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PREDICTIVE VALIDITY OF THE IMPLICIT ASSOCIATION TEST IN STUDIES OF BRANDS AND CONSUMER ATTITUDES AND BEHAVIOR

This research was supported by grants BST 632/32 and BST 671/12 from the University of Warsaw, Poland, and by grants from the U.S. National Institute of Mental Health, MH-41328, MH-01533, and MH-57672. The authors would like to thank Anna Mazerant from the University of Warsaw, for her assistance in planning and conducting Study 2, marketing research company CASE for help with conducting the study 2, and Lukasz Markiewicz from the University of Warsaw, for his assistance in planning and conducting Study 3.

Abstract

This article reports three studies investigating implicit brand attitudes and their relation to explicit attitudes, product usage and product differentiation. Implicit attitudes were measured using the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). Study 1 showed expected differences in implicit attitudes between users of two leading yogurt brands, also revealing significant correlations between IAT-measured implicit attitudes and explicit attitudes. In Study 2, users of two fast food restaurants (McDonald's and Milk Bar) showed implicit attitudinal preference for their favorite restaurant. In Study 3 implicit attitudes of users of two soft drinks (Coca-Cola and Pepsi) predicted brand preference, product usage and brand recognition in a "blind" taste test.

Role of implicit processes in consumer behavior

In understanding consumer attitudes and decisions, emotions, unconscious motives and automatic processes should be considered (Batra, Myers, & Aaker, 1996; Cohen & Areni, 1991; Gorn, 1982; Isen, 1989; McDonald, 1992; Shiv & Fedorkhin, 1999). This conclusion follows from recent work in implicit social cognition showing that attitudes can be automatically activated outside conscious awareness (Bargh, 1997; Johnson & Weisz, 1994).

Two studies can illustrate these implicit influences on consumers. In one study participants read a magazine with text on one page and on the facing page an advertisement. Even when their attention was focused on the text (not on the ad), information from the ad nevertheless influenced attitudes toward both ad and brand (Janiszewski, 1988, 1990). This influence occurred even though subjects showed no explicit memory of the ad. In the second study incidental ad exposure affected consideration of advertised products, even when subjects were explicitly trying to avoid choosing the products depicted in the ad (Shapiro, 1999).

Still more evidence of implicit processes in consumer behavior comes from research into the influence of brands on consumers' attitudes, judgments and preferences. Consumers perceive products through brand images that operate outside of their conscious awareness (Kirmani, Zeithaml, 1993; Edel & Moore, 1993, Bargh 2002). The manner in which brand images affect consumer behavior is often automatic (Janiszewski, 1988). Product trial research has shown that people have very different perceptions of product features (even such features as taste of coffee, strength of beer, sweetness of juice, etc.), depending on whether the product test is "blind" or not (Lannon, 1993). This is perhaps because many near-identical products are differentiated mainly by their brand identification (brand image or personality).

Measuring implicit attitudes in consumer research

Research on implicit attitudes is complicated by measurement difficulties. Self-reported measures typically do not suffice as indicators of brand image or advertising influence (Gordon & Longmaid, 1988; Levy, 1985; Smith, 1954). Therefore applied researchers as well as their academic counterparts are trying to introduce alternative methods. Applied researchers have attempted to develop qualitative techniques in order to study the issues that are beyond consumers' consciousness; especially "projective techniques", such as anthropomorphization or animalization (Hussey & Duncombe, 1999; Greenbaum, 1993; Branthwaite & Lunn, 1985), where the task of consumers is to imagine a brand as a person or an animal. Surprisingly, in the case of strong brands, people are able to create consistent images of a brand as if it were a person, including gender, age, education, character, lifestyle, likes and dislikes, leisure time activities, and so forth. Based on such data marketers can infer potential – but mostly unconscious - barriers to purchase and use of a brand, and can propose further marketing communication strategies in order to change those barriers (e.g., changing some elements of brand image). Despite the popularity of projective techniques in commercial research, they are not well accepted in academic research.

Measuring consumers' implicit attitudes with the Implicit Association Test

Since the 1980s much attention has been devoted to reaction time as indication of automatic processes and automatic activation of attitudes. Such automatic processes have been mostly studied in the context of stereotypes and prejudices (Greenwald & Banaji, 1995; Bargh,

1997; Pratto, 1994; Bargh, Chaiken, Govender & Pratto, 1992; Bargh, 1989; Brauer, Wasel & Niedenthal, 2000; Devine, 1989; Fazio, Sanbonmatsu, Powell & Kardes, 1986).

