

# Implicit Self-Referencing: The Effect of Nonvolitional Self-Association on Brand and Product Attitude

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In three experiments, nonvolitional self-association is shown to improve implicit attitude, self-reported attitude, purchase intention, and product choice for both product categories and fictional brands. Experiments 1 and 2 demonstrate that arbitrary categorization of self-related content with novel stimuli improved evaluations by creating new self-object associations in memory and that the influence of self-association is moderated by implicit self-esteem. Experiment 3 shows that such implicit self-referencing does not require conscious self-categorization and occurs even when novel stimuli are simply presented in close proximity to self-related content. In this final experiment, subjects responded more positively to brands featured in banner ads on a personal social networking webpage than when featured on an equivalent nonpersonal social networking page. This automatic self-association effect was mediated by the degree to which the advertising prompted an implicit association between the self and the advertised brands.

The ultimate goal of many brand campaigns is to create personal brand identification between the brand and a target individual's identity. Such brand identification can prompt more favorable evaluations of the brand (Burnkrant and Unnava 1995; Meyers-Levy and Peracchio 1996), facilitate storage and later retrieval of brand-relevant information (Forehand and Sood 2005; Rogers, Kuiper, and Kirker 1977; Symons and Johnson 1997), and foster brand loyalty. Traditionally, marketers create brand identification by carefully targeting consumers likely to respond to a brand's personality and image, promoting product evangelism among early adopters and opinion leaders, and creating opportunities for proponents of the brand to interact and

support the brand communities that hopefully develop. The assumption behind the majority of these techniques is that brand identification develops when people personally interact with a brand and its consumers and thereby develop a conscious self-brand association.

Although the creation of self-brand associations is often conceptualized as an intense and ongoing process in which the consumer is an active participant, we posit that self-brand identification can also be created by simple nonvolitional association. The potential for nonvolitional self-association is underscored by evidence that the vast majority of marketing exposures are experienced under conditions of low cognitive involvement and attention (Bargh 2002) and that many cognitive processes are inaccessible or beyond the conscious control of the individual (Bargh, McKenna, and Fitzsimons 2002; Farnham, Greenwald, and Banaji 1999; Gawronski and Bodenhausen 2006; Greenwald, Banaji, et al. 2002; Greenwald and Farnham 2000; Hetts, Sakuma, and Pelham 1999; Spalding and Hardin 1999). Such automatic or *implicit* processes can influence a host of cognitive processes including stereotype activation and resultant behavior (Bargh, Chen, and Burrows 1996), automatic attitudes (Gawronski and Bodenhausen 2006; Greenwald and Banaji 1995), attitude-behavior consistency (Greenwald et al. 2009; Swanson, Rudman, and Greenwald 2001), self-esteem development (Farnham et al. 1999; Greenwald, Banaji, et al. 2002; Yamaguchi et al. 2007), implicit egotism

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(Brendl et al. 2005; Jones et al. 2002, 2004; Pelham, Mirenberg, and Jones 2002), the influence of self-esteem on anxiety (Spalding and Hardin 1999), minimal group bias (Ashburn-Nardo, Voils, and Monteith 2001; Pinter and Greenwald 2004), implicit partisanship (Greenwald, Pickrell, and Farnham 2002; Perkins et al. 2008), and self-concept content and organization (Perkins, Forehand, and Greenwald 2006). Further, the existence of implicit attitudes and self-brand associations has recently become more well established in consumer behavior (Brunel, Tietje, and Greenwald 2004; Forehand and Perkins 2005; Gibson 2008; Greenwald et al. 2009; Maison, Greenwald, and Bruin 2004; Tietje and Brunel 2005).

