flood of studies demonstrating that an individual's goals greatly influence which information the individual attends to and perceives in the environment, as well as how he or she interprets and remembers that information (Allport, 1955; Bruner, 1951, 1957). Jones and Thibaut (1958) subsequently introduced this idea to the domain of social perception, describing the influence that various potential interaction goals might have on selective attention to and use of information about one's interaction partner.

After a period in which motivational and cognitive accounts of phenomena were viewed as mutually exclusive and competing instead of complementary and interdependent (see Gollwitzer & Bargh, 1996; Sorrentino & Higgins, 1986b), there recently has been a significant advance in theory and research on the motivation–cognition interface (e.g., Chaiken, Giner-Sorolla, & Chen, 1996; Gollwitzer & Moskowitz, 1996; Higgins & Sorrentino, 1990; Hilton & Darley, 1991; Sorrentino & Higgins, 1986a). It is now widely acknowledged that the intentions and goals people have while interacting with each other exert a powerful influence over the ways they attend to, perceive, judge, and remember that information. There has also been a complementary increase in our understanding of the cognitive bases of motivation.

As to the effect of goals on cognition, there is now abundant evidence that the particular goal a perceiver brings to a social interaction greatly affects the perceiver's processing of that information—that is, the way he or she organizes it in memory, recalls it, and forms it into impressions and judgments. For example, the goal to form an impression of a target person leads to a greater degree of thematic organization of presented behavioral information about the target than does the goal to memorize the information (Hamilton, Katz, & Leirer, 1980b). Impression formation processes have been shown to differ as a function of whether or not one's important outcomes depend on the other person (Erber & Fiske, 1984; Fiske & Neuberg, 1990; Neuberg & Fiske, 1987) or whether or not one anticipates future interactions with the target (Devine, Sedikides, & Fuhrman, 1989), with less stereotypic and more individuating judgments formed under outcome dependency and anticipated-interaction conditions. The range of social information processes, from attention allocation, encoding, memory organization, and retrieval to higher order judgment, have all been shown to vary as a function of the information-processing goals operative in a given situation (for reviews, see Gollwitzer & Moskowitz, 1996; Srull & Wyer, 1986; Wyer & Srull, 1986, 1989).

Yet whereas models have recognized the important determining nature of the current goal for the outcome of information processing and judgment, until recently there has been little research on the cognitive determinants of the goal itself. In experimental situations the various processing goals usually are given to participants explicitly through instructions (see Bargh, 1990), leaving open the question of what determines which goal

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the individual will pursue when left to his or her own devices. Recently, however, three different sources of goals have been identified and discussed.

The first source of goals is *structural:* the relative power differential between people interacting (Brewer, 1982; Fiske, 1993; Kipnis, 1976). To the extent that one party in an interaction has power over another, the relatively powerless person is motivated to process information about the relatively powerful person effortfully and accurately, because his or her important outcomes depend on what that person does. The relatively powerful person, on the other hand, does not have his or her outcomes in the hands of the other, and faces no consequences for an inaccurate impression, and so is more likely to use less effortful processing strategies, such as stereotyping, in forming an impression of the other.

A second avenue of research on sources of goals has taken an *individual-difference* tack. Several recent research programs exemplify this approach. First, Cialdini, Trost, and Newsom (1995) developed a scale that identifies those who do versus do not have a preference for consistency among their beliefs, attitudes, actions, and judgments. Cialdini et al. conducted a study in which only persons who did have this preference—roughly half of the participants studied—showed the classic cognitive consistency effects in three standard paradigms: balance, dissonance, and "foot in the door." Thus, people apparently differ in the extent to which maintaining consistency in their cognitions is an important cognitive goal.

Relatedly, Chaiken and her colleagues (Chen, Shechter, & Chaiken, 1996) demonstrated individual differences in the goals pursued in processing persuasive messages. High self-monitors, for example, are much more likely than low self-monitors to pursue a goal of having their interaction partner like them (termed an "impression-motivated goal") and so position their attitude to be in line with what they believe to be the partner's attitude. Yet another example of the individual-difference approach was provided by Jarvis and Petty (1996), who differentiated people who do versus do not have a "need" or preference to evaluate as good or bad the people, objects, events, and other information they encounter in the environment.

The focus of the present experiments was on a third way in which the goal-source issue has been addressed: the *auto-motive* hypothesis (Bargh, 1990; Bargh & Gollwitzer, 1994). This model holds that although many of the goals an individual pursues are the result of conscious deliberation and choice, conscious choice is not necessary for goal activation and operation. First, the model assumes that goals and intentions are represented in memory in the same way that social attitudes, constructs, stereotypes, and schemas are. Second, because constructs and stereotypes are capable of being automatically activated by relevant environmental stimuli (for reviews, see Bargh, 1994; Greenwald & Banaji, 1995), goal representations should have this capability as well, given the same conditions that lead to the development of automaticity in the other forms of representation. That is, with repeated and consistent choice (i.e., activation) of a particular goal in a certain social situation over time, the representation of that goal may become directly and automatically linked in memory to the representation of that situation (Bargh, 1984, 1990; Hebb, 1948; Posner, 1978). As a result, situational features in the environment can automatically trigger goals chronically associated with those features. The auto-motive model further holds that the automatically activated goal, in turn, activates plans to achieve the goal and that these plans then operate interactively with the available goal-relevant information in the environment (Norman & Shallice, 1986; Schank & Abelson, 1977; Wilensky, 1983). According to the model, the entire sequence of goal activation and operation can occur without the individual's intention or awareness (Bargh & Barndollar, 1996).

Bargh, Gollwitzer, and their colleagues demonstrated in several recent experiments that social–behavioral goals can be automatically activated or "primed" (for reviews, see Bargh, in press; Bargh & Barndollar, 1996; Bargh & Gollwitzer, 1994). These researchers used priming or temporary accessibility to simulate the effects of chronic goal accessibility. Thus, goals made more accessible through priming were expected to behave as did goals made more chronically accessible through frequent and consistent use. Previous research on impression formation has shown that, indeed, the qualitative effects of primed and chronically accessible trait constructs are identical (Bargh, Bond, Lombardi, & Tota, 1986; Bargh, Lombardi, & Higgins, 1988). In Bargh, Gollwitzer, and Barndollar's (1996; Experiments 1 and 2) research, participants primed via a "language test" in an ostensibly unrelated first experiment behaved in line with the primed goal in a second experiment in which that goal could be pursued. Thus, for example, participants whose achievement goal had been nonconsciously primed attained higher scores on a word search puzzle than did control group participants.

Given this support for the auto-motive principle in the behavioral realm, it is reasonable to expect that cognitive, information-processing goals can also be activated nonconsciously via priming techniques. According to the auto-motive model, how a goal representation becomes activated—whether consciously or nonconsciously—has no effect on whether it operates and produces its effects. Thus, if we nonconsciously primed the social information-processing goals that previous researchers have given to their experimental participants via explicit instructions, we would expect to find the same qualitative effects.

The Priming of Cognitive Goals

Although the hypothesis that cognitive goals can be automatically activated has not yet been tested directly, several recent experiments provide encouraging preliminary support for this prediction. These studies are similar in that the processing goals that were (consciously) pursued in one task were shown to carry over to affect cognition during a subsequent, ostensibly unrelated task, even though participants did not consciously choose the carried-over goal in the second task.

Gollwitzer, Heckhausen, and Steller (1990) explicitly instructed participants in the first phase of their study to adopt either a deliberative or an implemental mind-set while thinking about a personal problem. The deliberative mind-set involved thinking about alternative approaches to solving the problem, whereas the implemental mind-set involved considering specific actions they could take to solve the problem. The second phase of the experiment, which the participants believed to be unrelated to the first, consisted of completing a fairy tale after

being given just the opening sentences; one such tale involved a king who had to go away to war but was concerned about leaving his daughter, the princess, at the castle unprotected. Participants who had a deliberative mind-set in the first phase were more likely to write continuations of the fairy tale in terms of all the possibilities the king was thinking about, whereas those who had previously been in an implemental mind-set wrote continuations characterized by actions the king took to solve the problem.

