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Reports

Consequences of discrepant explicit and implicit attitudes: Cognitive dissonance and increased information processing

Robert J. Rydell [a,*], Allen R. McConnell [b], Diane M. Mackie [c]

[a] Department of Psychological and Brain Sciences, Indiana University, Bloomington, IN 47405, USA
[b] Miami University, USA
[c] University of California, Santa Barbara, USA

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ABSTRACT

Attitudes research has shown that evaluations assessed directly (explicit attitudes) and indirectly (implicit attitudes) can diverge for many reasons. However, only recently has work begun to examine the phenomenology of experiencing discrepant explicit and implicit attitudes, and a number of important questions remain unanswered. What are the consequences of explicit–implicit attitude discrepancies on information processing? What psychological states accompany these discrepancies, and can they account for behavior? In two experiments, the current work examined whether dissonance-related discomfort results from discrepant explicit and implicit attitudes and considered its role in directing subsequent information processing. Dissonance and additional information processing were observed in experimental conditions where explicit and implicit attitudes diverged (and increased dissonance-related discomfort accounted for greater information processing; Experiment 1), but they were eliminated by a manipulation that reduced dissonance (i.e., self-affirmation; Experiment 2). The role of cognitive dissonance in explicit–implicit attitude inconsistencies and information processing is discussed.

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Introduction

At times our feelings about people or objects are conflicted. That is, our explicit attitudes (evaluations that people can report and for which expression can be controlled) and implicit attitudes (evaluations for which people may not initially have conscious access and for which activation cannot be controlled) seem discrepant. For instance, one might dislike a co-worker despite the complete inability to articulate anything other than positive details about the person or be drawn to junk food despite its expense and fat content.

Explicit and implicit attitudes can diverge for a number of reasons, including self-presentational concerns (Olson, Fazio, & Hermann, 2007), quick implicit (Karpinski & Hilton, 2001) or explicit (Rydell & McConnell, 2006) attitude change, conflicting evaluations of individuated behaviors and social group memberships (McConnell, Rydell, Strain, & Mackie, 2008), extra-personal associations (Han, Olson, & Fazio, 2006), or exposure to inconsistently valenced subliminal primes and behavioral information (Rydell, McConnell, Mackie, & Strain, 2006). Although now documented extensively, little research has examined the consequences of explicit–implicit attitude discrepancies in terms of their phenomenology and their impact on information processing.

The only research examining the psychological consequences of divergent explicit–implicit attitudes or beliefs has shown that increased discrepancies lead to greater implicit ambivalence (a stronger association between the attitude object and doubt in memory) and increased information processing of attitude relevant information (Petty, Tormala, Briñol, & Jarvis, 2006). This research showed that once attitudes formed, they were not completely replaced when attitudes changed because increased implicit ambivalence accompanied attitude change. Briñol, Petty, and Wheeler (2006) showed that the greater the discrepancy between standardized measures of explicit and implicit self-beliefs (e.g., one's own shyness), the more extensive processing of persuasive messages related to the domain of discrepancy (e.g., arguments favoring shyness). As explicit–implicit discrepancies increased, people were motivated to carefully consider subsequently presented, relevant information. Yet, why does this outcome occur? What phenomenology is driving this increased information processing?

Although there are no data directly addressing this question, Petty, Briñol, and colleagues suggested that increased explicit–implicit attitude discrepancies lead to implicit ambivalence, which people attempt to reduce by elaborating on subsequent information about the attitude object. Indeed, research on explicit and implicit attitude ambivalence has shown that when attitudes are

* Corresponding author.
E-mail address: rjrydell@indiana.edu (R.J. Rydell).

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ambivalent, people engage in more detailed processing of subsequently presented attitude-relevant information (e.g., Bell & Esses, 2002; Jonas, Diehl, & Bromer, 1997; Petty et al., 2006).

In the current work, we examined whether holding discrepant explicit and implicit evaluations produces cognitive dissonance, which might in turn affect social information processing. It is clear that when people hold inconsistent cognitions, these discrepancies elicit feelings of psychological tension or discomfort (e.g., Aronson, 1992; Festinger, 1957). And, in response to dissonance-induced discomfort, people may attempt to reduce these feelings with responses ranging from justifying their beliefs (Aronson, 1997; Cooper & Fazio, 1984) to engaging in self-affirmation (Steele, 1988). Because explicit–implicit attitude discrepancies represent valence inconsistent cognitions (i.e., evaluations) about an attitude object, we explored whether they would lead to feelings of dissonance-induced discomfort (Olson & Fazio, 2007). Thus, as explicit–implicit attitude discrepancies increase, greater dissonance should be aroused and, as an attempt to reduce dissonance, increased information processing of attitude relevant information observed.

