

Making the Private Public, Accessing the Inaccessible: Marketing Applications of the Implicit Association Test

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Abstract

This article argues that explicit and traditional, implicit measures of attitude are either too sensitive to image management, not sensitive enough to individual differences, or don't address accessibility issues satisfactorily. An alternative: the Implicit Association Test (IAT) is proposed. Following a description of the test, an empirical illustration is presented. Results show that the IAT is a valid instrument to measure implicit brand attitudes, and brands' relationships to self. Explicit and IAT measures converged with respect to brand attitudes. However, the IAT revealed differences in brand-self relationships that explicit measures did not. A discussion of the findings, limitations and future marketing applications of the IAT are provided.

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Attitude is a central construct in much of social psychology, consumer behavior and marketing research in general. Theories of attitude formation and change (e.g., Fishbein 1963; Petty and Caccioppo 1986) and the attitude and behavior relationship (e.g., Ajzen and Fishbein 1980; LaPierre 1934) have been developed and tested to understand attitude antecedents and consequences. Yet, because attitude is “a psychological tendency that is expressed by evaluating a particular entity with some degree of favor or disfavor” (Eagly and Chaiken 1993, p. 1), it cannot be measured directly. Since “valid measurement is the *sine qua non* of science” (Peter 1979, p. 6), any conclusions about attitude processes depend on accurate measures. Further, despite the development of numerous explicit and implicit measures of attitude, measurement limitations still remain. For instance, explicit self-report measures may not be accurate indicators since people may be unable or unwilling to share their attitudes with a researcher (Dovidio and Fazio 1992; Gaertner and Dovidio 1986; Haire 1950). Also, because implicit attitudes¹ often differ from explicit attitudes, explicit measures are necessarily inappropriate. Moreover, implicit or indirect measures (e.g., projective measures, semantic priming) pose other obstacles including interpretation difficulty, researcher bias, and problems identifying individual differences.

This article reviews and evaluates existing explicit and implicit measures of attitudes and identifies associated shortcomings. An alternative attitude measure, the Implicit Association Test (IAT; Greenwald, McGhee and Schwartz 1998) is proposed along with a detailed description of the test and its merits. An illustrative empirical example of the IAT in a brand evaluation context

¹ “*Implicit attitudes* are introspectively unidentified (or inaccurately identified) traces of past experience that mediate favorable or unfavorable feeling, thought, or action toward social objects” (Greenwald and Banaji 1995, p. 8).

is presented. Finally, the implications and limitations of using the IAT in future research are discussed and potential marketing applications are identified.

EXISTING EXPLICIT AND IMPLICIT MEASURES

Explicit Measures of Attitude

Most explicit/indirect measures of attitude involve the use of Likert or semantic differential scales. These measures reference a target object in the subject's personal history (Jacoby, Lindsay and Toth 1992). Thus, explicit measures must necessarily assume that the subject has (1) formed an attitude, (2) is aware of (i.e., has access to) his or her attitude and (3) is willing to accurately share it with the researcher. For many reasons, it may be a tenuous assumption that all three conditions can be met in a given situation (Jacoby et al. 1992).

An individual who has never heard of a topic is unlikely/unable to have formed a prior attitude. However, to avoid appearing ignorant, many people will still answer the question (Hawkins and Coney 1981). In other cases, previously formed attitudes may not be easily accessible to the individual (Fazio 1986; Fazio et al. 1986). Thus, although they have an opinion, they report a newly created one. In addition, even if subjects can identify the prior experience, they may be unaware of its influence on attitude and, hence providing inaccurate reports (Greenwald and Banaji 1995). Finally, while subjects may have access to their attitudes they still may distort their answers for social-desirability or image management reasons.

Distortions are especially likely when an accurate response is seen as either violating social norms such as politeness or prejudice (Demo 1985; Dovidio and Fazio 1992) or would jeopardize the subject's self-image (Dovidio and Fazio 1992; Gaertner and Dovidio 1986; Sirgy 1982). Cliches, distortions and inhibited answers are to be expected if questions challenge a person's self-concept (Haire 1950). For example, after *Light* beer was positioned as the refined

and discriminating choice, a survey of beer drinkers showed that they drank three times as much *Light* (vs. *Regular*) beer. The brewery on the other hand reported that it produced and sold nine times as much *Regular* beer (Haire 1950)!

Speaking of stereotypes, but generalizable to other explicit measures, Banaji and Greenwald state that “contemporary measures ... continue to place the target of evaluation (a group or a group member) at the conscious focus of the respondent’s attention” (1994, p. 59). In other words, respondents are asked to explicitly recall and report an attitude even though doing so may force them, because of inaccessibility or unwillingness, to report it inaccurately. Thus, the validity and usefulness of explicit attitude measures must be questioned. In addition, because these measures are subject to both conscious and unconscious distortions, it should come as no surprise that explicit and implicit measures do not always converge (Banaji and Hardin 1996; Devine 1989; Greenwald et al. 1998).