One method of researching implicit attitudes that has become very popular in psychology over the last 6 years is the Implicit Association Test (Greenwald, et al., 1998; Swanson, Rudman & Greenwald, 2001; Greenwald & Nosek, 2001). The method involves a computerized task in which subjects sort stimuli into four different categories: two contrasted target concept categories (in the study of Greenwald, et al., 1998, Study 1, flowers and insects), and two contrasted attribute categories (pleasant and unpleasant words). The categorization task consists of presenting the subjects with a stimulus to be categorized quickly in one of two groups, presented as labels on the left and on the right of the computer screen. Subjects categorize the stimuli by pressing a key on the left (corresponding with the labels on the left side of the screen) or on the right side of a computer keyboard (corresponding with the labels on the right side of the screen). After completing practice categorization tasks with only one category per key, subjects perform the combined categorization task with two categories per key (an attribute category and a target concept). This task is done two times: once when the first concept category is paired with positive attributes and the second category with negative, and once as a reversed task, when the first concept category is paired with negative attributes and the second category with positive (footnote 1). In this manner, subjects make categorizations in which both target concept categories are paired with both attribute categories.

Shorter reaction times for stimuli belonging to a target concept category when it is paired with positive attributes and prolongation of the reaction time when this target concept category is paired with negative attributes, are interpreted as an indication of a more positive implicit attitude toward this concept category than toward the other concept category with which it is

tested. Thus far the IAT has been shown to be a very useful tool for research on automatic processes in several areas: for example, racial attitudes (Dasgupta & Greenwald, 2001), stigmatized behavior, such as smoking (Swanson, et al., 2001), and gender stereotypes (Rudman, Greenwald & McGhee, 2001).

In this article we present studies using the IAT method to research consumer attitudes, more specifically implicit attitudes toward brands. The studies used three sets of attitude objects (pairs of brands). The goal of the first study was to observe the relation between explicit and implicit measures of attitudes. It investigated two leading (in Poland) brands of yogurts and was conducted among regular consumers of yogurt. Study 2 observed relations among implicit attitudes, explicit attitudes, and brand choice behavior among consumers selected because they just had lunch at one of two fast food restaurants: McDonald's or Milk Bar (footnote 2). Study 3 observed relations among implicit attitudes, explicit attitudes, self-reported behavior, and brand taste recognition among brand-loyal users of Coca-Cola and Pepsi.

Study 1

The objective of Study 1 was to investigate use of the IAT method to study implicit attitudes toward brands and their relation to explicit attitudes. The study investigated two of Poland's leading brands of yogurt: Danone and Bakoma (footnote 3). Predictions were that, for these two brands of yogurt, IAT-measured implicit attitude will correlate with brand preferences and product usage. Those who prefer Danone were expected to have a more positive implicit attitude toward Danone, than those who prefer Bakoma. Because yogurts are products for which consumers should both (a) be aware of their attitudes and preferences, and (b) lack reasons for

suppressing report of these, it was also predicted that IAT-measured attitudes would correlate with self-reported attitudes toward the two brands.

Method

Participants

The 40 participants (28 female and 12 male) were undergraduate students of the Department of Psychology at the University of Warsaw (ages 19-25). For their participation subjects were paid 5 PLN (at the time the equivalent of 1.33 US\$). Subjects were selected based on one criterion: eating yogurt at least a few times per week. Brand preference was not checked at the stage of selecting participants.

Materials

Explicit measures. A questionnaire about yogurt usage and attitude toward the two brands contained the following questions: Self-reported behavior - frequency of eating of each brand (5-point scale; 1 = “more often Bakoma than Danone”; 5 = “more often Danone than Bakoma”); Liking - separate questions for liking of Danone and Bakoma (5-point scale 1 = dislike/5 = like very much); Preference - 5-point scale with preference for one of two yogurt brands (1 = definitely prefer to eat Bakoma than Danone; 5 = definitely prefer to eat Danone than Bakoma); Evaluation - separate evaluation of Danone and Bakoma on 8 different bipolar dimensions, each rated on a 7-point scale (not tasty/tasty, not nice/nice, not natural/natural, unhealthy/healthy, not worth buying/worth buying, for older/for younger, not fashionable/fashionable, not popular/popular).

Implicit measures. The IAT measuring implicit attitudes toward the two brands included the following pleasant and unpleasant stimuli (English translations of words used in the Polish version): (pleasant words) sun, luck, love, fun, happiness, pleasure, holiday, friendship; (unpleasant words) disease, death, murder, accident, poison, war, tragedy, vomit. These stimuli were used previously by Maison & Bruin (1999) and Maison, Greenwald, & Bruin (2001). Stimuli representing the two target categories (brands) were images taken from actual labels and pictures of packages. The four pictures for each brand were similar in size and form.

The IAT was completed on PC-type desktop computers, using Inquisit laboratory software (Inquisit, 2002). Stimuli were presented in the center of the computer screen. As previously described, subjects were instructed to assign each stimulus to one of two categories (in single categorization tasks) or one of four (in combined categorization tasks). Subjects used either the “A” key with the left index finger or the “5” key on the numeric keypad with the right index finger.

Procedure

Subjects who met the selection criterion (eating yogurt at least a few times per week) were invited to the laboratory. Upon entry in the laboratory, subjects were asked to complete the questionnaire that measured explicit attitudes toward the two brands of yogurt. Immediately after completing the questionnaire, subjects completed the IAT task. Subjects went through this procedure individually.

