



FlashReport

Can I borrow a feeling? Spillover of negative arousal from inconsistent information during attitude formation diminishes perceptions of well-being

Robert J. Rydell ^{a,*}, Geoffrey R.O. Durso ^b

^a Indiana University, USA

^b The Ohio State University, USA

ARTICLE INFO

Article history:

Received 16 September 2011

Revised 28 October 2011

Available online 7 November 2011

Keywords:

Attitude

Implicit ambivalence

Well-being

Misattribution of arousal

ABSTRACT

This research examines the extent to which the negative arousal caused by valence inconsistent supraliminal behavioral information and subliminal primes during attitude formation affects people's perceptions of their current well-being. Participants who received inconsistent information about a novel individual during an impression formation task reported more negative arousal, lower self-esteem, greater depression, and greater perceived stress than those in a control condition. Mediation analyses indicated that negative arousal stemming from attitude formation with valence inconsistent information guided participants' responses to well-being measures via misattribution of this arousal. These results cannot be explained by a simple response bias because recall of negative physical symptoms in the past 2 weeks were unaffected by receiving valence inconsistent information. This research suggests that the spillover of negative arousal from attitude formation, when unable to be easily attributed to the attitude object, served as a cue that people utilized when determining how they felt.

© 2011 Elsevier Inc. All rights reserved.

Introduction

Since the pioneering work of Schachter and Singer (1962), social psychologists have understood that people often use invalid external information to understand their internal states. In their work, participants were unknowingly administered an amphetamine, and misattributed their physiological arousal from the drug to experiencing emotions based on an insulting questionnaire or a happy-go-lucky confederate. Internal experiences that come from unknown or difficult-to-identify sources may not only shape people's emotional reactions, but they can also impact their perceptions of well-being (e.g., Schwarz & Clore, 1996). Schwarz and Clore (1983) showed that when people in a negative mood were given a plausible external source for these feelings (rainy weather) they misattributed their negative mood to the weather and subsequently reported greater life satisfaction. The current work builds on research showing that discrepancies between implicit and explicit attitude measures lead to negative arousal (Rydell, McConnell, & Mackie, 2008), examining if this arousal is misattributed to people's current level of well-being when they unknowingly receive inconsistent evaluative information while forming an attitude.

Most research on attitudinal discrepancies has examined "explicit" attitude ambivalence, where people simultaneously report positivity and negativity toward an object (Kaplan, 1972). Explicit ambivalence

is associated with feeling mixed or confused about the attitude object (known as "felt" ambivalence; Newby-Clark, McGregor, & Zanna, 2002), which often leads to more extensive processing of information related to the object to reduce inconsistency or confusion (e.g., Maio, Esses, & Bell, 2000). Unlike the research on explicit ambivalence, people receiving inconsistent subliminal primes (e.g., "war") and behavioral information (e.g. an honest behavior) when forming an attitude toward a novel person associate that individual with uncertainty only on an implicit measure (Petty, Tormala, Briñol, & Jarvis, 2006) and report diffuse feelings of negative arousal that are not specific to the attitude object (Rydell et al., 2008); importantly, they do not express both positivity and negativity toward the novel individual on traditional measures of explicit ambivalence. Because people cannot pinpoint the source of their feelings, Petty et al. (2006) referred to this state as "implicit ambivalence". Like the research on explicit ambivalence, processing of attitude relevant information increases when people experience implicit ambivalence, but in the case of implicit ambivalence this serves to reduce negative arousal (Rydell et al., 2008). Although people experiencing implicit ambivalence are unable to identify why they are feeling ambivalent, they are selective in what information they process (Briñol, Petty, & Wheeler, 2006), attending only to information relevant to the object making them feel aroused (Petty & Briñol, 2009). But in these experiments on selective processing, strong framing instructions make it quite apparent whether elaborative processing of subsequent information would reduce participants' implicit ambivalence. Therefore, it is unclear whether people would misattribute their arousal to an object unrelated to their ambivalence, impacting behaviors and judgments

* Corresponding author at: Department of Psychological and Brain Sciences, Indiana University, Bloomington, IN 47405, USA.

