Automatic Social Behavior as Motivated Preparation to Interact

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The authors propose that automatic social behavior may result from perceivers preparing to interact with primed social group members. In Study 1, participants primed with a disliked outgroup (gay men) showed evidence of interaction preparation (aggression) rather than direct stereotypic trait expression (passivity). In Study 2, participants with implicit positive attitudes toward the elderly walked more slowly after "elderly" priming, but participants with negative attitudes walked more quickly, results consistent with a preparatory account; the reverse was found priming "youth." Study 3 demonstrated that the accessibility of a primed category follows a pattern more consistent with that of goal-related constructs (including post-goal-fulfillment inhibition) than that of semantically primed constructs. Implications for the function of stored knowledge are discussed.

Keywords: automaticity, automatic social behavior, preparatory interaction, perception–behavior link

Something is needed to bridge the gap from knowledge to action . . . the bridge James gives us between the *ideo* and *motor* is nothing but a hyphen. (Miller, Galanter, & Pribram, 1960, pp. 10–12)

What is the function of storing knowledge about other people? How does this function help us understand how stored knowledge is translated into interpersonal behavior? In this article, we suggest that (a) stored knowledge about a social group (e.g., a stereotype) can provide useful information for interacting effectively with group members, and (b) automatic social behavior that arises from the activation of a social category can be the result of perceivers preparing to interact with a member of the target category. That is, when a social group category is activated, perceivers engage in a motivated preparation to interact with a group member. This preparation to interact, in turn, results in systematic and measurable automatic behavior.

The types of automatic behaviors we examine are like those investigated by Bargh, Chen, and Burrows (1996) in their now-classic studies. By now it has been well documented that exposure to specific trait constructs, actual behaviors, or social group members (whose stereotypes contain trait and behavioral constructs) can result in the nonconscious expression of the activated social behaviors (see Dijksterhuis & Bargh, 2001, for review). For example, Bargh et al. (1996) showed that priming the trait construct rude or polite (using different trait-related words) resulted in participants interrupting an experimenter sooner or later, respectively. In a second experiment, priming words related to the "elderly" stereotype (e.g., *old*, *bingo*), without actually mentioning the word *elderly*, resulted in participants walking more slowly out of the experiment than did priming with neutral words. Finally, subliminal priming of a young African American male face led participants to respond with more hostility (a stereotypic behavior associated with this social category) to provocation by the experimenter, as compared with priming with a Caucasian face. With a few exceptions (e.g., Dijksterhuis et al., 1998), priming a trait, stereotype, or behavior increases the likelihood of people expressing that same trait, stereotype, or behavior. The nature of this phenomenon has been shown to be quite widespread—effects are obtained with subliminal or supraliminal priming of words or pictures.

Other researchers have extended these findings and have shown similar effects from priming social categories. For example, priming "elderly" increased response latencies on lexical-decision tasks (Dijksterhuis, Spears, & Lépinasse, 2001; Kawakami, Young, & Dovidio, 2002) and decreased performance on memory tasks (Dijksterhuis, Aarts, Bargh, & van Knippenberg, 2000; Dijksterhuis, Bargh, & Miedema, 2000; but see Levy, 1996); priming "politician" resulted in participants producing longer essays than those not primed (with long-windedness as an associated trait of politi-

cians; Dijksterhuis & van Knippenberg, 2000); and priming "professor" led to more correct responses to general knowledge questions, with the reverse true for priming "soccer hooligan" (Dijksterhuis & van Knippenberg, 1998).

Although there is a separate literature on automatic goal pursuit (e.g., Bargh, 1990; Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001), the effects described above have generally been interpreted as consequences of nonmotivational, non-goal-directed processes. Because behavior in those studies was examined without explicitly inducing motivational states, one might be tempted to conclude that no motivational input contributes to the behavioral output. As discussed more below, the general explanation for the above effects has focused on the direct expression of activated trait and behavioral representations, what we refer to as *direct expression* accounts.

Could the behaviors described above also involve a motivational component? We propose that automatic social behaviors are not determined exclusively by the direct activation and expression of stored knowledge but instead might also be the result of a motivationally based behavioral preparation. We turn now to a discussion of this perspective.

A Motivated Preparation Account of Automatic Social Behaviors

We propose that when a perceiver encounters a social group member, whether through actual interaction or perception through pictures and words, the perceiver's motivational system begins to prepare for an interaction with the primed target. The specific outputs of this preparation depend not only on characteristics of the target ("Is the target threatening? Is the target rude?") but also on one's evaluation of the target ("Do I like this target? Do I want to approach or avoid this target?") and the context of the interaction. The behavioral outputs of this process are the ones that afford the most effective or successful interaction with the target, where effectiveness depends again on particular attributes of the perceiver, target, and situation (Plaks & Higgins, 2000).[1]

The literature has provided persuasive theoretical reasons for proposing some motivational influence in automatic social behaviors. Bargh's (1990) auto-motive model, for example, proposes that features of the environment can activate goals, which are represented mentally like other cognitive constructs such as trait information (Kruglanski, 1996). Once a goal is activated, the entire goal pursuit process can run to completion automatically, guiding "a person's goal-relevant cognition, affect, and behavior from that point on" (Bargh et al., 2001, p. 1015). For example, priming the goals of achievement or cooperation outside of awareness leads to better task performance or more cooperation, respectively (Bargh et al., 2001).

Given that there is room for some motivational influence in automatic behaviors, what is the nature of the motivational influence? If one applies the logic of the auto-motive model, being exposed to a social group member should activate the motivations associated with that group's cognitive representation—that is, the goals that are characteristic of that group. When exposed to a group member whose representation contains the goal to seek adventure (e.g., skydivers), perceivers should themselves adopt a more risk-taking motivational orientation. Therefore, in a typical priming paradigm, the motivations pursued by the primed group members could become activated and pursued by the perceiver. Instead of just direct expression of trait or behavior information, the auto-motive model would predict direct expression of the target's goals.

Recent automatic goal activation research, however, has suggested a more nuanced, interactive account. Fitzsimons and Bargh (2003) found that priming various interpersonal relationships led to the pursuit of one's own goals associated with those relationship representations. For example, people generally have a stronger goal of understanding when relating to friends than to strangers. Fitzsimons and Bargh found that priming a friend's name led to greater attempts at understanding a novel target's behavior. Summarizing, they note that the "mere activation of those [relationship] representations, even in the partner's physical absence, causes the goals to become active and to guide behavior nonconsciously within the current situation" (p. 148). Such work seems to argue for a more motivated account of automatic social behavior following priming that considers, for example, the nature of the relationship between the perceiver and the primed social category. If primed with "elderly," for example, one could expect perceivers' behaviors to be based on personally relevant goals toward the elderly. The present studies test this hypothesis.

Finally, research by Chen and Bargh (1999) showed that automatic evaluation of incoming stimuli results in direct predispositions to approach or avoid the target. Negative evaluations produce immediate avoidance behavior, and positive evaluations produce immediate approach behavior. To the extent that a social group member or primed target is automatically evaluated by a perceiver—which is a "pervasive tendency" (Chen & Bargh, 1999, p. 215)—approach and avoidance motivations should be automatically activated as well.

Direct Expression Accounts of Automatic Social Behavior

Our motivated preparation account differs from the direct expression accounts that are most often invoked in explaining automatic behavior—including the most notable, the perception–behavior link (Bargh & Chartrand, 1999; Bargh et al., 1996). The perception–behavior link has been described as an unintentional, amotivational mechanism whereby perception of environmental stimuli may have a direct, passive effect on behavior. This link is thought to operate according to the principles of spreading activation. First, the largely automatic act of perception takes place, which can include a substantial range of possibilities, such as perceiving an actual behavior, perceiving a written trait word, subliminally perceiving pictures of a target, and so on. Next, perception activates a corresponding internal mental representation. Finally, once the relevant behavioral representation is activated, it is more likely to be carried out than if it had not been activated.

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[1] Such a process need not be consciously pursued. We agree with previous explanations of these behavioral effects as "automatic," though we feel it useful to follow Bargh's (1989) suggestion of specifying exactly which qualities of automaticity characterize this process. We suspect that the process is at least unintentional and that the perceiver is unaware of its occurrence, but relevant evidence is beyond the scope of this article.

There is, of course, considerable agreement that mental representations are activated without conscious awareness upon mere perception of a target. What exactly is activated depends on the nature of the perceived stimuli. In the case of directly perceiving a behavior, it has been postulated that a mental representation of the behavior itself is activated (e.g., Chartrand & Bargh, 1999). When one perceives a social category member, presumably that category becomes activated along with all associated traits (e.g., Bargh et al., 1996, Experiment 3). When one perceives stereotype-related words, not only is the social category activated, but other, nonperceived associated traits are as well (i.e., perceiving *Florida*, *old*, and *Bingo* activates the category elderly and its associate slow; Bargh et al., 1996, Experiment 2). In these last two examples, then, the relevant behavioral information is activated only indirectly through its relation to the category as a stereotypic trait. In other words, "activation of the professor stereotype is expected to result in intelligent behavior because activation of the professor stereotype leads to activation of intelligence" (Dijksterhuis & van Knippenberg, 1998, p. 872).[2]

The final step is predicated on James's (1890) principle of ideo-motor action, which is conceptually similar to modern theorizing on knowledge activation (Higgins, 1996). The mere act of thinking about (or having activated) a behavior increases the likelihood of that behavior being carried out, given an appropriate situation for the behavior to be expressed. The source of the activation is irrelevant, as is the case for the influence of trait activation on judgment (Higgins, Rholes, & Jones, 1977).[3]

In summary, the perception–behavior link and similar accounts of automatic social behavior (Kawakami et al., 2002) posit direct activation of behavioral representations by the act of perception. Whether one perceives a behavior directly or perceives a social category containing behavioral information, the activation of a behavioral representation makes it more likely to engage in that behavior. "Perceptual inputs are translated automatically into corresponding behavioral outputs" (Dijksterhuis & Bargh, 2001, p. 1). Although there is support for some of the basic assumptions of this account, the question we take up is whether there is room for a motivated preparation account as well. To demonstrate the utility of this account, it is important for us to distinguish them clearly.

