

Research Report

Of Two Minds

Forming and Changing Valence-Inconsistent Implicit and Explicit Attitudes

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ABSTRACT—*Because different processes underlie implicit and explicit attitudes, we hypothesized that they are differentially sensitive to different kinds of information. We measured implicit and explicit attitudes over time, as different types of attitude-relevant information about a single attitude object were presented. As expected, explicit attitudes formed and changed in response to the valence of consciously accessible, verbally presented behavioral information about the target. In contrast, implicit attitudes formed and changed in response to the valence of subliminally presented primes, reflecting the progressive accretion of attitude object–evaluation pairings. As a consequence, when subliminal primes and behavioral information were of opposite valence, people formed implicit and explicit attitudes of conflicting valence.*

Consider the following scenario. A woman talks to a man at a singles mixer. He seems to be a perfectly pleasant conversationalist, assertive without being pushy. When asked later what she thinks of him, her first inclination is to say, “Nice guy.” Yet a friend points out that she seemed inattentive to his approaches and disgusted by his presence, perhaps because he is similar to an ex-lover with whom things ended badly.

Who has not had a similar experience of conscious reactions that contrast with unconscious ones? Social psychologists have recently begun to explain such apparently different reactions as reflecting distinct processes of evaluation that may occur simultaneously (Fazio & Olson, 2003; Smith & DeCoster, 2000; Wilson, Lindsey, & Schooler, 2000). Implicit attitudes (i.e., attitudes to which people do not initially have conscious access and whose activation cannot be controlled) can be distinguished from explicit attitudes (i.e., attitudes that people can report and

whose expression can be consciously controlled). These distinct types of evaluation are thought to reflect two very different systems by which information is processed (Sloman, 1996; Smith & DeCoster, 2000), and this distinction has been applied to many important areas of psychology (Chaiken & Trope, 1999).

Sloman (1996) argued that there are two independent systems of reasoning that differ both in what information they process and how they process it (see also McClelland, McNaughton, & O’Reilly, 1995). The first system of reasoning, the *slow-learning system*, operates using interconnected associations in memory that are based on similarity and contiguity. In this case, learning consists of associations in memory, which are formed and strengthened by the slow accrual of information over time. The second system of reasoning, the *fast-learning system*, relies on logic and symbolic representations at a relatively higher-order level of cognitive processing. Sloman’s approach is congruent with current conceptualizations of how implicit and explicit attitudes operate (Gawronski, Strack, & Bodenhausen, in press). The slow-learning system of reasoning is relevant to understanding of how implicit attitudes form and function because implicit attitudes are posited to follow the basic principles of similarity, association, and information accrual (Smith & DeCoster, 2000). The fast-learning system, in contrast, fits with a conceptualization of explicit attitudes as evaluations based on resource-intensive conscious thought; this conceptualization would indicate that people can, at times, have control over their expression of explicit attitudes (Fazio, 1995).

Given that the slow-learning system and the fast-learning system process information differently, we propose that different modes of evaluation should be differentially sensitive to different kinds of information. In the study reported here, we investigated sensitivity to subliminally presented, temporally congruent primes that provide valenced target-evaluation associations and to consciously accessible, written behavioral information that requires higher-level cognitive processing. We predicted that implicit attitudes would be affected more by subliminally presented primes and that explicit attitudes would

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be affected more by consciously accessible information. Thus, we expected that if both subliminal and consciously accessible information about an attitude object were available, implicit attitudes would form and change in ways consistent with the valence of the subliminal information, and explicit attitudes would independently form and change to reflect the valence of the consciously accessible information. We further predicted that if both subliminal and consciously accessible information about an attitude object were available but those two types of information differed in their evaluative implications, the resulting implicit and explicit attitudes about the attitude object would differ in valence. In addition, we predicted that those attitudes would continue to track the evaluative implications of the information to which they were sensitive, such that the valence of implicit attitudes and the valence of explicit attitudes would change in opposite directions if the evaluative implications of available associative and symbolic verbal information did so. Thus, people would form evaluatively inconsistent implicit and explicit attitudes about the same attitude object.

METHOD

Participants

Fifty undergraduates at Miami University participated for research credit.

