

RUNNING HEAD: The IAT in Consumer Behavior

Measuring the Non-conscious: Implicit Social Cognition on Consumer Behavior

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Abstract

Consumer behavior often occurs in the absence of conscious deliberation (Bargh 2002). However, a reading of current reviews of the discipline suggests that very little research has focused in this area. To this end, the current review outlines recent developments in the study and measurement of non-conscious processes in consumer behavior, devoting particular attention to the Implicit Association Test (IAT), a computer-based measurement technique that assesses the strength of association between concepts in memory. The IAT allows researchers to inspect many implicit cognitive processes including attitude formation, advertising response, and the development of links between brands and the consumer self-concept. This review outlines the theoretical origins of the IAT, and describes recent developments in its usage and scoring, extending previous reviews of the IAT methodology (Brunel, Tietje, & Greenwald, 2004), and reviews the extant research in consumer behavior. Overall, the IAT is a flexible measurement tool that has a wide range of applications in the study of implicit consumer behavior and decision-making.

Introduction

Current research in psychology suggests that much of human behavior is influenced by uncontrolled, unobserved processes in memory (Bargh, 2002; Greenwald et al., 2002). Despite this increased attention to non-conscious processes within academic psychology, consumer research has largely neglected this nascent field: reviews of the last fifteen years of consumer behavior research report a focus on research methodologies that directly tap conscious beliefs, but which provide little insight into underlying implicit processes (Cohen & Chakravarti, 1990; Jacoby, Johar, & Morrin, 1998; Simonson et al., 2001). As an example, research into the structure and function of attitudes has relied almost exclusively on explicit measures, encouraging the development of theories dependent on conscious evaluation and deliberation. Although these theories are essential to the advancement of the field, they often neglect the potential role of non-conscious processes. Moreover, the validity of explicit measures is threatened if subjects do not possess an attitude prior to measurement, are unable to access an attitude in memory, or are unwilling to share that information (Dholakia & Morwitz, 2002; Dovidio & Fazio, 1992; Fazio, 1986; Fazio & Williams, 1986; Gur & Sackeim, 1979; Hawkins & Coney, 1981; Louie, Curren, & Harich, 2000; Orne, 1962; Taylor & Brown, 1994). In sum, explicit measures are an important component of any behavioral research program, but they often illuminate only a partial picture of consumers' underlying cognitions.

Interest in implicit measures of social cognition

Interest in what are now identified as “implicit” measures of social cognition has increased as the limitations of self-report measures have become more apparent. The

most recent, well-established, and popular of these new measures is the Implicit Association Test, or IAT (Greenwald, Mcghee, & Schwartz, 1998). The IAT is a computer-based categorization task designed to measure relative strengths of association among concepts in memory without requiring introspection on the part of the subject. The IAT is easy to implement, generates large effects sizes, and possesses good reliability (Greenwald & Nosek, 2001). While initial applications of the IAT focused on implicit attitude measurement (Greenwald, Mcghee, & Schwartz, 1998; Greenwald & Nosek, 2001), researchers have expanded its usage to include measures of self-concept (Farnham, Greenwald, & Banaji, 1999; Greenwald et al., 2002; Greenwald & Farnham, 2000; Perkins, Forehand, & Greenwald, 2005; Perkins, Forehand, & Greenwald, 2006; Spalding & Hardin, 1999), stereotypes (Greenwald et al., 2002; Nosek, Banaji, & Greenwald, 2004; Rudman, Greenwald, & Mcghee, 2001), self-esteem (Farnham, Greenwald, & Banaji, 1999; Greenwald et al., 2002), implicit egotism (Jones et al., 2002; Pelham, Mirenberg, & Jones, 2002), and implicit partisanship (Greenwald, Pickrell, & Farnham, 2002; Perkins et al., 2006). As many of these concepts appear regularly in consumer behavior research, application of the IAT in consumer psychology seems like an obvious and viable opportunity.

An Explanation of the IAT Methodology

The Implicit Association Test (IAT; Greenwald, McGhee and Schwartz 1998) is an indirect measure of relative strength of association between concepts or objects in memory. The IAT procedure requires subjects to quickly map items representing four different categories onto two responses on a computer keyboard (e.g. pressing two pre-

specified keys such as “D” and “K”). Following the appearance of a category exemplar on the computer screen, a respondent categorizes the item as quickly as possible by pressing the response key that represents its appropriate category. The ease or difficulty with which a subject is able to assign the same response to distinct concepts is taken as a measure of strength of the association between them in memory. The following discussion is meant to familiarize the audience with the IAT method: several recent reviews (Brunel, Tietje, & Greenwald, 2004; Nosek, Greenwald, & Banaji, 2005) examine related methodological and psychometric issues.