Chen et al. (1996) also used the unrelated-first-experiment priming technique to activate one of two motivations in their participants: to make a good impression on another person or to hold accurate beliefs. Participants were instructed to imagine themselves in a situation in which they were concerned either with making an accurate assessment of that situation or with making a good impression on someone else. In an ostensibly unrelated second experiment, participants were told that they would be discussing their opinions on a specific issue with another participant, who was described as holding either a pro or con position on the issue. All participants were then given the same essay about the topic, which contained arguments on both sides, and asked to indicate their own position on the issue. As predicted, the final attitude of those who had recently imagined themselves being concerned with ingratiating themselves with another person was more in line with that of the (fictitious) other participant than was the final attitude expressed by participants in the accuracy motivation priming condition.

Bator and Cialdini (1996) used a priming procedure to activate participants' consistency motivation, that is, the degree to which they were motivated to hold consistent cognitions. In the first task, participants read an essay in which the writer either did or did not express a value for consistency between words and deeds. In the allegedly unrelated experiment that followed, participants wrote a counterattitudinal essay under a free-choice or no-choice condition. In this standard dissonance paradigm, the usual finding is that attitudes in the free-choice group are more in line with the counterattitudinal essay than attitudes in the no-choice group. However, Bator and Cialdini found this effect only for participants whose consistency motivation had been primed by the first task.

As noted, a feature of the goal priming manipulations in these studies that is important to the auto-motive hypothesis is that the goals were consciously and actively engaged in during the priming task. Participants pursued a goal themselves, imagined themselves pursuing it, or read about another person who pursued it. In all these cases, therefore, the goal representation had been recently and explicitly used. The auto-motive hypothesis, on the other hand, posits that goals can be activated by environmental stimuli unconditionally, without previous or current involvement of conscious intention and choice. Thus, an exact and conservative test of the auto-motive hypothesis in the case of cognitive goals waits on a demonstration that goals can be primed passively and nonconsciously, and then produce the same effects as when they are pursued consciously and deliberately.

Purpose of the Present Research

The purpose of the present research, then, was to test experimentally the notion that cognitive goals can be preconsciously activated by environmental features. As in studies demonstrating the preconscious activation of behavioral goals, we used priming as a proxy for features of the social environment. To the extent that our priming of goals produces the same effects that are found when the same goals are consciously induced (i.e., explicitly via experimental instructions) in previous studies, we would have evidence that goals can become active preconsciously.

Specifically, we conducted two experiments in which we tested the hypothesis that well-established findings about the effects of goals on impression formation can be replicated when the cognitive goals are not consciously and explicitly given to participants, but rather are primed nonconsciously. By "nonconscious" we mean that the individual is not aware of having or working toward these goals; they are activated by a means other than conscious choice. This can be done by presenting priming stimuli either to participants' conscious awareness (i.e., supraliminal priming) or to their preconscious (i.e., subliminal priming), as long as participants are not aware of the potential influence of the priming stimuli on their subsequent information processing.[1] In the present experiments, we used both supraliminal and subliminal priming techniques.

The two paradigms that we selected for replication are among the most historically important in social cognition research (Smith, in press). In Experiment 1, we used the Scrambled Sentence Test supraliminal priming technique (Srull & Wyer, 1979) to prime either an impression formation or a memorization goal just before replicating Hamilton et al.'s (1980b) seminal impression-set versus memory-set study. In Experiment 2, we used the subliminal priming technique of Bargh and Pietromonaco (1982; see also Bargh et al., 1986) to prime an impression formation goal (or no goal) before replicating the classic person memory study by Hastie and Kumar (1979).

Experiment 1

Hamilton et al. (1980b) provided one of the earliest demonstrations of the impact that operative processing goals have on perceivers' memory for others. In their study, participants read a series of sentence predicates describing various behaviors of a target person; the behaviors were chosen to represent four distinct personality trait categories. Before this task, the experimenter induced one of two processing sets (i.e., cognitive goals) in participants by instructing them either to remember as much of the information as possible (a memory set) or to form an impression of the target person described by the various behaviors (an impression set). After performing a brief filler task, all participants were asked to recall as many of the behavioral descriptions as possible. Counterintuitively at the time, participants whose goal had been to form an impression of the target person actually recalled more of the behavioral descriptions

[1] Indeed, in several research domains, such as trait construct accessibility and stereotyping, the same priming effects have been found regardless of whether the technique used was supraliminal or subliminal; what matters for the occurrence of priming effects is not conscious awareness of the priming stimuli but awareness of the possible influence of those stimuli on subsequent processing (for a review, see Bargh, 1992).

than did those whose goal had been to memorize the information.

This proved to be a very robust finding (Hamilton et al., 1980a, 1980b; Hartwick, 1979; Srull, 1981, 1983; Srull, Lichtenstein, & Rothbart, 1985; Wyer, Bodenhausen, & Srull, 1984; Wyer & Gordon, 1982) that prompted a surge of research on the mediation of this recall advantage (Hamilton et al., 1980b; Klein & Loftus, 1990; Wyer & Srull, 1989). In particular, clustering measures have been used to analyze the sequential order in which behavioral items are recalled, enabling an inference concerning the organizational structure imposed on the items by a participant.

The analysis of clustering in free-recall protocols suggested that goals influence not only the amount of information recalled, but also the way in which the information is organized and stored in memory (e.g., Cohen & Ebbesen, 1979; Hamilton, 1981; Hamilton et al., 1980b). The order of recalled items characteristic of participants given memory instructions tends to be directly determined by the temporal order in which the items are presented. In contrast, participants given instructions to form an impression tend to manifest more clustering around trait constructs, indicating the use of person-relevant schemas to impose organization on the information by linking items in the same conceptual class (trait categories in the case of the Hamilton et al., 1980b, study). Presumably, it is this organization of information in memory around meaningful constructs that is responsible for the greater recall exhibited by impression-set participants. Importantly, however, greater clustering is found for impression-set participants only when the behavioral information is related to several distinct conceptual categories (Srull, 1983) and not when the presented behaviors represent the presence or absence of only one trait category (Hastie & Kumar, 1979; Srull, 1981).

Experiment 1 was designed to test the hypothesis that the effect of conscious processing objectives on the organization of social information in memory (Hamilton et al., 1980b) can be replicated when the cognitive goals are activated outside of awareness, instead of explicitly given to participants. Specifically, we hypothesized higher clustering and recall for participants primed with a goal to form an impression than for participants primed with a goal to memorize. Participants were first supraliminally primed with words related to either an impression formation goal (impression goal condition) or a memorization goal (memory goal condition) in what was ostensibly a language experiment.[2] In an allegedly unrelated second experiment, participants read a series of sentence predicates describing various behaviors. After performing a brief filler task, participants were asked to recall as many of the stimulus behaviors as they could.

Method

Participants. Thirty-seven male and female students enrolled in an introductory psychology course at New York University participated in the experiment in partial fulfillment of a course requirement. Seven participants did not meet the criterion of having learned to speak English before the age of 10 years, and their data were excluded from all subsequent analyses. The responses of the remaining 30 participants fell equally into the two experimental conditions.

Apparatus and materials. The 3.96 m × 3.05 m experimental room contained two portable computer stands on which two Power Macintosh 6100/60 computers were placed. The stands were separated by a 1.52 m tall × 1.22 m wide divider, enabling 2 students to complete the procedure independently. A chair positioned next to each computer allowed participants to access the keyboard on a desk that slid out from the stand. The computer task used a program written in Super Lab Version 1.68 experiment preparation software.

The Scrambled Sentence Test (Srull & Wyer, 1979) designed to activate nonconsciously either an impression formation or a memory-processing goal included 15 items, each requiring the participant to form a grammatically correct four-word sentence from five words presented in a scrambled order. Examples of the test items are "idea has he impression an" (impression goal) and "somewhat memory prepared I was" (memory goal). In the impression goal condition, words related to forming an impression of someone (e.g., *opinion, personality, evaluate,* and *impression*) were embedded in 13 of the items. In the memory goal condition, words related to memorizing information (e.g., *absorb, remember, retain,* and *memory*) were embedded in 13 of the items. All remaining words in both conditions were neutral with respect to both processing goals.

The sentence predicates presented in the second phase of the experiment described behaviors representing the same four trait categories used by Hamilton et al. (1980b): social/interpersonal, athletic, intelligent, and religious. Seven of the behavioral descriptions we used in the present study were from Hamilton et al. (1980b), 8 were from among those developed by Hastie (1980; Hastie & Kumar, 1979), and 9 we constructed expressly for this experiment, for a total of 24 phrases, 6 in each of the four trait categories. Examples of the sentence predicates are "had a party for some friends last week" (social/interpersonal), "went skiing in Colorado for the weekend" (athletic), "caught the error in the mechanic's calculations" (intelligent), and "read the Bible in his hotel room" (religious). We arbitrarily constructed two different presentation orders with no consecutive appearances of behaviors from the same category.