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

toward that object. What happens when an object is unrelated to the source of implicit ambivalence, but could possibly explain negative arousal or uncertainty?

In this experiment, we examine if people who receive valence inconsistent supraliminal and subliminal information about an attitude object (and thus feel implicit ambivalence) experience negative arousal and subsequently misattribute this arousal to a plausible source: in this case, their perceived well-being. We expect that people experiencing implicit ambivalence, relative to those in a control condition, will not only show greater discrepancies between implicit and explicit attitude measures and increased negative arousal (Rydell et al., 2008), but will also report reduced self-esteem, greater perceived stress, and greater depression. Because we expected that the misattribution of negative arousal to perceptions of well-being would be the process underlying these effects, we predicted that feelings of negative arousal would account for the effect of our manipulation of subliminal and supraliminal information on measures of well-being. Finally, to verify that these results are not due to a simple bias to over report negative information, we expected that our manipulation would not impact retrospective ratings of physical illness.

Method

Participants

59 undergraduates participated for course credit. They were randomly assigned to one of three conditions: control, positive prime-negative behavior, and negative prime-positive behavior.

Presentation of primes and behavioral information

Over the course of 50 trials, participants formed an impression of “Bob” (Rydell et al., 2008). Each trial began with a fixation cross presented in the center of the screen for 1000 ms. It was replaced by three strings of letters, randomly presented to the right or left of the fixation cross, each presented for 30 ms: non-word mask; a neutral (control condition), positive (positive prime-negative behavior condition), or negative (negative prime-positive behavior condition) prime word; and finally another non-word mask. The primes were randomly selected from a list of either positive (e.g., “party”) or negative (e.g., “ugly”) words, based on condition (Fazio, Sanbonmatsu, Powell, & Kardes, 1986). Thus, participants saw 50 primes while learning about Bob. Given its rapid and parafoveal presentation, participants were unaware of the prime words, and could not identify any of the primes after the study. Then, an image of Bob was presented in the center of the screen for 250 ms. This image remained on-screen during the presentation of behavioral information about Bob.

The behavioral information presented about Bob varied in valence. In the control condition, all behavioral information was neutral; in the positive prime-negative behavior and negative prime-positive behavior conditions, 25 trials contained positive behaviors and 25 contained negative behaviors. Regardless of condition, participants indicated whether the behavior was characteristic or uncharacteristic of Bob using two keys on the keyboard. Participants were then given feedback about whether the behavior was characteristic or uncharacteristic of Bob for 5s. Feedback consisted of informing participants whether their selection was correct (“You are correct” in green text) or incorrect (“You are incorrect” in red text). Feedback was manipulated across conditions: in the negative prime-positive behavior condition, feedback indicated that positive behaviors were characteristic and negative behaviors were uncharacteristic of Bob; in the positive prime-negative behavior condition, feedback indicated that negative behaviors were characteristic and positive behaviors were uncharacteristic of Bob; in the control condition, neutral behaviors were randomly presented as characteristic or uncharacteristic of Bob, and thus were not diagnostic for attitude formation.

Explicit attitude measure

Participants evaluated Bob on 6 semantic differential scales, each using a 9-point scale: likeable–unlikeable, good–bad, pleasant–mean, agreeable–disagreeable, caring–uncaring, and kind–cruel, with greater mean indicating more positive explicit attitudes toward Bob ($\alpha = .98$). In addition, participants completed a traditional measure of attitude ambivalence (Thompson, Zanna, & Griffin, 1995).

Implicit attitude measure

An Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) was also used to assess attitudes toward Bob. In the critical trials, participants were asked to categorize pictures of Bob or 5 novel individuals as “Bob” or “Not Bob” and 20 adjectives (10 positive, 10 negative) as “Positive” or “Negative” using two response keys. For half of the critical trials, one response key was labeled “Bob or negative” and the other labeled “Not Bob or positive.” In the remaining critical trials, one response key was randomly assigned as “Bob or positive” while the other was labeled “Not Bob or negative.” The response latencies from the latter critical trials were subtracted from the response latencies for the former critical trials using Greenwald, Nosek, and Banaji’s (2003) D algorithm. Larger scores reflected a relatively more positive evaluation of Bob on this measure. These two attitude measures were presented in random order to participants.