The IAT involved 5 classification tasks: Task 1 – single categorization for the attributes (pleasant/unpleasant - 30 trials); Task 2 – single categorization for the target concept (Danone/Bakoma; 30 trials); Task 3 – combined categorization task - practice and data collection trials (Danone+pleasant/ Bakoma+unpleasant – 20 trials practice and 40 trials data collection);

Task 4 - single categorization for the target concept (as Task 2) but with reversal of the side of the screen on which the two category labels appeared (30 trials); Task 5 - combined categorization task - practice and data collection trials (as Task 3) but reversed categorization of target categories (Bakoma + pleasant/ Danone + unpleasant – 20 trials practice and 40 trials data collection). Half of the subjects did the Tasks in the order presented above; for the other half tasks 2 and 3 were interchanged with Tasks 4 and 5. Only the data from the data collection trials of Tasks 3 and 5 were used for analysis.

Results and Discussion

IAT Data Reduction

The first 2 trials of each data collection block were excluded from analysis because these response latencies are typically longer (Greenwald, et al., 1998). Also trials that had latencies longer than 3000 ms and shorter than 300 ms were recoded to 3000 ms and 300 ms respectively, to control for inattention or anticipation (as suggested by Greenwald, et al., 1998). One subject was excluded from the analyses because of an error rate higher than 30% (the average error rate of the other subjects was 6.75%). All analyses reported here involve the remaining 39 subjects.

Explicit Brand Attitudes

In response to “What is your favorite brand of yogurt?” (unaided brand preference), 17 of the 39 participants (43%) declared that their favorite brand of yogurt was Danone and 15 (38%) Bakoma. The others (seven persons – 18%) mentioned other brands or did not have a favorite brand of yogurt. When asked explicitly which of the two brands they prefer (aided brand preference), six (15%) said that they definitely prefer Bakoma over Danone; eleven (29%) somewhat prefer Bakoma over Danone; four (10%) did not have a preference for one of those

brands; eleven (29%) somewhat preferred Danone over Bakoma; and seven (18%) definitely preferred Danone over Bakoma. Thus, there were approximately equal numbers of participants who preferred each brand: 17 preferred Bakoma over Danone and 18 preferred Danone over Bakoma.

Averaged over all participants, evaluation of the two brands on 8 dimensions did not show significant differences for most dimensions. The only two dimensions on which the images of the two brands differed were perception of Danone as more fashionable and as a more popular yogurt than Bakoma. When comparison of evaluations was done separately for those who preferred one or another brand of yogurt, data showed a more positive evaluation of the preferred yogurt; those who preferred Danone rated their favorite brand more positively on all dimensions (all differences were statistically significant at $\alpha = .05$, two-tailed), those who preferred Bakoma evaluated more positively their brand on five of the eight dimensions.

Implicit Brand Attitudes

Comparison of the reaction times in the task in which one category was paired with positive words with those obtained in the task in which the other category was paired with positive words, provides a measure of implicit attitudes toward the two categories. Faster reaction time for one category together with pleasant words, than with unpleasant words, indicates a more positive implicit attitude toward that category.

Averaged over all subjects, there were no significant differences in reaction times (RT) when Bakoma was paired with unpleasant words and Danone with pleasant (696 ms; below this task will be described as [-B/D+]) compared with the reverse task (688 ms; [-D/B+] hereafter), $t(38) = .31$.

However, a comparison done separately for Danone and Bakoma users did reveal significant differences between the two groups of consumers. For this analysis the subjects were divided into two groups based on answers to the question about self-reported behavior, “Which of the two yogurt brands do you use more often?” This analysis included 34 subjects, only those who had indicated that they use one brand more often than the other.

The IAT effect for each subject was calculated by computing the mean latency for the [–D/B+] task minus the mean latency for the [–B/D+] task. Thus, higher positive values of the IAT effect indicate a more favorable implicit attitude toward Danone. For Danone users the difference between [–D/B+] and [–B/D+] averaged 58 ms; for Bakoma users the difference was –73 ms; and the difference between two groups was significant: $t(32) = 3.65$, $p < .001$ (see Figure 1 and Footnote 4). The difference between two tasks ([–D/B+] and [–B/D+]) within each group were also significant. For the Danone users: $RT[–D/B+] = 700$ ms; $RT[–B/D+] = 642$ ms; $t(17) = 2.58$; $p = .02$. For the Bakoma users: $RT[–D/B+] = 682$ ms; $RT[–B/D+] = 755$ ms; $t(15) = 2.56$; $p = .02$.

We can therefore conclude that both Danone and Bakoma users had more positive implicit attitudes toward their preferred brand.

FIGURE 1 ABOUT HERE

Correlation between explicit and implicit attitudes

Correlations of the IAT effect (implicit attitude) were computed with measures of frequency of use for each brand and explicit attitude (computed from variables: liking, preference, and evaluations of both brands on eight dimensions). The correlation analysis was

carried out on these self-report measures after transforming them to z-scores. For all variables higher values indicated more favorable ratings of Danone. As expected, IAT was positively correlated with explicit attitude ($r = .57$; $p = .0001$) and with frequency of using each brand ($r = .46$; $p = .003$).