The current research presents three experiments demonstrating that nonvolitional self-object association can influence subsequent object attitude independent of any self-affirmation motivation (Brendl et al. 2005) or deliberative choice or conscious possession (Gawronski, Bodenhausen, and Becker 2007) and can affect not only implicit associations but also explicit attitudes and behavior (Prestwich et al. 2010). Further, the current results extend findings in the domain of implicit egotism (Jones et al. 2004; Pelham, Carvallo, and Jones 2005) by demonstrating the crucial role of initial positive self-esteem in the process. In general, this research builds on Greenwald et al.'s *balance congruity principle* and demonstrates that nonvolitional pairing of objects with the self creates a series of associations between the self, the object, and positive valence that improves object evaluation to the extent that initial self-valence is positive (Greenwald, Banaji, et al. 2002).

Thus, the contribution of the current article is threefold. First, the experiments reported here extend the findings of Gawronski and colleagues (2007) by removing consciously understood prior ownership (either real or perceived) from the procedure that generates the self-object association in memory. Second, the project does not assume the existence of new self-association formation on the basis of manipulated exposure but instead directly measures this association. This allows a more direct assessment of the proposition put forward by Gawronski et al. (2007) and Tietje and Brunel (2005) that brand attitude can be modeled as a multiplicative function of brand-self identification and self-esteem. Finally, experiment 3 tests these associational processes in a natural context devoid of any direct categorization of self-related content and observes the formation of self-brand association as a result of incidentally observing banner advertisements embedded in a self-relevant social networking website.

## THE SELF-CONCEPT, SELF-OBJECT ASSOCIATIONS, AND ATTITUDE FORMATION

The collection of characteristics, traits, and group memberships that cognitively represent a person in memory is generally referred to as the *self-concept* (Greenwald and Pratkanis 1984; Markus 1983). The self-concept facilitates attention, interpretation, and memory for stimuli without the

explicit involvement of the observer (Markus and Nurius 1986). The associations that comprise the self-concept are created via personal experience, media and message exposure, and numerous unconscious learning processes (Collins and Loftus 1975). These self-associations may be strengthened with increased exposure, reinforcement, and conscious cognitive processing or may be reduced by disuse or the learning of new information. Moreover, memory links that involve the self tend to be stronger in memory due to constant activation and cogitation (Greenwald, Banaji, et al. 2002; Greenwald and Pratkanis 1984; Markus and Nurius 1987; Rogers et al. 1977; Ruvolo and Markus 1992).

Extant research suggests that objects that are linked to the self-concept tend to be better liked. Nuttin (1985) suggested the *name letter effect*, observing that letters that appeared in an individual's name were generally better liked. Similarly, *mere ownership* (Beggan 1992) observed that objects given to an individual attained greater than expected positive evaluations compared to when that object was not owned by that individual. An explosion of interest followed the discovery of the *implicit egotism* effect (Jones et al. 2004; Pelham et al. 2002, 2005) finding that people, places, and things that are linked to the self are better liked. For example, Feys (1991) observed that symbols representing one's own team in a computer game were subsequently ranked higher than symbols representing the opposition. More broadly, Jones et al. (2004) used subliminal conditioning to induce subjects to associate a number with their own name (and a different number with other gender-matched names). Subjects then evaluated a woman more favorably if the shirt she was wearing depicted their self-associated number. Interpreting these previous findings, Brendl et al. (2005) suggested a two-stage process for name-letter branding effects, arguing that motivation to self-enhance increases positive valence associated with the individual's own name letters, which is then transferred to a particular target object (e.g., a brand). Other research finds similar effects, without the motivational component (Gawronski et al. 2007; Zhang and Chan 2009).

In an attempt to explain how self-object associations can lead to the formation of positive attitudes toward target objects, Greenwald, Banaji, et al. (2002) posited that self-object relationships may occur unconsciously through the development of balanced triads of associations in a fashion similar to that of *cognitive consistency theory* (Festinger 1957; Heider 1958; Osgood and Tannenbaum 1955). These balanced triads include the *self*, or the self-concept; an *object* (e.g., brand) that is associated with the self-concept; and a mental representation of *valence*. A measured association between the self-concept and valence is defined as implicit *self-esteem* (Farnham et al. 1999; Greenwald and Farnham 2000), a measured association between an object and valence is an implicit *attitude* or *stereotype* (Greenwald, McGhee, and Schwartz 1998), and a measured association between a group or object and the self-concept is an implicit *self-identity* (Rudman, Greenwald, and McGhee 2001). These cognitive triads are thought to form as a result of an

intrinsic motivation to balance object associations in memory. These relationships are represented in figure 1.