The “randomized response method” (Warner 1965, 1971) is a measure which mitigates response bias through a modicum of disguise. Based on the outcome of a coin toss, subjects answer a yes/no question on either a sensitive (e.g., “Do you use illegal drugs?”) or mundane topic (e.g., “Were you born in March?”). Post hoc, the researcher can estimate the percentage of respondents who answered “yes” to the sensitive question with a few calculations (Dalton and Metzger 1992). Since respondents do not reveal the coin flip outcome, social desirability bias is reduced. However, this method still assumes that attitudes are accessible and that self-image management is not an issue. Overall, none of the measures reviewed here guarantee that responses will be free of bias or can provide detailed data for each individual.

Implicit Measures of Attitude

Implicit/indirect attitude measures were developed to measure *implicit attitudes* (as defined by Greenwald and Banaji 1995), that would not necessarily be detected up by explicit measures. These measures make no reference to objects in a subject's personal history. Instead, they focus a subject's attention on performing some task that can indirectly reveal the underlying attitude such that inaccessible and closely held attitudes can be measured.

Generally, implicit measures can be categorized as either *disguised-unstructured* or *disguised-structured* (Campbell 1950). They are disguised because subjects are aware they are participating in a study and yet unaware of what is truly assessed. Response alternatives can range from open/unstructured to a few structured alternatives (Lemon 1973).

Unstructured Implicit Measures

Projective measures are unstructured measures that ask subjects to react to a deliberately ambiguous stimulus. In the process of completing the task, subjects project parts of themselves (in the form of attitudes, prejudices, fears, etc.) which can then be interpreted. For example, Haire's shopping study (1950) was one of the first widely reported projective measures in marketing. Haire asked females to describe "the woman" who had developed a shopping list that included either Nescafe instant or Maxwell House drip coffee (otherwise, the lists were identical). Nearly half of the subjects described the Nescafe purchaser as "lazy" and a "poor planner"- attitudes they were loathe to admit directly (Haire 1950).

Sentence or word completion and word association tests are also used frequently. They are more structured than projective techniques because the stimulus is less ambiguous and the response options more focused. In a word association task, subjects respond to words with the first word that comes to mind. In completion tasks, subjects are provided with the first few words

or letters and, as suggested by the name, they complete the sentence or word. In these measures, only a few responses are analyzed, since target measures are hidden amongst a much larger set. Further, it is burdensome to create sentence/word completion or word association measures that gather the information of interest while truly disguising the study purpose.

In sum, even if an unstructured measure has face validity, the analysis process can create errors in the conclusion. These errors stem from difficulties in coding and interpretation of qualitative data (Churchill 1995). Thus, although unstructured measures can be valuable, their use should be discouraged in causal designs.

Structured Implicit Measures

By limiting response options, structured measures gain a degree of objectivity and avoid most interpretation problems. With these measures, a subject's attention is focused on the completion of a task with defined or undefined success criteria. For example, grouping pictures, words or objects based on subjects' evaluation of the stimuli is a structured task with no *right* answer. Yet, grouping pictures has demonstrated convergent validity with explicit measures, although concealing the research goals is difficult (Lemon 1973).

An information test is another type of structured implicit measure. It determines a subject's knowledge of a topic and has clearly defined success criteria – the answers are either correct or not. Since a subject's attitude toward a topic should systematically guide the selection and retention of knowledge, this test provides an implicit measure of that attitude (Campbell, 1950; Churchill 1995). Information tests are robust to social desirability if the purpose is sufficiently disguised (Lemon 1973) but may be confounded by need for cognition (Hautvedt, Petty and Caccioppo 1992). Other measures with defined success criteria and robustness to social desirability ask subjects to estimate a group's opinion or identify the social norms of an event.

However, neither judgment provides any information about the automaticity of attitude activation (Dovidio and Fazio 1992). The stronger the associative network around an attitude object, the more automatically the attitude will be activated, even if the attitude is weak (Bargh 1989) or not consciously held (Fazio 1986, Fazio et al., 1986).

Priming, at either a subliminal or conscious level, can implicitly assess both attitude and strength of the automatic activation effect (Dovidio and Fazio 1992; Fazio et al., 1986; Greenwald, Klinger and Liu 1989). A priming effect exists if a subject's ability to process a stimulus is enhanced by the previous presentation of a related or associated stimulus. "What matters more than whether one is aware of a stimulus event is whether one is aware of the potential influence of that event on subsequent experience and judgements" (Bargh 1994, p. 15). Thus, as long as the relationship between the prime and the target is concealed, the indirect effects of the primed stimuli can be detected. Priming is very flexible as it can use verbal or non-verbal (e.g., pictures, shapes, faces) stimuli (Tulving and Schacter 1990), and is robust to social desirability, self-image and accessibility problems. Past research has included: the effect of television programming on perceptions of social reality (Shrum, Wyer and O'Guinn 1998), contextual effects on print (Yi 1993) and television advertising (Schmitt 1994), racial attitudes and prejudice (Kawakami, Dion and Dovidio 1998; Devine 1989), attribute valence (Bargh et al. 1992) and ageism (Perdue & Gurtman 1990).

Semantic priming (where subjects classify the meaning of target words) measures response latency to assess attitude automatic activation. Although subjects are instructed to ignore the prime word preceding a target word, when prime and target are semantically similar, categorization judgements of the target words are faster (Meyer and Schvaneveldt 1971). While response latency data "provide reliable and valid indications of associative strength in memory"

(Fazio 1990, p. 95), there has been evidence that priming measures may not be sensitive enough to highlight individual differences (Bargh et al. 1992; Chaiken and Bargh 1993).