The ambivalence and dissonance accounts make similar predictions for attitude discrepancies and information processing. However, it is clear that dissonance and ambivalence are not isomorphic constructs (Maio, Esses, & Bell, 2000). For the current concerns, discomfort is not a necessary aspect of ambivalence (Newby-Clark, McGregor, & Zanna, 2002), whereas dissonance is always uncomfortable (Cooper & Fazio, 1984). Because discomfort is not necessary for ambivalence, to the extent that discomfort is necessary for explaining the relation between increased explicit–implicit discrepancies and increased information processing, then a dissonance account is given relatively more credence than an ambivalence account. Moreover, if the introduction of a manipulation known to undercut dissonance affects both dissonance-induced discomfort and additional information processing but has no impact on ambivalence, a dissonance account would be further supported.

Therefore, we examined the mechanisms by which greater explicit–implicit attitude discrepancies produce increased information processing. We suggest that explicit–implicit attitude discrepancies induce dissonance (discomfort) and, when subsequent information is available about the attitude object, people will attend to and elaborate on this information to reduce dissonance arousal. Also, manipulations that neutralize dissonance (e.g., self-affirmation; Steele, 1988) should reduce information processing about an attitude object for which discrepant explicit and implicit evaluations are accessible because they should eliminate the dissonance driving information processing.

In the current work, we adopted a technique developed in our lab to establish conflicting implicit and explicit attitudes toward the same object (Rydell et al., 2006). We demonstrated that explicit attitudes can form in response to consciously available information whereas implicit attitudes can form in response to the valence of subliminally-presented primes. When participants were presented with a series of trials in which a target person (“Bob”) was preceded by a subliminal prime (either positive or negative in valence) and who was described in a sentence as having performed a particular behavior (the valence of which was always opposite of the subliminal prime), implicit attitudes toward Bob reflected the valence of the subliminal primes whereas explicit attitudes corresponded to the valence of the behaviors presented.

Experiment 1

We borrowed this technique in Experiment 1, crossing the valence of the subliminal primes (positive vs. negative) with the valence of the behaviors (positive vs. negative) to produce conditions where implicit and explicit attitudes toward Bob either were, or were not, inconsistent with each other. We predicted that when primes and behaviors were valence inconsistent (as opposed to consistent), explicit–implicit attitude discrepancies would increase as would feelings of discomfort (i.e., dissonance arousal). We then provided participants with more information about Bob's opinion on an issue. We expected increased information processing about Bob's beliefs regarding this issue in an attempt resolve discrepancies in attitude toward Bob.

Information processing was examined by having participants read the target person's opinions about (or arguments for) instituting senior comprehensive exams. Research on persuasion has shown that greater attitude change in response to strong versus weak arguments reflects greater information processing of the message (Petty & Cacioppo, 1986). We expected more persuasion (i.e., attitude change toward the position advocated by Bob) in response to strong as opposed to weak arguments, especially when explicit–implicit attitude discrepancies toward Bob were greater (i.e., when the valence of the primes and behaviors associated with the target person were inconsistent). When explicit–implicit attitude discrepancies toward the target were minimal (i.e., the valence of the primes and behaviors associated with were consistent), there should be less attitude change in the wake of Bob's strong (vs. weak) arguments.

Importantly, we examined whether dissonance and ambivalence would result from greater explicit–implicit attitude discrepancies, and we explored whether each could account for the relation between greater explicit–implicit attitude discrepancies and greater information elaboration. To the extent that dissonance could serve a mediating role, a process account highlighting the importance of discomfort in understanding how explicit–implicit attitude discrepancies affect information processing would be supported.

Method

Participants

One hundred and sixty-three undergraduates at the University of Missouri participated for research credit. They were randomly assigned to a 2 (prime valence: positive vs. negative) × 2 (behavioral valence: positive vs. negative) × 2 (argument strength: strong vs. weak) between-subjects factorial.

Presentation of primes and behavioral information

Participants learned about Bob over the course of 50 trials. For each trial, participants first saw a fixation point (“+”) in the center of the computer monitor for 1000 ms that was replaced with a “rolling set of letters” randomly presented to the right or left of the fixation point. This “rolling set of letters” consisted of three letter strings. The first letter string was a non-word mask, presented for 30 ms. The second letter string was the prime word (e.g., party, ugly), which was presented for 30 ms. The final letter string was another non-word mask, also presented for 30 ms. Because of the rapid, parafoveal, and masked presentation, participants were unaware that the prime word was presented.[1] Participants were then immediately presented with just an image of Bob on the monitor for 250 ms. The image of Bob remained on the monitor while behavioral information about him was presented supraliminally in text below his photo.

