

Can Evaluative Conditioning Change Attitudes toward Mature Brands? New Evidence from the Implicit Association Test

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Two experiments ($N = 116$) explored the effects of evaluative conditioning on mature brands. Explicit attitudes for mature brands were unaffected by evaluative conditioning. Experiment 1 showed, however, that evaluative conditioning changed implicit attitudes toward Coke and Pepsi. This occurred only for participants who initially had no strong preference for either brand. Contingency awareness was not necessary to change implicit brand attitudes. Experiment 2 showed that brand choice was related to the altered implicit attitudes, but only when choice was made under cognitive load. Implications of these data for evaluative conditioning specifically, and for consumer research in general, are considered.

Since Gorn's (1982) pioneering work on the effects of pairing music with products, a number of studies have explored how evaluative conditioning can affect brand attitudes (Allen and Janiszewski 1989; Allen and Madden 1985; Bierley, McSweeney, and Vannieuwkerk 1985; Kellaris and Cox 1989; Kim, Allen, and Kardes 1996; Shimp, Stuart, and Engle 1991; Stuart, Shimp, and Engle 1987). The general pattern of results from these studies shows that the consistent pairing of positive stimuli with a brand can create a positive attitude toward that brand. For example, Shimp et al. (1991) found that they could create positive brand attitudes via conditioning and that the attitude change was most evident when the contingency between the unconditioned stimulus (US; the positive image) and the conditioned stimulus (CS; the cola brand) was noticed by the participant. Further, their research found that evaluative conditioning was successful in changing attitudes for novel brands but unsuccessful in changing attitudes for mature brands (like Coke and Pepsi). Other data support the idea that evaluative conditioning is most effective for unfamiliar conditioned stimuli (Cacioppo et al. 1992). Cacioppo et al. suggest that as we gain more experience with an attitude object it becomes represented in memory within a richer

network of associations. This greater availability of attitude-relevant information in memory, they suggest, leads to less attitude change after being exposed to an evaluative-conditioning procedure.

The majority of research discussed to this point has relied on traditional self-report strategies to measure attitudes. Participants are simply asked to express (usually on a Likert-type scale) their attitudes toward the brand. Recent research and theory in social cognition, however, has made a distinction between these more traditionally measured explicit attitudes and what have been termed implicit attitudes (Gawronski and Bodenhausen 2006; Greenwald et al. 2002; Wilson, Lindsey, and Schooler 2000). In contrast to explicit attitudes, which are more deliberative and propositional in nature, implicit attitudes are more automatic and based on associations in memory (Gawronski and Bodenhausen 2006). The most popular method for assessing implicit attitudes is the Implicit Association Test (IAT; Greenwald, McGhee, and Schwartz 1998). The IAT is a reaction time measure based on the assumption that responses to categories that are associated in memory will be faster than responses to categories not associated in memory. Data suggest that the IAT is internally consistent (Cunningham, Preacher, and Banaji 2001; Hofmann et al. 2005) and has good test-retest reliability (Bosson, Swann, and Pennebaker 2000) and good discriminant validity (Gawronski 2002; Nosek and Smyth 2007). In addition, the IAT is predictive of certain types of behavior (Poehlman et al. 2007).

Importantly, implicit and explicit attitudes vary in terms of their strength of relationship with each other (Hofmann et al. 2005; Nosek 2005) and can be shifted independently of one another (Baccus, Baldwin, and Packer 2004; Gawronski and Strack 2004; Gregg, Seibt, and Banaji 2006; Olson

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and Fazio 2006). This suggests that conclusions based solely on explicit attitudes may need to be revised when implicit attitudes are considered. Evaluative conditioning of brand attitudes is a likely place to search for such differing effects. Given the associative nature of implicit attitudes, Gawronski and Bodenhausen (2006) state that “the prototypical case for implicit attitude change resulting from changes in associative structure is evaluative conditioning” (697). Further, research on the conditioning of highly familiar concepts like self-esteem (Baccus et al. 2004; Dijksterhuis 2004) and prejudice toward a familiar group (Olson and Fazio 2006) suggests that such conditioning can alter implicit attitudes while leaving explicit attitudes unchanged. Thus, with attitude objects that are familiar (e.g., the self, a racial group, or perhaps a familiar soft drink brand), evaluative conditioning would be unlikely to affect explicit attitudes but could still affect implicit attitudes.

The underlying mechanisms leading to these changes in implicit self-esteem and implicit prejudice, however, are not entirely clear. Specifically, it seems unlikely that a brief conditioning procedure would significantly alter the extensive associative network for these concepts. A lifetime of positive and negative experiences related to the self, for example, would create a huge network of self-associations in memory. Adding a few positive associations in less than an hour’s time, as Baccus et al. (2004) and Dijksterhuis (2004) did, seems unlikely to have added enough positive connections to significantly alter the overall direction of the associative network. Another possibility, however, is that such an evaluative-conditioning procedure could simply activate already existing positive associations (Dasgupta and Greenwald 2001). This increased activation of positive associations could lead to a shift in implicit self-esteem or implicit prejudice. Gawronski and Bodenhausen (2006) argue that for attitude objects that already have rich associative networks, context can serve to activate certain portions of that associative network, leading to subsequent shifts in implicit measures.