Consider a *brand attitude* IAT designed to assess relative attitudes toward Coke and Pepsi. This attitude IAT requires the use of four categories, each having multiple exemplars. The two brand categories (Coke and Pepsi) are referred to as *target concepts*. The remaining two categories are the *attributes* that may be variably associated with the target concepts. In an attitude IAT, the attribute categories are *pleasant* and *unpleasant*. Typical target concept and attribute categories include between three and six stimulus items (category exemplars), although IATs with as few as two items per category have been effective (Nosek, Greenwald, & Banaji, 2004). Exemplar items for a target concept or attribute category can include images, brand logos, and/or words.

A typical IAT has a sequence of five *discrimination tasks*. Each task serves either to train the respondent in the appropriate responses to a given set of stimuli, or to measure the speed with which the subject can categorize concepts and attributes when they share a response key. The initial discrimination task involves distinguishing items of the two target concept categories, for example, images representing Coke versus Pepsi. Often, the number of initial training trials varies with the number of stimulus items, such

that each stimulus item is viewed twice, in random order. The second discrimination task parallels the first, using the attribute category stimulus items (e.g. words for *pleasant* versus *unpleasant*).

In the third discrimination task, or *initial combined task*, subjects categorize a series of items drawn from both target concept categories and both attribute categories. During this task, a target concept category and an attribute category are assigned a shared response key. For example, subjects press a specified response key with one hand (e.g., the ‘D’ key with left hand) as quickly as possible whenever a Coke category item or a pleasant attribute appears on the screen. Whenever a Pepsi category item or an unpleasant attribute item is presented, the subject would press the alternate response key (e.g., the ‘K’ key with right hand). Stimulus items are presented alternately from the two target concept and the two attribute categories, with the particular stimulus item being randomly chosen from the available set of exemplars.

The final two discrimination tasks reverse the appropriate response for the target concepts and thereby create a task that can be directly compared to the initial combined task. In the fourth discrimination task, the *reversed target concept discrimination*, subjects practice categorizing the Coke and Pepsi target concept items with the response keys previously used for the other. If the initial target concept discrimination assigned the Coke category to the ‘D’ key and the Pepsi category to the ‘K’ key, the *reversed* discrimination task would assign Pepsi to the ‘D’ key and Coke to the ‘K’ key. This reversal serves two purposes: it allows subjects to unlearn the category–response key associations acquired during the first and third discrimination tasks, and it sets up the fifth discrimination task, or *reversed combined task*. This final task is identical to the

initial combined task, with the target concept categories reversed. The critical response latency data are captured in tasks three and five.

Scoring the IAT

The IAT measure is computed as a function of the difference in average response speed between the *initial combined task* and the *reversed combined task*. After transformation of these aggregated response times (discussed below), the difference in performance speed between the initial and reverse combined tasks provides the basis for the IAT measure. Greenwald, McGhee and Schwartz (1998) provided a *conventional* scoring algorithm that provides detailed procedures for data reduction, difference score calculation, and IAT effect assessment. This algorithm was chosen over alternative latency-based scoring algorithms because it produced the largest statistical effects sizes. Although effective, the conventional algorithm was selected over other latency measure scoring methods based upon the effect sizes it produced rather than any theoretical reasoning (Greenwald & Nosek, 2001). To establish a psychometrically preferable measure, a new scoring algorithm was developed: the *D* measure (Greenwald, Nosek, & Banaji, 2003). The *D* measure differs in several ways from the conventional scoring procedure. The *D* measure is computed by dividing the difference between the congruent and incongruent test blocks by the standard deviation of the aggregate test-block latencies. This was justified because the magnitudes of differences between experimental treatment means are often correlated with the variability of the data from which the means are computed. Using the standard deviation as the divisor adjusts differences between means for this effect of underlying variability (Greenwald, Nosek, & Banaji,

2003). As a result, the D measure is similar to *Cohen's d* (Cohen, 1977) and may be interpreted as an effect size. However, where Cohen's d uses the pooled standard deviation *within treatment* as the divisor, the D measure computes an *inclusive* standard deviation from all latencies in the two combined tasks of the IAT (Greenwald, Nosek, & Banaji, 2003). Further, the D measure includes data from both practice and test blocks as well as the data from the first two trials in test blocks (these data are dropped in the conventional scoring procedure due to typically lengthened latencies). The inclusion of these additional trials improves the stability of the measure and increases correlations with explicit measures.