Presentation of Information

We used a modified version of an attitude-learning paradigm developed by Kerpleman and Himmelfarb (1971). Participants were seated at computers and were told that they would receive information about a person named Bob. They then learned about Bob over the course of 200 learning trials. In all of these trials, the sequence of events was the same. At the start of a trial, participants fixated on a point (an addition sign) in the center of the computer monitor. After 200 ms, the fixation point was replaced by a positive or negative word (the subliminal prime, e.g., *love*, *party*, *hate*, or *death*; see Fazio, Sanbonmatsu, Powell, & Kardes, 1986), which appeared for 25 ms. Immediately afterward, a picture of Bob was displayed for 250 ms. These steps constituted the priming phase of information presentation. Next, while the monitor displayed the picture of Bob, behavioral information that may have been characteristic of him was presented (supraliminally).¹ This constituted the presentation of the verbal behavioral information about the target. Participants then pressed the appropriate response key to indicate whether they believed that the behavior was characteristic or uncharacteristic of Bob. Finally, for 5 s, they were given feedback about whether the behavior was in fact characteristic of Bob.

¹Photographs of five different white males were randomly presented as "Bob." The photograph used did not affect the results. The positive and negative behaviors were developed by McConnell, Sherman, and Hamilton (1994); they were presented only once and were selected to ensure that they were not contradictory.

Manipulation of the Valence of the Information

During the first 100 trials, half of the participants were presented with 10 negative primes 10 times each and received feedback that positive behaviors were characteristic of Bob and negative behaviors were uncharacteristic of Bob. The other half of the participants were presented with 10 positive primes 10 times each and received feedback that negative behaviors were characteristic of Bob and positive behaviors were uncharacteristic of Bob. Thus, participants either received positive associative information and negative behavioral information about Bob or vice versa. During the second 100 trials, the valence of the prime and the valence of the feedback were switched (e.g., participants who were presented with positive primes in the first 100 trials were presented with negative primes in the second 100 trials, and those who were initially told that positive behaviors were characteristic of Bob were told that negative behaviors were characteristic of him). The order of the 10 primes within each 100-block segment was randomly determined for each participant.

Assessment of Attitudes

Participants' implicit and explicit attitudes were assessed at two different times: after the first 100 trials (Time 1) and after the second set of 100 trials (Time 2). The same attitude measures were used at these two times (the order of these measures was counterbalanced, producing no effects).

Explicit-Attitude Measure

To assess explicit attitudes, we asked participants to judge how likable Bob was, using a scale ranging from 1 (*very unlikable*) to 9 (*very likable*). In addition, they described Bob by completing five 9-point semantic differential scales: good-bad, pleasant-mean, agreeable-disagreeable, caring-uncaring, and kind-cruel. Further, participants provided their evaluation of Bob on a feeling thermometer that ranged from 0° to 100°. Responses to these seven items were standardized and averaged (Time 1 $\alpha = .91$, Time 2 $\alpha = .93$), with greater mean scores indicating greater liking for Bob.

Implicit-Attitude Measure

The Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) was used to assess implicit attitudes toward Bob. Twenty-six stimuli were used for this test: 1 picture of Bob, 5 different pictures of White men who were not Bob, 10 positive adjectives (e.g., *wonderful*), and 10 negative adjectives (e.g., *disgusting*).

This IAT was a modified version of the task used by McConnell and Leibold (2001) and consisted of seven 20-trial blocks. Participants were informed that the task involved making category judgments of stimuli (photos or words) presented on a computer monitor and that they should press one of two keys ("d" or "k") on the computer keyboard to indicate their judgment

for each stimulus. During each block, labels on the left and right sides of the display reminded participants which categories required which response (assignment of categories to the “d” and “k” keys was counterbalanced across participants and produced no effects). Participants were instructed to complete the task quickly while also minimizing errors.

Only data from the critical blocks (Blocks 3, 4, 6, and 7) were examined. In two of these blocks (Combination 1), participants judged whether the stimuli were “Bob or negative” or “not Bob or positive.” In the other two critical blocks (Combination 2), participants judged whether the stimuli were “Bob or positive” or “not Bob or negative.”² To assess implicit attitudes toward Bob, we subtracted mean response latency for Combination 2 from mean response latency for Combination 1 (Greenwald et al., 1998).³ Larger positive scores reflected relatively more positive implicit attitudes toward Bob.

After the Time 2 measures of attitudes were administered, participants were given a list of 40 words (the 10 positive and 10 negative primes used in the study and 10 positive and 10 negative filler words). Their task was to choose the 20 words that they believed had been presented during the session.⁴ This recognition test served as a check that the primes were subliminal.