This reasoning has implications for predicted changes in implicit brand attitudes for mature brands in response to evaluative conditioning. Specifically, for evaluative conditioning to shift implicit brand attitudes in these cases, it would be necessary for both positive and negative brand associations to exist in memory. If an individual had only negative associations for a particular brand, then experiencing a conditioning procedure pairing positive stimuli with that brand would not affect the individual’s implicit brand attitude. The lack of any positive associations in memory would mean that the conditioning procedure would not have the potential to shift the activation of the individual’s associative network in such a way as to lead to a shift in implicit attitude. Consider an individual who loves Coke but hates Pepsi. The taste associations in memory are likely to be highly consistent for both brands (given the stability of the taste of the products). The implicit attitude of this individual is unlikely to be altered by the pairing of Pepsi with positive stimuli and Coke with negative stimuli. They

would have no Pepsi-positive or Coke-negative experiences that could be activated by the conditioning procedure. An individual who is relatively neutral toward Coke and Pepsi, however, could potentially have different associations activated after exposure to such a conditioning procedure. This reasoning leads to hypothesis 1.

- H1a:** Implicit attitudes (but not explicit attitudes) for mature brands will be altered by evaluative conditioning.
- H1b:** This effect will occur only for those participants whose attitude toward the brand was initially neutral.

An additional question addressed in this research is how the conditioning process relates to subsequent changes in consumer behavior. Most studies on evaluative conditioning have focused on attitude change but not on subsequent brand choice, although there are exceptions (Gorn 1982; Kellaris and Cox 1989). Brand choice, however, is perhaps the more critical outcome measure. The goal of connecting positive stimuli to a brand via advertising is not just to change brand attitudes but to stimulate purchase of the brand. If evaluative conditioning can change implicit brand attitudes in some cases, then the question arises regarding how these implicit attitudes affect brand choice.

The research addressing a connection between implicit attitudes and behavior is still relatively new (Fazio and Olson 2003). Theory addressing attitude-to-behavior processes, however, suggests that when the motivation and opportunity for conscious control of behavior is limited, automatically activated attitudes will guide behavior (Fazio 1990; Fazio and Towles-Schwen 1999). Evidence is building in support of this notion. For example, when the behavior in question is less amenable to conscious control, then implicit attitudes are better predictors of behavior (Dovidio et al. 1997; McConnell and Leibold 2001). Similarly, when attentional resources are otherwise occupied (Sanbonmatsu and Kardes 1988) or when time pressure requires a quick choice (Friese, Wanke, and Plessner 2006; Sanbonmatsu and Fazio 1990), implicit attitudes are better predictors of behavior. Applying this reasoning to the current research leads to hypothesis 2.

- H2a:** Brand selection will be congruent with conditioning, but only under cognitive load.
- H2b:** Implicit brand attitudes will predict product choice, but only under cognitive load.

The current research used a modified version of the Olson and Fazio (2001) conditioning procedure in an attempt to change implicit brand attitudes. Coke and Pepsi were used as the conditioned stimuli in these experiments. These brands were selected because (a) they are so pervasive that virtually all of our potential participants would be familiar with them and (b) they provide good contrasting categories that could be used in the creation of an IAT.

EXPERIMENT 1

Method

Participants. Participants were 56 Central Michigan University undergraduate psychology students (36 females and 20 males) who participated to receive extra credit in their psychology class.

Procedure. Pretests were given at the beginning of the semester. Among a variety of questionnaires relating to other research, participants completed an explicit measure of preference for a variety of soft drinks, including Coke and Pepsi. These measures were identical to those used by Shimp et al. (1991) and included seven, seven-point semantic differential items (good-bad, high quality-poor quality, like very much-dislike very much, superior-inferior, attractive-unattractive, pleasant-unpleasant, and interesting-boring), a seven-point global evaluation item ("Overall, my feeling about Coke [Pepsi] is favorable-unfavorable"), and an 11-point measure of purchase intentions ("All things considered, if you were to purchase soft drinks on one of your next several trips to the supermarket, what are the chances in 10 that you would purchase Coke [Pepsi]?"). These nine items were then standardized and summed to create an overall attitude measure for both Coke (Cronbach's $\alpha = .95$) and Pepsi (Cronbach's $\alpha = .94$). The scale value for Coke was then subtracted from the scale value for Pepsi, yielding a composite score indicating the degree of existing preference for one brand over the other.