Following Briñol et al. (2006), an implicit–explicit discrepancy score (IED) was calculated from the explicit and implicit attitude measures. The implicit and explicit measures were first appropriately standardized, and then the absolute value of the difference was calculated. Thus, greater scores on this measure indicate greater discrepancy.

Negative arousal

Participants’ level of negative arousal was measured with a 3-item scale (Elliot & Devine, 1994). Participants indicated the extent to which they felt uncomfortable, uneasy, and bothered “right now, at the present moment” on a scale ranging from 1 (*very slightly*) to 5 (*quite a bit*). Their mean response was computed, with greater scores indicating more negative arousal ($\alpha = .76$).

Well-being

Participants’ level of well-being was assessed by using four scales. Physical symptoms were assessed by having participants rate the extent to which 33 symptoms have impacted them in the past 2 weeks, on a scale ranging from 1 (*not been a bother*) to 5 (*been an extreme bother*) ($\alpha = .92$) (Cohen & Hoberman, 1983). The Rosenberg (1965) scale was used to assess self-esteem. The 10 items were answered on a scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*), and greater scores indicated higher self-esteem ($\alpha = .75$). Participants also completed the 14-item Perceived Stress Scale (Cohen, Kamarck, & Mermelstein, 1983), with greater scores indicating the extent to which they were currently experiencing stress on a 5 point scale ranging from 1 (*not at all*) to 5 (*very much*) ($\alpha = .87$). In addition, the 20-item Center for Epidemiologic Studies Depression scale (Radloff, 1977) was used to measure participants’ current level of depression. Responses were provided on scales ranging from 1 (*not at all*) to 4 (*very much*) with greater scores indicating greater levels of depression ($\alpha = .89$). The perceived stress and depression scales were modified such that participants made indications of their current, not past, well-being (e.g., “I had a crying spell” was changed to “I feel like I could have a crying spell.”) The presentation of all well-being measures was randomized across the four scales. We created a measure of current well-being by averaging the standardized scores for the self-esteem,

perceived stress (reverse scored), and depression (reverse scored) measures. These three measures were used because they focused on current, not past, well-being.

Results

Correlational analyses

The zero-order correlations between the dependent variables are presented in Table 1. The expected positive correlations were obtained for the current measures of well-being, but none of these measures was related to experienced physical symptoms over the last 2 weeks. Most importantly, negative arousal and IED were positively correlated, and both of these measures were negatively correlated with self-esteem and positively correlated with perceived stress and depression.

Effect of condition

The results are presented as a function of condition for all the dependent variables in Table 2. Consistent with past work (e.g., Rydell, McConnell, Mackie, & Strain, 2006), participants showed more positive explicitly measured attitudes in the negative prime-positive behavior condition than in the positive prime-negative behavior condition or the control condition, $F(2,56) = 212.71, p < .001, \eta_p^2 = .880$. And, participants showed more positive implicitly measured attitudes in the positive prime-negative behavior condition than in the negative prime-positive behavior or the control condition, $F(2,56) = 7.76, p = .001, \eta_p^2 = .217$. As expected, the negative prime-positive behavior and positive prime-negative behavior conditions had greater IEDs than the control condition, $F(2,56) = 9.71, p < .001, \eta_p^2 = .258$. This contrasted with a traditional measure of attitudinal ambivalence (Thompson et al., 1995), which showed no effect of condition, $F(2,56) = .85, p = .43, \eta_p^2 = .029$.