To facilitate the balancing of these objects in memory, Greenwald and colleagues posit a *balance-congruity principle*, wherein two unlinked objects in memory (e.g., valence and brand) that share “first-order” links with a third object (e.g., self-concept) should develop a mutual association (Greenwald, Banaji, et al. 2002). Assuming an *a priori* link between self and valence, conceptualized as implicit self-esteem (Farnham et al. 1999; Greenwald and Banaji 1995), an association created between the self-concept and an object in the environment should produce a new link between the object and that valence. To the extent that implicit self-esteem is positive in the vast majority of cases (Farnham 1999; Farnham et al. 1999), it is thought that this newly formed self-object association should be positive in nature.

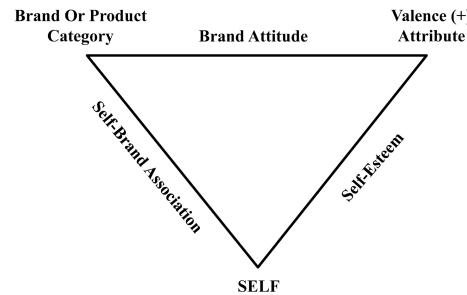
Both Gawronski and colleagues (2007) and Tietje and Brunel (2005) have applied Greenwald's theoretical development in different domains. Tietje and Brunel (2005) formalized an adaptation of Greenwald et al.'s unified theory into a Unified Implicit Brand Theory. Tietje and Brunel suggested, similar to Greenwald, Banaji, et al. (2002), that the concepts included in the unified theory of social cognition could be applied to knowledge about brands. Building from this unified theory, Tietje and Brunel proposed (but did not test) the hypothesis that brand attitude should be modeled as an interaction between self-esteem and brand-self identification. We formally test this hypothesis in experiment 2.

More direct evidence for Greenwald's Unified Theory of Implicit Social Cognition is provided in research on the transfer of self-valence to objects recently associated with the self (Gawronski et al. 2007). In this research, subjects choose between two images, with the understanding that they will receive their choice after completion of the experiment (experiments 1–3). In a final experiment, subjects rolled a die to determine which image would be given to them as a reward for participating. In each experiment, image allocation (either via choice or a die roll) created associations between the self and the image and improved attitude toward the image. Although the aforementioned research clearly indicates that self-valence can transfer to self-associated objects, it depends on consciously understood self-association as the basis of the effect. Even when the association was randomly determined (i.e., a die roll to determine the object to be received), the resulting possession of the object (and pairing of the object with the self) was nonetheless consciously understood. Given that much of consumer self-association occurs implicitly (Bargh 2002), the question arises whether conscious ownership of the associated object is a necessary requirement for valence transfer. To fully specify the associational basis of this phenomenon, a more apt test should use an association in which no conscious possession exists. This leads to the following hypothesis:

**H1:** Nonvolitional pairing of a previously unknown object with the self-concept will prompt more positive evaluation of the object.

## FIGURE 1

### GENERAL MODEL OF COGNITIVE ASSOCIATIONS



Experiment 1 was designed to test this hypothesis by manipulating the creation of nonvolitional associations between neutral (i.e., no a priori attitude) objects and the self-concept and observing the formation of positive attitudes toward those objects. Further, we wanted to ascertain whether these automatically formed attitudes could affect self-reported attitudes and purchase intention. Because we expect the formation of these associations in memory to be automatic, the experiments used an implicit association test (IAT), a computer-based indirect measurement technique that assesses the strength of association between concepts and attributes in memory (Greenwald et al. 1998). The applicability of the IAT to consumer behavior domains is well documented (Brunel et al. 2004; Forehand and Perkins 2005; Gibson 2008; Maison et al. 2004).