Participants were then recruited by phone to participate in the main portion of the study. Only those with a strong preference for Coke (i.e., over 1 standard deviation below the mean), a strong preference for Pepsi (i.e., over 1 standard deviation above the mean), or an approximately equal preference for each (i.e., within .5 standard deviations to either side of the mean) were selected for recruitment. On arrival to the experiment, the experimenter gave participants the cover story that the study focused on vigilance and how people attended to different brand images. They were told that they would be presented with a large number of words and images on the computer screen over the course of five blocks of trials. Each block consisted of 86 trials, presented for 1.5 seconds each. They were told that among these trials, occasionally a certain soft drink brand would appear, and when it appeared they were to hit the space bar as quickly as possible. These target brands were different for each of the five blocks of trials but were always popular soft drink brands and were never Coke or Pepsi. Within each block, 10 of the 86 images were of the target brand, and these were interspersed randomly throughout the block of trials. The 76 remaining trials within each block included other neutral images and words (e.g., a plane in flight, other soft drink brands that were not the target brand, the word "Perry," etc.), blank screens, and also four images of Coke and four images of Pepsi (the conditioning trials). Thus, over the five blocks of trials, participants saw a total of 20 images of Coke and 20 images of Pepsi. The images of

Coke and Pepsi included a photo of a can of Coke or Pepsi and three different versions of each brand's logo. These images of Coke and Pepsi were evenly spaced across the block of trials and always alternated in order. What appeared with these images of Coke and Pepsi varied across two levels of the evaluative-conditioning independent variable. In one level of this condition, Coke images were always paired with negative photographic stimuli and negative words, while Pepsi images were always with positive photographic stimuli and positive words. The paired positive or negative stimuli were presented on the same screen as the image of Coke or Pepsi, making this a simultaneous-conditioning procedure. The second level of this condition reversed these pairings, with Coke images being paired with positive photographic and verbal stimuli, while Pepsi images were paired with negative photographic and verbal stimuli. For simplicity, I will refer to these as the "Pepsi-positive" and "Coke-positive" conditions. Keep in mind, however, that within each level of this condition the contrasting brand was always paired with negative images and words. In the conditioning trials, the Coke or Pepsi images were placed on either the right or left side of the screen, against a black background, with the unconditioned stimuli placed adjacent to them on the other side of the screen (see figs. 1 and 2). In addition, the brand images were labeled with the word Coke or Pepsi underneath the image. Each brand appeared equally often on the right or left of the screen. The distracter images, positive and negative images, positive and negative words, and general procedure were those used by Olson and Fazio (2001). The appendix provides a list of the images and words used as unconditioned stimuli. The presentation of material and collection of data were carried out using MediaLab (Jarvis 2002b) and DirectRT (Jarvis 2002a) software.

After completing the five blocks of trials, participants completed the same explicit measures of soft drink attitudes they had completed in class weeks before, and they completed a Coke-Pepsi IAT developed for this research. Initial presentation of Coke or Pepsi on the right or left of the keyboard was counterbalanced across participants, as was the initial pairing of Coke or Pepsi with positive or negative words. After completing the IAT, they were presented with images and words paired with various soft drink images and asked how confident they were regarding whether the images had been paired during the initial portion of the experiment (from -2 , very confident the images did not appear together, to $+2$, very confident the images did appear together). There were a number of distracter items in which non-Coke or non-Pepsi soft drinks (e.g., Mountain Dew, 7UP, etc.) were presented with other images seen in the conditioning portion of the experiment. Participants had seen some of these pairings and had not seen others. Of primary interest, however, were their responses to images pairing Coke and Pepsi with pleasant and unpleasant stimuli. There were 16 of these items presented in this portion of the experiment, of which four paired a Coke image with a pleasant stimulus, four paired a Coke image with an unpleasant stimulus, four paired a Pepsi image with a pleasant stimulus, and four paired a

FIGURE 1

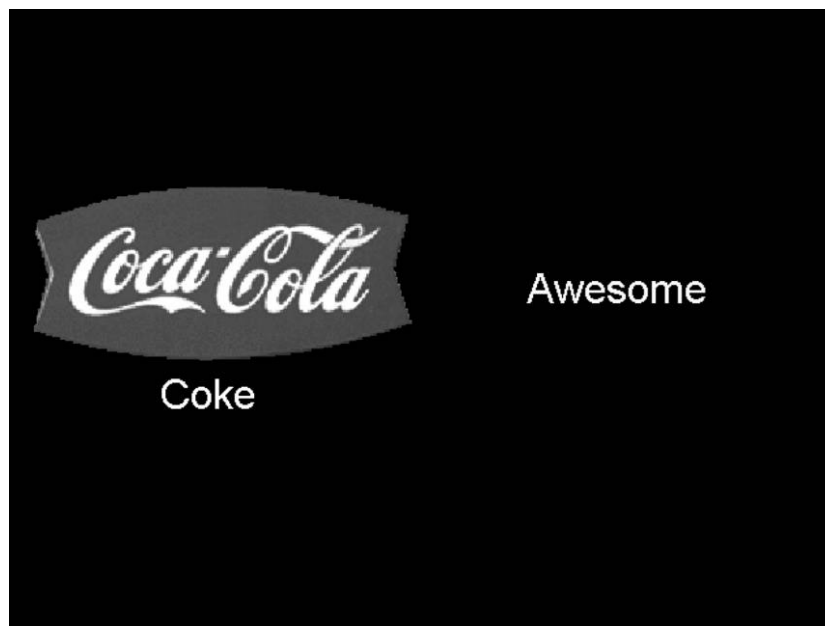
SAMPLE PAIRING OF PEPSI WITH A POSITIVE IMAGE