Overall, recent analysis suggests that the D measure is a superior measure to the conventional scoring procedure as it increases the magnitude of effects measured using the IAT, leads to higher correlations between the IAT and explicit measures, and increases the predictive validity of IAT scores on behavioral dependent variables (Perugini, 2004). A full discussion of the D measure may be found at <http://faculty.washington.edu/agg/>, where one can download analysis scripts that calculate the conventional and the improved D measure (as well as other measures discussed in Greenwald et al. (2003)). The current authors recommend using the D measure, not only because it has been shown to be a superior measure to the conventional scoring procedure, but also because its use will increase the interpretability and comparability of results across disciplines and experiments by providing an effect size-like statistic.

Applications of the IAT in Consumer Behavior

Implicit Attitude Measurement

Starting with Allport's declaration that attitude is "social psychology's most indispensable concept" (Allport, 1935), the psychological definition of attitude has evolved. In general, *attitude* has been defined as inclination toward evaluation, whether it be "a disposition to react favorably or unfavorably to a class of objects" (Sarnof, 1960) or "an individual's disposition to respond favorably or unfavorably to an object, person, institution, or event, or to any other discriminable aspect of the individual's world" (Greenwald, 1989). To say that attitude measurement is a cornerstone of social psychology historically and consumer behavior more recently is not hyperbole. Surveys of recent developments in consumer research (Cohen & Chakravarti, 1990; Jacoby, Johar, & Morrin, 1998; Simonson et al., 2001) are replete with a staggering array of models that describe people as creatures of conscious, careful, analytical decision making. Consumers are thought to be active, rational processors of the vibrant stimuli in their environment, consciously parsing information, deciding about what to attend to, discarding irrelevant or extraneous information, and weighing what is left over in order to optimize value and facilitate attitude creation. This social cognition paradigm is epitomized by the development of two related models of persuasion: the elaboration likelihood model (ELM) (Petty, Cacioppo, & Schumann, 1983) and the heuristic-systematic model (HSM) (Chaiken, 1987). These theories provide a foundation for models of advertising effectiveness, purchase decisions, and brand and product attitude development. Interestingly, while the focus of ELM and HSM is clearly conscious and cognitive, both

models propose that consumers may be influenced by inputs that are not consciously analyzed. By incorporating non-deliberative judgment into the process, these theories are the precursors to newer theories that advocate attitude development in the absence of overt cognition.

The notion that attitudes might develop as a by-product of non-conscious, automatic, or implicit process gained momentum in the early 1990s (Bargh et al., 1992; Bargh et al., 1996; Bargh, Chen, & Burrows, 1996; Fazio, Powell, & Williams, 1989), spawning the notion of *implicit* attitudes – “introspectively unidentified (or inaccurately identified) traces of past experience that mediate favorable or unfavorable feeling, thought, or action toward social objects” (Greenwald & Banaji, 1995). Implicit attitudes are thought to be more strongly influenced by non-conscious processing due to their independence from conscious adjustment and evaluation. Thus, it is common to observe dissociation between explicitly self-reported attitudes and implicit attitudes measured by non-traditional methodologies like the IAT. Initially, these disassociations prompted theorizing that implicit and explicitly stated attitudes may be independent constructs (Devine, 1989; Greenwald & Banaji, 1995), while more recent theorizing suggests that implicit and explicit measures assess related but distinct constructs in memory (Nosek & Smyth, 2005). However, interpretations of IAT results have generally not been committed to a theoretical position on the question of whether implicit and explicit measures of attitude tap two types of indicator of a common construct (single-process theories), tap two distinct constructions (dual-process theories), or represent general cultural knowledge versus personal attitudes (Greenwald & Nosek, 2007).

Using the IAT to Assess Implicit Consumer Attitudes

Within consumer research, there are many domains in which similar disassociations between explicit and implicit attitudes may occur. Constructs that have relied on self-report measures for description such as vanity (Netemeyer, Burton, & Lichtenstein, 1995), stigmatized behaviors (Mowen & Spears, 1999; Swanson, Rudman, & Greenwald, 2001), or the exploration of ‘dark side behaviors’ such as drug and alcohol use (Mick, 1996) may be affected by subject unwillingness to accurately report due to social desirability biases. One of the first examples of the IAT being applied to problems of this sort examined behavioral and attitudinal responses to spokesperson race in print advertising (Brunel, Tietje, & Greenwald, 2004). Prior research revealed low correlations between explicit and implicit measures when the focus of attitudinal measurement is related to race, suggesting that explicit measures are consciously modified as a result of self-presentation bias or reluctance to report true feelings (Dasgupta et al., 2000; Greenwald, McGhee, & Schwartz, 1998). Thus, the question of interest was whether the IAT would pick up negative attitudes related to the race of celebrity spokespersons. To this end, advertisements were created that paired brand information with athletes, and which manipulated the race of the celebrity sportsperson. Interestingly, White respondents exhibited a significant “pro-White” preference when measured with the IAT, but did not reveal a significant preference on self-report measures. On the other hand, Black respondents indicated a preference for advertisements with Black spokespersons on self-report measures, but no significant implicit preference. Further, the magnitude of implicit preference for advertisements that included White spokespersons was