Shortcomings of Existing Measures

Several shortcomings have been identified. First, explicit measures can only identify attitudes that a subject is able and willing to share. Second, projective, completion and association measures are subject to interpretation errors and could be identified by subjects, thereby becoming *de facto* explicit measures. Third, information tests may be confounded by need for cognition and neither these nor opinion estimation/norm identification can determine the level of automatic activation. Fourth, even though priming solves the weaknesses of explicit measures and can gauge the activation level of automatic attitudes, it may not be sensitive enough in all cases. Overall, this discussion of existing measures of attitude has highlighted that a desirable measure should be sensitive to individual differences and robust to image management and attitude accessibility issues. The Implicit Association Test (Greenwald et al. 1998) has been developed to address these concerns and requirements.

IMPLICIT ASSOCIATION TEST

This section provides an overview of the Implicit Association Test (for a detailed description, refer to Greenwald et al. 1998). The IAT measures the ease or difficulty with which a subject associates a *target-concept* (target) with an *attribute dimension* (attribute) (Greenwald et al. 1998). Targets (i.e., attitude objects) can be presented as words, pictures, colors, logos or icons. Attributes are presented as oppositely valenced descriptors of a category (i.e., pleasant-unpleasant, self-other). In a series of five steps, using only two response keys, subjects categorize and re-categorize targets and attributes separately and in combination. The alternating presentation of the combined stimuli permits the measurement of the level of association

between targets and attributes. The *IAT effect* measures the mean differential response latency between the two types of stimulus pairings. In the combination tasks, subjects map responses from four stimuli onto only two response keys. When targets and attributes are easily associated (compatible), mean response latency should be smaller (i.e., processing will be faster). The more (less) a subject associates a target with an attribute, the smaller (larger) the latency, indicating a more positive (negative) attitude toward the target.

For example, Greenwald et al. (1998) used *flowers* and *insects* as targets and the attributes are *pleasant* or *unpleasant* words. In the first step (see Figure 1) subjects identify target names as either a flower or an insect using response keys assigned to the left and right hand, respectively. In step 2, attributes (pre-tested words) are categorized in the same way with response keys now representing pleasant (left) and unpleasant (right). Once the targets and attributes are individually introduced and categorized, the third step involves a combination of the two dimensions, alternating targets and attributes. Each response key is used to represent a categorization of both targets and attributes. In this example, the left response key represents both “flower” and “pleasant” and the right key represents both “insect” and “unpleasant.” Next, the response keys assigned to each target (attribute) is reversed, and subjects re-categorize targets (attributes) with the new assignment. In the final step, using the *new* target (attribute) and the *original* attribute (target) response key assignments, subjects re-categorize the combined stimuli.

If target categories are differentially associated with the attribute dimension, subjects should find one combination task (either the third or fifth step) considerably easier than the other. The measure of this difficulty (as represented by differences in mean response latency) provides an implicit measure of attitude differences between the target categories. Faster performance (i.e., a smaller mean latency) combining “flower” and “pleasant” words (as compared to “insect”

and “pleasant”) is an indication that the individual has a stronger association and thus, a more positive attitude toward flower than insect.

FIGURE 1
SCHEMATIC DESCRIPTION OF THE IMPLICIT ATTITUDE TEST (IAT)

Sequence	1	2	3	4	5
Task description	Initial target-concept discrimination	Associated attribute discrimination	Initial combined task	Reversed target-concept discrimination	Reversed combined task
Task instructions	<ul style="list-style-type: none"> • FLOWER INSECT • 	<ul style="list-style-type: none"> • pleasant unpleasant • 	<ul style="list-style-type: none"> • FLOWER • pleasant INSECT • unpleasant • 	<ul style="list-style-type: none"> • FLOWER INSECT • 	<ul style="list-style-type: none"> • FLOWER • pleasant • INSECT unpleasant •
Sample stimuli	<ul style="list-style-type: none"> ○ FLEA ○ ASTER ○ LILAC ○ WEEVIL ○ VIOLET ○ BEETLE ○ MOTH ○ CROCUS 	<ul style="list-style-type: none"> ○ lucky ○ honor ○ poison ○ grief ○ gift ○ disaster ○ happy ○ hatred 	<ul style="list-style-type: none"> ○ ROSE ○ pleasure ○ CRICKET ○ evil ○ SPIDER ○ miracle ○ DAISY ○ bomb 	<ul style="list-style-type: none"> ○ ROACH ○ HORSEFLY ○ ORCHID ○ BEDBUG ○ ZINNIA ○ GLADIOLA ○ LOCUST ○ TULIP 	<ul style="list-style-type: none"> ○ peace ○ PEONY ○ filth ○ HORNET ○ rainbow ○ LILY ○ accident ○ MAGGOT

Categories for each of the target-concept and attribute discriminations are assigned to a left or right response, indicated by the black circles (third row). The open circles (fourth row) indicate correct responses for each step. (Adapted from Greenwald, McGhee and Schwartz 1998)

The IAT effect is calculated as the difference in mean latency between the compatible and incompatible association tasks. Raw latency data can be log-transformed for stabilization. For a detailed description of the treatment of outliers, effect sizes and order effects, refer to Greenwald et al. (1998). The test typically includes trial blocks and initial key assignment (right/left) is counterbalanced across subjects.