Procedure. There was a maximum of 2 participants in any given session. Upon arrival, the participants were shown into the experimental room and seated in front of the computers. In each session, 1 participant was randomly assigned to the impression goal condition and the other to the memory goal condition.

The experimenter told the participants that they would be taking part in several unrelated experiments. The first "experiment," participants were told, examined some of the cognitive processes involved in sentence structure tasks. The pencil-and-paper Scrambled Sentence Test appropriate to each participant's condition was then administered.

After the participants completed the Scrambled Sentence Test, the experimenter thanked them for completing the first "experiment" and told them that the second experiment, an investigation of information processing during reading tasks, would now begin. After receiving instructions from the experimenter (and on the computer screen) to read the phrases that would be presented on the computer monitor with care, because they would be asked questions about them later, the partici-

[2] Although it might have been interesting to include a neutral condition in which participants were not given any information-processing goal, we did not include such a condition for several reasons. First, our intent was to replicate Hamilton et al.'s (1980b) experiment as closely as possible, with the only difference being the way in which the participants were given the memorization and impression formation goals. Inclusion of a neutral goal condition in our study would have no comparable condition in Hamilton et al.'s findings. Similarly, we did not include a memorization goal in Experiment 2 because none of the person memory studies we replicated included one; again, any results we might have obtained with such a goal would have no comparison point within those previous findings.

pants read each of the 24 sentence predicates. To avoid inducing any explicit processing goal regarding judgment of the target person, the experimenter did not refer to the fact that the phrases all described behaviors and did not mention whether all of the behaviors described the same person. Participants were presented with one of the two orders of sentence predicates, and this order factor was completely crossed with condition. Each behavior predicate was presented for 8 s, with a 1-s pause before the next one.

Following the procedure of Hamilton et al. (1980b), the experimenter next administered a 3-min filler task to eliminate any short-term memory effects (e.g., recency and primacy effects) on free recall. As part of another ostensibly unrelated experiment, this filler task required that participants generate arguments both for and against three controversial issues (i.e., abortion, gun control, and capital punishment).

The surprise free-recall test was then administered. Participants were given a maximum of 4 min to recall as many of the stimulus sentence predicates as they could. They were told that although exact wording was not necessary, they should attempt to come as close as possible to the original wording they had read on the computer screen. All participants finished within the time allotted.

Finally, participants were asked to complete a funnel debriefing form that probed for awareness or suspicion concerning our priming manipulation. They were asked (a) what they thought the purpose of the experiment had been, (b) whether they thought any of the different tasks had been related, (c) whether anything they had done on one task had affected what they had done on any of the other tasks, (d) whether they had ever seen or completed a Scrambled Sentence Test for another experiment, and (e) whether they remembered any of the words from the Scrambled Sentence Test or thought any of the words seemed unusual or distinctive. No participant showed any awareness or suspicion of a relation between the different tasks of the experiment or indicated that what he or she had done on one task might have affected how he or she had responded on another. In addition, no participant reported having the intention either to memorize information or to form an impression at any time during the experiment. When asked, participants reported other purposes in line with the cover story given to them of studying cognitive processes involved in sentence structure and reading tasks. This suggests that the priming manipulation did not have its effect through differential construal of the experimental situation in terms of an impression formation versus memorization goal. After completing the debriefing form, the participants were fully debriefed and thanked.

Results and Discussion

Researchers who have studied person perception with correct recall as one of the dependent measures (e.g., Bargh & Thein, 1985; Hastie & Kumar, 1979) have coded recalled items twice, using both a lenient criterion and a strict criterion. However, they have found no significant differences in the results based on the use of lenient versus strict criteria and have based their final analyses solely on the leniently scored ("gist") protocols (see also Hamilton et al., 1980b). We followed this lead and, in all analyses, used scores based on a lenient criterion for accurate recall of the behavioral items. That is, we scored a recalled item as correct if it captured the essential meaning of both the behavioral description and the trait category it represented.

The analysis of clustering for this experiment determined the extent to which items in a recall list were grouped according to the social/interpersonal, athletic, intelligent, and religious trait categories. We coded clustering with the adjusted ratio of clustering (ARC) measure developed by Roenker, Thompson, and Brown (1971).[3] The ARC equation yields a clustering score ranging from 0, indicating no clustering beyond what would be expected by chance, to 1, indicating perfect clustering.

Coding of all protocols for correct recall was followed by the scoring of clustering using the ARC equation. The protocols were then coded for correct recall by a second rater who was unaware of the experimental condition of participants. Interjudge reliability was .86, with the judges agreeing on 247 of the 286 items scored. Discrepancies were resolved through discussion.

In line with the findings of Hamilton et al. (1980b), we predicted that relative to participants primed with a memory goal, participants primed with an impression goal would have higher clustering scores and, as a result of this better organization of social information in memory, would also correctly recall a greater number of behaviors.

To test this prediction, we subjected clustering and recall scores to a multivariate analysis of variance with prime condition (impression formation goal vs. memory goal) and presentation order as the two between-subjects independent variables. There was no significant main effect of presentation order on either of the dependent variables (all $ps > .10$) or on any of the prime condition effects reported below (all $ps > .30$), and so presentation order is not discussed further.

There was a significant overall effect of prime condition across the two dependent measures, Wilks's $\lambda = .77$, $F(2, 25) = 3.64$, $p = .04$. Furthermore, the interaction between prime condition and the repeated measures (dependent) variable was not significant ($p = .17$), indicating that the priming manipulation did not differentially affect the clustering and recall measures. As can be seen in Figure 1, participants who had been primed with the goal of impression formation ($M = .39$) clustered more than did those who had been primed with the goal of memorization ($M = .11$). This is consistent with the results reported by Hamilton et al. (1980b), who also obtained a higher mean clustering score for impression-set ($M = .70$) than for memory-set ($M = .50$) participants.[4] In addition, impres-

[3] Several indices have been proposed to measure clustering in free-recall protocols, including the ARC measure of Roenker et al. (1971) and Bousfield and Bousfield's (1966) deviation measure. The results reported by Hamilton et al. (1980b) were based on Bousfield and Bousfield's deviation measure of clustering. However, they coded protocols using the ARC measure as well, and reported the same pattern of means using this index in their analyses, albeit with only borderline statistical significance. After Hamilton et al.'s (1980b) study, there was a surge of arguments for preferring the ARC measure over Bousfield and Bousfield's index for the analysis of clustering (Murphy, 1979; Ostrom, Pryor, & Simpson, 1981; Srull, 1984; Wyer & Gordon, 1982). This was in part because, unlike the ARC measure, Bousfield and Bousfield's measure has no fixed upper bound. Specifically, the score that indicates perfect clustering for this index changes with the number of categories that the participant recalls and the distribution of the total items recalled across categories. The ARC therefore is the preferred clustering measure by consensus.

[4] We also coded the free-recall protocols with Bousfield and Bousfield's (1966) index and recomputed the analysis on the basis of this measure. The results were virtually identical, with the difference between the clustering of the impression goal condition ($M = 1.33$) and memory goal condition ($M = .20$) being even more significant with this index, $F(1, 26) = 8.23$, $p = .008$.

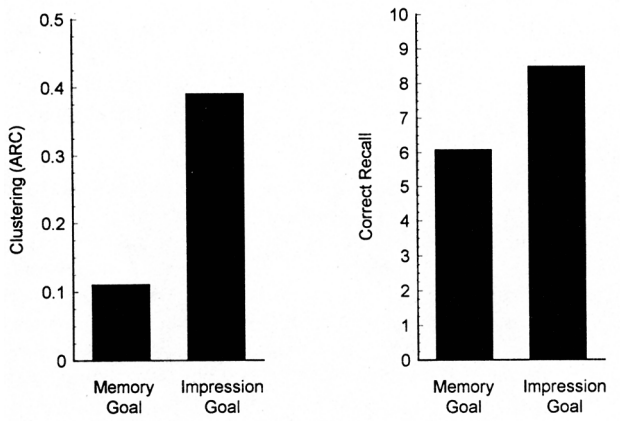

Figure 1. Clustering and correct recall as a function of prime condition. ARC = adjusted ratio of clustering.

sion goal participants (M = 8.47) recalled more of the behavioral descriptions than did memory goal participants (M = 6.07). Hamilton et al. found a similar disparity between the mean recall scores of their impression-set (M = 8.50) and memory-set (M = 5.10) participants.