significantly greater for White respondents than for Black respondents, whereas the opposite was true for the self-report measures. Further analysis confirmed a significant interaction of ethnicity and measurement method on the revealed preference for advertisements with spokespersons of one's own ethnicity.

A number of other researchers have used the IAT to explore the effects of implicit attitudes on judgments as well. For example, Forehand and Perkins (2005) found that favorable attitude toward a celebrity positively influenced response to advertising utilizing that celebrity's voice, but only when the subject was unable to identify the celebrity behind the voice. This influence reversed if the subject could correctly identify the celebrity, was motivated to eliminate irrelevant influences, *and* was able to consciously adjust response (an adjustment that was only possible on explicit measures). Using set/reset theory (Martin, 1986), the authors argued that this reversal on explicit measures was due to *resetting*, a correction of the perceived influence of the celebrity cue due to its logical irrelevance. The disassociation between the explicit and implicit results suggested that resetting requires explicit evaluation. This experiment also demonstrates that the IAT can be used to discern the underlying processes that produce effects traditionally observed on explicit measures.

Maison and colleagues (Maison, Greenwald, & Bruin, 2001) conducted a number of experiments exploring domains where one might expect dissociation between explicit and implicitly measured attitudes. One of these studies explored attitudes towards high and low calorie products. For these products, it was hypothesized that consumers (young women) hold ambivalent attitudes, perceiving high-calorie products as good in taste, but bad for their health and perceiving low-calorie products as bad in taste, but good for their

health. When attitudes toward these food products were measured using traditional explicit measures, results suggested that young women preferred high calorie products on some dimensions (e.g., taste). However, implicit attitude measures revealed that young women had more positive attitudes toward low calorie products. Moreover, favorable implicit attitudes towards low calorie products predicted dieting activities.

Another set of experiments investigated consumer ethnocentrism. Consumer ethnocentrism is defined as a conscious preference for one's own native products (e.g., products produced within your country or region) compared to foreign products (Verlegh & Steenkamp, 1999; Watson & Wright, 2000). Consumer ethnocentrism may result from any number of different mental processes: cognitive (people believe that products produced in their own country are better), affective (people have a positive affective reaction toward native products), or ideological or normative (people believe that it is appropriate to purchase products manufactured in their own country). Until recently, consumer ethnocentrism was studied in developed countries using explicit measures and this typically revealed a bias in favor of products produced in the subject's native country. However, in less economically developed countries this domestic preference is often not observed. This is thought to be the result of experience with poorer-quality native products compared to foreign brands. Maison and colleagues predicted that this situation can lead to dissociation between implicit and explicit attitudes and could produce internal conflict between automatic preference based on emotions and rational judgment based on observation and experience.

Thus, two experiments were conducted to explore explicitly and implicitly measured preferences toward foreign versus local products and their relationship to

behavior. The first study measured attitude toward Polish versus foreign brands of cigarettes, on the assumption that Polish cigarettes were considered to be lower quality than foreign brands of cigarettes. Subjects completed an attitude IAT that incorporated Polish (e.g. Sobieskie, Carmen) and American (e.g. Marlboro, Camel) cigarettes brands and filled out a survey measuring their opinions and attitudes toward these brands. Interestingly, the explicit measures revealed that the subjects preferred foreign brands, while attitude IAT suggested that the subjects preferred the Polish cigarette brands. This dissociation was stronger among non-smokers than among smokers, while smokers smoked foreign brands and reported a preference for the foreign brands of cigarettes but still revealed a slight preference for Polish brands using the IAT. A second experiment replicated these findings across a number of product categories.

The IAT has been used to explore other types of associations in memory beyond attitude. For example, recent research into the processing and understanding of brand slogans suggests that a significant component of the understanding of brand slogans may be implicit in nature (Dimofte & Yalch, 2004). Brand slogans may have implicit influence on belief to the extent that they are *polysemous* (i.e., the extent they possess both a literal and figurative meaning). For example, Hoover's brand slogan is "Deep down you want Hoover," a statement that implies both cleaning power and consumer's inner desire for the brand. Dimofte and Yalch suggest that polysemous advertising slogans (those that include both literal and figurative meanings) may be processed differently by consumers, according to ability to access meanings. Dimofte and Yalch argued that, in the case where a polysemous slogan incorporates literal and secondary

slogans that potentially differ in valence, one would expect differential responses to those slogans to the extent that the viewer of those slogans was able to discern both meanings.