NOTE.—Color version available as an online enhancement.

FIGURE 2

SAMPLE PAIRING OF COKE WITH A POSITIVE WORD



NOTE.—Color version available as an online enhancement.

Pepsi image with an unpleasant stimulus. Participants in the Coke-positive conditioning group had seen the four Coke-positive and the four Pepsi-negative images paired, while they had not seen the four Coke-negative and the four Pepsi-positive images paired. Participants in the Pepsi-positive conditioning group had seen the four Pepsi-positive and the four Coke-negative images paired, while they had not seen the four Pepsi-negative and the four Coke-positive images paired. Participants' responses to these items served as a measure of contingency awareness. Following completion of the contingency awareness measure, participants were debriefed and excused.

Results

Implicit-Explicit Attitude Correlation. A correlation was carried out to test implicit and explicit Coke-Pepsi attitudes across the entire sample. This correlation was significant ($r(55) = .51, p < .001$). The correlation remained significant for just those participants in the Coke-positive condition ($r(27) = .49, p < .01$) and those in the Pepsi-positive condition ($r(27) = .55, p < .004$). Note that testing for this relationship in just the Coke lovers, Pepsi lovers, or neutral groups alone would be inappropriate due to a restricted range problem.

Conditioning of Implicit and Explicit Attitudes. Neither participant sex nor the counterbalancing variables had any effect on the outcome of any of the following analyses and are not discussed further. A 3 (pretest score: Coke lover, Pepsi lover, neutral) \times 2 (conditioning group: Coke positive, Pepsi positive) ANOVA was carried out on both the IAT and posttest explicit attitude measures. The IAT was computed using the *D* scoring procedure outlined by Greenwald, Nosek, and Banaji (2003). For the IAT there was no main effect for the conditioning variable ($F(1, 50) < 1$). There was, however, a significant main effect for pretest attitude toward the products ($F(2, 50) = 12.88, p < .001$), such that those having more favorable pretest attitudes toward Pepsi had an IAT score more favorable toward Pepsi ($M = .537$), and those having more favorable pretest attitudes toward Coke had an IAT score more favorable toward Coke ($M = -.287$). Participants who were neutral had an IAT score falling between these two scores ($M = .066$). This main effect was qualified by a significant interaction between the pretest and conditioning variables ($F(2, 50) = 3.67, p < .04$). Tests for simple main effects show that the conditioning procedure had no effect for either the Coke-lover or Pepsi-lover groups (both t 's < 1 ; both p 's $> .35$). In contrast, neutral participants demonstrated a significant effect of conditioning ($t(17) = 2.42, p < .03$), such that those in the Coke-positive condition showed more favorable implicit attitudes toward Coke, while those in the Pepsi-positive condition showed more favorable implicit attitudes toward Pepsi (see table 1).

A similar ANOVA was carried out on the explicit measure. This analysis showed only a significant main effect for pretest attitude ($F(2, 50) = 59.29, p < .001$). As expected, participants who reported strong pretest preferences

TABLE 1

EXPERIMENT 1: THE EFFECTS OF CONDITIONING ON IMPLICIT AND EXPLICIT BRAND ATTITUDE AS A FUNCTION OF PRETEST PREFERENCE AND CONDITIONING GROUP

Conditioning group	Pretest preference			Total
	Coke lover	Neutral	Pepsi lover	
Implicit attitude:				
Coke positive:	-.183	-.243 _a	.585	.045
SD	.465	.674 _a	.402	.631
N	10	9	9	28
Pepsi positive:	-.392	.343 _b	.482	.120
SD	.576	.349	.394	.588
N	10	10	8	28
Total:	-.287	.066	.537	.082
SD	.520	.594	.389	.606
N	20	19	17	56
Explicit attitude:				
Coke positive:	-27.1	-5.4	26.6	-2.9
SD	14.3	11.1	19.6	27.0
N	10	9	9	28
Pepsi positive:	-24.7	2.8	19.5	-2.3
SD	16.1	6.3	9.9	21.5
N	10	10	8	28
Total:	-25.9 _a	-1.1 _b	23.2 _c	-2.6
SD	14.9	9.6	15.8	24.2
N	20	19	17	56

NOTE.—Negative scores indicate an implicit preference for Coke; positive scores indicate an implicit preference for Pepsi. Different subscripts represent means different at the .05 level by tests for simple effects (for the implicit attitude measure) and by Tukey's test (for the explicit attitude measure).

continued with those preferences following the conditioning procedure, and participants who were neutral on the pretest remained neutral after the conditioning procedure. Further, there was no significant main effect for the conditioning variable ($F(1, 50) < 1$) and no interaction between conditioning and pretest preference ($F(2, 50) = 1.43, p > .20$; see table 1).