## EXPERIMENT 1

## Subjects

Thirty-six student volunteers enrolled in an introductory psychology class participated for class credit.

## Procedure

Experiment 1 was divided into three phases: a stimuli learning task (phase 1), a self-categorization task designed to artificially create manipulated self-object associations in memory (phase 2), and the completion of indirect and self-report measures of brand attitude and purchase intention (phase 3). All phases were completed using a personal computer. During the first phase, subjects viewed a list of fictitious brand names on the computer screen. These fictitious brand names were presented as two distinct sets of brands, labeled Ace and Star. The Star brand was represented by the subbrands Aristo, Canina, Ozel, and Primera, while the Ace brand was represented by the subbrands Alzo, Delica, Largo, and Vitz. These fictitious brands were pretested to make sure no a priori differences existed (see below). Subjects were presented with the following instructions regarding the learning of the brands: "BRAND LEARNING TASK: On

the following page, you will be presented with two sets of potential automobile BRAND NAMES. One set of brands is identified as 'Ace' and the other is identified as 'Star'. Please spend the next 30 seconds getting familiar with these categories. After 30 seconds have passed, you will automatically be forwarded to a learning task that reinforces these brand name categories further. You will not be able to proceed until 30 seconds have passed."

The fictitious brand names were presented in two columns on the computer screen for 30 seconds. The subject was unable to continue until the 30 seconds were up. After 30 seconds passed, subjects completed a categorization task requiring them to correctly categorize the brands from the Ace and the Star families. These tasks were counterbalanced for response key assignment to avoid any potential learning bias. Subjects completed two such categorization tasks. After completing the brand-learning tasks, phase 2 required subjects to complete a combined categorization task in which either the Ace or the Star brand was paired with words representing "self" (I, self, me, my, and mine) or "other" (they, other, them, their, and theirs) in a between-subjects design. This combined categorization task was designed to create an association between the self and one of the two brand families with as little cognitive processing as possible. Subjects assigned to the Ace condition completed a categorization task that required the same response (e.g., pressing the D key) when items and images that represented self or the Ace brand names appeared on the computer screen and required a different response (e.g., pressing the K key) when items that represented other or the Star brand names appeared on the screen. Subjects completed two counterbalanced blocks of trials with each block comprising 36 trials. Phase 3 required subjects to complete an IAT that measured implicit attitudes toward the fictitious brand names that were self-associated in phase 2. The IAT methodology assumes it should be easier to make the same behavioral response (e.g., a key press) to stimulus objects when those objects are strongly associated in memory compared to when they are not. Behavioral responses are captured as a latency, such that faster responses are interpreted as a stronger association. Thus, to the extent that one set of the fictitious brand names is more strongly associated with positive valence in memory, the mean latency of response should be faster (slower) when that brand name shares a response key with pleasant (unpleasant) terms. The pleasant attributes used to represent positive valence were joy, sunrise, warmth, gold, and gift. The unpleasant attributes were death, corpse, vomit, slime, and agony. Subjects then evaluated each individual subbrand, reported their overall attitude toward the Ace and the Star family brands, and indicated their purchase intentions for the brands. The details of these measures are described below. For procedural reasons, the implicit measures preceded the explicit measures. Although most reported experiments counterbalance the order of implicit and explicit measure presentation, a recent meta-analysis suggests that this is not required (Nosek, Greenwald, and Banaji 2005) and recommends that implicit measures be collected

before explicit measures, as was done in this experiment. After the completion of all explicit measures, subjects were debriefed thoroughly and released.