Two features of the perception–behavior link account of automatic social behaviors are especially critical for the present studies. First, it is believed that this process is nonmotivational. Indeed, in their work with the auto-motive model, Bargh et al. (2001) explicitly contrast a motivational approach with the perception–behavior link account, which they refer to as the "behavior-priming alternative." There is a need, however, to test more directly whether motivation plays no role in automatic behavior. Thus far, studies on automatic social behavior have not explicitly been designed to test for the potential role of motivation in automatic behavior, especially motivation of the sort predicted by the motivated preparation perspective.

The second critical feature of the perception–behavior link account is the postulate that evaluations or attitudes toward a target group (in the case of group stereotype activation) or toward an individual (in the case of actual behavior exposure) do not influence automatic social behaviors. That is, for the predicted effects to occur, it is sufficient that everyone knows the cultural stereotype involved (e.g., elderly individuals walk slowly) or that they will

perceive an actual behavior being performed (e.g., an interaction partner scratching his face). People will walk more slowly once the elderly stereotype is activated because "slow" is activated for everyone; whether one likes or dislikes the target is irrelevant. According to this model, attitudes have no bearing on the path from priming to automatic behavior.

Support for this second critical feature derives in part from Devine's (1989) work demonstrating the activation of stereotype traits for both prejudiced and nonprejudiced perceivers (but see Lepore & Brown, 1997, 2002). Support has also come from several studies in which explicit attitudes toward a target social group were assessed and shown to have no relation to the behavioral measure of interest. It is important to note that as far as we are aware, no study has measured implicit attitudes, a point to which we return below. Thus, for example, Experiment 3 of Bargh et al. (1996) measured explicit, self-report attitudes toward African Americans (using the Racial Ambivalence Scale; Katz & Hass, 1988; and the Modern Racism Scale; McConahay, 1986) and found nonsignificant correlations between scores on these scales and the degree of hostility expressed following priming of the African American social group. On the basis of this evidence, Bargh et al. concluded that "participants who were low in racist attitudes . . . were just as likely to behave in a hostile manner as participants who were high in racist attitudes" (p. 239) and compared the finding with Devine's results. The lack of influence of explicit attitudes on automatic behavior has been taken as evidence that the perception–behavior link is a direct expression and purely cognitive in nature. According to our model, however, evaluations of the target or the target's social group should relate to automatic behavior, because evaluations inform what behaviors will afford an efficient or successful interaction. After all, one does not respond to slow enemies and slow friends with the same behavior.

Previous Research Reconsidered

We believe that much of what has been found in previous research is consistent with our motivated preparation account. First, the social categories used in previous priming studies have usually involved stereotypic traits that happen to coincide with the

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[2] It is worth noting, however, that in almost all studies (except Kawakami et al., 2002), what precisely is activated is not assessed in any way. In the Bargh et al. (1996) studies, for example, it is inferred from the behavioral dependent measures that the traits of rudeness, slowness, and hostility have been activated and are therefore the cause of the behaviors. Although this technique has been used frequently in this and related research, and can often be valid, it does leave the exact description open to alternative explanations. Kawakami et al. (2002) found that behavioral representations themselves (e.g., the behavioral representation of slow action) influenced participants' behavior independent of stereotypical trait information (e.g., the trait slow).

[3] One can question the appropriateness of invoking the ideo-motor principle for explaining automatic social behaviors. For example, the experimental situations which provide the best evidence for the ideo-motor principle as well as the necessary conditions for its development (e.g., Greenwald, 1970; Knuf, Aschersleben, & Prinz, 2001; Prinz, 1997), bear little resemblance to the paradigms of the automatic social behavior literature. Explicating this line of thinking, however, is beyond the scope of the current article, so we follow previous theorists in using this principle.

most effective or successful means of interacting with a category member. Priming "elderly," for example, could result in slower walking because slowing down might be an effective way to facilitate interaction with an elderly person. Increased hostility following priming of "African American" could occur because "fighting fire with fire" may be a natural way to prepare for an interaction with someone stereotypically assumed to be hostile. Because the primed social group category in previous studies implied identical behavior from a direct expression account or a preparatory account, in Study 1 we chose a social category that implied opposite behaviors from the two perspectives. Second, although there may have been a relationship between stereotypic traits and effective behavioral means in prior research, what exactly is effective when interacting with a member of a social group should also depend on one's attitude toward the group. As stated above, a motivated preparation account predicts that evaluations of a primed social category will be an additional determinant of what behaviors allow for an effective interaction. When considering perceivers' attitudes toward a social group, however, it is necessary to go beyond explicit measures of attitudes. In our research, we distinguish between explicit and implicit attitude measures and draw upon Fazio's (1990, 1995) MODE model of attitude–behavior relations and research by Dovidio and colleagues (Dovidio, Kawakami, & Gaertner, 2002; Dovidio, Kawakami, Johnson, Johnson, & Howard, 1997).

According to these researchers, nondeliberative behaviors should be better predicted by implicit attitudes, and deliberative behaviors should be better predicted by explicit attitudes. Thus, the failure of explicit attitudes to correlate with automatic social behaviors in past research may have less to do with attitudes being irrelevant for automatic behavior than with the appropriateness of such measures. Because automatic social behaviors are, by definition, not deliberative behaviors, one would expect explicit attitude measures to have a low attitude–behavior correlation and implicit attitude measures to show a significant attitude–behavior correlation. It therefore may be the case that evaluations are important for explaining automatic behaviors, but they must be assessed with implicit measures.

Relation Between Motivated Preparatory Account and Direct Expression Account

An important point to consider (which we revisit in the General Discussion) concerns the relation between the account proposed in the present article and prior direct expression accounts. At present, we propose that direct expression accounts cannot fully explain all situations that involve automatic behavior following priming of social categories. That is, including a motivational component may provide a more nuanced and complete understanding of this type of behavior. We are not suggesting that our account replaces direct expression accounts or that direct expression accounts do not contribute to psychologists' understanding of the determinants of automatic social behavior. Indeed, it is likely that there are conditions under which each account better explains automatic behavior, and further research is needed to elucidate these conditions. Instead, the objective of the present studies was to test whether there is support for an additional determinant of automatic behav-

ior that is more motivational in nature than the determinants that have been suggested previously.

Overview of the Present Studies

The purpose of the three studies presented here is to examine whether motivational factors are an additional determinant of automatic social behavior. All three studies used procedures and methods from the automatic social behavior literature. In Study 1, we primed a social group that would elicit opposite behaviors if perceivers were preparing to interact with a group member versus strictly expressing activated group traits. Specifically, we primed "gay men" and then provoked participants in a hostile manner. The literature indicates that gay men are a negatively perceived outgroup (like African Americans) but one whose stereotypic behavior, passivity, is opposite to hostile. Preparing to interact with a negatively perceived outgroup member predicts the adoption of hostile rejection behaviors, whereas direct expression of activated group traits predicts the opposite, the adoption of passive behaviors.

In Study 2, we measured implicit attitudes and tested whether these evaluations (and not explicit attitudes) would predict behavior following priming of two social groups. According to our approach, implicit attitudes are an important determinant of behavior insofar as different evaluations of a social group imply different effective interaction behaviors. For perceivers who implicitly like a target group and have a corresponding interaction goal, the most effective behaviors to fulfill this goal will likely be different than the behaviors pursued by perceivers who implicitly dislike a target group and, thus, have a different interaction goal. We predicted that participants primed with "elderly" would walk more slowly to the extent that they liked the elderly (you slow down to interact with a slow friend) but would walk more quickly to the extent that they disliked the elderly (you speed up to get away from a slow enemy). In contrast, participants primed with "youth" were predicted to walk more quickly to the extent that they liked young people but to walk more slowly to the extent that they disliked young people.

In Study 3, we extended the previous studies by investigating additional implications of motivational underpinnings, as suggested by our account. We tested whether the accessibility of a primed social category follows a time course that is characteristic of goal-related constructs. Specifically, it is known that goal-related constructs increase in accessibility after the goal has been activated and are inhibited following goal completion. Therefore, if priming activates a goal to interact with the primed category, then the accessibility of category-related words should show similar effects. To test this, we primed a social category, and participants did or did not complete an interaction with the primed category. According to a motivational account, category-related words should decrease in accessibility when the goal of interacting with a category member has been fulfilled. A strict direct expression account would predict that priming a category and interacting with a category member would result in a heightened level of accessibility, in that both events are sources of category activation.

Study 1

The purpose of this study was to test the divergent predictions of our motivated preparation account and an account based only on the direct expression of activated traits. We chose a target social group that we hypothesized would elicit opposite behavioral effects according to each account— gay men. Gay men are perceived as effeminate, passive, and nonhostile but are also an outgroup that is generally evaluated negatively (e.g., Haddock, Zanna, & Esses, 1993). Our account predicts that preparation to interact with a negative outgroup member should elicit negative or hostile behavioral responses associated with rejection. According to direct expression accounts, however, priming the social category gay men should elicit behavioral responses consistent with the stereotype for that group—passivity, femininity, or some nonhostile action. This difference in predictions is illustrated in Figure 1.

The paradigm used to test these predictions replicated the Bargh et al. (1996) Experiment 3 design. We wished to replicate previous methods as closely as possible, changing only the target group. In this study, participants worked on a boring computer task for approximately 8 min while being subliminally primed at the beginning of each task trial with pictures of either a gay or straight man (or a no-prime control). The computer crashed on the 130th trial, and participants were told they would have to start the program over. Both a confederate

Figure 1. Illustration of the similarity between stereotypic traits and implied interaction behaviors for social categories used in previous studies (top panel), and dissociation of predictions from the motivated preparation and direct expression accounts in Study 1 (bottom panel).

and the experimenter observed participants' reactions and recorded the level of hostility exhibited. Our motivated preparation account predicts increased hostility following the gay prime as compared with the straight and control primes; the direct expression account predicts decreased levels of hostility following the gay prime, as compared with either the straight prime or the no-prime control condition.

Method

Participants and Design

Seventy-one participants from Columbia University agreed to participate in a one-session, half-hour experiment in exchange for $5; participants were recruited through the use of flyers advertising the study. Gender had no main effect or interactions for any dependent variable in this or subsequent studies, so it is not discussed further. The single independent variable was priming condition (gay prime, straight prime, no-prime control), and the dependent variable was hostility ratings following provocation.