The behavioral information presented about Bob varied in valence: 25 trials contained positive behaviors and 25 contained negative behaviors. For each trial, participants judged whether the behavior was characteristic or uncharacteristic of Bob using two

[1] During an end-of-study debriefing, participants were told that words were presented subliminally during learning. None of the participants were able to correctly identify any of the prime words.

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keys on the keyboard. After responding, participants were given feedback about whether the behavior was characteristic or uncharacteristic of Bob for 5 s. Feedback consisted of informing participants whether their selection was correct "Your response is correct" (in green text) or incorrect "Your response is incorrect" (in red text) followed by a summary statement, "This behavior is (not) characteristic of Bob." The feedback suggested that Bob performed either positive (positive behaviors characteristic, negative behaviors uncharacteristic) or negative (negative behaviors characteristic, positive behaviors characteristic) actions. All participants were exposed to the same 50 statements about Bob, but behavioral valence was manipulated by whether the feedback about any given statement was "characteristic" or "uncharacteristic" of him. After the attitude induction, but before learning about comprehensive exams, participants completed the attitude, dissonance, and implicit ambivalence measures.

Explicit attitude measure

To assess explicit attitudes, participants evaluated Bob on a scale ranging from 1 (*very unlikable*) to 9 (*very likable*). In addition, they completed 5 semantic differential scales, each on a 9-point scale to describe Bob: good–bad, pleasant–mean, agreeable–disagreeable, caring–uncaring, and kind–cruel, with greater mean scores across all measures indicating more positive explicit attitudes toward Bob ($\alpha = .99$).

Implicit attitude measure

The affect misattribution procedure (AMP; Payne, Cheng, Govorun, & Stewart, 2005) was used to assess implicit evaluations of Bob. On each trial, participants were presented with a face prime for 75 ms. The face was then replaced by a blank screen for 125 ms, followed by a Chinese character for 100 ms. Immediately after the presentation of the Chinese character, a black-and-white pattern mask was presented, and participants indicated whether they considered the Chinese character as more pleasant or less pleasant than the average Chinese character. Participants were repeatedly instructed not to let the faces bias their judgments of the Chinese characters. The AMP consisted of 50 trials. Half of the trials used an image of Bob as prime stimulus; the remaining half used images of four unknown individuals as primes. Because we were interested in attitudes toward Bob, implicit attitudes were indexed by the percentage of trials, when Bob served as the prime, in which the Chinese character was judged to be more pleasant than average. Greater scores indicated relatively more positive implicit attitudes towards Bob.

Dissonance measure

Dissonance-based discomfort was measured with a 3-item scale (Elliot & Devine, 1994). Participants indicated the extent to which they felt uncomfortable, uneasy, and bothered on a scale ranging from 1 (*very slightly*) to 5 (*quite a bit*). Their mean response was computed, with greater scores indicating more dissonance ($\alpha = .87$).

Implicit ambivalence

The Implicit Association Test was used to assess implicit ambivalence toward Bob (Petty et al., 2006). The IAT had 16 stimuli: 1 image of Bob, 5 different images of men who were not Bob, 5 words related to confidence, and 5 words related to doubt. Participants were informed that the task involved making category judgments for stimuli presented on a computer monitor using one of two responses. Category label reminders were displayed on the left and right sides of the monitor.

In Bob/Doubt blocks, participants judged whether the stimuli were "Bob or Doubt" or "Not Bob or Confidence." In Bob/Confidence blocks, participants judged whether the stimuli were "Bob or Confidence" or "Not Bob or Doubt." To assess implicit ambivalence toward Bob, the mean response latencies from the Bob/Confidence blocks were subtracted from those of the Bob/Doubt blocks, and divided by the pooled standard deviation (Greenwald, Nosek, & Banaji, 2003).[2] Greater scores reflected more implicit ambivalence toward Bob.

Argument strength

Next, participants read Bob's opinion about whether "American Universities" should institute comprehensive exams. Bob always advocated for exam implementation. To assess the extent to which participants processed additional information about Bob carefully, the strength of Bob's argument was manipulated to provide either compelling (strong arguments) or specious (weak arguments) evidence for his opinion. Bob's opinion either consisted of 4 strong arguments or 4 weak arguments for instituting senior comprehensive exams, respectively (see Petty & Cacioppo, 1986).