To test these hypotheses, three versions of an experimental advertisement were created using two well-known automobile brands: Lexus and Mercedes-Benz. The advertisements were identical in their presentation of comfort and performance attributes, but differed in the slogans that were included in the advertisements: “Unlike any other” (literal positive), “No one comes close” (polysemous mixed, such that the secondary negative reading suggests that it is too expensive and thus unattainable for the vast majority of automobile buyers) and “For the few who can afford it” (literal negative). The IAT was used to measure subjects’ automobile brand associations with attributes related to “expensive” versus “affordable.” Consistent with expectations, Dimofte and Yalch found that subjects who were better able to access multiple meanings of the slogans exhibited a significant “Mercedes + Expensive” association suggesting that these subjects implicitly understood the secondary slogan meanings. On the other hand, subjects who were unable to access the multiple meanings of the slogans did not appear to process the secondary, implicit meaning of the slogan, suggesting that different cognitive processes were occurring between the groups.

A follow-up experiment by Dimofte and colleagues (Dimofte, Yalch, & Greenwald, 2003) suggested that incidental exposure to an object could produce novel implicit associations with that object. A particular brand name (Trojan) that could both represent a “party”-related product and the mascot of a major American university was chosen as a stimulus item. After incidental exposure to the brand name and logo, subsequent implicit associations of that specific university and the concept of “party”

emerged robustly among subjects familiar with both categories. Further, the strength of this novel implicit association was enough to reverse perceptions of the target university when compared to another, comparable university that was explicitly considered more of a “party” school (UCLA). A similar result was obtained using a different brand name that could trigger positive or negative valence depending on the context. To the extent that the context primed either positive or negative valence, subsequent implicit measures of brand attitude revealed valence-consistent associations with the brand in question.

Predicting consumer behavior with the IAT

Previous research suggests that the ability of the IAT to predict behavior is somewhat inconsistent, with some projects finding adequate predictive ability (Greenwald & Farnham, 2000; McConnell & Leibold, 2001; Rudman & Glick, 2001) and others not (Karpinski & Hilton, 2001). A recent meta-analysis (Poehlman et al., 2006) of IAT research in psychology (including 14 consumer behavior studies) found that both IAT and explicit measures reliably predicted behavior, and that implicit measures were superior in predicting stereotyping and prejudicial behaviors. Explicit measures were better predictors of behavior only when predictions by both implicit and explicit measures were both relatively strong.

Recent consumer behavior studies incorporating the IAT have found that the IAT does predict behavior. For example, purchase intention, brand preference, and perceived brand superiority were all predicted by implicitly measured self-brand association (Perkins, 2005). Further, these relationships were completely mediated by implicit attitude toward the brand. These results are consistent with the notion that self-concept association with objects directly influences attitude formation and behavior (Bargh &

Chartrand, 1999; Greenwald & Banaji, 1995; Perkins, Forehand, & Greenwald, 2005; Perkins et al., 2006).

Interestingly, explicit and implicit measures of brand attitude predict brand choice differentially. When under time constraints, consumer brand choice was significantly influenced by prior implicit attitude, while explicitly reported attitudes were more diagnostic when consumers had more time available (Wanke, Plessner, & Friese, 2002). Similarly, Plessner and colleagues (Plessner et al., 2004) looked at the effect of time pressure on product choice of recycled versus non-recycled writing pads, finding that implicit attitudes toward recycled versus non-recycled paper predicted product choice only when subjects were required to make the product choice within a five-second response window, while explicit measures predicted product choice when there was no response window limitation. Taken together, these findings suggest that cognitive resource limitations may lead people to base choices on implicit associations in memory, since they lack the cognitive resources to go through conscious deliberation. While exploring consumer behavioral situations where a dissociation between explicit and implicit attitudes might occur, Vantomme and colleagues (Vantomme et al., 2004) suggested that implicit measures of negative attitudes toward “green” or ecologically friendly products should be both dissociated from explicit measures of attitude toward green products, and be less likely to predict product choice, because it was thought that negative implicit attitudes toward green products should be consciously modified by subjects. Interestingly, the reverse was true: implicit attitudes were found to be extremely positive toward green products, and predicted green product choice.