Contingency Awareness. Recall that contingency awareness was measured by presenting participants with 16 paired images (among a variety of distracter images), eight of which they had seen, and eight of which they had not seen. They were then asked to rate their confidence—on a scale of -2 (very confident they had not seen this pair) to $+2$ (very confident they had seen this pair)—that the image presented had been seen during the conditioning phase of the experiment. For the Coke-positive and Pepsi-positive groups, their response to paired images they had not seen was multiplied by -1 so that a positive number would represent accurate contingency awareness (i.e., they should have responded with a negative value, indicating that they had not seen the pairing). These 16 items were then added together and divided by 16 to come up with an overall contingency awareness value that could range from -2 to $+2$. A 3 (pretest score) \times 2 (conditioning group) ANOVA was carried out on the contingency awareness variable. Results indicate that there was a significant effect of the pretest variable ($F(2, 50) = 4.27, p < .02$). A Tukey's test shows that Coke lovers ($M = 1.76$) and Pepsi lovers ($M = 1.59$)

were significantly better at identifying the CS-US contingency than were the neutral participants ($M = .62$). Single sample t -tests showed that all groups exceeded chance in their ability to identify the contingency for the Coke-lovers group ($t(16) = 6.27, p < .001$), for the Pepsi-lovers group ($t(19) = 4.69, p < .001$), and in the neutral group ($t(18) = 2.64, p < .02$).

To evaluate whether contingency awareness was related to implicit attitudes, the contingency awareness variable was correlated with the absolute value of participants' IAT score. The absolute value of the IAT was used due to the nature of the conditioning manipulation. Specifically, participants in the Coke-positive group would demonstrate conditioning with a negative IAT value, while those in the Pepsi-positive group would demonstrate conditioning with a positive IAT value. The contingency awareness measure, however, does not switch in valence in this fashion. By using the absolute value of the IAT in these analyses, I was able to see whether the strength of the conditioning effect was related to contingency awareness across conditioning groups. This correlation was significant for the entire sample ($r(55) = -.27, p < .05$). This indicates that participants who were worse at identifying the conditioning contingency had stronger implicit attitudes. Given that the neutral attitude group was the only group to show significant conditioning effects on the IAT, this correlation was carried out separately for these participants. Although approximately equal in magnitude and in the same direction, the correlation did not reach significance with the smaller sample size ($r(18) = -.28$).

Discussion

The results of experiment 1 provide support for hypotheses 1a and 1b. First, explicit attitudes were unaffected by the conditioning procedure. This replicates the findings of Cacioppo et al. (1992) and Shimp et al. (1991) in that they also demonstrated that evaluative conditioning did not affect explicit attitudes for familiar stimuli. Second, implicit brand attitudes were successfully conditioned, but only for participants who were initially neutral toward the brands in question. The data from the current experiment do not speak directly to the reason for the successful conditioning of implicit attitudes for neutral participants but not for Coke lovers and Pepsi lovers. One possibility is that those with neutral attitudes toward the brands simply have few or no connections between the brand and valence in memory. If so, then the conditioning procedure could create such connections, leading to a shift in implicit attitudes. A problem with this account, however, is that other research on conditioning of attitudes toward neutral stimuli suggests that in addition to successfully conditioning implicit attitudes, explicit attitudes are also affected in these situations (Olson and Fazio 2001, 2002). In experiment 1, explicit attitudes were unaffected by the conditioning procedure. Further, Pepsi and Coke are so ubiquitous that it seems unlikely that people who were neutral toward the brands would have no valenced connections to them in memory. For these reasons, it seems more likely that evaluative conditioning changed

implicit attitudes through differential activation of existing associations in memory. Although this explanation seems reasonable, the current data do not speak directly to this question.