Assessing information processing

To ascertain whether participants had carefully processed additional info about Bob, we assessed whether their own attitudes on the issue of comprehensive exams had been changed, reasoning that only if they had carefully processed this information would their attitudes reflect the strength of the opinions Bob presented. Participants reported their level of agreement with the statement "I believe that the University of Missouri should institute senior comprehensive exams" on a scale ranging from 1 (*Completely Disagree*) to 9 (*Completely Agree*). Participants also rated Bob's arguments on 4, 9-point, semantic differential scales: good–bad, favorable–unfavorable, wise–foolish, and beneficial–harmful. These ratings were highly intercorrelated ($\alpha = .98$) and were combined to form a measure of comprehensive exam attitudes, with greater scores indicating more positive ratings of comprehensive exams.[3]

Results and discussion

Attitudes toward Bob

The attitude measures were examined in separate 2 (prime valence) × 2 (behavioral valence) × 2 (argument strength) ANOVAs. For explicit attitudes toward Bob, there was only a significant effect of behavioral valence, $F(1,155) = 1765.68$, $p < .001$. Explicit attitudes were more positive in the positive behavior condition ($M = 8.25$) than in the negative behavior condition ($M = 1.41$). For implicit attitudes toward Bob, there was only a significant effect of prime valence, $F(1,155) = 16.69$, $p < .001$. Implicit attitudes were less positive when primes were negative ($M = .49$) than when they were positive ($M = .63$). Replicating Rydell et al. (2006), explicit attitudes reflected the valence of the behavioral information whereas implicit attitudes reflected the valence of the subliminal primes.

Explicit–implicit attitude discrepancies

The absolute value of the difference between the standardized values of explicit attitudes and implicit attitudes was calculated as a measure of explicit–implicit attitude discrepancy (E–I discrepancy; Briñol et al., 2006) and showed only a significant interaction between prime valence and behavioral valence, $F(1,155) = 12.19$, $p < .001$ (Table 1). When the primes were negative, E–I discrepancy was greater when behaviors were positive than when they were negative, $F(1,81) = 4.01$, $p = .049$. When the primes were positive,

[2] Only critical IAT trials were presented and they were counterbalanced.

[3] In addition, positive and negative affect were measured using the PANAS (Watson, Clark, & Tellegen, 1988) and showed no significant effects on any of the manipulations in either experiment. Further, participants completed traditional attitude ambivalence measures; these measures showed no effects of the manipulations in either experiment and are not mentioned further.

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Table 1
E–I discrepancies, dissonance, and implicit ambivalence as a function of prime valence and behavioral valence in Experiment 1

Behavior	Positive prime		Negative prime	
	Positive	Negative	Positive	Negative
E–I discrepancies	$.84_a$	1.30_b	1.26_b	$.96_a$
Dissonance	1.59_a	2.16_b	2.16_b	1.86_a
Implicit ambivalence	$-.73_a$	$-.45_b$	$-.42_b$	$-.60_{a,b}$

Note. Means in the same row not sharing a common subscript differ at the .05 level.

E–I discrepancy was greater when behaviors were negative than when they were positive, $F(1,74) = 8.35$, $p = .005$. These results support our assumption that valence inconsistent primes and behaviors produce greater explicit–implicit attitude discrepancies than valence consistent primes and behaviors.

Dissonance and implicit ambivalence

The results for dissonance and implicit ambivalence both showed only a significant interaction of prime valence and behavioral valence, $F(1,155) = 15.67$, $p < .001$, and $F(1,155) = 9.42$, $p = .003$, respectively (Table 1). For the dissonance measure, when the primes were negative, there was greater dissonance when behaviors were positive than when they were negative, $F(1,81) = 8.45$, $p = .005$. However, when the primes were positive, there was greater dissonance when behaviors were negative than when they were positive, $F(1,74) = 7.28$, $p = .009$.

For the implicit ambivalence measure, when the primes were negative, there was a somewhat greater level of implicit ambivalence when behaviors were positive than when they were negative, $F(1,81) = 2.54$, $p = .115$. When the primes were positive, there was a greater level of implicit ambivalence when behaviors were negative than when they were positive, $F(1,74) = 8.16$, $p = .006$. In general, conditions producing greater discrepancies between explicit and implicit attitudes revealed increased both implicit ambivalence and dissonance.

Attitudes toward comprehensive exams

The results for attitudes toward comprehensive exams showed a main effect of argument strength, $F(1,155) = 26.08$, $p < .001$, but more important, the 3-way interaction of prime valence, behavioral valence, and argument strength obtained, $F(1,155) = 17.19$, $p < .001$ (Fig. 1). To understand this outcome, we explored the interaction between behavioral valence and argument strength as a function of prime valence. When the primes were negative, there was a 2-way interaction between behavioral valence and argument strength $F(1,81) = 13.91$, $p < .001$. When the prime and the behavioral valence were both negative, comprehensive exam attitudes did not differ as a function of argument strength, $F(1,41) = 0.16$, $p = .69$. However, when the prime valence was negative and the behavioral valence was positive, strong arguments were more persuasive than weak arguments, $F(1,40) = 24.62$, $p < .001$. When prime valence was positive, there was also a 2-way interaction of behavioral valence and argument strength, $F(1,74) = 4.43$, $p = .039$. When the prime and the behavioral valence were both positive, comprehensive exam attitudes did not differ as a function of argument strength, $F(1,38) = 2.01$, $p = .16$. When the prime valence was positive and the behavioral valence was negative, strong arguments were more persuasive than weak arguments, $F(1,46) = 20.62$, $p < .001$. Thus, greater attention to the quality of Bob's opinion was realized when the valence of the primes and behaviors were inconsistent.