The self-concept in Consumer Behavior

Recent research suggests that many cognitive processes related to the self-concept and its effect on behavior may be unconscious or beyond active control (Bargh, Mckenna, & Fitzsimons, 2002; Farnham, Greenwald, & Banaji, 1999; Greenwald et al., 2002; Greenwald & Farnham, 2000; Hetts, Sakuma, & Pelham, 1999; Spalding & Hardin, 1999). This differs from previous theorizing about the self-concept, which suggests that self-related cognitions tended to be conscious, active processes (Higgins, 1987; Higgins, Klein, & Strauman, 1985; Markus, 1983; Markus & Nurius, 1986; Markus & Nurius, 1987; Meyers-Levy & Peracchio, 1996). The idea that cognitive processes related to the self-concept may unconsciously influence behavior builds from prior research that suggests that people process social information at both an explicit and implicit level (Bargh et al., 1992; Devine, 1989; Fazio et al., 1986; Greenwald & Banaji, 1995). For example, automatic or implicit process have been observed in stereotype activation and resultant behavior (Bargh, Chen, & Burrows, 1996), automatic attitude formation (Greenwald & Banaji, 1995), self-esteem development (Farnham, Greenwald, & Banaji, 1999; Greenwald et al., 2002), implicit egotism (Jones et al., 2002; Pelham, Mirenberg, & Jones, 2002), implicit partisanship (Greenwald, Pickrell, & Farnham, 2002; Perkins et al., 2006), and self-concept organization (Perkins, Forehand, & Greenwald, 2006).

The influence of the implicit self-concept has been explored in a number of domains. For example, people exhibit automatic minimal group bias, but were unaware of the bias at an explicit level (Ashburn-Nardo, Voils, & Monteith, 2001). Greenwald and Farnham (2000) found low correlations between implicitly and explicitly measured self-

esteem and self-concept, suggesting differences in the constructs tapped by each measurement technique. Further, implicitly measured self-esteem predicted expected mental buffering following manipulations of success versus failure. Spalding and Hardin (1999) found that implicit self-esteem predicted anxiety during an interview. Swanson, Rudman, & Greenwald (2001) reported inconsistent attitude-behavior relationships for smokers using both implicit and explicit measures. Overall, there seems to be evidence that the self-concept operates at an implicit level, and that the implicit self-concept may reveal different associations and attitudes compared to the explicit self-concept.

One of the newest areas of exploration that leverages much of the methodological development of the IAT is a project by Perkins, Forehand, and Greenwald (under review). The authors introduce the notion of *implicit self referencing*, or the automatic self-association of objects encountered in the environment and subsequent generation of a positive implicit attitude toward those objects. Recent research (Greenwald et al., 2002) in the tradition of cognitive consistency theory (Festinger, 1957; Heider, 1958; Osgood & Tannenbaum, 1955), suggests that self-object relationships are tied to implicit identities (self-group associations). Greenwald et al. (2002a) theorized interrelations among triads composed of the following components: the *self*, a *group*, and an attribute such as *valence*. Thus, a linkage between the self-concept and valence is interpreted as *implicit self-esteem*, (Farnham, Greenwald, & Banaji, 1999; Greenwald & Farnham, 2000), an association between an object and valence is interpreted as an *implicit attitude* (Greenwald et al., 2002) and an association between a group or object and the self-concept is interpreted as an implicit *identity* (Rudman, Greenwald, & McGhee, 2001). Although the research cited here focuses primarily on self-group interactions and notions

of identity, a long tradition in social psychology and consumer behavior has argued that objects (in the form of gifts, products, or brands) may help define identity as well (Aaker, 1999; Belk, 1988; James, 1890; Kleine, Kleine, & Kernan, 1993; Tietje & Brunel, 2005; Wicklund & Gollwitzer, 1982). Tietje and Brunel (2005) applied these theories to establish a unified brand theory framework and experimental results that examine the existence and influence of these existing triads in memory. The authors' previous research (Brunel, Tietje, & Greenwald, 2004) provides initial support for the unified theory framework, finding that Macintosh users revealed stronger self-Macintosh association than PC users revealed self-PC association. They suggested that Macintosh users identify with Macintosh due to the minority status of Macintosh in the marketplace, the strong sense of community that surrounds Macintosh users, and the notion that, while PC users are generally compelled to use PCs due to work availability, Macintosh users must actively choose the brand, usually incurring social and professional difficulties. Tietje and Brunel (2005) propose a theoretical framework that incorporates self-esteem, attitudes, stereotypes, and self-concept similar to Greenwald and colleagues (2002a) framework.