Note that the conditioning effects occurred in the context of a generally strong relationship between implicit and explicit attitudes. Nosek (2005) suggests that implicit-explicit correlations will be strongest when (a) there are no self-presentational concerns, (b) the evaluations are stronger, (c) the attitudes are bipolar rather than unipolar in structure, and (d) one's evaluation is perceived to be more distinctive, compared to normative information. Given these factors, it is not surprising to find a strong implicit-explicit correlation for these soft drink brands. First, it seems unlikely that one would moderate one's response to the explicit measure due to self-presentational concerns. Most people do not view their attitudes toward Coke and Pepsi as something upon which others will readily judge them. Second, two-thirds of the sample were selected precisely because their evaluations of these brands were strong. Third, although attitudes toward Coke and Pepsi are not bipolar in the strict sense that Nosek discusses (i.e., liking Coke does not in itself imply disliking Pepsi), note that the calculation of the explicit Coke-Pepsi attitude as a difference score makes this a bipolar construct. Finally, distinctiveness seems unlikely to play a large role for these attitude objects since people are likely to know a range of other people who hold widely varying attitudes toward these brands. In general, however, this analysis would suggest that Coke-Pepsi attitudes are likely to be of the sort that would demonstrate a strong implicit-explicit relationship, and indeed, Nosek (2005) reports a correlation of .54 between implicit and explicit attitudes toward Coke and Pepsi.

The contingency awareness data also provided some interesting information. Although all groups identified the contingencies at greater than chance levels, the conditioning effect was actually related to less awareness of the CS-US contingency. Although tentative, this could imply that evaluative conditioning of implicit attitudes is actually more successful without contingency awareness. It may be that engaging in a more deliberative process (e.g., consciously attending to and noting the contingency between the brand and the unconditioned stimuli) in some way interferes with the more automatic process of building associative strength. Further research would be necessary to explore this possibility. An additional finding of note was that Coke lovers and Pepsi lovers were significantly better at identifying the contingency between CS and US than were the initially neutral participants. This finding dovetails nicely with other research showing that highly accessible attitudes lead people to attend to the attitude object when it is present in the visual field (Fazio, Powell, and Williams 1989; Roskos-Ewoldsen and Fazio 1992). In the current study, it seems likely that the Coke lovers and Pepsi lovers had more accessible attitudes toward these products (as compared to the neutral participants), and therefore when Coke or Pepsi appeared during the conditioning phase of the experiment they drew

more attention. If so, then awareness of the CS-US contingency would likely follow.

EXPERIMENT 2

Experiment 2 was carried out to replicate the conditioning effects for neutral participants identified in experiment 1 and to extend these results by evaluating the effect of conditioning on brand choice. Because less-considered choices are more likely to fall in line with automatically activated (implicit) attitudes, I expected that the choice of Coke or Pepsi would correspond to the recent evaluative-conditioning procedure, but only for those participants making this choice under cognitive load. Given the chance to consider the choice more carefully, a variety of memory-based factors (e.g., well-rehearsed explicit attitudes, which brand was consumed most recently, etc.) would have a greater chance of affecting brand choice. Further, I also expected that implicit brand attitudes would predict brand choice, but only for participants under cognitive load.

Method

Participants. Participants were 60 Central Michigan University undergraduate psychology students (38 females and 22 males) who participated to receive extra course credit.

Procedure. Potential participants were again pretested regarding their attitudes toward Coke and Pepsi. Only those participants who reported having no strong preference for Coke or Pepsi (i.e., who were within .5 standard deviations of zero) were recruited to participate. As in experiment 1, participants were randomly assigned to receive the Coke-positive or Pepsi-positive conditioning procedure. Also as in experiment 1, participants then completed the explicit measures and the Coke-Pepsi IAT. Participants were then told (via instructions presented on the computer) that they would also be receiving a bonus prize for their participation. They were told that they could select between two prizes and that these items would appear on the next screen. They were instructed to push the E key to select the item on the left of the screen or the I key to select the item on the right of the screen. The time (in milliseconds) it took participants to select a brand was also collected. The next screen presented them with an image of a can of Coke and a can of Pepsi. The side of the monitor on which these images appeared was counterbalanced across participants. Prior to the presentation of the on-screen images, however, half of the participants were told that I was also interested in how memory capacity could interact with the kinds of measurements taken in the study, and to measure memory capacity they would be given an 8-digit number to remember. They were instructed to study this number as long as they needed in order to remember it and then to hit the continue key. Once they continued to the next screen, they were presented with the choice between a can of Coke and a can of Pepsi. After making this choice, they were asked to recall the number

they had been given. They were then given a can of the brand they selected and were debriefed and excused.

Results

Preliminary Analyses. The explicit attitude measure for Coke or Pepsi was computed as in experiment 1. The pretest preference score was entered into a 2 (cognitive load: high load, low load) \times 2 (conditioning group: Coke positive, Pepsi positive) ANOVA. Results of this analysis reveal no differences between groups for the pretest variable (all F 's < 1.0). This indicates that random assignment led to equivalent groups to begin the experiment. Finally, neither participant sex nor the counterbalancing variables had any effect on the outcome of any of the following analyses and are not discussed further.