Validation

The IAT shows evidence of high construct and nomological validity. In each of the reported experiments the IAT effect was in agreement with theoretically predicted outcomes (Greenwald et al. 1998). Based on a comparison of effect sizes, the IAT shows approximately

twice the sensitivity of past semantic priming studies (Bargh et al. 1992; Fazio et al. 1986; Greenwald et al. 1989). Further, IAT permits the measurement of attitudes that subjects deny holding. Correlation between the IAT and several explicit measures (e.g., feeling thermometer, semantic differential and other scales) was generally weak, thereby supporting that the IAT is robust to image management attempts. Overall, the high construct and nomological validity of the IAT provide theoretically grounded measurements of attitude. As a result, the IAT would be a valuable measurement tool in marketing applications.

A MARKETING APPLICATION




This study was designed to investigate consumers' perceptions of brands and the degree to which some brands are part of consumers' identities. That possessions and brands are part of one's extended self is not novel (Belk 1988; Fournier 1998), but, as we discussed earlier, measurements associated with "the self" can be problematic if only explicit measures are used. We did not expect significant differences between explicit and implicit attitudes, since subjects should know their attitudes and lack motivation to disguise them as computers are not considered a sensitive topic. Computer platforms, more specifically Macintosh by Apple (Mac) and PC (Microsoft Windows-based) machines, were chosen as the focal targets for this study of implicit attitudes and implicit brand-self concepts.

Procedure and Design

Fifty-six introductory psychology students at a large North American university participated on a voluntary basis for extra course credit. First, participants completed a 3-page survey containing explicit measures of Mac versus PC attitudes, computer ownership, and usage frequency. Then, a combined IAT, assessing implicit brand attitude and brand-self concept, was administered via a personal computer. Subjects were randomly assigned to one of eight

counterbalanced task orders. The IAT consisted of 13 blocks with 32 (practice) to 40 (measured) trials each. In addition to trial, block, and stimuli information (see Figure 2), subjects' response latencies (in milliseconds) and error rates were recorded.

FIGURE 2
STIMULI USED TO MEASURE IMPLICIT BRAND ATTITUDE AND BRAND-SELF CONCEPT

<i>Category</i>	Mac	PC	Brand Attitude		Brand-Self Concept	
			Pleasant	Unpleasant	Self	Other
<i>Stimuli</i>	Macintosh Apple 	IBM PC Windows  	Honor Lucky Diamond Loyal Freedom Love	Evil Cancer Sickness Disaster Poverty Vomit	Me Mine My Self	Other They Theirs Them

Measures

Mac versus PC “loyalists” were identified based on self-reported attitudes, ownership, and usage frequency. Attitudes toward Mac and PC were measured with a 5-item semantic differential scale, anchored by *good-bad*, *pleasant-unpleasant*, *inferior-superior*, *unsatisfactory-satisfactory*, and *favorable-unfavorable* ($\alpha = .90$ for both Mac and PC scales). Two ownership measures (Mac and PC) asked subjects to indicate how many computers of each type they owned. For each brand, usage frequency was measured with semantic differential scales anchored by *not at all*–*very frequently*. Explicit measures of brand loyalty, computer knowledge and familiarity, and attitudes towards twelve specific brands of computers were also captured, but are not used in this analysis.

Subjects' mean attitudes toward PC were subtracted from their mean attitudes towards Mac computers to generate a difference score representing their relative explicit attitude. These difference scores were dummy coded. Subjects who were assigned a 1 had relatively pro-Mac explicit attitudes while a 0 indicated pro-PC or indifferent attitudes. Similar variables were

created based computer ownership and usage frequency. The IAT effect was operationalized as the difference in response latencies when the target category shared the same response key as the attribute (unpleasant v. pleasant; self v. other). Thus, a pro-Mac implicit attitude effect occurred when a subject was quicker to categorize a stimulus when Mac and pleasant shared the same response key compared to when Mac and unpleasant shared the same key. A self-Mac implicit brand-self concept effect occurred when a subject was quicker to categorize Mac and self together compared to Mac and other.

Results

All explicit measures of attitudes, ownership and usage frequency were significantly correlated with each other, within and across brands, with one exception (explicit PC and explicit Mac attitudes, $r = -.212$, $p = .061$; which is directionally as anticipated) (see Table 1).

Differences in mean response latencies provided the implicit (IAT) attitude score (the higher the score, the more favorable one was toward Mac; the lower the score, the more favorable toward PC). The same operationalization was used for the implicit (IAT) brand-self concept.