Mediational analyses

To understand what accounts for the relation between E–I discrepancy and persuasion, multiple regression analyses were conducted to examine whether dissonance and implicit ambivalence could mediate this effect. Because the relation between E–I discrepancies and attitudes toward comprehensive exams differed as a function of argument strength, $\beta = .52$, $p < .001$ (E–I discrepancy and attitudes towards comprehensive exams were positively correlated when arguments were strong, $\beta = .35$, $p < .001$, and negatively correlated when arguments were weak, $\beta = -.30$, $p = .001$), we evaluated mediation as function of argument strength.

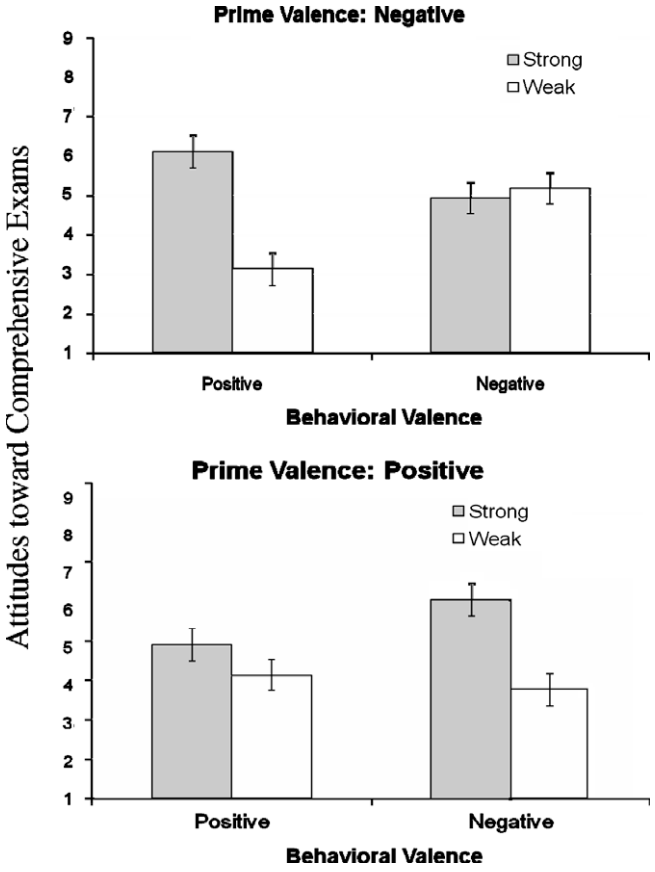

Fig. 1. Attitudes toward comprehensive exams as a function of behavioral valence and argument strength when primes were negative (upper panel) and positive (lower panel) in Experiment 1. Error bars represent standard error.

The conditions necessary to examine if dissonance mediated the relation between E–I discrepancy and attitudes toward comprehensive exams obtained (see Aiken & West, 1991). Namely, the mediator variable (i.e., dissonance) was significantly correlated with the independent (i.e., E–I discrepancies) and the dependent variable (i.e., attitudes toward comprehensive exams) when arguments were strong and weak $|r|$s $> .35$, ps $< .01$. Thus, participants' attitudes toward senior comprehensive exams were simultaneously regressed on their E–I discrepancies and dissonance. When dissonance was included, the relation between E–I discrepancy and attitudes toward comprehensive exams was non-significant both when arguments were strong (dropping from $\beta = .35$, $p < .001$ to $\beta = .20$, $p < .07$, Sobel $z = 2.26$, $p = .024$) and when arguments were weak (dropping from $\beta = -.30$, $p < .01$ to $\beta = -.16$, $p < .12$, Sobel $z = -2.09$, $p = .035$).

It is possible that implicit ambivalence could also explain the relation between E–I discrepancies and information elaboration. The data showed implicit ambivalence was unrelated to E–I discrepancies and unrelated to comprehensive exam attitudes regardless of argument strength (strong, ps $> .22$; weak, ps $> .34$). Therefore, implicit ambivalence was not a viable mediator. These meditational results support the conclusion that dissonance arousal accounts for the relation between stronger explicit–implicit attitude discrepancies and greater information processing.