Procedure

Participants completed the experiment individually in a small room with a table and two soundproof booths. A male confederate was ostensibly filling out questionnaires at the table, with his back to the door, when participants entered. They were told they would complete two unrelated studies that had been combined to save time and money, the first investigating "quick visual judgments" and the second testing "several short, new questionnaires." Participants were seated in the first soundproof booth. The position of the confederate allowed him visual and auditory access to the participant with a slight tilt of his head. The first study, the priming task, was then begun. Participants were told they would be asked to judge, as quickly and accurately as possible, whether an odd or even number of circles appeared on the screen at any given time. When the experimenter began the computer task, it randomly assigned the participant to the no-prime control, straight prime, or gay prime condition. Both the experimenter and the confederate were blind to condition.

The program was designed to present the subliminal prime pictures while participants judged whether an odd or even number of colored circles were present on the screen. Each trial proceeded as follows, with all stimuli presented in the center of a white background. A fixation point of 10 asterisks first appeared for 1,000 ms. Next, the prime picture (or a blank screen in the control condition) was presented for 11 ms. The prime consisted of a black-and-white head-and-shoulders photograph of a white adult man with either the word *GAY* or *STRAIGHT* in black 48-point font written beneath his chin. The picture was immediately followed by two pattern masks for 21 ms each—the first contained black diagonal cross-hatches, with the letters *XVXVXV* in the same position as the prime word, and the second contained six circles of different size and position on a gray background. Finally, the target picture was presented for 2,000, 2,500, or 3,000 ms, followed by a 1,500 ms intertrial interval. The target was 1 of 14 randomly selected pictures with blue and purple circles on a gray background. Participants pressed the *1* key for odd responses and the *2* key for even responses.

After 130 trials of this tedious task, the computer supposedly crashed. At this time the message "F11 error: Failure saving data. Press return to continue" appeared, which was followed by "You must start the program over again. Please get the experimenter." When the experimenter, who was seated outside the booth, was notified he said "Hmmm. It looks like you'll have to start the program over," and at this point both the confederate and the experimenter began noting the participant's reaction. The experimenter then fiddled with the keyboard for approximately 10 s, at which point a specific key sequence was pressed which revealed the message "F11: Data
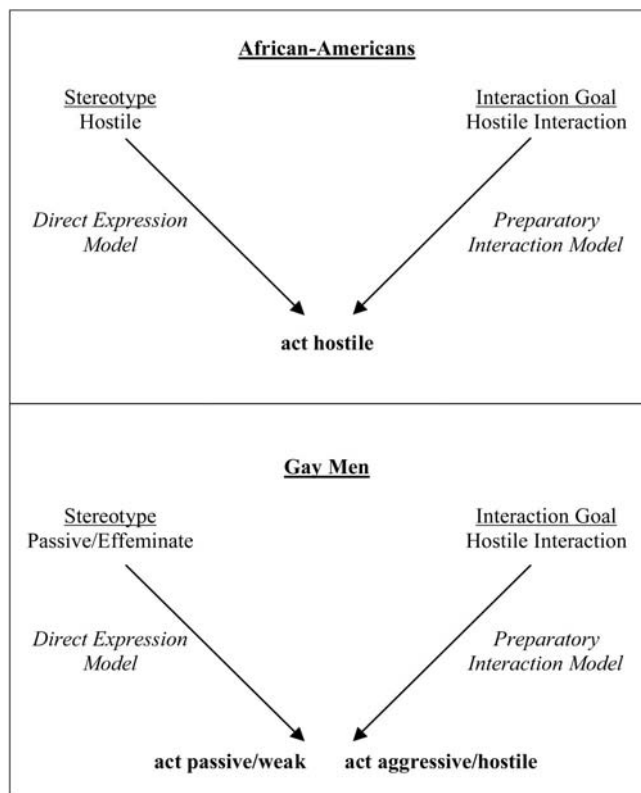
Recovered," and participants were told everything was okay and the second study would begin. Until this point, our study was identical to the original Bargh et al. (1996) study, and therefore our primary dependent measure was completely uncontaminated by any possible attitudes, goals, or motivations activated by the questionnaires that followed.

For the second study, participants filled out the following measures in order: two self-regulation measures unrelated to the current study; Herek's (1988) Attitudes Toward Lesbians and Gay Men Scale (ATLG); a free-response measure eliciting the stereotype content of gay men; a demographics form that included a question on participants' sexual orientation; and a funneled debriefing form (see Bargh & Chartrand, 2000). Once the packet containing these measures was provided to the participant, the experimenter recorded his hostility ratings; the confederate made his ratings as soon as the data were "recovered." After participants completed the measures, they were questioned about what they believed the purpose of the experiment was and whether they believed the cover story; then they were verbally debriefed. Eleven participants expressed some form of disbelief about either the computer error or the cover story and were therefore removed from analyses.

Dependent Measures

Hostility rating. The experimenter and confederate both rated participants' reactions on an 11-point scale anchored at 0 = *not at all hostile* and 10 = *extremely hostile*.[4] Average ratings for each participant served as the primary dependent variable. Confederate and experimenter ratings were significantly correlated, $r(50) = .67$, $p < .001$.

ATLG. The ATLG is a 20-item scale designed to assess explicit attitudes toward both lesbians (ATL subscale) and gay men (ATG subscale). Because the primes involved gay and straight men, only the ATG scale was relevant. Participants rated, on 9-point scales from 1 = *strongly disagree* to 9 = *strongly agree*, their agreement with a variety of questions concerning gay men (e.g., "If a man has homosexual feelings, he should do everything he can to overcome them."). Higher scores indicate more negative attitudes toward gay men. This measure was included primarily as an analog to the Racial Ambivalence Scale (Katz & Hass, 1988) and Modern Racism Scale (McConahay, 1986) included in the original Bargh et al. (1996) Experiment 3. We predicted no correlation between explicit attitudes toward gay men and hostile reactions following the gay prime, but for different reasons from Bargh et al., as discussed earlier.

Stereotype content assessment measure. We designed this measure, modeled after Devine's (1989) free-response task, to assess participants' knowledge of the cultural stereotype of gay men and to ensure that no participant believed gay men to be hostile in any way. Participants were instructed to list the typical characteristics of three social groups: African American men, elderly women, and gay men. It was emphasized that the experimenter was not interested in participants' personal views but was interested in knowledge of cultural stereotypes.

Demographics. One item in the demographics form asked participants to indicate their sexual orientation by choosing either "heterosexual," "homosexual," "bisexual," or "I prefer not to answer." Data from any participant who did not select heterosexual were excluded (n = 8).

Funneled debriefing. Seven items of increasing specificity probed participants for their beliefs about the purpose of the study. Data from any participant who expressed thoughts about the two studies being related or who guessed that the experiment involved subliminal priming were excluded (n = 2), leaving a final sample size of 50.

Results

Analysis 1: Hostility Ratings

Average hostility ratings for each participant served as the primary dependent variable in an analysis of variance, with prime condition (control, straight, gay) as the independent variable. Results showed a near-significant effect of prime condition, $F(2, 47) = 2.71$, $p = .08$. Planned contrasts revealed that the control prime ($M = 0.43$, $SD = 0.65$) and straight prime ($M = 0.44$, $SD = 0.62$) conditions did not differ from each other, $t(47) < 1$. Participants in the gay prime condition, however, had significantly higher hostility ratings ($M = 1.18$, $SD = 1.59$) than both the control prime, $t(47) = 1.98$, $p = .05$, and the straight prime conditions, $t(47) = 2.04$, $p = .05$. Inclusion of the no-prime control condition allows for the conclusion that this latter difference is due to an increased hostility in the gay prime condition and not to a decreased hostility in the straight prime condition. The primary hypothesis for Study 1 was confirmed—participants responded with more hostility following priming of a gay man than of a straight man.

Analysis 2: Explicit Attitude Measure

As noted above, we predicted no relation between the explicit measure of attitudes toward gay men and hostility ratings. ATG scores were not significantly correlated with hostility ratings in the gay prime ($r = .06$), straight prime ($r = .12$), or control conditions ($r = -.31$); all $ps > .25$.

Analysis 3: Stereotype Content

It is important to show that no participant believed the stereotype of gay men to include hostility or related traits and, if anything, that the stereotype of gay men is the exact opposite—effeminate and weak. Indeed, no participant listed any hostility-related word as part of the gay male stereotype, and a full 34 participants (68%) listed effeminate, feminine, weak, or some form of these words in their free-response descriptions. These results clearly replicate previous research demonstrating gay men to be perceived as relatively passive or effeminate and rule out a trait-expression explanation of these results.

In addition, we conducted a follow-up study with a different sample of 43 participants from the same population as the participants in the above study. These participants were asked "How hostile do you think gay men are, on average?" on a scale from $-4 = $ *very peaceful* to $+4 = $ *very hostile*. The mean hostility rating for this sample was $-.40$, which was significantly different from 0 toward the peaceful end of the scale, $t(41) = -2.01$, $p = .05$. According to our measures in both Study 1 and our follow-up study, as well as much previous research, gay men are not viewed as hostile or aggressive but, rather, its opposite.

Discussion

Study 1 provided evidence that priming social categories can lead to behaviors opposite of those traits associated with the stereotype. We suggest that automatic behavior may result in part

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[4] In order to ensure that the experimenter and confederate would consider the same mannerisms and speech as hostile, a total of 19 pilot participants were first run. After each pilot participant, the experimenter and confederate discussed the participant's behaviors and what degree of hostility was appropriate. Data from these participants are excluded.

from a preparation to interact with a member of a primed social group, rather than only from direct expression of activated stereotypic traits. If automatic behaviors were due solely to activating stereotypic traits and the ideo-motor process, then participants primed with gay men should, if anything, have behaved with less hostility than those primed with straight men. In contrast, preparing to interact with a negative outgroup member would produce greater rejection-related hostility for the gay male prime, as found in Study 1.

One limitation of Study 1 was that no implicit measure of attitudes toward gay men was collected. Although we found the predicted null effect of explicit attitudes on automatic behavior, it would be useful to show that an implicit measure does predict behavior. Study 2 addressed this issue by collecting implicit as well as explicit attitude measures toward the target social group.