Our findings, then, closely parallel the pattern of results obtained by Hamilton et al. (1980b) in their study of the effect of different conscious processing goals on clustering and recall. It appears that the information-processing goals that have been shown in previous work to produce differential organization and memory for social information when operating consciously and intentionally have the identical effects on processing when operating automatically.

Experiment 2

Experiment 1 provided encouraging support for the automotive hypothesis of nonconscious goal activation and operation. Nevertheless, it was important to assess whether our findings would generalize to a different experimental paradigm. Moreover, we wanted to provide an even more conservative test of the automaticity of goal activation and operation, one that effectively ruled out any experimental-demand interpretation of the findings of Experiment 1. Therefore, in Experiment 2 we attempted to replicate the effects of conscious goal induction in a paradigm different from the one we used in Experiment 1 and also used a subliminal priming technique that precluded any awareness of the goal priming stimuli.

On-Line Versus Memory-Based Judgments

In addition to the interest in the influence of processing goals on memory for target information, a major focus of research has been the conditions that foster on-line impression formation. Hastie and Park (1986) distinguished between impressions formed on-line, at the time of information acquisition (i.e., while interacting with the target person or otherwise witnessing his or her behavior), and those made later on the basis of the information that can be recalled from memory. Impressions tend to be formed on-line, and not based on memory for the target's behaviors, when the person has the goal of forming an impression while interacting with the target person (Hastie & Park, 1986). A second necessary condition for on-line impression formation is sufficient attentional capacity at the time of information acquisition; if the perceiver is distracted or overloaded with other things demanding his or her attention, he or she has no recourse but to make the judgment at a later time on the basis of the behaviors that are accessible to recall (Bargh & Thein, 1985; Lichtenstein & Srull, 1987; Srull, 1981, Experiment 4). Thus, both the intention to form the impression and sufficient attention to support the integration of the various sources of relevant information are necessary for on-line impression formation.

Thus, another test of the auto-motive hypothesis concerning nonconscious goal operation would be to prime subliminally the goal of forming an impression and then present behaviors ascribed to a target person, but without explicitly instructing the participant to form an impression of the target. Those primed with an impression formation goal should form an impression of the target on-line, whereas those whose impression goal is not primed should not form an on-line impression. In other words, impression-primed participants could be expected to show the same evidence of on-line impression formation as shown by participants in previous person memory studies who received explicit instructions to form an impression of the target.

Of course, even though our participants would not receive explicit instructions to form an impression before being presented with the behavioral descriptions, at some point afterwards they would be asked for their impression of the target. At that time they would consciously and intentionally complete the impression rating scales. In order to provide support for the auto-motive hypothesis, it would be imperative to show evidence that the impression-primed participants had already formed their impression before this explicit instruction to rate the target—that is, on-line instead of exclusively on the basis of what they could recall about the target.

Bargh and Thein (1985) provided just such a demonstration by means of a path analysis assessing the degree to which the impression ratings were a function of the original information presented (either a majority of honest or a majority of dishonest behaviors) versus the subset of behaviors the participant could recall. After presentation of the behaviors, all participants were given a surprise free-recall test in which they wrote down as many of the behaviors as they could. Then they completed the impression rating scales. The path analysis computed the independent influences of the information presented (specifically, the ratio of honest to dishonest behaviors) and of the information recalled by the participant (the ratio of honest to dishonest behaviors recalled) on impressions of the target's honesty.

The purpose of Bargh and Thein's (1985) study was to test whether participants with a chronically accessible trait construct for honesty could still form an on-line impression when under attentional overload conditions. The signature of on-line impression formation in the path analysis was a direct and significant path from the information-presented factor to the honesty rating of the target. As hypothesized, such a direct path was obtained for the participants with a chronically accessible trait construct for honesty but not for the remaining partici-

pants, who lacked this automatic processing structure and showed no direct influence of the information presented, indicating an inability to form an impression on-line when attentional resources were in short supply.

In addition to this direct path between the information presented and the impression judgment, there are two other signatures of on-line impression formation for which we can test. One is a greater sensitivity to the actual behavioral differences between the mainly honest and mainly dishonest target persons, as evidenced by a greater differentiation in honesty ratings of the two targets (Bargh, 1984, pp. 19–21; Hastie & Park, 1986). Another way in which on-line impression formation is revealed is in its theoretical consequences for the pattern of majority versus minority behavior recall over time (Hastie & Kumar, 1979; Srull, 1981). A number of studies have shown that participants motivated to form an impression of another person show a bias toward recalling behaviors incongruent with the impression they form during information acquisition, relative to behaviors that are either congruent with or irrelevant to that impression (Bargh & Thein, 1985; Hastie, 1980; Hastie & Kumar, 1979; Hemsley & Marmurek, 1982; Stern, Marrs, Millar, & Cole, 1984; Wyer et al., 1984; Wyer & Gordon, 1982). Importantly, these effects do not occur in the absence of the impression goal, such as when participants are instead told to memorize the information (Srull, 1981; Stangor & McMillan, 1992). Thus, the emergence of a recall advantage for impression-incongruous behaviors (i.e., the minority behavior type presented) after the point at which the impression is formed on-line is yet a third signature of on-line impression formation; no such incongruity advantage should emerge if an impression is not formed on-line (Srull et al., 1985).

Experiment 2 was a replication of Bargh and Thein's (1985) person memory study, with the following exceptions. First, we presented the behavioral descriptions to all participants under non-overload conditions, so that they had sufficient attention to process the information. Second, no participant received explicit instructions to form an impression of the target person; instead, half the participants had the impression formation goal primed subliminally, and the other half did not. Because both the intention to form an impression and the attentional resources to do so are required for on-line impression formation, and all of our participants had sufficient attentional resources to process the behavioral information, we predicted that only those participants whose impression goal had been primed would show evidence of on-line impression formation.

Method

Overview. Participants performed a parafoveal vigilance task in which words related or unrelated to an impression formation goal were presented outside of awareness. They next read a series of sentence predicates at their own pace on a computer screen; the predicates described honest behaviors, dishonest behaviors, and behaviors irrelevant to the honesty–dishonesty dimension. Participants were presented with either twice as many honest as dishonest behaviors or twice as many dishonest as honest behaviors. A filler task intervened, followed by a surprise free-recall test of the behavior descriptions. Finally, participants were asked to report their impression of the person described by the behavioral phrases they had read. A 2 × 2 design was thus created by the manipulation of prime condition (impression formation goal vs. no goal) and the manipulation of majority type (honest behaviors vs. dishonest behaviors) during the presentation of the sentence predicates.

Participants. Seventy-seven male and female introductory psychology students at New York University participated in the study for credit toward a course requirement. Eleven participants did not meet the language criterion of having learned to speak English before the age of 10 years, and their data were excluded from all analyses. Responses from 6 additional participants were excluded because these participants were familiar with subliminal priming paradigms in general and suspected that words were being subliminally flashed to them in an attempt to influence their responses in some way (although they could not specify how their responses might have been affected). Thus, we computed all analyses on responses from a final sample of 60 participants, with 11 in the impression goal/majority honest condition, 16 in the impression goal/majority dishonest condition, 13 in the no goal/majority honest condition, and 20 in the no goal/majority dishonest condition. All participants had normal or corrected-to-normal vision.

Apparatus and materials. The experimental room was the same as that used in Experiment 1, with two Power Macintosh 6100/60 computers separated by a partition. The *F* and *J* keys on the computer keyboard were labeled LEFT and RIGHT, respectively. All computer tasks used programs written in Super Lab Version 1.68 experiment preparation software.

In preparation for the vigilance task, participants were seated so that the distance between their eyes and a fixation point at the center of the screen was 99 cm when they sat erect in the chair, as they were instructed to do. This ensured that the stimuli were presented outside of participants' foveal visual field (see *Procedure* section). Leaning forward would only restrict the foveally processed region about the fixation point so that stimuli would continue to be presented in the parafoveal region. Marks made on the floor of the room and on the computer stand enabled the experimenter to make sure that the chair and monitor were the proper distance from each other.