### Self-Report Measures

It was critical that the fictitious brands chosen as stimuli not be asymmetrically preferred *a priori*. Thus, a separate group of subjects ( $N = 29$ ) who did not participate in the main experiment completed a battery of implicit and self-report evaluations of the fictitious brand names. Subjects evaluated each individual brand using a three-item scale. The anchors for these items included good/bad, like/dislike, and pleasant/unpleasant; these items were averaged into a single measure ( $\alpha = .93$ ). Attitude toward the overall family brand (Star or Ace) was measured using a six-item scale (good/bad, negative/positive, useless/useful, worthless/valuable, unpleasant/pleasant, and low quality/high quality;  $\alpha = .95$ ) that was then averaged. Finally, purchase intention was measured using a 9-point single-item scale ("if the need arose, how likely would you be to purchase from (Ace/Star)") anchored by "not likely" and "very likely." Difference scores were then calculated for each of the measures. As expected, no significant differences were found in evaluation of the individual car brand names ( $t(28) = .61, p = .54$ ), evaluation of the family brand names ( $t(28) = 1.09, p = .28$ ), or purchase intention toward the family brands ( $t(28) = .76, p = .45$ ).

### Implicit Measures

Implicit attitudes toward the fictitious brand names were measured using a brand attitude IAT (Greenwald et al. 1998). The procedure for the IAT is described in detail in the appendix. The raw millisecond data were converted using the *D* measure scoring algorithm (Greenwald, Nosek, and Banaji 2003). The *D* measure rescales IAT effects by dividing each individual's millisecond-difference score (the original scoring algorithm) by the pooled standard deviation of the components of the difference score. Comparison to several alternative algorithms suggested that the *D* measure reduced the effect of individual response ability and better captured individual differences. The *D* measure is analogous to an effects size (Greenwald et al. 2003). In all of the studies reported here, one condition was reverse scored so that a positive *D* measure, significantly different from zero, would indicate the existence of an attitude. Again as expected, there was no significant difference in implicit attitude toward the Ace or the Star brands ( $D = .04, t(28) = .51, p = .61$ ). Further, an ANOVA revealed no differences due to order of presentation of categorization tasks ( $F = 1.11, p = .30$ ).

### Results

*Implicit Attitude toward Fictitious Brands.* It was hypothesized that nonvolitional pairing of previously unknown objects (e.g., fictitious brands) with the self-concept would prompt more positive evaluation of the object. Supporting

hypothesis 1, subjects revealed a significant attitude IAT effect ( $D = .15$ ,  $t(35) = 3.71$ ,  $p < .001$ ). Thus, subjects who categorized self and Star brand names revealed a more positive implicit attitude toward the Star brand name, while those who practiced categorizing words representing self and Ace brand names revealed a positive attitude toward the Ace brand name.

*Explicit Attitudes toward Fictitious Brands.* Using the same items used in the pretest (described above), aggregate measures of family brand attitude, individual brand attitudes, and purchase intention were created. Family brand attitude was calculated from evaluations of the Ace and the Star brands on a six-item semantic differential scale (items were anchored with good/bad, negative/positive, useless/useful, worthless/valuable, unpleasant/pleasant, and low quality/high quality). Reliability for both the Ace and the Star brands was acceptable ( $\alpha_{ace} = .95$ ;  $\alpha_{star} = .95$ ). Subsequent analyses of family brand attitude used a difference score between the average evaluation of the two family brands such that a positive number indicated a more positive attitude toward the self-associated brand. Attitude toward each individual brand was measured using a three-item semantic differential scale (items were anchored with good/bad, like/dislike, and pleasant/unpleasant). These three items were then averaged to create a single measure of individual brand attitude. Reliability for the individual Ace and Star brands was acceptable ( $\alpha_{ace} = .93$ ;  $\alpha_{star} = .92$ ). Purchase intention was measured using a 9-point single-item scale ("if the need arose, how likely would you be to purchase from (Ace/Star)"). Subjects reported more positive family brand attitudes ( $M_{family} = .65$ ,  $t(34) = 2.42$ ,  $p = .021$ ), more positive individual brand attitudes ( $M_{subbrand} = .61$ ,  $t(34) = 2.28$ ,  $p = .028$ ), and increased likelihood of purchase ( $M_{PI} = 1.02$ ,  $t(34) = 2.57$ ,  $p = .015$ ) for the brands that had been experimentally associated with the self-concept. Table 1 summarizes the correlations among these measures.