Study 2

There were two primary purposes of Study 2. One major purpose was to test the role of attitudes (when measured implicitly) as a motivational underpinning in automatic behaviors, as predicted by their impact on preparing action toward a social category member. It is notable that positive versus negative implicit attitudes toward a social category in this case imply opposite behavioral intentions toward a category member. In priming the elderly social category, positivity toward the elderly should lead to decreased walking speed—one slows down to interact effectively with elderly people. In contrast, negativity toward the elderly should lead to increased walking speed—one speeds up to avoid interacting with the stereotypically slow disliked outgroup member. It is interesting that the opposite pattern should arise from priming the youth social category, with increased walking speeds resulting from positivity (speed up to interact with the faster youth) and decreased walking speeds resulting from negativity (slow down to stay away). To test this, we measured participants' implicit positivity and negativity toward "elderly" and "youth" at Time 1. In a separate session several weeks later, we primed participants with either the elderly or youth category (or a no-prime control condition) and then measured the amount of time it took them to exit the experiment room. Direct expression accounts generally predict no effect of attitudes toward a social group on automatic behaviors, as both positive- and negative-attitude perceivers know the cultural stereotype of age and walking speed.

The second major purpose of Study 2 was to test the hypothesis that an implicit measure of attitudes will relate to automatic behaviors even though an explicit measure does not. Thus, two explicit measures of attitudes toward the elderly were assessed at Time 1, allowing for a comparison of explicit and implicit attitude measures in their ability to predict automatic behaviors.

Of importance is that there was a significant number of days between the two sessions for each participant. If we had measured attitudes within the same session as the priming task, it could be argued that goals related to the elderly had been activated by the attitude measure and that our priming task no longer represented an appropriate test of (supposedly) nonmotivated automatic social behavior. The second session was pure in the sense that any effects of having provided attitude measures in the first session would have decayed by the second session.

Method

Participants and Design

Participants were 80 Columbia University students (37 men, 43 women) between the ages of 18 and 30 who completed two half-hour sessions in exchange for $10. Participants were recruited through the use of flyers posted around campus. No participant from Study 1 was included in this study. The primary dependent variable was the time it took participants to walk out of the experiment room after the priming task. The independent variables were prime condition (elderly, youth, no-prime control), four orthogonal implicit attitude scales (positivity toward elderly, negativity toward elderly, positivity toward youth, negativity toward youth), and two explicit attitude toward elderly scales (Semantic Differential Scale; Osgood, Suci, and Tanenbaum, 1957; and Kogan Attitude Toward Old People Scale; Kogan, 1961). Data from one female nonnative English speaker were removed. Data from one female participant were removed because of a timing error on the part of the confederate. Data from three other female participants and one male participant were removed because of walking errors (e.g., a participant stopping to tie his shoes).

Procedure

To help conceal the true nature of the study and the relation between the two sessions, we informed participants that they would participate in two studies investigating "perceptual and motor activity, how they relate, and how they change over time." No participant expressed any disbelief in our cover story. The first session involved, in the following order, three self-regulation measures unrelated to the current study, the implicit attitude measures (sequential priming task), an approach/avoidance measure unrelated to the current study; and two explicit attitude measures (Semantic Differential Scale and Kogan Attitude Toward Old People Scale). The attitude measures are described below. To increase believability of the cover story, the experimenter described in detail where on the keyboard the participant should place his or her hands, how he or she should sit, and so forth; in addition, the phrase "Cognition & Perception Lab–Exp. 4a" appeared at the top of the screen during the instructions for all computerized tasks. The primary purpose of this first session was to assess implicit and explicit attitudes toward elderly and youth and to separate these measures from the primary dependent variable, so as to ensure no contamination in responses in the priming task of Session 2. After completing these measures, participants signed up for a second session some time later ($M = 12.2$ days, $Mdn = 8.0$ days). The length of this delay ensured that any potential influence of completing the attitude measures would decay by the second session.

The second session took place in a long rectangular computer lab. A confederate with a concealed stopwatch sat at a large table in the center of the room, ostensibly working on an assignment. When participants arrived (individually) at this session the experimenter met them at the door and instructed them to sit at a computer at the end of the room, telling them that he would be right with them; the experimenter stayed at the door so as not to walk with the participant. The confederate began the stopwatch as participants passed a piece of floor tape 4 ft (1.22 m) from the door, and stopped it when participants reached a piece of floor tape 4 ft (1.22 m) from the computer. This provided a prepriming measure of the time it took the participant to walk across the set distance, which was approximately 26 ft (7.92 m). The experimenter then walked to the computer and told the participant that the session would consist of a single 5-min task (the X-judgment task) during which he or she would be asked to estimate the number of Xs present on the screen at any given time. The judgment task allowed for the subliminal presentation of elderly picture primes or youth picture primes (or no primes in the control condition). Following the X-judgment task, participants were paid and dismissed; they were told they would be sent a debriefing form by e-mail, so as to avoid participants

asking about the purpose of the study and delaying their exit. As the experimenter stayed at the computer preparing it for the next participant, the confederate recorded the participant's walking time across the same two pieces of floor tape as he or she exited. After the participant passed the second piece of tape, the experimenter called out to him/her that he "forgot one last thing." He then approached the participant and questioned about any possible awareness of the prime during the judgment task, in a funneled manner (first asking if anything unusual during the task was noticed, then if any flashing was noticed, then to describe what was seen, etc.). No participant expressed awareness of the prime.

Materials

Implicit Attitude Measure. Our measure of implicit attitudes toward "elderly" and "youth" was modeled after Fazio's sequential priming task (Fazio, Jackson, Dunton, & Williams, 1995; Fazio, Sanbonmatsu, Powell, & Kardes, 1986), in which participants judged the valence of target adjectives preceded by social category label primes. Relatively faster response latencies in evaluating positive target adjectives when preceded by the category prime is indicative of more positive attitudes toward that group, and relatively faster response latencies in evaluating negative targets when preceded by the category prime is indicative of more negative attitudes toward that group.

Our measure was designed to assess positive and negative associations with both youth and elderly categories. Thirty-two trials proceeded as follows. All stimuli were presented in black 16-point font in the center of a white screen: fixation point ("*") for 1,000 ms, *XVXVXVXVXVXV* forward mask for 52 ms; category prime for 26 ms; *XVXVXVXVXVXV* backward mask for 52 ms; target adjective until participants registered a response; and an intertrial interval of either 1,000, 1,500, 2,000, or 2,500 ms. Right-handed participants were instructed to press the *A* key (which had a "-" sticker affixed) for negative judgments and the *L* key (with a "+" sticker affixed) for positive judgments; this was reversed for left-handed participants so that everyone registered positive judgments with their dominant hand. The primes were either *YOUTH* or *ELDERLY*, and the targets were 1 of 16 possible adjectives, 8 negative and 8 positive.[5] Crossing primes by targets yielded 32 trials; all possible combinations were randomly chosen and presented. This design permits separate scales of positivity and negativity toward both "elderly" and "youth."

To be sure participants understood how to complete the task, we provided 10 practice trials at the start of the program, which proceeded according to the sequence above. For these trials, *BLANK* appeared as the prime, and a different set of positive and negative adjectives were used.

Semantic Differential Scale (Explicit Attitude Measure 1). Osgood, Suci, and Tanenbaum's (1957) semantic differential scale (cited in Eagly & Chaiken, 1993) was adapted as an explicit measure of attitudes toward the elderly. Participants were asked to rate the extent to which one of two opposing adjectives described the social group elderly. Five pairs of adjectives were given: *bad* and *good*, *pleasant* and *unpleasant*, *cold* and *warm*, *like* and *dislike*, and *dirty* and *clean*. Each adjective was at opposite ends of a 7-point scale, with the midpoint designated as neither adjective describing the social group better. Responses were coded such that higher scores equaled more positive responses.

Kogan Attitude Toward Old People Scale (Explicit Attitude Measure 2). This measure is a second explicit attitude measure tapping attitudes toward elderly people and is conceptually related to other explicit measures used in automaticity experiments. Participants answer, on a scale from 1 = *strongly disagree* to 7 = *strongly agree*, 22 items related to attitudes toward elderly people (e.g., "Most elderly spend too much time prying into the affairs of others," reverse coded). Higher scores indicate more positive evaluations of elderly people.

X-judgment priming task. The purpose of this task in the second session was to expose participants to pictures of either elderly men (elderly prime condition) or teenage boys (youth prime condition) or to no pictures (no-prime control condition) prior to measuring their exit walking time. Participants were instructed to estimate how many *X*s were present on the screen at any given time, with subliminal exposure to the primes preceding presentation on each trial. Each trial proceeded as follows, with all stimuli appearing on a white background in the center of the screen: fixation point ("*******") for 1,000 ms; prime picture for 11 ms; picture mask consisting of two gray circles with smaller white circles within each, positioned to cover the face of the prime, for 44 ms; 1 of 15 target pictures with a varying number of *X*s for 1,000, 1,500, 2,000, or 2,500 ms; and an intertrial interval of 500 ms. Each new trial did not begin until participants responded with either *1* (for 0–10 *X*s), *2* (for 11–20 *X*s), or *3* (for 21–30 *X*s). Primes were either four headshots of elderly men or four headshots of teenage boys (or no picture control).

Dependent Measure

The sole dependent measure was the time it took participants in the second session to walk out of the experiment room, as unobtrusively measured by the confederate, following exposure to either elderly, youth, or no-picture control primes. The time it took participants to enter the experiment room was also recorded for use as a covariate in the analyses.

Results

Analysis Overview

Procedures for analyzing the reaction time data for the implicit attitude measure were as follows (e.g., Bargh, Chaiken, Govender, & Pratto, 1992; Fazio et al., 1995; Shoben, 1982). First, all reaction times identified as outliers at greater than 2,000 ms (1.22%) were removed, as were any trials on which participants made an error (3.89%). Next, we removed data from three male participants for excessive errors (>25% of trials), one male participant for excessive outliers (>25% of trials), and one male participant for excessively low response times (50% of trials). This left a final sample of 69 participants. To reduce skewness of the remaining distributions, we converted all reaction times using log transformations.[6] Finally, we computed the continuous implicit attitude scales by averaging reaction times for the eight same-valenced target adjectives within each word prime condition for each participant.