Conditioning of Implicit and Explicit Attitudes. A 2 (cognitive load) \times 2 (conditioning group) ANOVA was carried out on both the IAT and posttest explicit attitude measures. The IAT was computed using the D scoring procedure outlined by Greenwald et al. (2003). As would be expected, for the IAT variable, there was no main or interactive effect of cognitive load (both F 's < 1.0). There was, however, a significant main effect for the conditioning variable ($F(1, 56) = 23.00, p < .001$). Participants in the Coke-positive group had an implicit preference for Coke ($M = -.28$), while those in the Pepsi-positive group had an implicit preference for Pepsi ($M = .29$). For the posttest explicit attitude measure, no significant effects were identified (all F 's < 1.3). Including the pretest measure of preference for Coke or Pepsi as a covariate in both of these analyses does not alter the results. These data replicate the results of experiment 1 for the initially neutral participants.

Product Choice. I hypothesized that under cognitive load, participants would be more likely to select the product for which they had been positively conditioned, in line with their altered implicit attitude. To test this hypothesis, I carried out separate chi-square analyses for the no cognitive load and high cognitive load groups, comparing product choice as a function of conditioning group. In the low cognitive load group, this analysis was not significant ($\chi^2(1) = 0.00$). In both the Coke-positive and Pepsi-positive conditions, eight participants chose Pepsi, and seven chose Coke. In contrast, in the high cognitive load group, this analysis revealed a significant effect ($\chi^2(1) = 4.82, p < .03$). In the high cognitive load group, participants in the Coke-positive conditioning group were more likely to select Coke, and participants in the Pepsi-positive conditioning group were more likely to select Pepsi (see table 2).

The Relationship between Product Choice and Attitude Indexes. To further explore the notion that increasing cognitive load leads participants to rely on their implicit attitudes when making the brand choice, I carried out sequential logistic regression analyses separately for the high and low cognitive load conditions. Choice of Pepsi or Coke

TABLE 2

EXPERIMENT 2: THE EFFECTS OF CONDITIONING
AND COGNITIVE LOAD ON PRODUCT CHOICE

Conditioning group	Cognitive load		Total
	Low	High	
Coke positive:			
Selected Coke	7	10	17
Selected Pepsi	8	5	13
Pepsi positive:			
Selected Coke	7	4	11
Selected Pepsi	8	11	19
Total	30	30	60

NOTE.— $N = 60$; values represent the number of participants in each condition who chose the indicated soft drink.

was the criterion variable. On the first step, I entered the pretest and posttest explicit attitude values as predictors. On the second step, I entered the implicit product attitude. For the low cognitive load group, the model was significant after the first step ($\chi^2(2, N = 30) = 11.62, p < .005$; Cox and Snell $R^2 = .32$). This model accurately predicted product choice 75% of the time for those choosing Pepsi and 78.6% of the time for those choosing Coke. The addition of the IAT as a predictor on the second step did not significantly improve the model ($\chi^2(1, N = 30) = .192$; Cox and Snell $R^2 = .33$). For the high cognitive load group, the model was again significant after the first step ($\chi^2(2, N = 30) = 6.06, p < .05$; Cox and Snell $R^2 = .18$). This model accurately predicted product choice 68.8% of the time for those choosing Pepsi and 50% of the time for those choosing Coke. The addition of the IAT as a predictor on the second step significantly improved the model ($\chi^2(1, N = 30) = 4.97, p < .03$; Cox and Snell $R^2 = .31$). The addition of the IAT improved the prediction of product choice to 87.5% for those choosing Pepsi and 71.4% for those choosing Coke. The Wald coefficient for the IAT variable was 3.96, with 1 degree of freedom ($p < .05$).

Reaction Time to Select the Product Reward. I propose that the reason that the participants' choices more closely corresponded with their implicit product attitude in the high cognitive load condition was that in that condition they did not retrieve memory-based evaluations of the brands and recent experiences with the brands (e.g., recalling which brand they had most recently consumed). In contrast, under low cognitive load, participants may have retrieved this information, which in turn could have overridden the recently altered implicit attitude. If this reasoning is correct, people in the low cognitive load condition should take more time to make their product selection because they are retrieving product information from memory. To test this notion a 2 (cognitive load) $\times 2$ (conditioning group) ANOVA was carried out on the reaction time data. One participant had a reaction time over 4 standard deviations above the overall mean reaction time (it took him more than 25 seconds to make his choice), and this participant was removed from

the analysis. This analysis revealed no significant effects of the conditioning group ($F(1, 55) < 1$) and no significant interaction ($F(1, 55) = 2.18, NS$). Cognitive load, however, did have a significant effect on reaction time ($F(1, 55) = 4.86, p < .05$). As expected, participants under low cognitive load took longer to make the product choice ($M = 4,795$ milliseconds) than those under high cognitive load ($M = 3,237$ milliseconds).