Discussion

Study 1 provides evidence that the IAT can be used successfully to measure implicit attitudes toward brands. First, the IAT revealed significant differences between subjects' reactions to different yogurt brands depending on their preferred brand of yogurt. Second, implicit attitudes (measured with the IAT) were positively related to subjects' explicit ratings of yogurt brands (self-reported behavior, explicit attitude based on liking, preference and brand evaluation). Those who had more positive attitude and declare using one brand more often than another showed an IAT effect indicating a positive implicit attitude toward this brand.

Study 2

Study 1 showed that the IAT method can be used as a measure of implicit attitudes toward brands. Results also showed a correlation between implicit attitudes measured by the IAT and both evaluation of brands and declared behavior. However, because in the first study behavior was only self-reported, the goal of the second study was to observe implicit attitudes in relation to actual behavior in the form of known usage of a brand.

The brands used for Study 2 were two types of fast food restaurants: McDonald's and Milk Bar (see Footnote 2). Predictions were that: (1) subjects' explicit ratings of each of two fast food restaurants will be consistent with place of eating (observed behavior); (2) implicit attitude

toward McDonald's and Milk Bar will also be consistent with place of eating; and (3) implicit attitude toward McDonald's relative to Milk Bar will be positively correlated with explicit attitudes.

Method

Participants

Participants (20 females and 20 males; ages 16–25) were recruited from one of two fast food restaurants in the center of Warsaw, directly after finishing a meal: 20 from McDonald's and 20 from Milk Bar. For their participation in the study subjects were paid 5 PLN (at that time the equivalent of 1.33 US\$).

Materials

Explicit measures. Subjects completed a questionnaire asking about their attitude toward McDonald's restaurants and Milk Bar. This questionnaire contained the following parts: Self-reported behavior - frequency of eating in each of two restaurants (two separate questions, 5-point answer scale: 1 = almost never, 5 = almost every day); Preference – 5-point scale with stated preference for one of two restaurants (1 = definitely prefer to eat in Milk Bar over McDonald's; 5 = definitely prefer to eat in McDonald's over Milk Bar); Evaluation – 5-point semantic differentials (six dimensions for each of McDonald's and Milk Bar, scored from 1 to 5: not tasty/tasty, not popular among peers/popular among peers; not nice/nice; not healthy/healthy; dirty/clean; slow/fast).

Implicit measures. Subjects completed an IAT task measuring implicit attitudes toward the two types of fast food restaurants: McDonald's and Milk Bar. The list of stimuli, based on two groups of typical fast food meals, included: (a) McDonald's stimuli: Hamburger, Cheeseburger, Big Mac, McChicken and (b) Milk Bar stimuli: Pierogi, Nalesniki, Zurek, Barszcz (all four are typical food served in Milk Bar). The list of Polish pleasant and unpleasant words was the same as in Study 1.

The IAT task was completed on IBM-compatible desktop computers, using the Inquisit program. Stimuli corresponding to the task's categories were presented in the center of the computer screen. Subjects responded to the categorization task by pressing either the "A" key with the left index finger or the "5" key on the numeric keypad with the right index finger.

Procedure

The procedure in this study was similar to that of Study 1, except that the list of stimuli in the IAT task was different, as was the questionnaire at the beginning of the study (for further descriptions of both, see below). Participants completed a questionnaire (explicit attitude measure) before doing the IAT.

Results and Discussion

IAT data reduction

The same data reduction procedure was applied as in Study 1. Also in this study one person was excluded from analysis because of an error rate higher than 30% (the average error rate of the other subjects was 4.7%). All analyses reported here involve the remaining 39 subjects.

Explicit attitudes toward McDonald's and Milk Bar

On the global level (analysis for all participants) McDonald's was perceived as cleaner, faster and more popular among peers, but Milk Bar was perceived as a healthier place to eat (significant differences). Separate analyses of users of one or the other restaurant showed strong explicit preference for the place at which they had eaten. Users of McDonald's evaluated McDonald's more positively than Milk Bar on all dimensions (all differences significant) and users of Milk Bar evaluated Milk Bar more positively than McDonald's (five of six differences significant).

Implicit attitudes toward McDonald's versus Milk Bar - IAT effect

The IAT effect for each subject was calculated by computing the latency for the [–MB/McD+] task minus the latency for the [–McD/MB+] task (the same procedure of data computation as used in Study 1). Higher positive scores for the IAT effect indicated a more favorable implicit attitude toward Milk Bar. Comparison of the IAT effect between those who use McDonald's and those who use Milk Bar showed a significant difference in reaction time: for McDonald's users the IAT effect was –62 ms; for Milk Bar users it was 113 ms; $t(37) = 2.29$, $p = .028$ (see Figure 2).

Among Milk Bar users comparison of reaction times for [–MB/McD+] (the task in which names of Milk Bar meals were paired with unpleasant words and McDonald's meals with pleasant words) with the reverse task [–McD/MB+] showed a significant difference ($RT[–MB/McD+] = 921$ ms; $RT[–McD/MB+] = 808$ ms; $t(18) = 2.06$, $p = .05$). Among McDonalds users, comparison of reaction times between these two tasks did not show a significant difference ($RT[–MB/McD+] = 863$ ms; $RT[–McD/MB+] = 925$ ms; $t(19) = -1.07$, $p = .30$), however the difference between means was in expected direction.