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Experiment 2

The results of Experiment 1 provide initial support for a dissonance account in explaining the relation between increased explicit–implicit attitude discrepancies and increased information processing. Specifically, explicit–implicit discrepancies resulted in dissonance-based discomfort, which in turn uniquely accounted for additional elaboration that produced greater attitude change. However, some lingering questions remain regarding a dissonance interpretation. First, Experiment 1 relied on a well-validated measure of dissonance-induced discomfort (Elliot & Devine, 1994), yet this is only an indicator of dissonance. Feeling uncomfortable (i.e., uncomfortable, uneasy, and bothered) could be due to dissonance or another factor including perhaps ambivalence (although an ambivalence account makes no specific predictions on this possibility). In order to gather converging evidence that might support a dissonance account, we utilized a manipulation in Experiment 2 known to undercut cognitive dissonance: self-affirmation (Steele, 1988). The self-affirmation literature shows that when an individual affirms a valued aspect of the self, dissonance arousal is reduced or eliminated, which should also eliminate dissonance-related outcomes such as attitude change (Steele, 1988). If explicit–implicit attitude discrepancies increase information processing because they arouse dissonance, people who self-affirm (after explicit–implicit discrepancies are created) should show less information processing than those that do not self-affirm. Because self-affirmation reduces dissonance, when self-affirmation is absent, information processing should be greater in situations where greater explicit–implicit discrepancies exist.

In addition to adding a manipulation designed to undercut dissonance (i.e., self-affirmation), Experiment 2 modified two other features of Experiment 1. First, the current experiment only employed conditions designed to induce considerable explicit–implicit discrepancies (i.e., conditions where the valence of primes and behaviors were at odds with each other). Also, it explored how greater information processing might be directed toward information that is more germane for evaluations of Bob (rather than for scrutinizing his opinions). Indeed, one might contend that a more convincing argument for increased elaboration about Bob would be revealed by showing how explicit–implicit attitude discrepancies toward him affect subsequent attention to information directly relevant to evaluations of him (Briñol et al., 2006). Therefore, in the current experiment, we replaced Bob's counter attitudinal advocacy (that came at the end of the study) with the presentation of additional behaviors about Bob that would bear on one's evaluations of him. Following a delay, we assessed recognition accuracy for his additional behaviors. We expected that those experiencing dissonance (i.e., those not given an opportunity to self-affirm) would reveal better recall for Bob's supplemental behaviors than those who had self-affirmed.

Method

Participants

Seventy undergraduates at University of Missouri participated for research credit. They were randomly assigned to a 2 (Behavior/Prime Valence: negative-prime/positive-behavior, positive-prime/negative-behavior) × 2 (Self-Affirmation: No Affirmation, Self-Affirmation) between-subjects factorial.

Procedure

The same primes and behaviors from Experiment 1 were used in Experiment 2. However, as noted above, only experimental conditions where the valence of the primes was at odds with the valence implied by the behaviors were included. Afterwards, participants' explicit ($\alpha = .99$) and implicit attitudes were assessed, as in Experiment 1.

After attitude measurement, self-affirmation was manipulated by having participants complete a packet in which they ranked the self-importance of 11 attributes. Those in the affirmation condition wrote about why the domain they ranked first was important to them and then described a specific time in their lives when it was important to them, whereas those in the no affirmation condition wrote about the ninth most important self-domain and its impact on the day of another Missouri student. Then, dissonance-based discomfort ($\alpha = .76$) and implicit ambivalence were measured, as in Experiment 1.

Finally, additional information processing was assessed by presenting participants with 24 additional behaviors performed by Bob (12 positive, 12 negative, in a randomly determined order, each presented for 5 s). After a 4 min distracter task, participants were presented with 24 pairs of behaviors, one pair at a time. For each pair, one behavior had been previously presented about Bob (i.e., old) and the other had not (i.e., new, but it was matched to the old behavior in terms of valence and extremity). Participants were asked to determine which of the two behaviors had been presented previously. Greater recognition of the previously presented behaviors indicated greater information processing.

Results and discussion

The measures were examined in a 2 (behavior/prime valence) × 2 (self-affirmation) between-subjects ANOVA. The explicit attitude measure showed only a main effect of behavior/prime valence, $F(1,66) = 712.78$, $p < .001$, with explicit attitudes more favorable in the negative-prime/positive-behavior condition ($M = 7.78$) than in the positive-prime/negative-behavior condition ($M = 1.64$). The implicit attitude measure also showed a main effect of behavior/prime valence, $F(1,66) = 19.03$, $p < .001$, however, implicit attitudes were less favorable in the negative-prime/positive-behavior condition ($M = .44$) than in the positive-prime/negative-behavior condition ($M = .55$). As in Experiment 1, explicit–implicit attitude discrepancies were created with explicit attitudes reflecting the valence of behavioral information and implicit attitude showing the valence of primes.