Perkins and colleagues have extended these theoretical and experimental findings to the creation of new attitudes toward novel stimuli items, such as brands. Greenwald and Banaji (1995) define *implicit self-esteem* as "the introspectively unidentified (or inaccurately identified) effect of the self-attitude on evaluation of self-associated and self-dissociated objects" (p.11). Numerous studies (Taylor & Brown, 1994) have established that the majority of people report favorable self-descriptions and self-evaluations, suggesting that a link in memory exists between the self-concept and a cognitive

representation of positive valence. To the extent that a new link is created between the self and some object in the environment, perhaps due to environmental exposure, one would expect a new link to form between that object and a positive valence representation (i.e., forming or increasing a positive attitude). This should occur not require either conscious input or awareness of attitude formation by the subject.

Two experiments bear this out. In the first experiment, subjects were randomly assigned to perform a categorization task that created a trivial link between their own self-concepts and an innocuous object, in this case either *analog* or *digital clocks*. These target concept categories were extensively pretested to ensure that pre-experimental implicit attitudes toward the two categories were, on average, approximately equal. The categorization task required subjects to categorize target concepts (images of either *analog* or *digital clocks*) and attribute items (words representing the concepts of “self” and “other”) in specific pairs. For example, subjects who were randomly assigned to associate self with *analog clocks* did a categorization task that required the same response (pressing the computer’s ‘D’ key) when items that represent *self* or *analog clocks* appeared on the screen, and required a different response (pressing the ‘K’ key) when items that represent the concept *other* (opposite of self) or images of *analog* clocks appeared on the screen. No specific explanation of this purpose of the categorization task was provided. Phase 1 required subjects to complete two blocks of 36 trials each categorizing *digital* and *analog* clock images with the attributes *self* and *other*. The response key (‘D’ or ‘K’) was reversed for both contrasts in the second categorization task to avoid associating any concept with a specific key response.

After this associative practice, subjects completed an IAT that measured implicit attitudes toward the target concepts. It was hypothesized that the association practice would create a new link in memory between the self and one of the target concept categories, indirectly producing an association of positive valence with that concept. This was precisely what was found: subjects who (for example) associated self with analog clocks subsequently showed IAT-measured positive implicit attitudes toward analog clocks.

Experiment 2 replicated Experiment 1, but added a twist: instead of a self-association task that was designed to create a link between the self-concept and a known but previously unlinked object category in memory (clocks), Experiment 2 incorporated invented brand names that were unknown to the subjects. Again, the brand names were pretested to make sure that the subjects did not prefer one of the brand name sets (ACE and STAR, each with four invented model names) prior to the manipulation. In order to facilitate the learning of the new brand names, subjects were presented with a static list of the brand names for 30 seconds prior to the self-categorization task. Following the self-categorization task, subjects again completed attitude IAT. The same results as Experiment 1 obtained: Subjects who self-associated with the ACE brand, for example, automatically generated a positive implicit attitude toward the ACE brand relative to the STAR brand. Taken together, these results suggest that attitudes may be automatically generated toward objects as a result of merely self-associating that object. The research question is now whether we can pin down automatic self-association.

An extension of this implicit self-referencing project examined the possibility that implicit attitudes may be spontaneously formed as a result of a self-group association.

Previous research suggests that simply learning the names of randomly assigned team members leads a subject to associate self with that team (Greenwald, Pickrell, & Farnham, 2002). This automatic self-group association has been shown in related research as well. Pinter and Greenwald (Pinter & Greenwald, 2004) found that automatic self-group association led to differential resource allocation amongst competing teams. Perkins and colleagues (Perkins et al., 2006) sought to further understand mere group membership by looking at its effects on brand attitude formation in two experiments.

Under the guise of a scavenger hunt, subjects were instructed that they would be randomly assigned to one of two fictitious groups, named “circle” or “triangle”. In order to learn their group membership, subjects were first exposed to a list of names either of members of the subject’s or another group that they were competing with. Following this exposure, subjects practiced categorizing the names of their own and the competing team to become familiar with the names and the group memberships. The subject’s group included four names, and the word “myself” representing the subject’s membership in that category, while the opponent group included five names.

Subjects were next instructed to learn a set of objects pretested to assure that they were, on average, initially equivalent in evaluation: *analog* or *digital clocks* (Study 1) or fictitious automobile brand names *Ace* or *Star* (Study 2; the experimental design differed only with regard to the stimuli employed between the two studies). These objects were to be the target of a fictitious scavenger hunt on the campus where the experiments were run. However, the categorization task required here was different from the task employed in the implicit self-referencing project described above. Subjects categorized their team members’ names and one of the target objects using the same response key. For example,

if the subject was on the *circle* team, and was assigned to find the *Ace* automobile brand names, than the categorization task required giving the same response when either *circle* team names or *Ace* brand names were presented, and a different response when *triangle* team names or *Star* brand names were presented. For this categorization task, only four names from each team were used, allowing omission of “yourself” stimuli. Thus, during the second categorization task, the subject never categorized any explicitly self-identified stimuli with the target objects. Following these tasks, subjects completed a self-target object IAT (either *clocks* or *brands*) and a parallel attitude IAT for the target objects.