 FIGURE 2 ABOUT HERE

Correlation between explicit and implicit attitudes toward low and high calorie products

Similar to the first study, it was expected that a more positive explicit evaluation of either brand would coincide with a more positive implicit attitude toward that brand. In order to test this hypothesis, the correlation between the IAT effect and the explicit attitude and frequency of eating in each place was examined. Explicit attitude was computed from variables: liking, preference, and evaluations of each brand on five of the six dimensions (scores on the dimension “clean” were not correlated with the other five). The correlation analysis was carried out on these variables after transforming each to z-scores and averaging them. In case of all three variables (IAT, explicit attitude and frequency of eating) higher values indicate more favorable rating of Milk Bar. IAT was positively correlated with explicit attitude ($r = .54$; $p = .0004$) and frequency of eating in each place ($r = .47$; $p = .003$). Moreover, IAT correlated with observed behavior (place patronized when recruited for the study), $r = .35$; $p = .03$.

Discussion

Study 2 provides further confirmation that the IAT method can be used as a measure of implicit consumer attitudes. For the two types of fast food restaurants, implicit attitudes correlated with explicit attitude and choice of place to eat.

Analysis of implicit attitudes partially confirmed the hypothesis. The difference between the IAT effect in two groups was significant and the direction of this difference was consistent with the prediction (Figure 2). However, separate analysis within each consumer group found a

nearly significant difference from zero within the Milk Bar users group and a non-significant difference within the McDonald's users group.

Study 3

Studies 1 and 2 showed that the IAT method can be used as a measure of implicit attitudes toward brands. Their results also showed significant correlations between implicit attitudes measured by the IAT and evaluation of brands, as well as with declared (Study 1) and observed (Study 2) behavior. Study 3 was conducted to investigate the relation between implicit attitude toward brands and product differentiation. When consumers have a choice between two brands that are difficult to differentiate (e.g., two brands of coffee, beer, or detergents from the same price category), they may make choices based on their implicit brand attitudes (Batra, et al., 1996). However, some consumers can differentiate even very similar products, and their product choice may be based on more than brand image. The next study was conducted to investigate if implicit attitude toward brands are stronger for consumers who are capable of distinguishing perceptually between similar brands, operationalized as brand recognition in a blind product test.

Study 3 used two competing brands of soft drink that were difficult to differentiate in taste: Coca-Cola and Pepsi. The study was conducted among regular users of each of the two brands. Predictions were that: (a) Subjects will have explicit attitudes that are consistent with their brand preference; (b) implicit attitudes will be also consistent with brand preference; (c) positive implicit attitude toward a particular brand will be stronger among those who are able to differentiate this brand from a competitor than among those who are not able to differentiate it; and (d) explicit attitudes will correlate with implicit attitudes.

Method

Procedure

In a preliminary session subjects were asked if they have a preference for Coca-Cola or Pepsi, and how frequently during a week they drink it. Only those participants who indicated that (a) they have a clear preference for Coca-Cola or Pepsi and (b) who indicated that they drink their preferred beverage at least several times per week, were given a blind product test: they were given two unmarked cups, one of which contained Coca-Cola while the other contained Pepsi. They were encouraged to try, and to indicate which cup contained which product. This test allowed for a further division of the participants into those who were able to identify the products correctly, and those who were unable to do this.

In this manner four groups were created: (a) those who preferred Coca-Cola, and who were able to identify the product correctly, (b) prefer Coca-Cola but unable to identify, (c) prefer Pepsi and able to identify correctly, and (d) prefer Pepsi but unable to identify correctly.

Next, subjects completed a questionnaire about their explicit attitude towards the two brands. Finally, they completed an IAT for Coca-Cola versus Pepsi. Subjects completed the entire study individually.

Participants

Participants in the research were students from a Polish high school. A total of 103 participants were selected for the main study, divided into four groups: (a) those who preferred Coca-Cola, and who were able to identify the product correctly (27 subjects), (b) prefer Coca-Cola but unable to identify (25 subjects), (c) prefer Pepsi and able to identify correctly (25

subjects), and (d) prefer Pepsi but unable to identify correctly (26 subjects). A total of 57 females and 46 males participated; ages 16-19.

Materials

Explicit measures. Subjects completed a questionnaire about their explicit attitudes toward Coca-Cola and Pepsi. This questionnaire contained the following parts: Frequency of drinking, answered separately for Coca-Cola and Pepsi (5-point scale: 1= almost never, 5 = almost every day); Preference – 5-point scale to assess relative preference for the two beverages (1 = definitely prefer to drink Pepsi over Coca-Cola; 5 = definitely prefer to drink Coca-Cola over Pepsi); Liking – 10 cm scale representing intensity of liking (separately asked for Coca-Cola and Pepsi); Evaluation – six semantic differential items (scored from 1 to 5: not tasty/tasty; not healthy/healthy; not popular among peers/popular among peers; not fashionable /fashionable; not modern/modern; for older people/for younger people).