RESULTS

The attitude measures were examined in a 2 (condition: negative primes and positive behaviors first vs. positive primes and negative behaviors first) × 2 (time: Time 1 vs. Time 2) × 2 (standardized attitude measure: implicit vs. explicit) mixed-model analysis of variance, with the latter two factors within subjects. The expected three-way interaction obtained, $F(1, 48) = 102.60, p < .001, \eta^2 = .68$. Thus, the two-way interactions between condition and time were examined separately for implicit and explicit attitudes.

Explicit Attitudes

The predicted two-way interaction between condition and time was found for explicit attitudes, $F(1, 48) = 119.98, p < .001, \eta^2 = .71$ (see Fig. 1). When negative primes and positive behaviors were presented first, explicit attitudes were more positive at Time 1 than at Time 2, $F(1, 48) = 57.36, p < .001, \eta^2 = .43$. When positive primes and negative behaviors were pre-

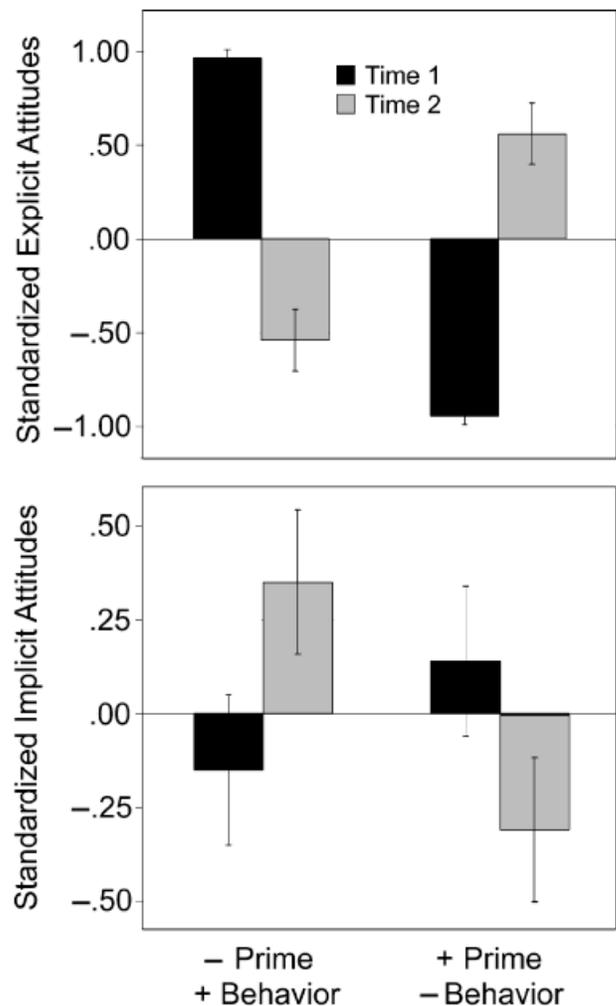


Fig. 1. Explicit (top panel) and implicit (bottom panel) attitudes as a function of condition and time. Error bars represent standard errors.

sented first, explicit attitudes were more negative at Time 1 than at Time 2, $F(1, 48) = 78.99, p < .001, \eta^2 = .54$. As predicted, participants’ explicit attitudes formed and changed in response to the valence of written behavioral information.

Implicit Attitudes

The predicted two-way interaction between condition and time was observed for implicit attitudes, $F(1, 48) = 6.84, p < .02, \eta^2 = .13$ (see Fig. 1), and, as expected, the pattern of results for implicit attitudes was the exact opposite of the pattern observed for explicit attitudes. Indeed, when negative primes and positive behaviors were presented first, implicit attitudes were more negative at Time 1 than at Time 2, $F(1, 48) = 4.78, p < .04, \eta^2 = .10$. When positive primes and negative behaviors were presented first, implicit attitudes were more positive at Time 1 than at Time 2, $F(1, 48) = 7.19, p < .02, \eta^2 = .18$. As predicted, participants’ implicit attitudes formed and changed in line with the valence of subliminally presented primes.

²Half of the participants performed Combination 1 in Blocks 3 and 4 and Combination 2 in Blocks 6 and 7, and the other half performed Combination 2 in Blocks 3 and 4 and Combination 1 in Blocks 6 and 7. This counterbalancing produced no effects.

³All trials in the critical blocks were retained for analysis. Responses faster than 300 ms were recoded as 300 ms, and those slower than 3,000 ms were recoded as 3,000 ms (Greenwald et al., 1998). After these adjustments, each response latency was log-transformed before being analyzed (Fazio, 1990). Alternative approaches to IAT scoring (e.g., Greenwald, Nosek, & Banaji, 2003) produced identical results.