All characters presented on the computer screen appeared as black on a white background. For the vigilance (priming) task, three asterisks were constantly displayed at the center of the screen and served as the fixation point. Participants were instructed to focus their gaze on these asterisks at all times during the task.

Each stimulus word flashed for 60 ms and was immediately followed by a 60-ms masking string of letters in the same location. With a screen refresh rate of 15 ms, the presentation length of 60 ms was adequate to ensure that the stimulus words and masks were always exposed to the participants. The masking string ("XQFBZRMQWGBX") was originally designed by Bargh et al. (1986) to present a variety of letter patterns and therefore to be structurally similar to the preceding stimulus words. We used a central (as opposed to energy) pattern mask (see Turvey, 1973, for an explication of this distinction). It has been argued that, unlike energy masking, central masking allows automatic processing of the priming word to proceed, yet interferes with its reaching consciousness (Marcel, 1983, p. 262).

The stimulus word and mask appeared at one of four locations on the computer screen equidistant from the fixation point at angles of 45°, 135°, 225°, and 315° (one in each of the four quadrants). We constructed one randomized location order and gave all participants the same sequence of locations. Within a particular location, we placed each word so that the center of the word was 7.6 cm from the fixation point. At this distance, the stimulus words were within the parafoveal visual field (from 2° to 6° of visual angle) and outside the foveal visual field associated with conscious awareness (Bargh, Raymond, Pryor, & Strack, 1995, Experiment 1; Rayner, 1978). Because (a) participants were told to focus on the central asterisks throughout the task, (b) the stimulus words were flashed for 60 ms each, and (c) 140 ms has been shown to be the minimum time required to move the eyes away from an initial fixation point toward a parafoveally presented stimulus word

(Rayner, 1978), it was not possible for participants to see the stimulus words, even if they immediately looked toward the location of the flash.

The amount of time between word presentations (including the stimulus word and the mask) varied from 2 to 7 s to enhance the "reaction time task" cover story—participants could not anticipate when the next target would be presented and would thus remain vigilant. All participants received one randomized order of time interval lengths. Because we created the sequence of time intervals randomly, it was impossible for participants to learn or predict the length of time between word presentations.

We took these precautions—brief prime word duration, immediate masking, and placement of stimulus content in the parafoveal processing area—so that participants would not become conscious of the semantic content of any of the stimulus words. These safeguards have succeeded in preventing awareness of priming stimuli in previous subliminal priming studies (e.g., Bargh et al., 1986; Bargh & Pietromonaco, 1982; Bargh et al., 1995).

We primed participants either with stimulus words related to forming an impression (impression-goal condition) or with neutral words (no-goal condition). We chose four words to represent each of these two sets. For the impression-goal condition, the stimulus words were *impression, judgment, personality,* and *evaluate.* The prime words for the no-goal condition were *building, coffee, chalkboard,* and *alarmclock.* All participants completed 75 experimental trials, with the four stimulus words for their condition presented repeatedly in a randomized order. Thus, the participants had 75 subliminal exposures to either the impression formation words or to the neutral words.

The honest, dishonest, and neutral behavior descriptions we used were from Hastie (1980; Hastie & Kumar, 1979). Examples are "searched for the owner of the lost wristwatch" (honest), "did not report hitting the parked car" (dishonest), and "rode the elevator to the third floor" (neutral). We ensured that the sets of honest, dishonest, and neutral behaviors we used each had a comparable number of average syllables per sentence predicate (8.92 for honest behaviors, 8.75 for dishonest behaviors, and 8.83 for neutral behaviors) to eliminate any bias for recalling behaviors in a certain set that could result from differential processing times needed to read the different sentence lengths.

We constructed a total of eight lists of 24 behaviors each. Each list consisted of 12 majority behaviors congruent with either honesty or dishonesty, 6 minority behaviors incongruent with that majority trait, and 6 behaviors irrelevant to the honesty–dishonesty dimension. Four of the eight lists represented the majority honest condition, and the other half represented the majority dishonest condition. In addition, there were two random orderings of the 24 behaviors within each of these two list types, with the restriction that within each block of four sentence predicates there would be 2 behaviors consistent with the majority trait presented, 1 behavior inconsistent with that trait, and 1 behavior irrelevant to the trait. We constructed these two orders to ensure that the results were not dependent on the specific order in which the behaviors were presented. Finally, we created two nonoverlapping sets of inconsistent behavioral descriptions for each of the two majority types to allow generalization of results beyond any one specific set of behaviors. We randomly assigned each participant to one of the eight list types formed by the three completely crossed variables of majority type, presentation order, and inconsistent item set.

Participants completed an impression rating form that consisted of 12 trait scales. They rated the stimulus person being described by all of the behaviors on each of the 12 traits on an 11-point scale ranging from *not at all* (0) to *extremely* (10). Half of these traits were relevant to the honesty–dishonesty dimension (e.g., trustworthy, deceitful, sincere), and the other half were irrelevant to this dimension (e.g., stubborn, intelligent, boring). Within the sets of relevant and irrelevant traits, half had positive connotations and were high in social desirability, and the other half had negative connotations and were low in social desirability. We constructed one randomized order of the 12 trait dimensions and administered it to all participants.

Procedure. A maximum of 2 participants took part in each session. Upon arrival, participants were shown into the experimental room and seated in front of the computer monitors. The experimenter randomly assigned them to a behavioral list type and priming condition and informed them that they would be taking part in several unrelated experiments. The experimenter told them that the first experiment investigated attention and visual acuity.

The experimenter then explained the vigilance task, first verbally and then via instructions on the computer screen. The experimenter told participants that the task examined one type of attention by measuring reaction times to see how quickly and accurately they could respond to visual stimuli. We explained that very brief flashes would appear on the screen at unpredictable places and times and their task was to decide as quickly and accurately as possible whether the flash appeared on the right or left side of the screen. We instructed participants to place their index fingers on the two labeled keys of the keyboard and to press the one labeled LEFT if the flash appeared on the left side of the screen and the one labeled RIGHT if the flash appeared on the right side of the screen. A fixation point consisting of three asterisks was presented continually in the center of the screen. We emphasized to participants that because of the unpredictable timing and location of the flashes, the best way to detect all of them quickly would be to keep their eyes focused on the fixation point at all times.

Participants were given six practice trials to become familiar with the procedure and to ensure that they understood it. After answering any questions, the experimenter began the 75 experimental trials of the vigilance task, which took participants approximately 6 min to complete.

After participants had completed this priming procedure, the experimenter told them they would now begin the second experiment. The experimenter (as well as instructions on the computer screen) explained that this next experiment examined the relation between reading comprehension ability and various cognitive processes. The experimenter told the participants that they were to read a series of phrases on the screen (the stimulus behaviors) presented one at a time, controlling how long they looked at each one by pressing the space bar on the computer keyboard when they were ready to read the next phrase. The experimenter told them they would later be asked several questions about the phrases. Although the self-paced nature of this task allowed for differential reading times for the 2 participants in any given session, no participant waited longer than 2 min for the other to finish reading the sentence predicates.

After participants had read the behavioral phrases, the experimenter administered a 3-min filler task to eliminate the effects of working memory on the subsequent surprise free-recall measure. This "environmental knowledge" task, taken from Bargh and Thein (1985), called for participants to list as many of the street names in the immediate vicinity of the university as they could in 3 min. Participants were told that the purpose of this experiment was to examine the attention paid to physical environments.

The surprise free-recall test followed, in which participants were instructed to recall as many of the phrases they had read as they could. They were told that although exact wording was not necessary, they should attempt to come as close as possible to the original wording presented on the computer screen. Although given 4 min to complete this task, all participants finished before this time.

After participants had completed the free-recall task, the experimenter informed them that all of the behaviors they had read had been performed by the same person ("Gregory Cullen"). At this point the experimenter requested their impressions of Gregory and administered the impression rating forms.

After completing the rating scales, participants received a verbal funnel debriefing. They were probed for general suspicion, as well as for

any conscious cognitive goals or strategies they may have formed during the stimulus presentation (especially impression formation). The experimenter then asked participants (a) what they thought the purpose of the experiment had been and what it was trying to study, (b) whether they thought any of the tasks had been related, (c) whether anything they had done on one task had affected what they had done on any other task, (d) whether anything about the experiment seemed strange or suspicious to them, and (e) what they thought the content of the flashes had been during the vigilance task.