TABLE 1
CORRELATION TABLE

<i>Pearson Correlation</i>	IAT Attitude	IAT Brand-Self	Explicit PC Attitude	Explicit Mac Attitude	Explicit own PC	Explicit own Mac	Explicit use PC
IAT Brand-Self	.542*** (n=63)						
Explicit PC Attitude	-.357** (n=54)	N.S.					
Explicit Mac Attitude	.414** (n=54)	N.S.	N.S.				
Explicit own PC	-.401** (n=54)	-.340* (n=54)	.358** (n=79)	-.300** (n=79)			
Explicit own Mac	.385** (n=54)	.356** (n=54)	-.398*** (n=79)	.575*** (n=79)	-.426*** (n=79)		
Explicit use PC	-.666*** (n=54)	-.525*** (n=54)	.518*** (n=76)	-.489*** (n=76)	.592*** (n=76)	-.604*** (n=76)	
Explicit use Mac	.578*** (n=50)	.464** (n=50)	-.319** (n=75)	.627*** (n=75)	-.398*** (n=75)	.594*** (n=75)	-.607*** (n=72)

* $p < .05$

** $p < .01$

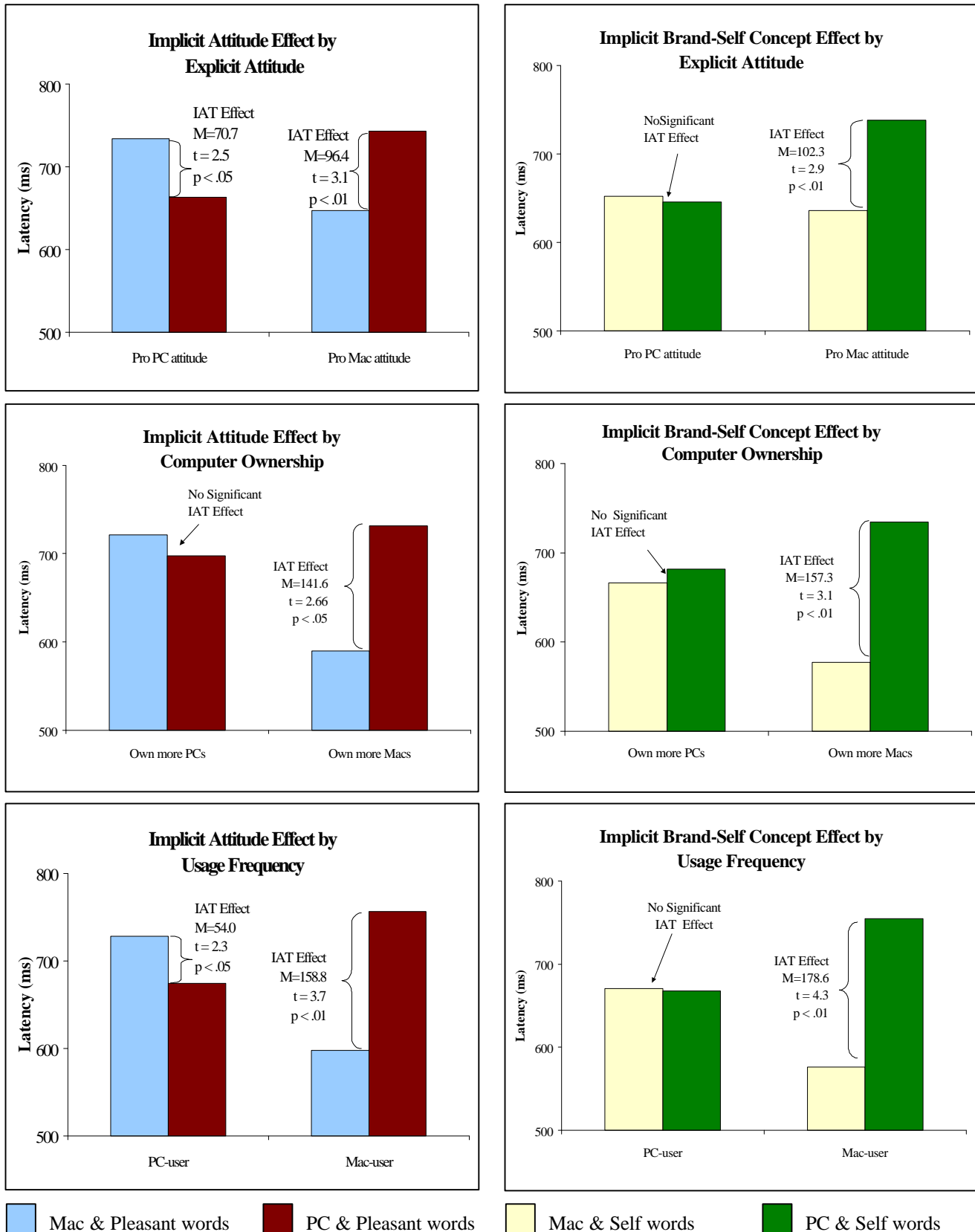
*** $p < .001$

Analyses revealed that the implicit attitudes were correlated with all other measures in the predicted direction. However no significant correlation effects were found between implicit brand-self concept and overall explicit attitude toward Mac or PC.