Thus, an average was computed of all positive target adjectives preceded by the elderly prime, all negative adjectives preceded by the elderly prime, all positive target adjectives preceded by the youth prime, and all negative adjectives preceded by the youth prime, yielding four separate, continuous measures of attitudes toward the elderly and youth. Given these computations, low scores (i.e., faster response times) indicated relatively more valence-congruent associations following the appropriate prime, such that low scores on positive targets following elderly primes indicated more positive attitudes toward the elderly, low scores on negative targets indicated more negative attitudes, and so forth. Following Aiken and West

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[5] Positive adjectives were *beautiful, excellent, magnificent, marvelous, outstanding, delightful, wonderful, positive*; negative adjectives were *miserable, revolting, dreadful, painful, awful, terrible, disgusting, negative*.

[6] Analyses on raw latencies revealed the same statistically significant pattern of results.

(1991), all independent variables were centered prior to analyses.

Analysis 1: Replication of Previous Automatic Social Behavior Effects

The first analysis of interest was a test of whether our study replicated previous automatic behavior findings; specifically, participants in the elderly prime condition showing the slowest exit walking time, participants in the youth prime condition showing the fastest exit time, and participants in the no-prime control condition being in between these two. A preliminary analysis testing the assumption of homogeneity of slopes indicated that the relation between the covariate and the dependent variable did not vary across levels of prime condition, $F(2, 62) = 1.01$, $p = .37$, partial $\eta^2 = .03$, allowing us to proceed with the analysis of interest.

A one-way analysis of covariance with exit walking time as the dependent variable, prime condition (control vs. youth vs. elderly) as the independent variable, and entrance walking time as the covariate revealed a near-significant main effect of prime condition, $F(2, 64) = 2.93$, $p = .06$, partial $\eta^2 = .08$. Participants in the elderly prime condition had the slowest mean exit time ($M = 6.83$, $SD = 1.10$), and participants in the youth prime condition had the fastest mean exit time ($M = 6.15$, $SD = 0.84$), with no-prime control participants in between ($M = 6.61$, $SD = 0.86$). Pairwise comparisons revealed, first and most important, a significant difference between the elderly prime and the youth prime conditions, $F(1, 64) = 5.81$, $p = .02$. Thus, participants primed with elderly pictures took more time walking to the exit than those primed with youth pictures. As predicted, mean exit time for the no-prime control condition was between the elderly and youth prime conditions and was not significantly different from either ($Fs < 1.06$).

Analysis 2: Prediction of Elderly Prime Exit Walking Time by Implicit Attitude Measure

Within the elderly prime condition, our model predicted that the implicit elderly attitude measure should have significantly predicted exit walking time. As positivity toward the elderly increases, participants should exit more slowly (increased walking exit time), but as negativity increases, participants should exit more quickly (decreased exit walking time). In contrast, direct expression accounts predict no effect of attitudes on exit walking time.

To test this, we first examined just those participants in the elderly prime condition and conducted a multiple regression predicting exit walking time with entrance time, implicit measure of positivity toward "elderly," and implicit measure of negativity toward "elderly" as independent variables. Both implicit attitude measures significantly and independently predicted exit walking time in the opposite direction, as predicted. As positivity toward "elderly" increased (faster response latencies), exit walking time significantly increased, $\beta = -.74$, $t(18) = -2.78$, $p = .01$. As negativity toward "elderly" increased (faster response latencies), exit walking time significantly decreased, $\beta = .71$, $t(18) = 2.64$, $p = .02$, $R^2 = .42$. Figure 2A displays the predicted regression

lines for each implicit measure. For ease of presentation, the implicit measure is graphed in terms of the positivity and negativity toward the elderly, which the response latencies imply, not in terms of the response latencies themselves. (This involves simply switching the x axis along its mean.) The point values of these slopes are mean, 1 standard deviation above mean, and 1 standard deviation below mean. The primary hypothesis for Study 2 was therefore confirmed. Exit walking time was not determined simply by stereotype activation associated with category priming but was more completely explained by the strategic behaviors that would best fulfill attitudes toward the group members—walking slowly when one likes the elderly and walking more quickly when one dislikes the elderly.

Analysis 3: Prediction of Youth Prime Exit Walking Time by Implicit Attitude Measure

As above, we predicted that implicitly measured positivity and implicitly measured negativity toward youth would predict exit walking time following the youth prime. As positivity increases, participants should exit more quickly (decreased exit time), but as negativity increases, participants should exit more slowly (increased exit time).

Again, we examined just those participants in the youth prime condition and regressed exit time on entrance time, implicit positivity toward youth, and implicit negativity toward youth. As predicted, as positivity toward youth increased (faster response latencies), exit time significantly decreased, $\beta = .51$, $t(19) = 2.26$, $p = .04$, and as negativity toward youth increased (faster response latencies), exit time significantly increased, $\beta = -.46$, $t(19) = -2.38$, $p = .03$, $R^2 = .61$. Figure 2B displays the predicted regression lines for these results, again in terms of the implied evaluation toward youth, not the response latencies themselves.

These results provide additional convergent evidence for the motivated preparation hypothesis that attitudes toward a social category inform the most effective means of interacting with members of that category. In addition, the finding for participants with negative attitudes toward youth in the youth prime condition rules out a possible alternative explanation for the finding described above for participants with negative attitudes toward the elderly in the elderly prime condition. Specifically, did elderly prime participants who dislike the elderly walk more quickly simply because negative attitudes induce greater arousal or vigor? If so, the youth prime participants who dislike youth should have walked more quickly; instead they walked more slowly.

Analysis 4: Full Regression Model Predicting Exit Walking Time

Another way of analyzing the present data is to conduct a multiple regression on exit walking time with the full model implied by our study. Specifically, one could examine the ability of each implicit measure to predict exit walking time uniquely for the relevant prime condition, while simultaneously demonstrating that each implicit measure does not predict exit time for the nonrelevant prime condition. If implicit attitudes toward the elderly are influencing walking speeds because they imply effective interaction behaviors toward the elderly, then they should have no
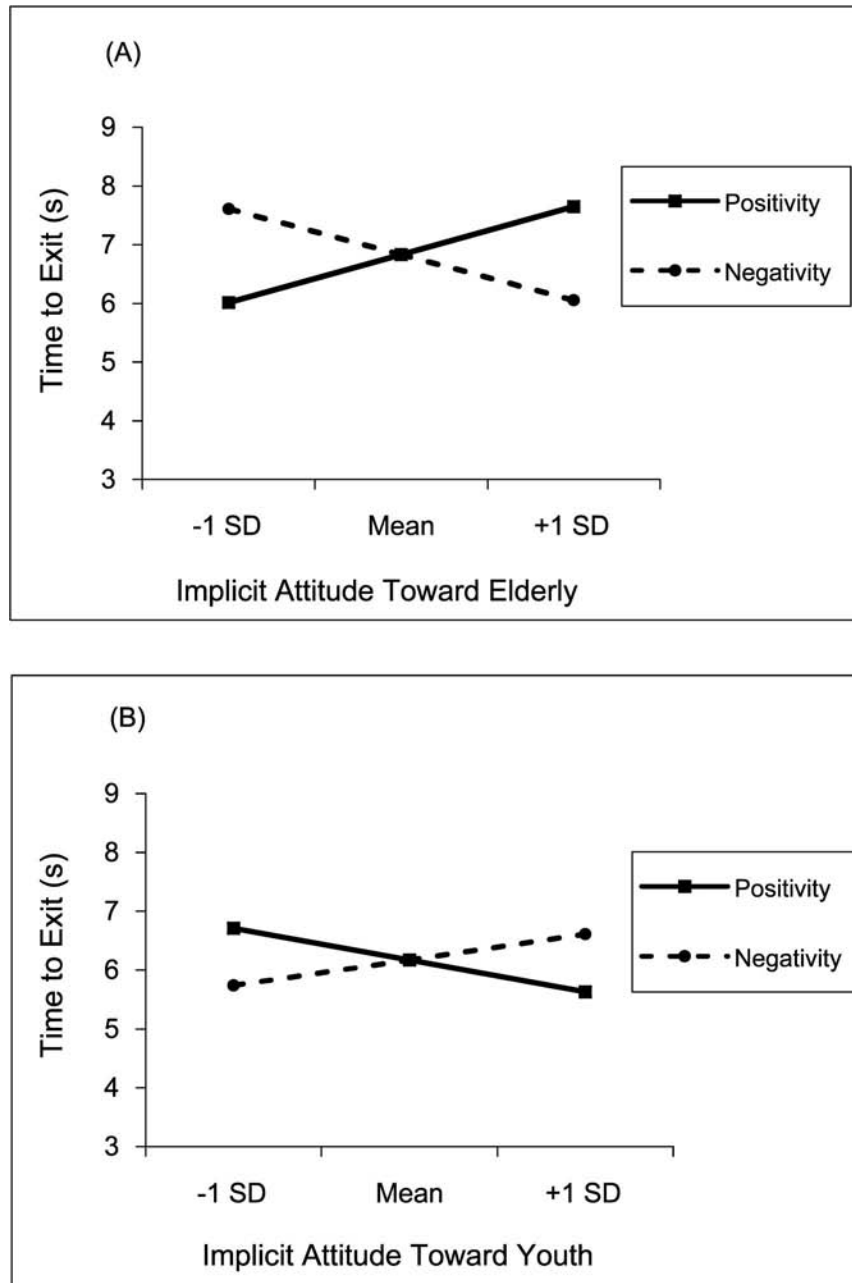
Figure 2. Implicit positivity and implicit negativity predicting time to exit experiment in the elderly prime condition (A) and youth prime condition (B), Study 2. Higher implicit measure scores indicate more positivity or negativity.

bearing on walking speed after priming of youth. The same is true for the youth attitude measure.[7]

To test this, we created the following variables. First, a simplified implicit attitude measure toward each group was computed by subtracting each participant's positivity score from the negativity score, within each group. This yielded one implicit attitude measure toward "elderly" and one implicit attitude measure toward "youth" (with higher numbers indicating more positive attitudes). Two dummy-coded condition variables were then created to rep-

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[7] In terms of predictions in the control condition, in which no priming occurs, our model is silent on the role of implicit attitudes toward each group and how it might relate to walking speed. It might seem at first that neither measure should predict walking speed in this condition. However, it is reasonable to suppose that if an attitude (and its relevant behavior) was strong enough and exercised frequently enough, it could become so chronic as to influence behavior even in the absence of a relevant prime. That is, if one disliked the elderly to an extreme degree, faster walking speeds (the relevant behavior) could become one's baseline speed.

resent the three priming conditions: Prime 1, comparing the elderly (0) and control (1) conditions, and Prime 2, comparing the elderly (0) and youth (1) conditions. Finally, the relevant interactions among the variables were created: Prime 1 × Elderly Attitude, Prime 2 × Elderly Attitude, Prime 1 × Youth Attitude, and Prime 2 × Youth Attitude. Along with entrance time, each of these served as an independent variable in a multiple regression predicting exit walking time.