⁴The filler words and primes were equivalent in valence, length, and frequency of use.

Differences Between Implicit and Explicit Attitudes

We also assessed whether people held different implicit and explicit attitudes about Bob at the same time by conducting paired-sample t tests for implicit and explicit attitudes for both conditions at Time 1 and Time 2. As expected, people held significantly different implicit and explicit attitudes at both Time 1, $t(24) = 5.26, p < .001, \eta^2 = .54$, and Time 2, $t(24) = -4.17, p < .001, \eta^2 = .42$, when negative primes and positive behaviors were presented first, and at both Time 1, $t(24) = -5.85, p < .001, \eta^2 = .59$, and Time 2, $t(24) = 3.47, p < .005, \eta^2 = .33$, when positive primes and negative behaviors were presented first.

Response Latencies

The mean response latency for participants' characteristic/uncharacteristic judgments during the learning session was calculated for Trials 1 through 100 and for Trials 101 through 200. Latencies were examined in a 2 (condition: negative primes and positive behaviors first vs. positive primes and negative behaviors first) \times 2 (trials: first 100, second 100) mixed-model analysis of variance, with the latter factor within subjects. The results showed only a practice effect (i.e., only the main effect of trials was significant), $F(1, 48) = 500.82, p < .001, \eta^2 = .92$; responses were slower in the initial 100 trials ($M = 3,970$ ms, $SD = 786$) than in the second 100 trials ($M = 1,811$ ms, $SD = 615$).

Recognition Task

To check that participants did not recognize the primes, we assessed their mean accuracy in identifying the 20 primes (from a list of 40 words). The results showed that the primes were indeed presented subliminally. Participants performed at no better than chance levels ($M = .48, SD = .09$), $t(49) = -1.58$, n.s., $d = -0.31$.

DISCUSSION

These findings support our contention that implicit and explicit attitudes form and change on the basis of different types of information that are consistent with different underlying systems of reasoning. Explicit attitudes formed and changed in response to consciously available information. This result supports our contention that explicit attitudes are formed and changed by a fast-learning, verbal system of reasoning. Implicit attitudes responded to the valence of the subliminally presented primes. This shows that implicit attitudes were sensitive to associative information presented below conscious awareness, whereas explicit attitudes were changed by information that was amenable to higher-order cognition. Perhaps the most impressive support for our proposal is the finding that implicit and explicit attitudes changed in opposite directions when the valence of the primes and of the behavioral information changed in opposite directions.

This research reveals that implicit and explicit attitudes are changed through different processes (Slooman, 1996; Smith & DeCoster, 2000) and that people can hold different implicit and explicit attitudes about the same attitude object at the exact same time, according to how the information they encounter is processed. Although some research has yielded evidence consistent with implicit and explicit attitudes being the products of different pools of social knowledge (e.g., Jellison, McConnell, & Gabriel, 2004), the current work experimentally demonstrates that implicit and explicit attitudes are simultaneously formed and changed by different processes that rely on different information.

This study has implications for existing models of attitudes and attitude change (Fazio, 1995; Petty & Wegener, 1998). The results seem incompatible with models of evaluation that assume explicit attitudes are simply modified versions of implicit attitudes accessed from memory (Fazio, 1995). Specifically, these models cannot account for inconsistent valence of implicit and explicit attitudes formed in response to the same information. However, the current results are consistent with models that envision implicit and explicit attitudes as products of different underlying evaluative systems and predict that people can simultaneously hold different implicit and explicit attitudes about an object (Wilson et al., 2000). These findings suggest that attitudes researchers should more fully consider that the slow-learning and fast-learning systems are independent in some cases. One implication of such independence is that people may not feel dissonance when their implicit and explicit attitudes are inconsistent. Indeed, Gawronski and Strack (2004) found that dissonance induced attitude change for explicit but not implicit attitudes.

In sum, elucidating the differential processing underlying the formation and change of implicit and explicit attitudes is important for advancing theoretical conceptualizations of attitude change. This differential processing may explain why attitudes are resistant to change at some times but change quickly at other times. Thus, to return to the example with which we opened this article, it is not surprising that sometimes a woman has negative evaluations about a man she met at a party despite the fact that everything she can articulate about him is positive. Although she might not be able to "put her finger on" why he is at some level both likable and unlikable, the current work suggests that the answer lies in dissociations between a slow-learning, association-grounded evaluative system and a fast-learning, verbally oriented evaluative system.

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