As predicted, participants in the negative prime-positive behavior and positive prime-negative behavior conditions showed greater negative arousal than those in the control condition, $F(2,56) = 9.95, p < .001, \eta_p^2 = .262$. These participants' self-esteem was also lower in the negative prime-positive behavior and positive prime-negative behavior conditions than in the control condition, $F(2,56) = 4.32, p = .018, \eta_p^2 = .134$. Furthermore, these participants were experiencing greater levels of perceived stress, $F(2,56) = 3.96, p = .025, \eta_p^2 = .124$, and tended to experience greater levels of depression, $F(2,56) = 2.96, p = .060, \eta_p^2 = .095$, than those in the control condition. Not surprisingly, participants in the negative prime-positive behavior and positive prime-negative behavior conditions had lower levels of overall well-being than those in the control condition, $F(2,56) = 5.49, p = .007, \eta_p^2 = .164$. Importantly, there was no difference in reported physical symptoms across the 3 conditions, $F(2,56) = 0.66, p > .93, \eta_p^2 = .002$.

Table 1
Zero-order correlations between the variables measured in the current experiment.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Explicit attitude measure (1)	-	-.41**	-.25	-.07	-.12	.03	.22	-.16	-.10	.19
Implicit attitude measure (2)		-	.30*	.00	.14	.24	.02	.03	-.03	.01
E-I discrepancy (3)			-	-.28*	.51***	-.07	-.31*	.50***	.51***	-.53***
Explicit ambivalence (4)				-	-.24	.25	.19	-.23	-.15	.23
Negative arousal (5)					-	-.03	-.44***	.30*	.45***	-.47***
Physical symptoms (6)						-	-.05	.05	.04	-.06
Self-esteem (7)							-	-.49***	-.42***	.76***
Perceived stress (8)								-	.76***	-.89***
Depression (9)									-	-.86***
Current well-being (10)										-

Current well-being is the average of the standardized measures of self-esteem, perceived stress (reverse scored), and depression (reverse scored).

* $p < .05$.
** $p < .01$.
*** $p < .001$.

Table 2

Explicit attitude measure, implicit attitude measure, E-I discrepancies, negative arousal, physical symptoms, self-esteem, perceived stress, depression, well-being as a function of experimental condition.

	Control	Negative prime Positive behavior	Positive prime Negative behavior
Explicit attitude measure	6.28 _a	8.01 _b	1.65 _c
Implicit attitude measure	.56 _a	.30 _b	.84 _c
E-I discrepancies	.83 _a	1.48 _b	1.96 _b
Attitude ambivalence	2.91 _a	.75 _a	1.22 _a
Negative Arousal	1.57 _a	2.52 _b	2.57 _b
Physical symptoms	1.56 _a	1.62 _a	1.60 _a
Self-esteem	3.20 _a	2.96 _b	2.84 _b
Perceived stress	2.52 _a	2.88 _b	3.01 _b
Depression	1.59 _a	1.98 _b	1.99 _b
Current well-being	.44 _a	-.16 _b	-.34 _b

Note. Means in the same row not sharing a common subscript differ at the $\leq .05$ level. Current well-being is the average of the standardized measures of self-esteem, perceived stress (reverse scored), and depression (reverse scored).

Mediational analyses

We conducted mediational analyses to examine whether negative arousal could account for the impact of receiving inconsistent prime and behavioral information on current well-being. Specifically, we recoded the experimental conditions such that the control condition was -1 , the negative prime-positive behavior condition was $+1$, and positive prime-negative behavior condition was $+1$. As can be seen in Fig. 1, negative arousal accounted for the impact of experimental condition on current well being (see Baron & Kenny, 1986), and a significant Sobel test obtained, $z = 2.34, p = .019$.

Discussion

This work suggests that receiving valence inconsistent subliminal primes and supraliminal behaviors (i.e., experiencing implicit ambivalence) led to negative arousal, which was misattributed to having a lower level of current well-being. Compared to those in a control condition, those experiencing implicit ambivalence had greater negative arousal, lower self-esteem, greater perceived stress, and greater depression. Further, negative arousal accounted for differences between the control and the inconsistent prime-behavior conditions on those measures of well-being. Recall of past physical symptoms was not impacted by the manipulation, making it unlikely that the well-being results were due to a response bias.