In order to probe further the relative relationships between the explicit and implicit measures, an analysis of implicit attitude and implicit brand self was done for the pro-Mac/pro-PC, own-more-Mac/own-more-PC, and use-Mac/use-PC groups (see Figure 3). A significant implicit attitude effect was obtained across all three categorizations. With one exception (PC ownership), subjects who explicitly reported more favorable explicit attitudes, greater ownership or usage frequencies for a target had significantly faster response latencies when pleasant shared the same key with the target as opposed to when unpleasant shared it, thereby indicating favorable implicit attitudes consistent with the explicit ones. Subjects who owned mainly PCs (v. Mac) did not exhibit a significant implicit attitude effect. Further, a comparison of implicit attitude effects for PC versus Mac loyalists yielded stronger implicit attitude effects for the Mac group ($p < .01$ in all three comparisons), indicating that attitude strength and accessibility are different across the two groups of loyal consumers.

In contrast, a significant implicit brand-self concept effect was obtained across the three categorization schemes only for the Mac loyalists ($p < .01$ in each case, see Figure 3). Subjects who explicitly reported more favorable explicit attitudes, greater ownership or usage frequencies for Mac had significantly faster response latencies when Mac and self were combined as opposed to Mac and other. Conversely, PC loyalists had no statistically different response latencies when PC and other were combined as opposed to PC and self ($p > .10$). This result suggests that being a “Mac person” is related to one’s identity. PC loyalists on the other hand do not seem to hold such identity defining attitudes.

FIGURE 3
IMPLICIT ATTITUDE AND IMPLICIT BRAND-SELF CONCEPT RESULTS



Discussion

This study demonstrates the validity of the IAT as an instrument for measuring implicit brand attitudes and brand-self concepts. Firstly, the IAT permits us to compare the relative strength of the attitudes held by both groups of loyal consumers, in a bias-free manner. While explicit measures suggested that both groups were loyal to their favorite computer platform, the analysis of the implicit measures showed finer and different gradations of loyalty. Secondly, the measurement benefits of the IAT are even more compelling with respect to the brand-self concept. Using Fournier's terminology (1998), the IAT results showed that Mac loyalists have a strong *self-connection* to the brand, thereby suggesting that the Mac *brand relationship quality* is superior to the PC one. This strong Mac relationship to the self might stem from the resistance/loyalty that Mac users have developed after years of being a minority in the computing world (Macintosh currently holds a 5% share of all desktop computer sales (Hamilton 1999)). The IAT results also confirm that brands "serve as powerful repositories of meaning purposively and differently employed in the substantiation, creation, and (re)production of concepts of self in the marketing age" (Fournier 1998, p. 365).

IMPLICATIONS AND FUTURE DIRECTIONS

As discussed, explicit measures of attitude assume subjects are willing and able to report attitudes and understand the influence of prior events on the knowledge structures supporting these attitudes. Traditional implicit measures, which focus subjects' attention on a task, are robust to accessibility and image management issues, but have other weaknesses. Information tests, estimation of group opinion, and identification of social norms cannot capture the automatic activation level of an attitude, while semantic priming may not be sensitive to individual differences. The IAT, on the other hand, is sensitive to individual differences and can

capture the automatic activation level of an attitude in many situations (Greenwald et al. 1998). In addition to words, pictures, colors, logos, and icons can serve as stimuli. For instance, the present marketing application of the IAT successfully used text and graphic elements (logos) for stimulus. Further, the insights and bias-free measures obtained here showed that the IAT is an attractive measure for marketing and consumer behavior researchers and professionals. While potential applications are numerous, a few limitations should nonetheless be addressed.

Limitations

As with any method, there are some limitations associated with the IAT. First, the question of whether to obtain explicit measures prior or subsequent to the IAT remains. If they are administered prior to the IAT, they may sensitize or prime subjects to the IAT stimuli (Fazio, 1990). It is also possible that, having just completed the IAT, subjects would try harder to manage their self-presentation on explicit measures than they otherwise might have. However, since IAT effects are generally much larger than either explicit attitudes or semantic priming latencies, this possibility is of lesser concern and consistent with recent results (Greenwald et al. 1998). Also, as the IAT becomes more common, explicit measures may serve simply as an indication of attitude accessibility and sensitivity. Second, initial evaluations of the IAT have used targets that were clearly associated with generally well-known categories. Yet, the IAT effect is not believed to be an artifact of prior exposure (Ottaway, Hayen and Oakes 1999). For example, the words used to describe the negative category of insects are more frequently used in English than those used to describe the positive category of flowers (Greenwald et al. 1998). If the IAT effect were simply an artifact, insects would have been more favorably evaluated. Third, because it is a computer-based test, the IAT requires investments in hardware, software and lab space. While this limits the use of the measure in the field, and requires larger resource

commitments than paper and pencil tasks, researchers should not overlook the added value of such a test.

Future Directions

In addition to the brand attitude and brand-self contexts illustrated here, the following topics constitute opportunities for the future application of the IAT in marketing. This list is meant to serve as an illustration of the broad potential of the IAT and stimulate thoughts and discussion in consumer research. As such, it is not meant as an exhaustive account nor in any way should it frame or limit future research.

A first area could be the study of spokespersons. Consumers' evaluation of a (potential) company spokesperson may not reflect "politically incorrect" attitudes because subjects were unwilling to voice a negative attitude. In this way, stereotypes, including the race, gender, age, religion, income level, speech patterns and sexual preference of the spokesperson may remain unidentified, but later might effect consumer behavior. For example, if a spokesperson is highly identified with a brand, negative attitudes toward the person may be imposed on the brand or product. Because subjects may be aware but embarrassed or just unaware of their prejudice, explicit measures are unlikely to capture this important information. There are also public policy implications for these findings. While explicit measures might not detect some levels of prejudice, the IAT could.