Implicit measures. Subjects completed an IAT that measured implicit attitudes toward the two brands. In the IAT sets of four graphic logo and brand-name stimuli were used to represent each brand. Stimuli used for each brand had similar form and size and were typical for the two brands. The list of Polish pleasant and unpleasant words and IAT task was the same as in the previous studies.

Results and Discussion

IAT data reduction

The same data reduction procedure was applied as in previous studies. The average error rate for this study was 5%. All analyses reported here include all 103 subjects.

Explicit attitudes toward Coca-Cola and Pepsi

Coca-Cola was generally perceived as more popular than Pepsi, but Pepsi was perceived as more modern than Coca-Cola. Separate analyses for Coca-Cola and Pepsi users revealed that users of each brand evaluated their preferred brand more positively than the other brand on most of the dimensions. Coca-Cola users perceived their brand significantly more positively than Pepsi users on four out of six semantic-differential dimensions (significant differences for all dimensions except modern and for younger people), and Pepsi users perceived their brand more positively on five dimensions out of six (significant differences for all dimensions except popular).

Implicit attitudes (IAT effect) toward Coca-Cola and Pepsi among those brands users

Comparison of the IAT effect (the difference in reaction time between [–C/P+] and [–P/C+] tasks) between those who drink Coca-Cola and those who drink Pepsi showed a significant difference: for Coca-Cola users it is $RT = 113$ ms; for Pepsi users this difference is -62 ms; $t(101) = 7.01$, $p = 10^{-10}$ (see Figure 3).

Also comparison of reaction times between the tasks done separately for the two groups of users showed significant differences. Among Coca-Cola users comparison of reaction time where Coca-Cola was paired with unpleasant words and Pepsi with pleasant [–C/P+] with the task where Pepsi stimuli were paired with unpleasant words and Coca-Cola with pleasant [–P/C+] was significant ($RT[–C/P+] = 832$ ms; $RT[–P/C+] = 719$ ms; $t(52) = 6.67$; $p = 10^{-8}$). Among Pepsi users, the same comparison also showed significant differences ($RT[–C/P+] = 754$ ms; $RT[–P/C+] = 816$ ms; $t(51) = -3.39$, $p = .001$).

FIGURE 3 ABOUT HERE

Implicit attitudes (IAT effect) toward Coca-Cola and Pepsi among those who recognize and do not recognize the taste of their own brand

A 2 x 2 (preferred brand x recognition) analysis of variance was conducted with the IAT effect as the dependent variable. Comparison of the reaction times shows a significant main effect of the preferred brand ($F(1, 102) = 49.00, p = 10^{-10}$), but no main effect for recognition ($F(1, 102) = 0.15, p = .70$), and no significant interaction effect ($F(1, 102) = 1.67, p = .20$). The prediction that the implicit attitude toward the favorite brand would be stronger among those who are able to differentiate tastes of two researched products than among those who are not able to differentiate tastes, was therefore not confirmed, even though the pattern of the results was consistent with the predictions (Coca-Cola users: correct recognition RTdif = 130 ms, $\underline{n} = 27$; incorrect recognition RTdif = 97 ms, $\underline{n} = 25$; Pepsi users: correct recognition RTdif = -84 ms, $\underline{n} = 25$; incorrect recognition RTdif = -41 ms, $\underline{n} = 26$ – higher values indicate stronger implicit preference for Coca-Cola).

Although the research participants were carefully selected, it was difficult to find persons who strongly preferred one brand over another. Therefore the relative distance between liking and drinking one or the other brand in most cases was not very large. Many subjects indicated that they liked one brand more than the other, while drinking both. As a consequence, subjects' attitudes toward the brands were probably not as distinctive as was expected before the study. In order to explore this line of reasoning, a second analysis was carried out with more rigorous selection of participants, involving only those subjects who had expressed extreme attitudes

toward the two researched brands. For this analysis subjects were selected based on the difference between their answers to two questions: (a) frequency of drinking Coca-Cola and (b) frequency of drinking Pepsi. Subjects were selected only if this difference was at least two points on the 5-point scale. In this manner 54 subjects were selected from the total of 103. The same 2 x 2 (preferred brand x recognition) analysis of variance was conducted for these subjects, with the IAT effect as the dependent variable. The following differences in reaction time of conducting two tasks were obtained in each group: (a) Coca-Cola users, correct recognition RTdif = 132 ms, $\bar{n} = 18$; (b) Coca-Cola users, incorrect recognition RTdif = 65 ms, $\bar{n} = 14$; (c) Pepsi users, correct recognition RTdif = -126 ms, $\bar{n} = 13$; (d) Pepsi users, incorrect recognition RTdif = -63 ms, $\bar{n} = 9$ (higher values indicate stronger implicit preference for Coca-Cola). Comparison of the reaction times showed a significant main effect for preferred brand ($F(1, 53) = 45.68, p = 10^{-8}$), a non-significant main effect for recognition ($F(1, 53) = 0.007, p = .94$) and a significant interaction effect ($F(1, 50) = 4.71, p = .03$) -- see Figure 4.