*Relationship between Implicit Associations and Self-Reported Attitudes.* To explore the relationship between the newly formed implicitly measured brand attitudes and the self-reported measures, a series of regressions was completed. In these regressions, the attitude IAT predicted self-reported individual brand attitude ( $R^2 = .11$ ;  $b = 2.21$ ,  $t = 2.04$ ,  $p = .049$ ), self-reported family brand attitude ( $R^2 = .12$ ;  $b = 2.29$ ,  $t = 2.11$ ,  $p = .042$ ), and purchase intention ( $R^2 = .15$ ;  $b = 3.85$ ,  $t = 2.41$ ,  $p = .022$ ).

## Discussion

Experiment 1 found that subjects generated positive implicit attitudes toward fictitious brand names after nonvolitional self-association with those brand names. Critically, the fictitious brand names did not differ in perceived valence or attitude before the self-brand association task that preceded the implicit and self-report attitude measures. This suggests that the act of self-associating with the fictitious brand names, even at the low level that the self-brand cat-

TABLE 1

REGRESSION RESULTS FOR THE TWO-STEP REGRESSION ANALYSIS PREDICTING BRAND ATTITUDE AS A FUNCTION OF SELF-ESTEEM AND SELF-BRAND ASSOCIATION

Variable	Coefficient	SE	t-ratio	p-value
Step 1:				
Self-esteem × self-brand association	.440	.137	3.21	.002
Intercept	.153	.051	3.02	.003
Step 2:				
Self-esteem × self-brand association	.198	.272	.72	.46
Self-esteem	.102	.136	.75	.47
Self-brand identification	.168	.182	.92	.36
Intercept	.092	.091	1.02	.31

NOTE.— $R^2_{step1} = .079$ ,  $F = 10.31$ ,  $p = .002$ ;  $R^2_{step2} = .088$ ,  $F_{change} = .543$ ,  $p_{change} = .58$ .  $N = 122$ .

egorization task required, is enough to create the self-brand association in memory and thus facilitate the creation of the brand-valence association that is measured as an implicit attitude.

One limitation of experiment 1 is that it assumes that the observed implicit self-referencing is driven by experimentally created self-brand associations, but the experiment did not directly measure them. To support the proposal that self-association is the source of this attitude formation, a self-brand association should be observed after the experimental manipulation.

**H2:** Nonvolitional pairing of an object with the self-concept will create an implicit self-association with that object.

Further, it was argued earlier that an individual's self-valence, or self-esteem, should be the source of positive valence that is transferred to a newly self-associated object. This argument is based on the balanced identity framework (Greenwald, Banaji, et al. 2002), which proposes triadic relationships between three specific sets of associations: implicit self-esteem (Farnham et al. 1999; Greenwald and Farnham 2000), implicit attitude (Brunel et al. 2004; Forehand and Perkins 2005), and (in the case at hand) the experimentally created self-object association. These relationships are represented in figure 1. In the current research, it is assumed that a link exists between the self and a cognitive representation of valence, or self-esteem (Farnham et al. 1999; Greenwald and Farnham 2000). After the experimentally induced self-object association in memory, a link between the newly self-associated object and the cognitive representation of valence should automatically form. Greenwald, Banaji, et al. (2002) propose that the interaction term of any two of these associations should significantly predict the third association.