As predicted, the Prime 2 × Elderly Attitude interaction, $\beta = -.34$, $t(58) = -2.36$, $p = .02$, and the Prime 2 × Youth Attitude interaction, $\beta = -.33$, $t(58) = -2.12$, $p = .04$, were significant, but none of the other interactions reached significance ($ts < -1.61$). More important, tests of the simple slopes for each attitude measure within the relevant condition were significant in the predicted direction and show opposite effects on exit walking time within each. For the elderly prime condition, as attitudes became more positive, exit time increased; in other words, those with positive attitudes walked more slowly following priming of "elderly," but those with negative attitudes walked more quickly following priming, $\beta = .511$, $t(58) = 3.08$, $p = .003$. Furthermore, in the elderly prime condition, the implicit youth attitude measure did not predict exit time ($t < 1.19$). For the youth prime condition, as attitudes became more positive, exit time decreased; in other words, participants with positive attitudes walked more quickly following youth priming, but participants with negative attitudes walked more slowly, $\beta = -.35$, $t(58) = -1.88$, $p = .065$. In addition, the elderly attitude measure did not predict exit time in this condition ($t < -0.39$).

It is interesting that in the control condition, the elderly attitude measure significantly predicted walking speed, $\beta = .41$, $t(58) = 2.05$, $p = .05$, and the youth attitude measure, though nonsignificant, related to walking speed in the direction opposite of the elderly measure, $\beta = -.18$, $t(58) = -1.10$, $p = .27$.

Analysis 5: Prediction of Exit Walking Time by Explicit Attitude Measures

For the explicit measures of attitudes toward the elderly, we predicted no relation between attitudes and exit walking time following elderly primes. As expected, neither the Semantic Differential Scale, $\beta = -.21$, $t(19) = -0.82$, $p = .40$, nor the Kogan Attitude Toward Old People Scale, $\beta = -.01$, $t(19) = -0.04$, $p = .97$, was significantly related to exit time following the elderly prime.

Analysis 6: Comparison of Implicit Attitude Measures and Explicit Attitude Measures

We repeated Analysis 2 for the elderly prime condition while including in the multiple regression equation both the implicit and explicit measures of attitude toward the elderly. This analysis tested the ability of the implicit attitude measure to predict automatic behaviors independent of, or controlling for, explicit attitude measures. For the elderly prime condition, both implicit positivity, $\beta = -.73$, $t(16) = -2.72$, $p = .02$, and implicit negativity, $\beta = .79$, $t(19) = 2.89$, $p = .01$, still significantly predicted exit walking time in opposite directions. Neither of the explicit measures had a significant effect ($ts < 1.43$).

Finally, it should be noted that because the above analyses all included entrance walking time in the multiple regression equa-

tions, the results cannot be due to any correlation between people's implicit positive or negative attitudes and their general walking speed. That is, the effects of implicit attitudes on exit walking time are independent of participants' general walking speed. We also conducted a follow-up study a month later, but before participants knew of the exact nature of the tasks, to check on the relation between participants' implicit positive or negative attitudes toward elderly and youth and their stereotypic beliefs about the walking speeds of elderly people and youths. We did this to demonstrate that our results were not due to differences in knowledge about the walking speeds of each group and that beliefs about walking speeds did not idiosyncratically relate to participants' implicit attitudes or walking speeds. The participants (45 participants responded) almost uniformly thought that elderly people walk slowly and youths walk quickly, demonstrating that participants had similar cognitive beliefs about the speeds of old and young people. Furthermore, these consensual beliefs were unrelated to implicit positive or negative attitudes toward elderly and youth and were also unrelated to exit walking speeds for each participant. This rules out the unlikely alternative explanation that participants who had positive or negative implicit attitudes toward the elderly somehow differed in their stereotype content.

Discussion

The predictions of Study 2 were confirmed. Implicit attitude measures significantly predicted automatic behavior following priming of elderly and youth social categories in a way consistent with our motivated preparation account. Given that participants showed agreement with the stereotypes that elderly people walk slowly and youth walk quickly, it is unlikely that direct expression accounts alone can predict these effects. Study 2 also demonstrated the expected differences in predictive validity for implicit versus explicit attitude measures.

The purpose of Study 3 was to extend our motivated preparation account of automatic behaviors by examining further implications. Although the previous two studies provide evidence consistent with our motivated account, neither directly tested for qualities associated only with goal-directed behavior. It would be useful to demonstrate that qualities known to be associated with motivated behavior are present in automatic social behaviors. Furthermore, both prior studies used behavioral measures as the primary dependent variable, and it would be useful to assess the cognitive processes underlying the proposed account. Study 3 was designed with these aims in mind.

Study 3

The purpose of this study was to provide more direct evidence that the priming of social categories induces motivated behavior. We sought to accomplish this by examining whether social category priming would yield a phenomenon that is characteristic of motivated (vs. nonmotivated) cognition. It is known that upon activation of a goal, the accessibility of goal-related constructs increases during goal pursuit and persists until goal completion, at which point it is actively reduced or inhibited (see, e.g., Förster, Liberman, & Higgins, 2005; Liberman & Förster, 2000; Marsh, Hicks, & Bink, 1998). According to this approach, the completion

of a goal renders goal-related thoughts less urgent and therefore less accessible. Thus, providing participants with the opportunity to interact (even symbolically) with a primed target should lead to a decrease in the accessibility of the category and related concepts. In contrast, nonmotivational models of semantic priming (see Higgins, 1996) would predict that providing participants with an opportunity to interact with the target would serve as an additional prime of the target's social category and thereby produce an increase in the accessibility of the category and related concepts.

To test this, participants were either primed with the category elderly or given a no-prime control. After this, participants completed either an irrelevant delay task (writing about their morning routine) or completed a task that would complete the goal of interacting with a category member. Specifically, participants in this latter condition wrote about what it would be like to interact with an elderly man. Although this is not an actual physical interaction, this writing task represents a substitutable task, which can symbolically fulfill the activated goal and thereby eliminate the action-tendency of the goal (see Lewin, 1951). All participants then completed a lexical-decision task to measure the accessibility of the category elderly.

As in other research assessing the postfulfillment inhibition of goal-related constructs (e.g., Förster et al., 2005; Hedberg & Higgins, 2005), the accessibility of the goal activity itself is not measured; instead, accessibility of concepts related to the goal is measured. For example, in Förster et al. (2005), the participants' goal was to find a picture of eyeglasses in a series of pictures; the key lexical-decision task testing the accessibility of goal-related constructs did not test the accessibility of the goal to search or identify, but instead tested the accessibility of the concept "eyeglasses." Additionally, the lexical-decision task assessing the accessibility of "eyeglasses" did not use the word *eyeglasses* itself, but instead used words that were conceptually related to "eyeglasses" (e.g., *read*). Similarly, we assessed the accessibility of the concept "elderly" (and not the interaction goal itself), and we did so with words known from research on stereotyping (Bargh et al., 1996) to be associated with that social group (e.g., ancient, forgetful). As in prior research and for reasons described in greater detail below, we did not use the word *elderly* itself.

Hypothesis

Our motivational account predicts that priming "elderly" activates a goal to interact with the elderly. The substitutable task of writing about interacting with an elderly man represents fulfillment of that goal, which should lead to inhibition or reduction of the category accessibility. Therefore, in this combination of conditions (prime/elderly writing task) the accessibility of "elderly" should be reduced as a result of postfulfillment inhibition. Direct expression models, however, should predict that this combination of conditions would result in the highest level of accessibility of "elderly"—not only was the construct initially activated through priming, but the activation was repeated by having participants write about an elderly man. To check for the effect of an intervening task that did not fulfill the interaction goal but otherwise had similar task properties, some participants wrote instead about their morning routine. The predicted reduction of the category

accessibility of the elderly construct was not expected to occur in this non-goal-fulfillment condition.

Method

Participants and Design

Seventy-seven participants from Columbia University participated in exchange for either $5 or $8 (depending on whether an additional, unrelated study followed the present experiment). No participants from any of the previous studies were included. The primary dependent variable was the accessibility of elderly related constructs. The independent variables were prime condition (elderly prime, no-prime control) and filler task type (substitutable, irrelevant).

Procedures

Participants completed the study individually in soundproof booths. They were told that the study concerned "cognitive and perceptual performance" and that they would perform two tasks that measured this, with a "filler task" in between in order to separate their performance on each task. We used this cover story to avoid arousing suspicion because of the obviously unrelated nature of the filler tasks. It was explained that the computer would automatically go from task to task and provide instructions at the beginning of each.

Participants were then randomly assigned by the computer to either the elderly prime condition or a no-prime control condition. For both groups, a modified version of the X-judgment task from Study 2 was used, with presentation of either pictures of elderly men or a blank space before each trial. Following this task, participants were then randomly assigned to one of two filler task conditions. In the substitutable task condition, participants wrote about what it would be like to interact with an elderly man. In the irrelevant delay task, participants wrote about their daily morning routine. After this, all participants completed a lexical-decision task designed to assess the accessibility of elderly related constructs.

Materials

X-judgment priming task. This task was identical in structure to that used in Study 2. For participants in the elderly prime condition, four pictures of elderly men were subliminally presented at the beginning of each trial. For participants in the control prime condition, a blank screen was presented instead.