 FIGURE 4 ABOUT HERE

Correlation between explicit and implicit attitudes toward Coca-Cola and Pepsi

Similar to the previous studies, it was expected that a more positive implicit attitude toward a brand would correlate both with a more positive explicit attitude toward that brand and behavioral choice of the brand. In order to test this hypothesis, the correlation between the IAT effect and the explicit attitude and frequency of drinking of each brand was examined. The correlation analysis was carried out on these variables after standardizing the separate explicit attitude measures and averaging their z-scores. In case of all three variables (IAT, explicit

attitude and frequency of drinking) higher values indicate more favorable rating of Coca-Cola. IAT was positively correlated with explicit attitude ($r = .56$; $p = 10^{-9}$) and frequency of drinking the preferred brand ($r = .49$; $p = 10^{-7}$).

Discussion

The results of Study 3 again confirm that the IAT provides a valid measure of implicit attitudes toward brands. Those who preferred one soft-Drink brand over the other, and who drank it more often, had a more positive implicit attitude toward that brand.

The hypothesis that implicit attitude for a particular brand will be stronger among those who differentiate taste of this product from its competitor than among those who do not differentiate was confirmed partially. The first analysis done for all participants of the study did not yield a significant result. However, when selection criteria were more rigorous, results were significant and confirmed the hypothesis. Those who were able to differentiate the taste of their favorite product had a more positive implicit attitude toward this brand than those who could not differentiate the taste. Conduct of the test on the more restricted subsample is justified in part on the basis of the substantial error of measurement inherent in the taste recognition measure.

General Discussion

The present studies sought to validate the IAT as a measure of consumers' implicit brand attitudes. Results revealed a consistent pattern in which IAT effects were correlated with explicit attitudes (based on multiple dimensions of brand evaluation and brand preference) and behavior (declared and observed). In all three studies correlations were significant with r values of 0.5 or

above. These results indicated that preference and brand use are related to the strength of the automatic association of the brand with positive evaluation, as measured by the IAT.

An interesting result was the finding in Study 3, that people who correctly recognized their favorite brand in a blind product test, and people who could not recognize their favorite brand, both were found to have a significantly more positive implicit attitude toward their preferred brand (see Figure 4). This result suggests that the ability to differentiate one's preferred product from competitors is not a requirement for having an implicit attitude toward it; having a positive brand image is sufficient. However, the results obtained in the study suggest that correct product differentiation from the competition is related to stronger implicit attitudes.

With these consistent results, an important question concerns the relevance of implicit attitudes and the IAT for consumer and marketing research. For academic research the Implicit Association Test is valuable for the study of brand attitudes and the role of brand in consumer decisions. Because attitudes toward brands are not necessarily conscious, reliance on explicit measures is not sufficient. Especially in the case of ambivalent attitudes, the IAT can aid understanding the complexity of such attitudes. The IAT can also be useful for research into issues for which impression management concerns may make people reluctant to express their attitudes explicitly. Examples of such attitudes are those toward controversial ads, containing for example sex, nudity, or homosexual elements. A recent study (Brunel, Tietje, Collins & Greenwald, 2001) assessed explicit and implicit attitudes (measured using the IAT) toward ads using Black or White models. On explicit measures, all participants were equally positive to ads with White and Black persons, however implicit measures showed preference for ads depicting a White model. Another possible use of the IAT in consumer context is proposed in Unified Brand Theory (Tietje, Brunel, & Greenwald, 2001). The authors propose to use the IAT for diagnosing

brand identification, which is understood as a consequence of the links between brand and self on the one hand, and between self and positive valence on the other hand. The authors suggest that such brand identification, measurable with the IAT, will in some circumstances be a better predictor of brand usage than traditional explicit measures.

In a modified version, the IAT could also be used in research on brand image and brand personality. Current practice is to study these issues in focus group research, using different types of projective techniques (e.g., personification, animalization, planet, etc.). Such techniques are problematic because of subjectivity of interpretation and (in most cases) the lack of standardization of procedures and materials used as stimuli. By contrast, the IAT offers a standardized procedure that yields a quantitative measure.

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Footnotes

(1) All studies presented in this article used positive and negative words to represent the attribute dimension of evaluation. However the IAT method is not limited to assessing associations with evaluation. (see Greenwald & Nosek, 2001).

(2) Milk Bar (Bar Mleczny) is a Polish type of fast food restaurant. It is typically considered to be a place to eat very inexpensively, with a reasonable food quality. (The name is misleading, because the food is not exclusively milk based.) Milk Bars are not chain restaurants. The name functions more as a generic name than a brand name. However, these restaurants are easily identifiable as a category. It was not possible to use another more similar category to McDonald's, because another fast-food restaurant chain which is as easily recognized and as widely present did not exist in Poland at the time of the experiment.