Thus, if implicit attitude formation occurs due to the creation of a second-order association between a neutral object and positive valence associated with the self-concept (Greenwald, Banaji, et al. 2002), the degree to which one self-as-

sociates with positive valence (implicit self-esteem) should influence the magnitude of the created self-concept–attitude relationship. Specifically, implicit self-esteem should moderate the relationship between self-object association and subsequent attitude formation.

**H3:** Implicit self-esteem should moderate the relationship between self-object association and subsequent attitude formation.

To test this proposed process, experiment 2 incorporated an implicit measure of self-esteem before the experimental treatments.

## EXPERIMENT 2

Experiment 2 was designed to examine the full set of relationships among self-brand association, an individual's implicit self-esteem, and brand attitude. To investigate these relationships, experiment 2 uses the balanced identity design framework posited by Greenwald, Banaji, et al. (2002).

### Subjects

One hundred twenty-one college-age students participated for class credit.

### Procedure

The procedure for experiment 2 was generally identical to that described in experiment 1, with a few important changes. First, instead of fictitious brand names, experiment 2 examined product categories, specifically, digital and analog clocks. These product categories were chosen because it was thought that there would be few preexisting self-category associations or attitudes toward them and also because the product categories could be represented as images in the experimental manipulations. To ensure that these product categories were equivalent *a priori*, pretesting similar to that outlined in experiment 1 was completed (see below). Experiment 2 was thus divided into three phases: a stimuli learning task (phase 1), a self-categorization task designed to artificially create manipulated self-object associations in memory (phase 2), and the completion of indirect measures of self-object association, self-esteem, and brand attitude (phase 3). All phases were completed using a personal computer. After completing all three phases, subjects were debriefed and released.

### Stimuli

For experiment 2, images of the product categories analog and digital clocks were used as the target objects for nonvolitional association. These images are presented in figure 2.

To assess the appropriateness of the images representing the product categories analog and digital clocks, a pilot study with a separate group of 31 subjects completed an IAT (Greenwald et al. 1998) that measured implicit attitudes to-

**FIGURE 2**  
DIGITAL AND ANALOG CLOCK STIMULI

**Analog Clocks**      **Digital Clocks**



NOTE.—Color version available as an online enhancement.

ward the analog and digital clock images. This *clock attitude* IAT measured the ease or difficulty with which a subject associated a set of images representing one of the target concepts (e.g., analog or digital clocks) with pleasant and unpleasant terms (the attribute dimension). As expected, there was no significant difference in implicit attitude toward the images of analog and digital clocks, resulting in the *D* measure not differing significantly from zero ( $D = .00, t(30) = .07, p = .95$ ). On the basis of these pretest findings, the images representing the product categories analog and digital clocks were used as stimuli for the main experiment.

### Implicit Measures

The self-esteem IAT was patterned closely on that reported in previous research (Farnham et al. 1999; Greenwald and Banaji 1995; Greenwald, Banaji, et al. 2002). Specifically, subjects were instructed to categorize words that represented the target concepts self or other and the attributes

pleasant and unpleasant. Thus, faster responses when the target concept category self and the attribute category pleasant are mapped on the same response key compared to when self and unpleasant are mapped on the same response key are indicative of positive self-esteem. Similar to the brand attitude IAT used in experiment 1, the clock attitude IAT included the analog and the digital clock images described above and both pleasant (joy, sunrise, warmth, gold, and gift) and unpleasant (death, corpse, vomit, slime, and agony) attributes. The self-product category IAT was identical to the attitude IAT, except that the attribute concepts pleasant and unpleasant were replaced with category items representing either self or other. IAT order was counterbalanced across conditions.

## Results

*Individual IAT Results.* No order effects obtained for either order of IAT presentation or task order. The self-esteem IAT measure revealed a significant implicit self-esteem effect ( $D = .67$ ,  $t(121) = 20.20$ ,  $p < .000$ ). Further, and consistent with experiment 1, subjects demonstrated more positive implicit associations with clock images categorized with the self ( $D = .25$ ,  $t(121) = 5.99$ ,  $p < .000$ ). In addition, categorization also prompted a significant self-clock association ( $D = .28$ ,  $t(121) = 7.92$ ,  $p < .000$ ).