DISCUSSION

The results of experiment 2 replicate and extend the results of experiment 1. As in experiment 1, participants who were initially neutral toward Coke and Pepsi had their implicit but not explicit attitudes toward these brands altered via an evaluative-conditioning procedure. Experiment 2 also provides some insight into when this conditioning experience is most likely to alter brand choice. Given the opportunity to choose Coke or Pepsi, only those participants making the choice under cognitive load selected the product that they had been conditioned to prefer. Similarly, it was only these participants whose implicit brand attitude predicted brand choice. Although speculative, the reaction time data are consistent with the notion that participants under low cognitive load recruit explicit attitudes in order to guide brand choice, while those under high cognitive load do not. Further research will be necessary, however, to provide more direct evidence of this process.

GENERAL DISCUSSION

A number of authors have called for consumer researchers to more carefully consider automatic or nonconscious processes (Bargh 2002; Chartrand 2005; Dijksterhuis et al. 2005). The results of the experiments presented here provide direct evidence of the benefits of doing so in research on evaluative conditioning. In both experiments, had measures of implicit attitudes not been included, the effects of evaluative conditioning would have been significantly underestimated. In experiment 1, failure to include the measure of implicit brand attitude would have led to the conclusion that attitudes toward mature brands are unaffected by evaluative conditioning. This certainly seems to be true for explicit attitudes (Shimp et al. 1991). Implicit brand attitudes, however, were altered for participants who were initially neutral toward the brands. In experiment 2, failure to consider nonconscious processes would likely have led to a failure to consider how cognitive load could affect brand choice. It was only through a consideration of research and theory regarding when implicit attitudes are likely to influence behavior that cognitive load was identified as an important moderating variable. Further, choice in this high load condition was related to implicit attitudes, while choice in the low load condition was not. This result fits well with Fazio's MODE model of attitude-to-behavior processes (Fazio and Towles-Schwen 1999).

The results of these and other experiments (Brunel, Tietje, and Greenwald 2004; Forehand and Perkins 2005; Maison,

Greenwald, and Bruin 2004; Redker and Gibson 2007) suggest that the IAT can be a valuable measure in consumer research. It seems reasonable to suggest that the areas of consumer research most likely to benefit from use of the IAT are those areas based on associative learning. One such area is product placement. Product placement is a marketing strategy thought to be based on associative learning mechanisms (Balasubramanian 1994; Balasubramanian, Karrh, and Patwardhan 2006; Dal Cin et al. 2007; Russell 2002; Russell and Stern 2006). In this strategy, brands are used by characters in movies and television shows in the hope that viewers will adopt positive attitudes toward the brand. Given the associative nature of this process, looking for effects on implicit attitudes would seem to be a logical strategy to adopt. Second, this reasoning could also apply to the search for mere exposure effects in marketing (Janiszewski 1993; Obermiller 1985). Zajonc (2001) argues that mere exposure effects are a form of associative learning. Thus, mere exposure to novel brands can potentially have a direct effect on implicit brand attitudes. This line of reasoning also suggests that careful consideration of implicit attitudes may shed light on potential effects of subliminal variables on brand evaluation. There has been much skepticism regarding the viability of subliminal techniques in the consumer domain (Moore 1982; Pratkanis and Greenwald 1988; Trappey 1996). Recent research, however, has uncovered some situations in which these effects may exist (Strahan, Spencer, and Zanna 2002, 2005). The notion that mere exposure effects could exert their influence first on implicit attitudes suggests that a search for subliminal mere exposure effects in consumer research could benefit from an inclusion of implicit attitude measures.

Finally, it would be reasonable to ask how to best generalize the product choice results to real world consumer settings. In experiment 2, implicit attitudes predicted product choice only when participants were under cognitive load. This suggests that implicit product attitudes may play a greater role in product choice when the consumer is distracted or making an impulse purchase (Vohs and Faber 2007). These are situations in which there is less chance for a variety of memory-based variables to intervene, making the implicit attitude more likely to guide behavior. Of course, in many cases, the implicit and explicit attitudes may be the same. As the current research demonstrates, however, implicit and explicit brand attitudes need not always match, and when they do not match, the implicit attitude could exert more influence when consumers are distracted or making quick decisions.

In conclusion, the results suggest that evaluative conditioning does affect attitudes toward mature brands, but in a way that has not been previously measured. Identifying how implicit attitudes toward these brands could shift after exposure to an evaluative-conditioning procedure broadens the range of products for which evaluative conditioning could be viewed as a viable marketing strategy. Further, the research clearly identifies situations in which these shifted implicit attitudes can affect behavior. Beyond the implica-

tions for evaluative conditioning, the data also highlight how the implicit attitude construct can play a role in extending our understanding of consumer behavior.

APPENDIX

WORDS AND IMAGES USED IN THE EVALUATIVE-CONDITIONING PROCEDURE

Positive words	Amazing, awesome, delightful, enjoyable, exciting
Negative words	Dreadful, saddening, sorrowful, terrifying, upsetting
Positive images	Field of flowers, beautiful mountain scene, smiling older couple, cute hippo, mother holding child
Negative images	Person in a contamination suit, exhaust coming out of a car, people at a grave site, pile of dirty dishes, trash piled on a sidewalk

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