If participants indicated knowledge that the flashes consisted of words, the experimenter further probed them for general or specific content of the words. Almost all participants reported that they had seen just flashes or scrambled, "jumbled" letters; among the few who did think or guess that words had been presented, none could report or correctly guess the general or specific content of these prime words. However, as noted earlier, the responses from 6 participants who indicated that they knew of the subliminal nature of the vigilance task or that it had had an effect on their performance in subsequent tasks were excluded from analyses. Importantly, participants in the impression-goal condition did not report having the conscious goal to form an impression any more than did participants in the no-goal condition; in fact, no participant reported having had this goal while reading the stimulus behaviors. Reports of what the participants thought the experiment was about most often reflected various versions and combinations of the cover stories (e.g., visual acuity, reading ability, and attention). After the funnel debriefing, participants were fully debriefed and thanked.

Results and Discussion

We present the results in terms of each of the three signature effects of on-line impression formation: (a) a direct effect of the behavioral information on impressions, partialing out the effect of the behaviors just recalled; (b) a greater difference between impressions of the mainly dishonest and mainly honest targets; and (c) the emergence of an incongruent recall advantage at some point during information acquisition.

Path analysis: On-line versus memory-based impressions. We computed impression favorability indices from participants' impression rating forms by averaging the individual trait ratings after scale reversal on the negative items. For each participant, we calculated indices separately using the six honesty-relevant and six honesty-irrelevant trait ratings. We entered presentation order and inconsistent item set separately into each analysis as an additional between-subjects independent variable to determine whether either moderated any of the effects found. Neither did so, suggesting that the results were not dependent on any idiosyncratic characteristics of one particular sentence predicate order or inconsistent item set.

Our most important prediction was that impressions of the target's ("Gregory's") honesty for the impression-goal condition participants would be a direct function of the proportion of honest behaviors presented, after partialing out the effect of the behaviors the participant had just recalled. We expected that on-line impression formation would not occur for no-goal participants and that therefore their honesty impressions would not be correlated with the proportion of honest behaviors presented.

To test this prediction, we first conducted an overall path analysis to examine the causal relation between the proportion of honest behaviors presented (majority type) and honesty-related trait rating (impression rating), with the ratio of honest to dishonest behaviors recalled (free-recall ratio) included as a possible mediator. We included prime condition (impression goal vs. no goal) as a potential moderator. Most important, however, was the Prime Condition × Majority Type interaction term, which we included to determine whether the direct path of majority type to impression rating was significantly different in the two prime conditions. The finding of significantly different paths would enable us to break down the path analysis according to prime condition and conduct separate analyses at each level of this variable.

The results supported our hypothesis. Majority type significantly predicted free-recall ratio ($\beta = .67$, $p = .0001$), which simply reflects the fact that participants recalled more honest than dishonest behaviors if more honest than dishonest behaviors had been presented. More important, the interaction between prime condition and majority type proved significant ($\beta = .41$, $p = .02$), indicating that, as predicted, the critical path from majority type to impression ratings significantly differed in strength for impression-goal participants and no-goal participants. That is, the extent of on-line impression formation differed reliably as a function of whether the impression formation goal had been primed subliminally. The significant Prime Condition × Majority Type interaction enabled us to conduct separate path analyses for each of the two priming conditions.

Figure 2 shows the separate path analyses for the impression-goal and no-goal conditions. Consistent with our prediction that only impression-goal participants would form on-line impressions, the direct path between majority type and impression ratings was reliable for the impression-goal participants but not for the no-goal participants. (That these two paths were significantly different had been indicated by the significant Prime Condition × Majority Type interaction in the overall path analysis; see above.) Given that the free-recall measure was completed immediately before the impression rating form, thereby increasing the salience of the recalled behaviors, it is particularly noteworthy that the direct path from majority type to impression ratings for impression-goal participants occurred in the absence of any significant mediation by the free-recall measure.

The path analysis results replicate those of Bargh and Thein (1985) in that, in both studies, only participants with both the attentional capacity and the goal to form an impression showed evidence of on-line impression formation. These findings support the auto-motive hypothesis that the effects of an impression goal on the processing of behavioral information are the same regardless of whether the goal is activated consciously or nonconsciously.

Interestingly, no-goal participants not only did not form on-line impressions, but also did not appear to form memory-based impressions—there was no mediation of the majority-type-to-impression-ratings path by free-recall ratio. This suggests that the participants without a primed impression formation goal were unable to form a coherent impression of the target person either on-line or on the basis of behaviors stored in memory. It is possible that because participants were not told that the behaviors described the same person, those in the no-goal condition did not read the behaviors with a single person in mind. If participants thought that different people had per-

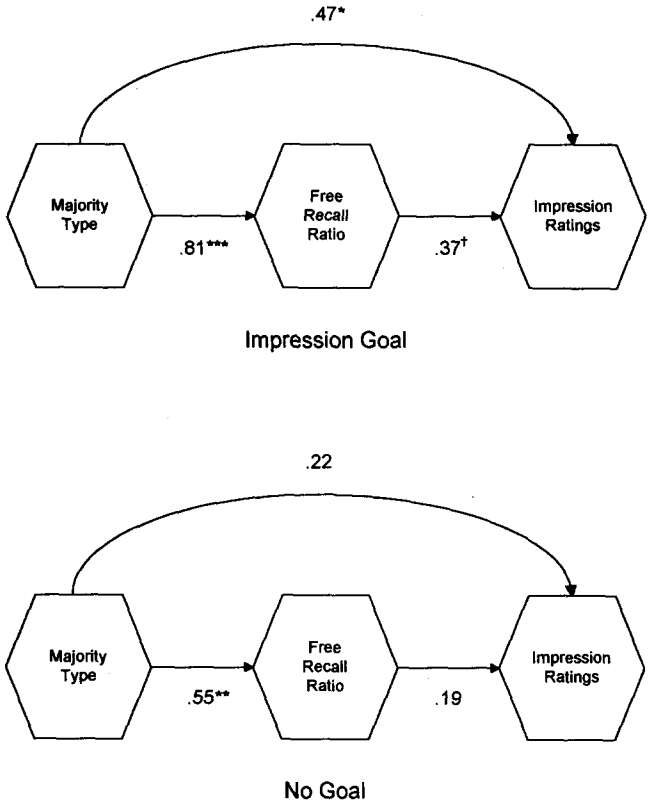

Figure 2. Path analyses of impression ratings as a direct function of proportion of honest behaviors presented (majority type) and its mediation by proportion of honest behaviors recalled (free-recall ratio). $*p < .05$. $**p < .001$. $***p < .0001$. $\dagger p < .10$.

formed the various behaviors, they may have organized them in memory in ways that could have interfered with forming a coherent impression of an individual (e.g., Pryor, Simpson, Mitchell, Ostrom, & Lydon, 1982).

Extremity of impressions. To test the hypothesis that impression-goal participants would form impressions of Gregory that more accurately reflected the type of majority behavior presented (i.e., impressions more polarized on the honesty–dishonesty dimension), we subjected the impression favorability indices to a repeated measures analysis of variance with prime condition (impression goal vs. no goal) and majority type (honest vs. dishonest) as between-subjects factors and relevance (six relevant traits vs. six irrelevant traits) as the repeated, within-subject factor.

There was a main effect of majority type, $F(1, 55) = 35.89$, $p < .0001$, such that participants presented with a majority of honest behaviors reported more favorable impressions of Gregory than did those presented with a majority of dishonest behaviors. Furthermore, a main effect of relevance revealed that impressions were more favorable overall for the irrelevant traits than for the relevant traits, $F(1, 55) = 46.54$, $p < .0001$. Of more theoretical import and interest, the predicted three-way interaction between majority type, prime condition, and relevance (Figure 3) was reliable, $F(1, 55) = 5.80$, $p = .02$.

Interaction contrasts revealed that for relevant-only trait ratings, as predicted, the impressions formed by the impression-goal participants diverged more as a function of the majority behavior type presented than did the impressions of the no-goal participants (see Figure 3): For the Prime Condition × Majority Type interaction, $F(1, 56) = 7.37$, $p = .009$. This was not the case for trait ratings not relevant to the target's honest and dishonest behaviors: interaction $F(1, 56) < 1$.