(3) "Danone" is the European spelling of the yogurt brand known in the US as "Danon". Bakoma is a local Polish brand; however a majority of Poles perceive this brand as an international one. At the time of conducting these studies, these two brands were the two market leaders in Poland.

(4) Following suggestions of authors of the IAT method (Greenwald, et al., 1998), all statistical analyses were done on log transformed latencies. However, all figures and reaction time data are presented in millisecond units (before log transformation).

Figure 1. IAT task (categorization with unpleasant vs. pleasant words) in two groups of participants: Danone users ($n = 18$) and Bakoma users ($n = 16$) – Study 1.

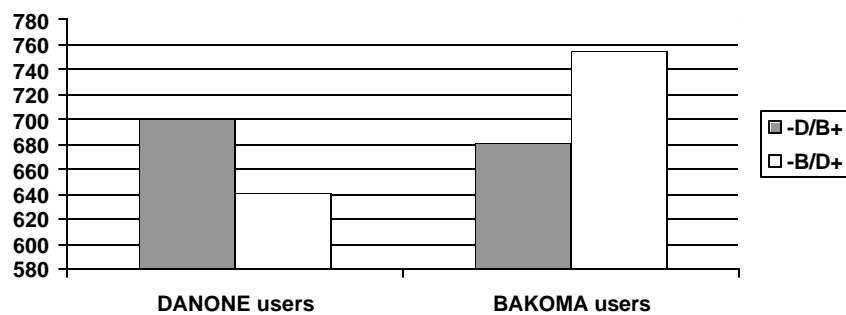


Figure 2. IAT task (categorization with unpleasant vs. pleasant words) in two groups of participants: those who eat in McDonald's ($n = 20$) and those who eat in Milk Bar ($n = 19$) – Study 2.

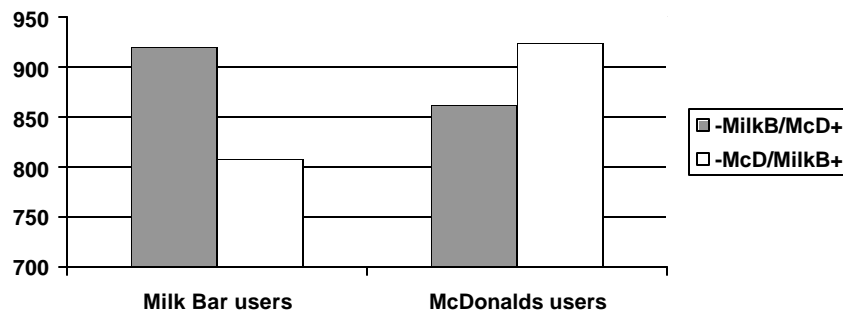


Figure 3. IAT task (categorization with unpleasant vs. pleasant words) in two groups of participants: Coca-Cola users ($n = 52$) and Pepsi users ($n = 51$) – Study 3.

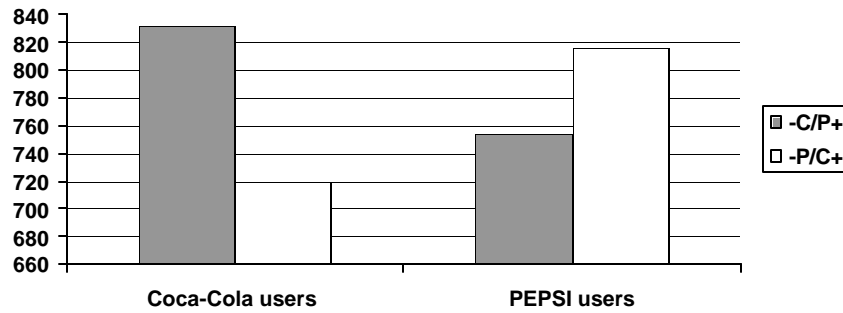
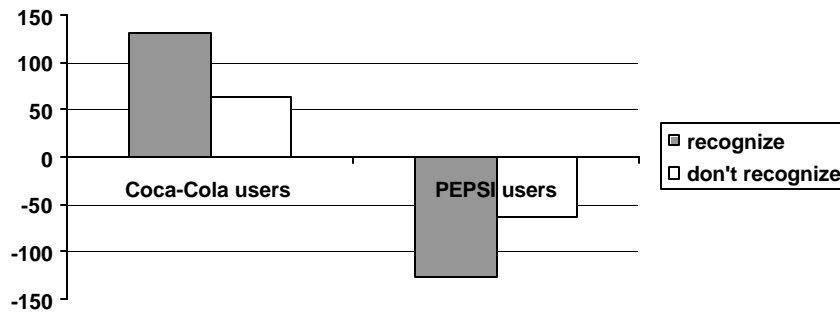


Figure 4. IAT effect in Coca-Cola and Pepsi users who differentiate and do not differentiate taste of their brand - Study 3.



Main effect “users” $F(1, 53) = 45.68, p = 10^{-8}$

Main effect “recognition” $F(1, 53) = 0.007, p = .94$

Interaction effect $F(1, 53) = 4.71, p = .03$