Substitutable interaction elderly writing task. We used this filler task to allow for the activated goal of interacting with the elderly to be completed through a substitutable task. Participants were asked to

> pretend you are interacting with an elderly man. Think about the sorts of things you would say if you were going to talk with him, how you would act, the physical aspects of interacting with him, etc. We are interested in anything that comes to mind when you think about interacting with an elderly man.

Participants were asked to write as much detailed information as they could. A text box appeared beneath the instructions and remained until participants clicked on a box on the screen labeled "done" (or after 5 min).

Irrelevant morning routine writing task. This task was used as a condition to test, given an intervening writing task, the general level of decay over time of elderly-related words after priming the elderly category (in the prime condition), as well as the standard level of accessibility of elderly-related words when there was no previous priming of the elderly construct (in the no-prime condition). Participants were asked to describe their morning routine in as much detail as possible. The appearance of the

screen and all other instructions were identical to that of the substitutable task.

Dependent Measure

A lexical-decision task measured the accessibility of the category elderly by having participants make word/nonword judgments for words related to that category. In a randomized order for each participant, 7 elderly-related words, 18 elderly-unrelated words, and 25 nonwords[8] were presented one at a time in the center of the screen and remained there until a word/nonword response was registered. Participants were instructed to place one index finger on the key marked *W* and the other index finger on the key marked *NW*; all participants used the finger on their dominant hand to register the "word" response. The words used for measuring the accessibility of the category elderly were the category-related words, but not the word *elderly* itself.

Results

Analysis Overview

Preparation of the lexical-decision task data proceeded as follows. First, any trials containing errors (4.42%) or latencies greater than 2,000 ms (2.08%) were removed; no trials contained latencies less than 300 ms. Next, each participant's filler task essay was probed for any words that would directly serve as trials in the lexical-decision task; if found (e.g., a participant writing about talking with an old man) these trials were also removed. The reasoning behind removing these trials is the same for why the word *elderly* itself was not included in the lexical-decision task. It is because there is an additional, unrelated source of accessibility associated with words that appear in the filler task. The lexical term *elderly* appears in the instructions themselves for the elderly writing task. In addition, the participants themselves used certain elderly-related terms when writing about interacting with an elderly person. When priming of a word (e.g., *old*) occurs in the filler task, and then this word is assessed in the LDT, both the concept associated with the word ("elderly") and the lexical term itself has been primed. Given that we are only interested in the accessibility of the related category, and not of the accessibility associated with terms in the lexicon as well, there exists a confounding source of accessibility. Independent of its association with the category, and the activation of the category, the word as a lexical term produces an additional, irrelevant source of accessibility.

The frequency with which several of the elderly-related lexical-decision task terms appeared in participants' essays for the substitutable filler task was rather high. This left the participant sample with a substantial variation in the number of words being used in the computation of each person's reaction time. Although missing data would not be a problem for just a few participants, most of the sample had at least one missing value because of the widespread use of lexical-decision task words (e.g., "I would speak in a *slow* manner . . ."). Eliminating the most frequent words found in the filler task reduced this variability and made the measure more consistent across participants. It is important to note that the number of participants with missing data from each of the related words removed did not vary between the elderly prime and no-prime conditions. Overall, the following words were left out of analyses because of an excessively high number of participants

with missing data (from incorrect responses, slow latencies, or mention of the word in the filler task essay): *slow*, *old*, *forgetful*, *off*, *plunder*, *fond*. In addition, two participants were removed from analyses for excessive errors or slow latencies (>25% of trials).

Log transformed reaction times were then averaged for the elderly-related words and elderly-unrelated words.[9] Facilitation scores were computed by subtracting each participant's average related word time from his or her average unrelated word time. Thus, higher scores represent greater facilitation—or increased accessibility—of the category elderly.

As in prior studies, we used a funneled debriefing to probe for knowledge of the connection between the tasks or perception of the subliminal prime. Any participants who expressed awareness of either ($n = 9$) were removed from analyses. Participants were also removed if at any time during the computer program they summoned the experimenter and had an interaction with him or her ($n = 2$). Three participants were also removed because of computer failures, leaving a final sample of 61.

Primary Analysis

A 2 (prime condition: elderly, no prime) × 2 (filler task: substitutable, irrelevant delay) analysis of variance was performed, with facilitation scores of elderly-related concepts as the dependent variable. The predicted interaction was near significant, $F(1, 57) = 3.54$, $p = .065$. As shown in Figure 3, the pattern of results was clearly consistent with the motivated account and inconsistent with a pure spreading activation account. As predicted, the difference between the no-prime/elderly writing condition ($M = 30.76$, $SD = 87.44$) and the elderly prime/elderly writing condition ($M = -26.61$, $SD = 55.95$) was significant, $t(26) = 1.80$, $p = .04$ (one-tailed). This decreased accessibility of elderly-related words following both elderly priming and elderly writing, as compared with the no-prime/elderly writing condition, can only be explained if the priming task activated a goal, which was then fulfilled by the substitutable task. A nonmotivational account would predict, if anything, increased accessibility of elderly-related words in the elderly prime/elderly writing condition because there were two primes of the category rather than one. In addition, this analysis revealed a trend toward a decrease in accessibility in the elderly prime/elderly writing condition as compared with the elderly prime/irrelevant task condition, though this difference did not reach significance ($t < 1.17$). (Although a significant effect on this comparison would have further bolstered the present interpretation, the elderly prime/elderly writing vs. no-prime/elderly writing

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[8] Elderly-related words were *ancient*, *forgetful*, *grey*, *old*, *retired*, *slow*, and *wrinkle*. Elderly-unrelated words were *adequate*, *come*, *few*, *fond*, *impact*, *inferior*, *logical*, *mild*, *off*, *peacock*, *plunder*, *pollution*, *pure*, *revenue*, *scatter*, *tall*, *vehicle*, and *warm*. Nonwords were *aidity*, *blater*, *blerd*, *buse*, *campure*, *clacorate*, *conjourn*, *crose*, *deme*, *dight*, *doly*, *eanism*, *fabirt*, *futus*, *lench*, *manoor*, *measing*, *nesion*, *poit*, *reesy*, *serterd*, *shend*, *snarm*, *spench*, and *tumase*. Unrelated words were matched to the related words on as many dimensions as possible, including part of speech, number of letters, number of syllables, familiarity, written frequency, and verbal frequency.

[9] A log transformation was used because of skew in the reaction time distributions. Use of raw latencies produces a similar pattern of results.
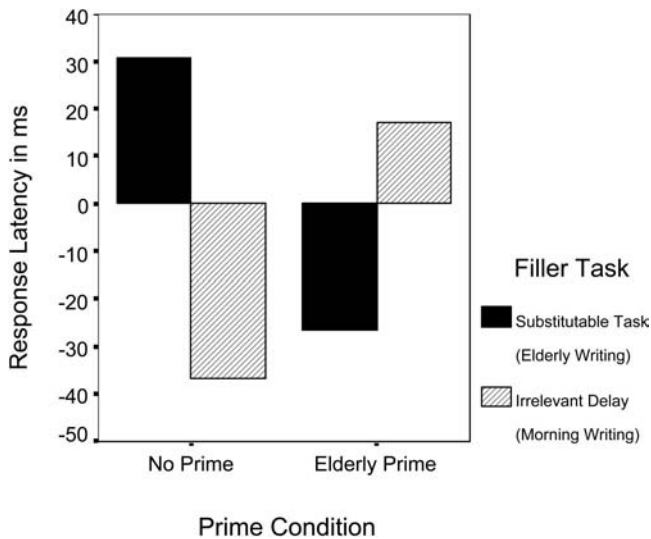
Figure 3. Mean response latencies for facilitation of elderly-related words, by prime condition and filler task type, Study 3. Facilitation times are displayed in untransformed milliseconds for clarity. Higher numbers equal greater accessibility of the category elderly.

comparison nevertheless remains difficult to explain without invoking the perceiver's interaction goal.)

Discussion

In sum, the accessibility of the primed social category (elderly) generally followed a course that is characteristic of motivated processing. Namely, after social category activation and subsequent (symbolic) satisfaction of the goal, accessibility decreased, rather than increased (compared with participants for whom the social category was not activated). A purely nonmotivated account would suggest that the accessibility of the primed social category should have been greatest following priming and writing about the social category because such a combination would have resulted in the most activation. As Förster et al. (2005) noted, "post-fulfillment inhibition . . . may distinguish accessibility from a motivational source from accessibility that is due to semantic priming" (p. 221). By taking advantage of this characteristic of motivated cognition, the Study 3 results provide evidence that priming a social category does activate interaction goals.

General Discussion and Conclusions

The three studies presented here indicate that taking a closer look at possible motivational factors in automatic social behaviors could prove fruitful. Study 1 used a social group that would elicit opposite behavioral responses from a motivated preparation account versus a strict direct expression account and found support for the former. For two different social groups, Study 2 demonstrated opposite behavioral effects for implicit positive attitudes versus implicit negative attitudes toward each group, results consistent with a preparatory account. Study 3 provided more direct evidence of motivated processing in that the accessibility of a primed category followed a time course consistent with that of

goal-related constructs. When an interaction with the primed social category took place through a substitutable task, the accessibility of the primed category decreased. These predictions are opposite to those that follow from an account based only on nonmotivational principles of accessibility.

As with any new program of research, there are limitations in the present studies. Although the pattern of findings across the three studies is generally consistent with predictions, the results are not equally strong in every study with respect to the level of statistical significance. There is obviously a need for further replication of these findings. Another limitation is that there was no actual interaction with a category member in the substitution task of Study 3. The fact that the predicted decrease in construct accessibility occurred for a symbolic interaction is impressive from one perspective, but replication of this effect with a real interaction with a category member is clearly needed. It would also be beneficial to move beyond the paradigm of subliminal priming used in these studies to other methods for examining our proposed motivational account. Nonetheless, the three studies presented here support our motivational account and provide preliminary evidence that looking beyond strict direct expression accounts could be a productive avenue for understanding human social behavior.