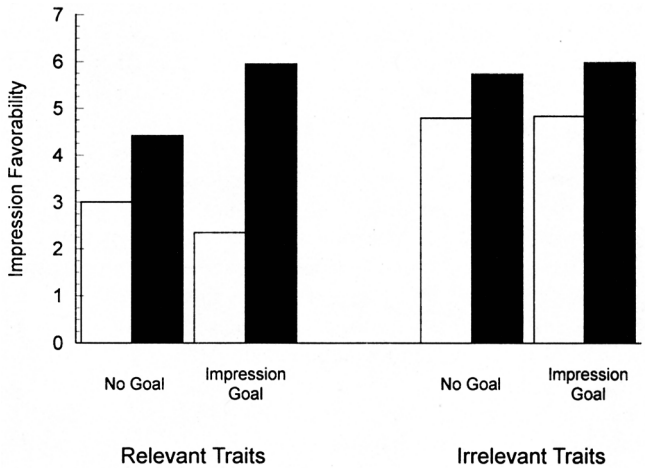

Figure 3. Impression favorability as a function of prime condition, majority type received, and relevance of traits to the honesty–dishonesty dimension.

Figure 4 shows this interaction (for the relevant trait ratings

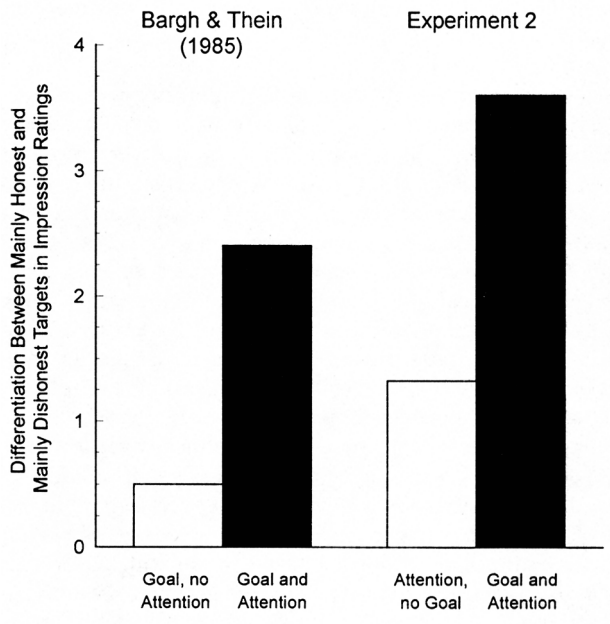

Figure 4. Differentiation between mean impression ratings when participants were given mainly honest target versus mainly dishonest target as a function of attention capacity and goal to form impression.

only) in terms of the difference between the mean impression ratings of the majority honest and the majority dishonest target persons, for both the present experiment and the Bargh and Thein (1985) study it replicated. In both studies, when the goal to form an impression was operating and the participant had sufficient attentional capacity, there was greater observed differentiation between mainly honest and mainly dishonest targets. When the goal was inactive, as in the no-goal condition in the present study, or attentional capacity was insufficient, as in the rapid-paced condition of Bargh and Thein's study (for participants without a chronically accessible construct for honesty), there was much less differentiation between the two targets. The present study thus replicates this additional signature of on-line impression formation but with subliminal activation of the impression formation goal.

Recall advantage for incongruent behaviors. The third signature of on-line impression formation is the emergence of the recall advantage for behaviors incongruent with the majority behavior type, once the impression is formed (Srull et al., 1985). Thus, at some point during the reading of the behaviors, the participant should form an impression of the target and thereafter should give more attention and consideration to behaviors that are inconsistent with that impression in an effort to reconcile them (Srull, 1981). In fact, Srull et al. (1985) demonstrated that it may be only after a substantial amount of behavioral information has been presented that participants are able to extract an evaluative concept of a target person (Srull & Wyer, 1989). Once this impression is formed, however, it can exert its influence on attention and elaboration, resulting in a recall advantage for inconsistent items.

One rater who was unaware of participants' experimental conditions scored all protocols for correct recall using the same lenient gist criterion as used in Experiment 1. A randomly selected proportion of protocols (25%) was then coded by a second judge also unaware of experimental conditions. Interjudge reliability was .95, with agreement on 123 of the 130 items scored.

Having two majority behaviors, one minority behavior, and one irrelevant behavior in each of the six blocks of four behavioral descriptions made it possible to assess whether a recall advantage for the minority behavior type emerged in either the impression-goal or no-goal condition (or both) and at what point this advantage appeared. Inspection of the majority and minority behavior recall means in the impression-goal condition revealed no advantage for minority behaviors until the final trial block, when the minority advantage did emerge. Before this, for four of the first five blocks, majority behaviors were (nonsignificantly) better recalled. No such minority behavior recall advantage emerged for the no-goal condition.

Figure 5 depicts the relative recall of minority versus majority behaviors separately by trial block and goal condition. As may be seen, there was a sudden shift in recall advantage at Block 6 to the minority behavior type only for the impression-goal condition. We assessed this conclusion with a three-way analysis of variance involving prime condition, behavior type, and trial block. Trial block had two levels, formed by comparing the mean of Blocks 1–5 with the mean of Block 6. The predicted three-way interaction was significant, $F(1, 58) = 6.48$, $p = .01$. Within this interaction, the simple two-way Behavior Type × Trial Block interaction was significant for the impression-goal condition, $F(1, 58) = 5.30$, $p = .03$, but not the no-goal condition ($p = .20$).

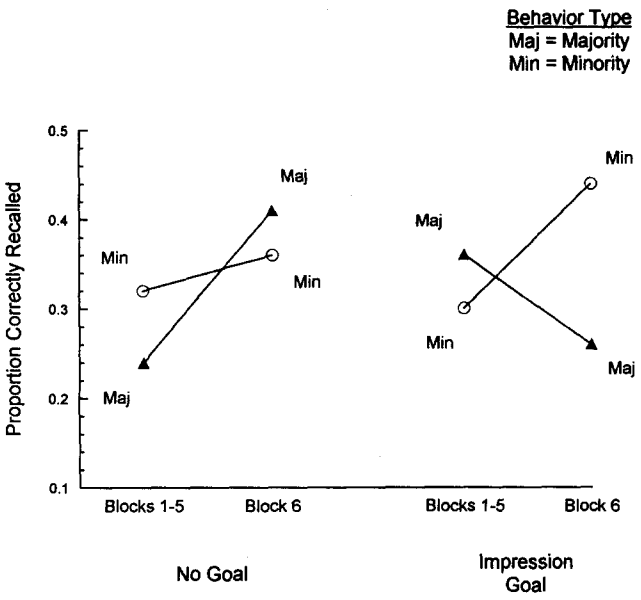

Figure 5. Proportion of behaviors recalled as a function of prime condition, presentation block, and behavior type.

Thus, as predicted, impression-goal but not no-goal participants showed all three signature indications of having formed impressions on-line, even though they had not been given the explicit conscious goal to do so. The subliminal priming of their impression formation goal in the ostensibly unrelated first "vigilance" task resulted in the same effects on processing as obtained in previous person memory studies in which explicit impression formation instructions were given.

General Discussion

Models of impression formation and of person memory have not typically focused on the source of current processing goals in a given situation. Rather, the focus has been on the effect that these cognitive goals have on information processing once they are already selected and operating. One possible answer to the question of where social information-processing goals come from is to posit that they can become automatically associated to representations of situations in which they have been chosen frequently in the past. Thus, one possible determinant of which goal will be pursued by an individual in a given social situation is the person's chronic history of goal choice in that type of situation. The auto-motive model hypothesizes that such chronic goals can become active automatically, given the presence of relevant situational features, and then operate without any role played by conscious choice or intention. In the present two experiments, we sought to assess this prediction of the model.

If the model is valid, we should be able to prime social information-processing goals (thereby simulating activation of goals by environmental features) and show them to operate the same

as if they had been consciously chosen. In two experiments, we replicated standard social cognition paradigms, with the critical change being that we primed processing goals instead of explicitly instructing participants to pursue them. In both paradigms, we obtained in our replications the same effects that had been obtained in the prior research. The results therefore strongly support the auto-motive model's central postulate that intentions and goals can be automated and that their effects when operating nonconsciously are identical to their effects when they are operating consciously and deliberately (Bargh, 1990).