Second, research demonstrates that when consumers are encouraged to relate a marketing message or brand information to themselves (self-referencing), more favorable brand evaluations, information retention and recall are obtained (Burnkrant and Unnava 1989). Although explicit or other implicit measures can measure recall, the IAT may also identify the

extent to which the advertising message shaped consumers' attitudes, even though they often deny such influences in explicit measures (Braun and Zaltman 1998).

Third, the IAT may provide unique and important information on several topics in brand management. Consumers' associative brand networks may include nodes that a consumer either can't or won't report but may surface through the IAT. The IAT might identify and measure the link between cognition and valence of an attitude as well as an understanding of the formation and strength of brand attitude, image, and personality. Further, since a successful brand extension or brand alliance would share at least some of the traits associated with the core brand (Simonin and Ruth 1998), the IAT may expand our understanding of this transfer process.

Finally, the IAT may provide valuable information in the product design process more efficiently than conjoint analysis. The effect of product aesthetics, such as color and shape, on consumers' perception and evaluation of the product might also be investigated with the IAT.

Besides these applications, readers should evaluate how the IAT might apply to their own research agenda, as we believe that our list is only the tip of the marketing and consumer behavior research opportunities this test can provide.

REFERENCES

- Ajzen, Icek and Martin Fishbein (1980), Understanding Attitudes and Predicting Social Behavior, Englewood Cliffs, NJ: Prentice-Hall.
- Banaji, Mahzarin R. and Anthony G. Greenwald (1994), "Implicit Stereotyping and Prejudice," in The Psychology of Prejudice: The Ontario Symposium, Volume 7, ed. Mark P. Zanna and James M. Olson, Hillsdale, NJ: Erlbaum, 55-76.
- and Curtis D. Hardin (1996), "Automatic Stereotyping," Psychological Science, 7 (May), 136-141.
- Bargh, John A. (1989), "Conditional Automaticity: Varieties of Automatic Influence in Social Perception and Cognition," in Unintended Thought, ed. James S. Uleman and John A. Bargh, New York: Guilford Press, 3-51.
- (1994), "The Four Horsemen of Automaticity: Awareness, Intention, Efficiency and Control in Social Cognition," in Handbook of Social Cognition 2nd ed., Vol. 1, ed. Robert S. Wyer, Jr., & Thomas K. Srull, Hillsdale, NJ: Erlbaum, 1-40.
- , Shelly Chaiken, Rajen Govender, and Felicia Pratto (1992), "The Generality of the Automatic Attitude Activation Effect," Journal of Personality and Social Psychology, 62 (June), 893-912.
- Belk, Russell W. (1988), "Possessions and the Extended Self," Journal of Consumer Research, 15 (September), 139-168.
- Braun, Kathryn A. and Gerald Zaltman (1998), "Backward Framing Through Memory Reconstruction," Working Paper No. 98-109, Marketing Science Institute, Cambridge, MA.
- Burnkrant, Robert E. and H. Rao Unnava (1989), "Self-Referencing: A Strategy for Increasing Processing of Message Content," Personality and Social Psychology Bulletin, 15 (December), 628-638.
- Campbell, Donald T. (1950), "The Indirect Assessment of Social Attitudes," Psychological Bulletin, 47, 15-38.
- Chaiken, Shelly and John A. Bargh (1993), "Occurrence Versus Moderation of the Automatic Attitude Activation Effect: Reply to Fazio," Journal of Personality and Social Psychology, 64 (May), 759-765.
- Churchill, Gilbert A. (1995), Marketing Research: Methodological Foundations (6th edition), Fort Worth, TX: Dryden Press.
- Dalton, Dan R. and Michael B. Metzger (1992), "Towards Candor, Cooperation and Privacy in Applied Business Ethics Research: The Randomized Response Technique," Business Ethics Quarterly, 2 (April), 207-221.
- Demo, David (1985), "The Measurement of Self-Esteem: Refining Our Methods," Journal of Personality and Social Psychology, 48 (June), 1490-1502.
- Devine, Patricia G. (1989), "Stereotypes and Prejudice: Their Automatic and Controlled Components," Journal of Personality and Social Psychology, 56 (January), 5-18.