Much like traditional work on attitude ambivalence (Maio et al., 2000), individuals experiencing implicit ambivalence have been shown to direct more cognitive resources towards processing information about the attitude object (Petty & Briñol, 2009). Given

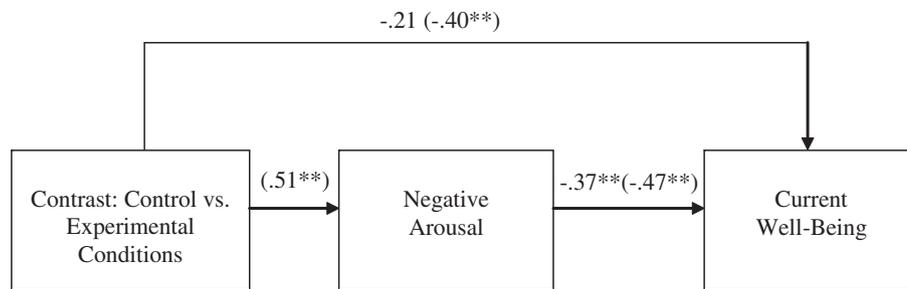


Fig. 1. The results of mediational analyses in which the relation between the control condition and the two experimental conditions on well-being is accounted for by negative arousal. *Note.* Direct relations are presented in parentheses. * = $p < .05$, ** = $p < .01$. The contrast compares the control condition to the positive prime, negative behavior and negative prime, positive behavior conditions. Current well-being is the average of the standardized measures of self-esteem, perceived stress (reverse scored), and depression (reverse scored).

that participants experiencing implicit ambivalence do not report both positive and negative feelings toward Bob to a greater degree than those in the control condition, they were presumably unaware of the source of their negative arousal. Without an obvious route to attribute this negative arousal to the attitude object, implicitly ambivalent feelings – caused by forming a discrepant impression of Bob – were instead “borrowed” by participants to make judgments about their overall well-being.

These findings add to the attitudes literature in many ways. First, negative arousal due to implicit–explicit discrepancies that could presumably occur for any attitude objects would, if the source of the discrepancies is not understood, affect people's judgments, emotional reactions, or behavior related to themselves, others, groups, or consumer products. Second, although the current study was designed to address attitude formation, chronic discrepancies between implicit and explicit attitude measures toward an attitude object may not only impact reactions or behaviors to that attitude object, but may also impact perceptions of objects unrelated to the source of the discrepancy. After watching a commercial, for example, implicit ambivalence about a consumer product may impact how people feel about significant others.

Third, these results complement recent work on implicit–explicit discrepancies in the self-esteem literature. For instance, Haddock and Gebauer (2011) found that individuals with high explicit and low implicit measures of self-esteem (“defensive self-esteem”) generally expressed stronger and more polarized attitudes compared with control participants, and were more susceptible to manipulations of self-affirmation. People with defensive self-esteem also exhibit greater materialism and self-enhancement when processing advertisements (Park & John, 2011). These consequences of implicit–explicit self-esteem discrepancies may be due to the misattribution of arousal from discrepant self-beliefs to other attitude objects.

Negative arousal often signals that something is unusual or wrong in the environment. Without an apparent source, this arousal is misattributed in potentially detrimental ways—as seen in this study, it can negatively affect self-perceptions. Given the ubiquity of implicit–explicit discrepancies in evaluation (Gawronski & Bodenhausen, 2006), continued investigation into their effects could help researchers understand the mechanisms behind misattribution, learn the moderators of this process, and discover strategies that lead to a more accurate resolution of ambivalence that occurs without misguided self-evaluation.