In Experiment 1 we replicated Hamilton et al.'s (1980b) classic study of processing objectives and person memory, substituting supraliminal priming for experimental instructions to give participants the impression formation or memorization goal. As predicted, the results replicated the major patterns found by Hamilton et al. Specifically, compared with participants primed with a memorization goal, participants whose goal to form an impression was primed without their awareness recalled more of the behavioral information presented to them and exhibited significantly more clustering of the recalled behaviors around trait categories. This difference in information processing between the two goal conditions can only be attributed to the experimental priming manipulation that differentiated them.

We conducted Experiment 2 to assess the generalizability of our nonconscious goal activation findings by extending them to a different experimental paradigm, the Hastie–Kumar (1979) person memory experiment. Another change from Experiment 1 was that we presented the impression goal priming stimuli subliminally in order to eliminate entirely any conscious involvement in the goal activation process. Our hypothesis was that participants in the impression-goal condition (but not those in the no-goal condition) would form an impression of the target on-line, during the presentation of behavioral information.

The data supported this prediction. Impression-goal participants, but not no-goal participants, showed evidence of all three signatures of on-line impression formation. First, a path analysis revealed a significant regression path from the presented behavioral information to the trait ratings given by these participants, one not mediated by the behaviors that they had just recalled. Second, impression-goal participants showed a greater differentiation than did no-goal participants in their honesty ratings of the mainly honest versus mainly dishonest targets. Third, their block-by-block behavior recall data (and not that of the no-goal participants) indicated the emergence of a recall advantage for the minority behavior type, an advantage that theoretically should occur only if an impression has been formed on-line (Srull et al., 1985). In other words, subliminal activation of an impression formation goal produced the same effects as conscious impression formation goals for each of the three indicants of on-line impression formation (Bargh & Thein, 1985; Hastie & Park, 1986; Srull et al., 1985).

Importantly, there was nothing in our data to suggest that no-goal participants had formed an impression before receiving the instructions to report one. This difference between impression-goal and no-goal conditions is critical to our hypothesis, because it suggests that the "default" (represented in the present study by the no-goal condition) is to abstain from forming an impression until given instructions to do so.

Our results are thus quite germane to the issue of whether social judgments are made unintentionally; the results from Experiment 2 suggest that they are not (see also Bargh & Thein, 1985). It has been argued that dispositional inferences about the traits of others are made spontaneously or automatically with or without the intention to do so (e.g., Gilbert, 1989; Uleman, Newman, & Moskowitz, 1996; Winter & Uleman, 1984). Although the participants in the no-goal condition did in fact report impressions somewhat indicative of the trait-related information provided, in our view a truly automatic or spontaneous inference would have been formed on-line, prior to the experimenter's asking for one. Yet participants in the no-goal condition showed no evidence of any such on-line impression formation on any of the three possible signature criteria.

The Role of Consciousness in the Operation of Cognitive Goals

A considerable amount of information processing occurs preconsciously, before (and sometimes in the absence of) one's conscious awareness of that environmental information. Whereas some have argued that this preconscious stage of processing is rather limited and crude (e.g., Loftus & Klinger, 1992; Neisser, 1967), we would argue instead that preconscious processing is rich and extensive and capable of activating goals that are chronically associated with features of the current environment. The goals then operate autonomously, without the need for conscious monitoring, and guide subsequent information processing interactively with the environment.

It is easy to imagine settings in which one is conscious of the features of the environment per se but is not aware of the impact that those features may have on goal activation and subsequent cognition. This situation is analogous to the supraliminal priming procedure used in Experiment 1 and, in fact, to most previous priming studies (see Bargh, 1992, 1994). The fact that conscious perception of the environmental cues themselves may not even be necessary for the associated goals to be triggered (analogously to the subliminal priming paradigm of Experiment 2) suggests all the more that conscious involvement in the process is unnecessary.

What are the implications of the automatic activation of social information-processing goals? In other words, what are the advantages and disadvantages to having one's goals activated outside of one's awareness? To the extent that the unconscious is a repository of one's chronic goals and motivations (Bargh & Barndollar, 1996), it is the goals that have been used successfully in the past that become activated automatically, and these unintended goals are likely to be in the service of the individual. Thus the majority of the goals preconsciously activated will be helpful, and not harmful, to the individual. The auto-motive model considers the preconscious activation of chronic goals to be the delegation of one's frequent conscious choice to the subconscious, in the way that any skill can eventually operate without the need of conscious involvement.

Yet there are potential problems that can be associated with the unawareness of current operative goals. For example, if one is not aware of the goals, motivations, and intentions that drive

one's cognition on a moment-to-moment basis, one is not able to stop or change those goal influences if they happen to be inappropriate for the current situation. Although in many, if not most, cases the frequent choice of a goal in the past reflects its appropriateness and functionality, it is possible that a goal can be chosen chronically for dysfunctional reasons. For example, research has shown that depressed individuals automatically process information in self-defeating ways (Andersen, Spielman, & Bargh, 1992; Bargh & Tota, 1988). One can imagine automatic motivations or goals that might be chosen repeatedly for short-term purposes but result in long-term problems, such as the withdrawal from social situations to avoid the risk of social failure and embarrassment that eventually may lead to social isolation and unhappiness.

What Are the Situational Features That Activate Information-Processing Goals?

An important question for further research is what kinds of environmental features are associated with social information-processing goals. In the present experiments, as in the great majority of previous priming studies, the priming stimuli were directly and synonymously relevant to the representation they activated (for an exception, see Bargh et al., 1995). Thus, for example, we used words such as *impression* and *evaluate* to prime an impression motivation. It would be useful to demonstrate that in addition to the somewhat artificial prime presentation techniques used in the present experiments, everyday contextual factors can nonconsciously prime goals. After all, the priming methods in the current studies serve as a proxy for what is assumed to happen in naturalistic settings via environmental features.

That said, it should be noted that previous research on behavioral priming has successfully used both the tightly controlled prime presentation techniques used in the present studies (Bargh, Chen, & Burrows, 1996; Bargh & Gollwitzer, 1994) and more naturalistic cues (e.g., Berkowitz, 1984). Similarly, research on the effects of power on sexual harassment behavior have obtained the same effects with manipulations of situational power differentials (e.g., Pryor, 1987) as with subtle power priming techniques (Bargh et al., 1995). We are therefore confident that the present findings of nonconscious information-processing goal activation and operation will also be obtained when more natural, contextual priming manipulations are used.

What are the naturally occurring features of the social environment that might activate an impression formation, consistency, or other information-processing goal? Although we can only speculate at this point, it is plausible that cognitive goals such as impression formation are tied to situations in which the individual typically needs to understand and predict the behavior of the others with whom he or she is interacting. We would expect, therefore, that when a person interacts with another person on whom important outcomes depend, such as a colleague or work supervisor, this impression formation motivation is chronically selected. The features of those situations (e.g., the workplace) would then become automatically associated with this processing goal. One can be even more speculative and imagine that people who hold unpopular or eccentric beliefs might chronically engage in defensive information-processing strategies when viewing the mainstream media or discussing politics with neighbors or acquaintances. Thus, the television set or the back fence would trigger this defensive goal. Another possibility is that a goal to preserve cognitive consistency could be linked to the presence of friends and other long-term acquaintances who would be likely to notice and call one's attention to statements that are inconsistent with previously expressed views.

This last example suggests that the auto-motive model may have implications for intimate relationships. This may be the only case in which the environmental agent that controls the activation of goals and motivations has foreknowledge of an individual's chronic goals. And it is in this way that the individual's goals can be under the direct control of the environment. For example, a person who wishes to change his or her partner's opinion regarding a much-disputed issue could capitalize on the foreknowledge of the partner's chronic goal to be considered an open-minded individual by intentionally inducing that goal ("I'm surprised—you've always been so open-minded") in the hope that it will lead to the desired change in opinion. Having intimate knowledge of a person's chronic goals may be another way of saying one knows how to push the person's buttons.

Beyond these potential applications of the auto-motive model, the present findings underscore a fundamental property of mental knowledge structures. Like social trait constructs and stereotypes, social information-processing goals appear to exert their influence once they are activated, regardless of whether the source of that activation was conscious or not. This principle in the case of the present experiments leads to the interesting paradox that one's intentions can be activated unintentionally.

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