Explicit–implicit attitude discrepancies

As expected, E–I discrepancy (calculated as in Experiment 1) showed no effect of prime/behavior valence or self-affirmation, however, the overall discrepancy was greater than 0 ($M = 1.43$), $t(69) = 12.51$, $p < .001$.

Dissonance and implicit ambivalence

Consistent with a dissonance account, the results for dissonance only showed a main effect of self-affirmation, $F(1,66) = 9.80$, $p = .003$. Those in the no affirmation condition showed greater levels of dissonance-based discomfort ($M = 2.26$) than those in the affirmation condition ($M = 1.67$). Thus, participants showed evidence of greater dissonance in response to explicit–implicit attitude discrepancies when they were unable to self-affirm.

However, the results for implicit ambivalence did not show any significant effects. Importantly, the main effect of self-affirmation was not significant, $F(1,66) = 0.17$, $p = .68$. Thus, the manipulation of self-affirmation impacted dissonance but not implicit ambivalence.

Additional information recognition

As expected, recognition for the additional information only showed a main effect of self-affirmation, $F(1,66) = 13.23$, $p = .001$. Those in the no self-affirmation condition were more likely to correctly indicate which of the two behaviors displayed had been pre-

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viously presented about Bob (M = .65) than those in the self-affirmation condition (M = .57). Consistent with the position that greater dissonance leads to greater information processing about the attitude object, those in the no affirmation condition (those experiencing greater dissonance) also recognized more additional information presented about Bob than those in the self-affirmation condition (those experiencing less dissonance).

Based on a dissonance account, we expected that the extent of the E–I discrepancy would be positively correlated to dissonance-based discomfort and recognition in the no self-affirmation condition, but uncorrelated in the self-affirmation condition. To examine these hypotheses, we conducted multiple regressions in which E–I discrepancy, self-affirmation manipulation (coded −1 for the no affirmation condition and +1 for the self-affirmation manipulation), and their interaction were regressed on dissonance-based discomfort and on recognition. As expected, there was a significant interaction of E–I discrepancy and the self-affirmation manipulation on dissonance-based discomfort, $\beta = -.45$, $p = .02$. This interaction showed a stronger correlation between E–I discrepancy and dissonance in the no affirmation condition, $r = .45$, $p = .01$, than in the self-affirmation condition, $r = -.03$, $p = .88$ (Fig. 2). The same pattern emerged for the recognition data. There was an E–I discrepancy by self-affirmation manipulation interaction, $\beta = -.45$, $p = .02$, showing a stronger correlation between E–I discrepancy and recognition in the no affirmation condition, $r = .51$, $p = .002$, than in the self-affirmation condition, $r = .08$, $p = .65$ (Fig. 3).

General discussion

These experiments showed that when explicit–implicit attitude discrepancies were greater, dissonance was aroused. This dissonance, in turn, induced greater information processing of attitude object relevant information. The results are consistent with the idea that implicit–explicit attitude discrepancies can create dissonance that people attempt to reduce through learning more about the attitude object. Although this finding is novel, future research should examine the implications of increased dissonance as a response to explicit–implicit attitude discrepancies and how this will impact subsequent interactions involving attitude objects to manage these discrepancies. Specifically, dissonance can be dealt with in a multitude of ways that do not mandate increased scrutiny of attitude objects such as trivialization, attribution, or rationalization (Aronson, 1992).

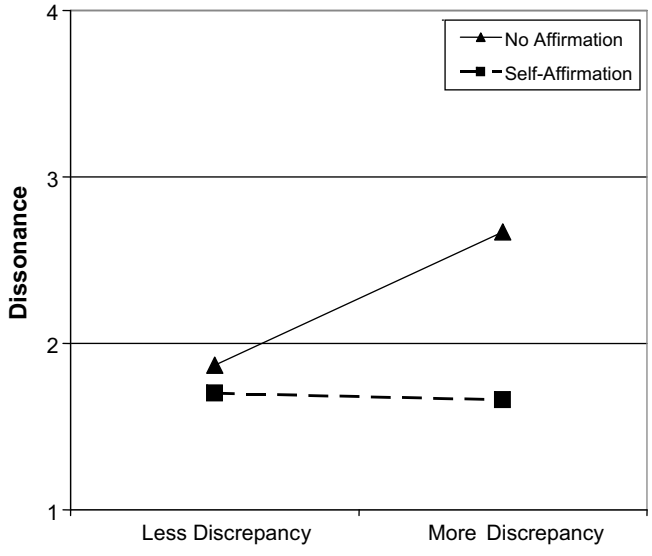

Fig. 2. Dissonance as a function of explicit–implicit discrepancy (E–I discrepancy) (plotted at 1SD above and below the mean) and self-affirmation condition in Experiment 2.