References

- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51, 1173–1178.
- Briñol, P., Petty, R. E., & Wheeler, S. C. (2006). Discrepancies between explicit and implicit self-concepts: Consequences for information processing. *Journal of Personality and Social Psychology*, 91, 154–170.
- Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress. *Journal of Applied Social Psychology*, 13, 99–125.
- Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A global measure of perceived stress. *Journal of Health and Social Behavior*, 24, 385–396.
- Elliot, A. J., & Devine, P. G. (1994). On the motivational nature of cognitive dissonance: Dissonance as psychological discomfort. *Journal of Personality and Social Psychology*, 67, 382–394.
- Fazio, R. H., Sanbonmatsu, D. M., Powell, M. C., & Kardes, F. R. (1986). On the automatic activation of attitudes. *Journal of Personality and Social Psychology*, 50, 229–238.
- Gawronski, B., & Bodenhausen, G. V. (2006). Associative and propositional processes in evaluation: An integrative review of implicit and explicit attitude change. *Psychological Bulletin*, 132(5), 692–731.
- Greenwald, A. G., McGhee, D. E., & Schwartz, J. L. K. (1998). Measuring individual differences in implicit cognition: The Implicit Association Test. *Journal of Personality and Social Psychology*, 74, 1464–1480.
- Greenwald, A. G., Nosek, B. A., & Banaji, M. R. (2003). Understanding and using the Implicit Association Test: I. An improved scoring algorithm. *Journal of Personality and Social Psychology*, 85, 197–216.
- Haddock, G., & Gebauer, J. E. (2011). Defensive self-esteem impacts attention, attitude strength, and self-affirmation processes. *Journal of Experimental Social Psychology*, 47, 1276–1284.
- Kaplan, K. J. (1972). On the ambivalence-indifference problem in attitude theory and measurement: A suggested modification of the semantic differential technique. *Psychological Bulletin*, 77, 361–372.
- Maio, G. R., Esses, V. M., & Bell, D. W. (2000). Examining conflict between components of attitudes: Ambivalence and inconsistency are distinct constructs. *Canadian Journal of Behavioural Science*, 32, 58–70.
- Newby-Clark, I. R., McGregor, I., & Zanna, M. P. (2002). Thinking and caring about cognitive inconsistency: When and for whom does attitudinal ambivalence feel uncomfortable? *Journal of Personality and Social Psychology*, 82, 157–166.
- Park, J. K., & John, D. R. (2011). More than meets the eye: The influence of implicit and explicit self-esteem on materialism. *Journal of Consumer Psychology*, 21, 73–87.
- Petty, R. E., & Briñol, P. (2009). Implicit ambivalence: A meta-cognitive approach. In R. E. Petty, R. H. Fazio, & P. Briñol (Eds.), *Attitudes: Insights from the new implicit measures* (pp. 119–164). New York, NY: Psychology Press.
- Petty, R. E., Tormala, Z. L., Briñol, P., & Jarvis, W. B. G. (2006). Implicit ambivalence from attitude change: An exploration of the PAST model. *Journal of Personality and Social Psychology*, 90, 21–41.
- Radloff, L. S. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385–401.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Rydell, R. J., McConnell, A. R., & Mackie, D. M. (2008). Consequences of discrepant explicit and implicit attitudes: Cognitive dissonance and increased information processing. *Journal of Experimental Social Psychology*, 44, 1526–1532.
- Rydell, R. J., McConnell, A. R., Mackie, D. M., & Strain, L. M. (2006). Of two minds: Forming and changing valence inconsistent attitudes. *Psychological Science*, 17, 954–958.
- Schachter, S., & Singer, J. (1962). Cognitive, social, and physiological determinants of the emotional state. *Psychological Review*, 69, 379–399.
- Schwarz, N., & Clore, G. L. (1983). Mood, misattribution, and judgments of well-being: Informative and directive functions of affective states. *Journal of Personality and Social Psychology*, 45, 513–523.
- Schwarz, N., & Clore, G. L. (1996). Feelings and phenomenal experiences. In E. T. Higgins, & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles* (pp. 433–465). New York: Guilford.
- Thompson, M. M., Zanna, M. P., & Griffin, D. W. (1995). Let's not be indifferent about (attitudinal) ambivalence. In R. E. Petty, & J. A. Krosnick (Eds.), *Attitude strength: Antecedents and consequences* (pp. 361–386). Mahwah, NJ: Erlbaum.