The results revealed that subjects spontaneously generated positive implicit self-associations as well as positive implicit attitudes toward the target objects that were sorted together with the names of their group’s members during the experimental treatments. Specifically, subjects in the *circle* group, who categorized their group members with the *Ace* brand model names, subsequently self-associated with and generated a positive implicit attitude toward the *Ace* brand, even though there was no direct linkage of self with the *Ace* brand during the experiment. These results extend the implicit self-referencing experiments described above: Instead of examining the spontaneous creation of an implicit attitude that is the direct result of implicit self-association, these two experiments revealed a positive implicit attitude resulting from merely being associated with a group that was in turn associated with the arbitrarily assigned target object.

Finally, Forehand and colleagues (Forehand, Perkins, & Reed II, 2003) explored self-identity and responses to advertising stimuli in three experiments. Prior research demonstrates that accessible and self-important social identities affect judgments in

predictable ways, and has identified three main classes of variables that may influence identity accessibility — enduring traits such as strength of identification with a specific identity, aspects of the social context in which a consumer resides, and contextual primes that can activate or prompt identity-based processing (Forehand, Perkins, & Reed II, 2003). In these two experiments, consumer sensitivity to situational manipulations of distinctiveness (Mcguire et al., 1978) was assessed using standard explicit self-report measures and IATs. The IATs measured the degree to which each subject associated specific self components (gender and ethnicity) with identity-related concepts and thereby provided implicit measures of identity accessibility. During a preliminary phase of the first two experiments, subjects completed a battery of demographic items, personality scale items, and implicit identity IATs to provide baseline measures of their prevailing identity accessibility. Several weeks after this initial measurement, the subjects participated in an ostensibly unrelated experiment in which the composition of the subject's immediate social environment was either measured (Experiment 1) or manipulated (Experiment 2). It was hypothesized that identity accessibility during this second session would be influenced not only by the subject's distinctiveness within their immediate social context, but also by general sensitivity to such social information (as measured using Snyder's self-monitoring scale). Forehand and colleagues found that social distinctiveness did influence both explicit and implicit identity accessibility, and that the influence of distinctiveness on identity accessibility was moderated by the subject's predisposition toward self-monitoring, such that high self-monitors were influenced by social cues to a greater extent than were low-self monitors. This pattern of results was observed on both explicit and implicit measures of identity accessibility.

Forehand et al.'s (2003) third experiment assessed the degree to which the expression of an identity-based preference reinforces identity accessibility. It was hypothesized that the use of one's identity as an informational cue in attitude expression reinforces the accessibility of that identity and thereby increases the likelihood that the identity will be used in subsequent judgments. To test this hypothesis, college-age subjects evaluated advertisements for vitamins intended for children, young adults, or seniors and then completed an Implicit Association Test designed to measure self-association with youth versus aged. Compared to subjects who evaluated the young adult version of the ad (the control condition), subjects who evaluated the children-focused ad or the senior-focused ad demonstrated stronger self-youth associations. This finding suggests that the use of an identity dimension in an evaluation activates pre-existing identity associations. Since the majority of consumers possess pre-existing strong associations between the self and youth (Nosek, Banaji, & Greenwald, 2002), this identity activation increased the self-youth association.

Concluding remarks

Since its introduction, the IAT has exploded in popularity and usage. While previous reviews (Brunel, Tietje, & Greenwald, 2004; Nosek, Greenwald, & Banaji, 2005) have explored various psychometric and methodological issues, the purpose of this chapter is to review the most recent examples of IAT usage in consumer behavior research. It is hoped that this review will serve as a launch pad for marketing researchers to become familiar with current research streams and to start exploring the unconscious or implicit processes that most of us believe underlie much consumer behavior. The

current state of theoretical development, methodology, and areas of application form a “perfect storm” of exciting, valuable, and rewarding research, and the opportunity to incorporate what seems to be a major component of social cognition — the non-conscious role of implicit cognitive processes in consumer decision making and behavior.

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Footnotes

1. Steps 4 and 5 are reversed here as a result in a change in the scoring algorithm following publication of Greenwald et. al. (2003). The published algorithm requires the calculation of standard deviation prior to error trial replacement. The description here (error trial replacement followed by standard deviation calculation) is corrected.