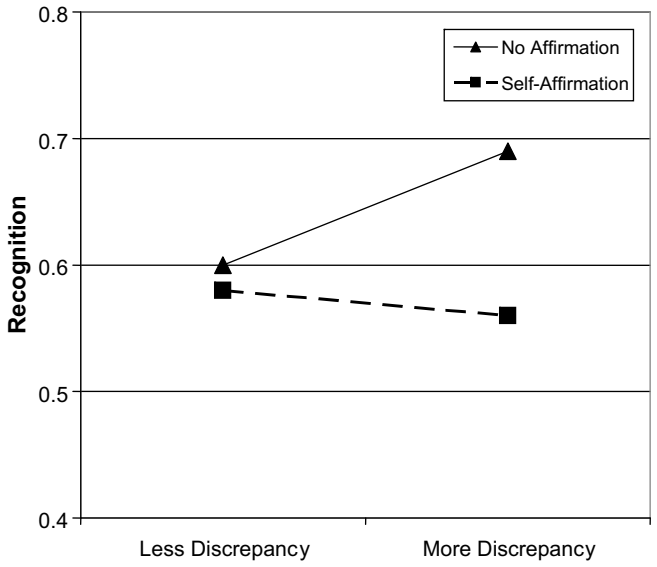

Fig. 3. Recall as a function of explicit–implicit discrepancy (E–I discrepancy) (plotted at 1SD above and below the mean) and self-affirmation condition in Experiment 2.

Dissonance or ambivalence?

Petty et al. (2006) suggested that increased explicit–implicit attitude discrepancies lead to implicit ambivalence, which people attempt to reduce by elaborating on subsequent information about the attitude object. This account predicts that holding inconsistent evaluations of an attitude object should lead to implicit uncertainty or doubt about the attitude object that is reduced by increased information processing. Although we did observe greater ambivalence resulting from stronger explicit–implicit attitude discrepancies in the current work, the data indicate that dissonance may provide a better account for the current findings.

For example, the relation between dissonance-related discomfort and subsequent information processing was observed in both studies. Even though it is possible that discomfort might result from ambivalence (though such a prediction is not explicit in an ambivalence account), discomfort is acknowledged as a *sine qua non* consequence of cognitive dissonance (Cooper & Fazio, 1984). But perhaps more important are other findings that support a dissonance account in the current work. First, we did not observe any correspondence between the strength of implicit ambivalence and subsequent information processing. For instance, in Experiment 1, implicit ambivalence did not mediate the relations between E–I discrepancy and increased information processing, but dissonance-based discomfort did. Second, in Experiment 2, the self-affirmation manipulation reduced dissonance-based discomfort and additional information processing, but did not impact implicit ambivalence. Thus, a hallmark manipulation that undercuts cognitive dissonance (i.e., self-affirmation) both reduced dissonance-based discomfort and additional information processing about the attitude object while leaving ambivalence unaffected.

That being said, it is difficult to conclusively dismiss an ambivalence account. Because dissonance and implicit ambivalence are both likely to be uncomfortable on average, the distinction between these constructs can be somewhat blurred, especially when considering *felt ambivalence*. Although the weight of the evidence presented here favors a dissonance account, an ambivalence ac-

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count may also play a role and might explain other results related to attitude discrepancies that cannot be explained by dissonance. What is clear from this recent work is that holding discrepant explicit and implicit attitudes is consequential, and that additional research is needed to better understand the processes involved in domains such as persuasion and impression formation (e.g., Briñol et al., 2006; McConnell et al., in press; Petty et al., 2006; Rydell, McConnell, Strain, Claypool, & Hugenberg, 2007).

Conclusions

Understanding discrepancies between explicit and implicit attitudes has been at the forefront of contemporary social cognition research (Gawronski & Bodenhausen, 2006), and speaks to larger debates regarding: (a) the processes though which automatic and controlled cognition diverge (Chaiken & Trope, 1999), (b) the consequences of their divergence (Briñol et al., 2006), and (c) exactly how to conceptualize attitude representation (Fazio, 2007; Schwarz, 2007). From a functional perspective, it seems that having inconsistent implicit and explicit attitudes is aversive and induces one to expend cognitive resources in the service of understanding attitude objects better, suggesting that such circumstances merit the individual's attention and thus have psychological value (e.g., making sense of circumstances that "do not add up"). It is perhaps fitting and not completely surprising that a venerable construct in the attitudes literature such as cognitive dissonance continues to shed important light on even some of the most contemporary issues in the literature such as the processes underlying the consequences of explicit–implicit attitude discrepancies.

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