An underlying assumption of our perspective is that there are important differences between social beings and nonsocial objects. People, as objects of perception, have a unique status because of the evolutionary interdependence of early humans (see Brewer, 2004). Given this, the processes that determine behavior toward people should differ from those that determine behavior toward nonsocial objects. While direct instructions for interacting with an object may be sufficient, they may at times fall short of functionality when interacting with humans, who require more contextually sensitive processing in determining appropriate behavior. Humans are more complex and require an understanding of situation, context, motivations, and so forth to determine appropriate behavior (kindness toward Person X in some situations, strictness in others) in a way not typically relevant for nonsocial objects (Mischel & Shoda, 1995). These additional processes assumed by our motivational account begin to answer the question "What is the function of stored knowledge?" in a somewhat different way than direct expression accounts. We now turn to a discussion of why considering motivation may be important for understanding the function of stored knowledge.

Functionality of Stored Knowledge: Is Thinking Only for Doing?

James's (1890) famous dictum "thinking is for doing" is often cited as evidence that direct expression accounts are adequate and functional accounts of social behavior, in that the function of having stored behavioral information is to directly guide behavior. Thus, a process whereby this stored information can quickly and unintentionally guide behavior is said to be an effective and highly functional means of producing behavior (see Dijksterhuis & Bargh, 2001).

We believe, however, that thinking is not just for doing anything. Rather, thinking is for doing that accomplishes goals. Because we are social beings, our goals are often interpersonal in nature. Thus, the processes whereby stored knowledge is translated

into behavior should take a social perspective—a purely cognitive approach may be insufficient. It is difficult for perception and cognition to be of much assistance to behavior if they are not context sensitive and not in the service of motivation.

Recall that evaluations of the primed category play no role in direct expression accounts. Because people with both positive and negative attitudes toward a social group have similar stored group information (both pro- and anti-elderly people know that the elderly walk slowly), such stored information can be activated and acted upon for everyone. But is it functional to respond to both slow friends and slow enemies with the same behavior? Should one slow down to maintain contact both with people one likes and with people one dislikes? If one dislikes the elderly, would it not be more functional to speed up and get away from them? A functional process should be flexible enough to know that slow friends should be responded to in kind, but slow enemies should be responded to with the opposite behavior—speeding up to remove oneself from the enemies' presence.

As Fiske (1992) noted, "social understanding operates in the service of social interaction" (p. 877). In other words, the stored knowledge of social groups is important because it can effectively guide social interaction, not only because it can be directly expressed as behavior. Social categories provide more than just a list of a target's attributes, behaviors, beliefs, and so forth. The purpose of these categories and of social knowledge may be to provide useful information for guiding interactions with group members. Knowing that the elderly walk slowly is functional precisely because it can be combined with other nondescriptive knowledge (one's motivations toward elderly; the current interaction situation) to produce appropriate behavior. Social interaction is not just doing; it is doing for the current goal or end state present as a part of the interaction or for the context in which the interaction takes place (Plaks & Higgins, 2000). The importance of considering the social foundations of stored knowledge was clear when Levine, Resnick, and Higgins (1993) noted, "the cognitive 'products' that emerge from these interactions cannot be attributed to single individuals" (pp. 599–600). If the social foundation of stored knowledge is taken seriously, it is difficult to conceive of social behavior as unfolding directly from perceptual input.

In typical priming studies, the perceiver is presented, supraliminally or subliminally, with the social group as a possible interaction partner. The pragmatic approach to such an interaction is not always to mimic or express the same traits as the partner but instead, at least under certain conditions, to respond to the partner in a way that takes into account the traits of the partner and the motivations and evaluations the perceiver has toward the partner.

For example, Plaks and Higgins (2000) demonstrated that perceivers are pragmatic in their behavioral responses to targets in a way not captured with a strict mimicry account. Using a teamwork situation that varied the characteristics of the task and the stereotype of the partner, such that a partners' stereotype implied they would be good versus poor at the task, they found that participants did not mimic the traits associated with the partner's stereotype. Instead, participants strategically varied their effort on a collective task to optimize performance relative to effort. Because Plaks and Higgins (2000) provided incentives, thereby explicitly activating goals, their studies are not appropriate for testing the types of automatic social behaviors of interest in the present article. It could

be, however, that the presence of a social group itself is enough to be considered an interaction situation and sufficient to activate relevant goals.

Implications for Mimicry

We have noted that basic automatic behavior phenomena may contain a motivated component. The same may be true of behavior mimicry (the "chameleon effect"). Although research on behavioral mimicry has a long history, studies of mimicry recently have seen a resurgence. Briefly, studies have found that participants in an interaction situation with a confederate partner tend to mimic the behaviors of the partner. For example, Chartrand and Bargh (1999) placed participants in an interaction with a confederate who either touched his face or shook his foot and found participants to do the same with greater frequency than when he did not perform those behaviors.

Originally this research was interpreted in terms of the perception–behavior link, such that perceiving a behavior in the partner activates the corresponding mental representation of that behavior and, through the principle of ideo-motor action, thereby makes the behavior more likely to be performed. Although Chartrand and Bargh (1999) found that mimicry increased liking and provided for a smoother interaction, this was interpreted as a consequence of mimicry rather than the motivation responsible for imitation. Dijksterhuis and Bargh (2001) interpreted other evidence that behavioral mimicry leads to liking and rapport with similar reasoning.

Is it possible for human mimicry to be interpreted as evidence that perceiving is not for doing as an end in itself but is in the service of a motivation to have shared social experiences? Imitated facial expressions (cited in Dijksterhuis & Bargh, 2001), for example, lead to shared emotions, which lead to stronger social bonds between actors. Thus the proposed direct connection between perception and behavior need not be considered strictly a consequence of our perceptual and cognitive apparatus but could be understood as part of a motivated drive to experience a shared reality (e.g., Hardin & Higgins, 1996). The same applies to mimicry of gestures and postures, which occur in the service of increasing rapport (Chartrand & Bargh, 1999; Lakin & Chartrand, 2003).

Recently, Lakin and Chartrand (2003) provided evidence that having an affiliation goal increased mimicry and that failing to affiliate in an interaction increased subsequent mimicry, concluding that mimicry "may be part of a person's repertoire of behaviors . . . when there is a desire to create rapport" (p. 334). This seems to argue for a motivational approach, in that mimicry may be the result of activated affiliation goals when put in an interaction situation. However, prevailing models maintain that mimicry still occurs through a nonmotivated mechanism and that the desire to affiliate temporarily increased the strength of the perception–behavior link by causing participants to attend to the environment more.

The present research suggests a motivated alternative for these findings, an alternative that Lakin and Chartrand (2003) mention but dismiss as unlikely. The reasons they give for dismissing a motivational perspective are similar to those given by Chartrand and Bargh (1999) and Dijksterhuis and Bargh (2001) in their

discussion of behavioral mimicry. Specifically, both cite attempts to reduce affiliation between participants and the confederate partner by using a confederate unknown to the participant. Using a stranger as an interaction partner was a means of "greatly reducing the probability that any imitation was motivational in nature" (Dijksterhuis & Bargh, 2001, p. 13). However, as with other work on automatic social behaviors, relevant conditions to test for motivational influences have not been conducted, and it has only been assumed that motivation has played no role in these results. After all, although the participants and the confederate in mimicry studies may be strangers, the fact that participants are placed in an interaction situation should immediately activate goals associated with interactions—for example, cooperation goals—which would then be pursued strategically with tactics such as mimicry (e.g., Bargh, 1990).

Our proposal is that when participants in mimicry experiments are placed in an interaction situation, relevant interaction goals become activated and the perceiver prepares to complete these goals in an effective manner. In mimicry experiments, when the interaction target is similar to oneself, whether a stranger or not, an effective interaction is likely defined as having affiliation with the target or having a smooth, cooperative interaction. Because mimicry is one way to achieve success at affiliation and to ensure a positive interaction, behavioral mimicry will ensue. We ask, however, what if the likability of the interaction partner were manipulated? Our prediction is that people would evince less mimicry when paired with a disliked partner, a hypothesis that we are currently testing. Note that as with automatic behavior phenomena, we do not suggest that ideo-motor processes never occur in mimicry. Instead, we propose that motivated processes may play an important, complementary role in what is undoubtedly a complex, multifaceted phenomenon.

Further Considerations

As noted earlier, despite the differences between the two accounts, we are not suggesting that our motivated preparation account can replace direct expression accounts. We have tested only a particular range of conditions. For these conditions, we have found support for the notion that motivation plays a role in automatic social behavior. Such support in itself, however, does not speak to when and how each type of account may be better suited to explain the nature of automatic social behaviors. There is a clear need for additional research to address this limitation.

One important variable may be the nature of the primed category. For example, Aarts and Dijksterhuis (2002) found that priming of cheetah exemplars impacted participants' walking speeds (with assimilation under low comparability conditions and contrast under high comparability). It may be that direct expression is more important for certain types of categories, like animals. Even for such categories, however, it seems unlikely that direct expression is the only determining factor. Our human ancestors would not have survived long if they responded to every encounter with grizzly bears, lions, and gorillas with fight as opposed to flight behaviors. It may be that the mechanisms of direct expression and motivated preparation are weighted differently in producing automatic behavior depending on a host of categorical and situational features. Advances in both theory construction and empirical evidence are needed to address these issues.

It should also be noted that there are possible alternative accounts for the findings of any one of our studies, some of which can be applied to prior automaticity work as well.[10] These alternatives are less plausible, however, when the findings from all three studies are combined. Consider Study 1, for example. A perceptual priming account could be proposed, such that participants in the gay prime condition judged the experimenter as more passive (a trait activated by the gay construct) in his attempts to fix the computer problem and were therefore more upset. It is also possible that participants in this condition judged the experimenter as gay and prejudicially responded with hostility. A more affective account would be that a negative reaction to gay men induced negative emotions that produced a hostile reaction. These accounts, however, cannot explain the results of Study 2. For instance, it is unlikely that participants perceived the experimenter (a 25-year-old graduate student) as more elderly, and an affective account cannot explain the opposite results found for *elderly* and *youth* priming.

In sum, we have introduced a model of automatic social behavior that proposes that behavior following category priming is in some measure the result of perceivers being motivated to prepare to interact with the primed target member. We have presented three studies that provide initial support for this model and demonstrate that understanding the nature of automatic behavior, at least in the conditions tested here, can be increased by considering the role of motivational factors in addition to nonmotivational factors.

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[10] We thank one anonymous reviewer in particular for his or her great effort put forth in proposing a number of alternative accounts.

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