- Dovidio, John F. and Russell H. Fazio (1992), "New Technologies for the Direct and Indirect Assessment of Attitudes," in Questions About Questions: Inquiries into the Cognitive Bases of Surveys, ed. Judith M. Tanur, New York: Sage, 204-237.
- Eagly, Alice H. and Shelly Chaiken (1993), The Psychology of Attitudes, Fort Worth, TX: Harcourt Brace.
- Fazio Russell H. (1986), "How Do Attitudes Guide Behavior?" in Handbook of Motivation and Cognition: Foundations of Social Behavior, ed. Richard M. Sorrentino and E. Tory Higgins, New York: Guilford Press, 204-243.
- (1990), "A Practical Guide to the Use of Response Latency in Social Psychological Research," in Research Methods in Personality and Social Psychology, Vol. 11, ed. Clyde Hendrick and Margaret S. Clark et al., Newbury Park, CA: Sage, 74-97.
- , David M. Sanbonmatsu, Martha C. Powell, and Frank R. Kardes (1986), "On Automatic Activation of Attitudes," Journal of Personality and Social Psychology, 50 (February), 229-238.
- Fishbein, Martin (1963), "An Investigation of the Relationships Between Beliefs About an Object and the Attitude Toward That Object," Human Relations, 16 (3), 233-240.
- Fournier, Susan (1998), "Consumers and Their Brands: Developing Relationship Theory in Consumer Research," Journal of Consumer Research, 24 (March), 343-373.
- Gaertner Samuel L. and John F. Dovidio (1986), "The Aversive Form of Racism," in Prejudice, Discrimination, and Racism, ed. John F. Dovidio and Samuel L. Gaertner, Orlando FL: Academic Press, 61-89.
- Greenwald, Anthony G. and Mahzarin R. Banaji (1995), "Implicit Social Cognition: Attitudes, Self-Esteem and Stereotypes," Psychological Review, 102 (1), 4-27.
- , Mark R. Klinger, and T J. Liu (1989), "Unconscious Processing of Dichoptically Masked Words," Memory and Cognition, 17 (January), 35-47.
- , Debbie E. McGhee, and Jordan L. K. Schwartz (1998), "Measuring Individual Differences in Implicit Cognition: The Implicit Association Test," Journal of Personality and Social Psychology, 74 (June) 1464-1480.
- Haire, Mason (1950), "Projective Techniques in Marketing Research," The Journal of Marketing, 14 (April), 649-656.
- Haugtvedt, Curtis P., Richard E. Petty, and John T. Caccioppo (1992), "Need for Cognition and Advertising: Understanding the Role of Personality Variables in Consumer Behavior," Journal of Consumer Psychology, 1 (3), 239-260.
- Hawkins, Del I. and Kenneth A. Coney (1981), "Uninformed Response Error in Survey Research," Journal of Marketing Research, 18 (August), 370-374.
- Hamilton, David P. (1999), "Apple Computer Releases New Operating System for Web Servers," The Interactive Wall Street Journal, March 17.
- Jacoby, Larry L., D. Stephen Lindsay, and Jeffrey P. Toth (1992), "Unconscious Influences Revealed," American Psychologist, 47 (June), 802-809.

- Kawakami, Kerry, Kenneth L. Dion, and John F. Dovidio (1998), "Racial Prejudice and Stereotype Activation," Personality and Social Psychology Bulletin, 24 (April), 407-416.
- LaPierre, Richard T. (1934), "Attitudes Versus Actions," Social Forces, 13, 230-237.
- Lemon, Nigel (1973), Attitudes and Their Measurement, New York: John Wiley & Sons.
- Meyer, David E. and Roger W. Schvaneveldt (1971), "Facilitation in Recognizing Pairs of Words: Evidence of Dependence Between Retrieval Operations," Journal of Experimental Psychology, 90 (October), 227-234.
- Ottaway, Scott A., Davis C. Hayden, and Mark A. Oakes (1999), "Implicit Attitudes and Racism: Effect of Word Familiarity and Frequency in the Implicit Association Test," Unpublished working paper, Western Washington University.
- Perdue, Charles W. and Michael B. Gurtman (1990), "Evidence for the Automaticity of Ageism," Journal of Experimental Social Psychology, 26, 199-216.
- Peter, J. Paul (1979), "Reliability: A Review of Psychometric Basics and Recent Marketing Practices," Journal of Marketing Research, 16 (February), 6-17.
- Petty, Richard E. and John T. Cacioppo (1986), Communication and Persuasion: Central and Peripheral Routes to Attitude Change, New York: Springer-Verlag.
- Schmitt, Bernd H. (1994), "Contextual Priming of Visual Information in Advertisements," Psychology and Marketing, 11 (Jan-Feb), 1-14.
- Shrum, L.J., Robert S. Wyer, Jr., and Thomas C. O'Guinn (1998), "The Effects of Television Consumption on Social Perspectives: The Use of Priming Procedures to Investigate Psychological Processes," Journal of Consumer Research, 24 (March), 447-458.
- Simonin, Bernard L. and Julie A. Ruth (1998), "Is a Company Known by the Company It Keeps? Assessing the Spillover Effects of Brand Alliances on Consumer Brand Attitudes," Journal of Marketing Research, 35 (February), 30-42.
- Sirgy, M. Joseph (1982), "Self-Concept in Consumer Behavior: A Critical Review," Journal of Consumer Research, 9 (December), 287-300.
- Tulving, Endel and Daniel L. Schacter (1990), "Priming and Human Memory Systems," Science, 247 (January), 301-306.
- Warner, Stanley L. (1965), "Randomized Response: A Survey Technique for Eliminating Evasive Answer Bias," Journal of the American Statistical Association, 60 (March), 63-69.
- (1971), "The Linear Randomized Response Model," Journal of the American Statistical Association, 66 (December), 884-888.
- Yi, Youjae (1993), "Contextual Priming Effects in Print Advertisements: The Moderating Role of Prior Knowledge," Journal of Advertising, 22 (March), 1-12.