*Balanced Identity Design Analysis of Clock Attitude IAT.* Greenwald, Banaji, et al. (2002) posited specific expected data patterns for balanced identity designs. In general, the data should be fit entirely by the interaction effect in the regression of any one variable on the other two in the first step of a two-step hierarchical regression. The model is said to be good fitting if four criteria are met: the  $R$  in step 1 should account for substantial variance in the criterion and should estimate a numerically positive value for the  $\beta$  of the interaction term ( $C_1$ ), the estimate of the  $\beta$  of the interaction term should also be positive in step 2 ( $C_2$ ), the increment in  $R$  on step 2 should not be statistically significant ( $C_3$ ), and neither  $\beta$  for the individual predictor variables should differ significantly from zero in step 2 ( $C_4$ ). Thus, to analyze the clock attitude IAT data consistent with Greenwald, Banaji, et al. (2002), a two-stage regression was performed. Specifically, the clock attitude IAT was regressed on the interaction term of the other two IATs ( $b_1$ ; self-esteem and self-clock association) and was followed by the inclusion of the individual predictor variables that comprise the interaction term. Consistent with  $C_1$  and  $C_2$ , a substantial  $R$  and positive  $\beta$  in step 1 of the two-step regression is observed (IAT<sub>brand att</sub>:  $R = .28$ ;  $b = .44$ ,  $t = 3.21$ ,  $p = .002$ ), and the  $\beta$  continues to be positive in step 2 (IAT<sub>brand att</sub>:  $b = .20$ ,  $t = .726$ ,  $p = .47$ ). Note that the nonsignificant finding for the interaction term is due to high collinearity among the interaction term and the individual predictors; thus, significance for the interaction term in the second regression is not required. Further,  $C_3$  and  $C_4$  are met: there is no significant change in  $R$  after the second step ( $R_{\text{step 1}} = .28$ ,  $R_{\text{step 2}} = .30$ ;  $R^2_{\text{change}} = .008$ ;  $F_{\text{change}} = .543$ ,  $p = .58$ ),

and neither of the main effects is significant (IAT<sub>self-clock</sub>:  $b = .17$ ,  $t = .92$ ,  $p = .36$ ; IAT<sub>self-esteem</sub>:  $b = .10$ ,  $t = .75$ ,  $p = .46$ ). Thus, consistent with the theorizing in Greenwald, Banaji, et al. (2002), the interaction term fully accounts for the explained variance in the model supporting hypothesis 3.

## Discussion

Experiment 2 was designed to more fully explore the relationship among a self-associated object, the automatic attitude formed toward that object as a result of that self-association, and the individual's self-esteem. Specifically, previous researchers (Gawronski et al. 2007; Greenwald, Banaji, et al. 2002; Tietje and Brunel 2005) have argued that the formation of automatic attitudes should result from the interaction of the self-association with that target object as well as the overall positivity of the individual's self-esteem. To the extent that the individual holds more positive feelings toward himself, we expect to see stronger positive attitudes form toward the object as a result of that positive self-esteem. Further, the pattern of effects was consistent with those predicted by the balanced identity design (Greenwald, Banaji, et al. 2002). Specifically, the interaction between self-esteem and self-clock association fully predicted clock attitude, even after the inclusion of the individual main effects. Thus, these findings both extend previous findings and directly test the proposed mechanism (Gawronski et al. 2007; Greenwald, Banaji, et al. 2002; Tietje and Brunel 2005) for automatic attitude formation. Interestingly, while the  $R^2$  (.08) reported in experiment 3 is relatively small, it is equivalent to the  $R^2$  found in the first study reported in Greenwald, Banaji, et al. (2002;  $R^2 = .11$ ) but smaller than the  $R^2$  reported in the second study ( $R^2 = .20$ ). Other recent studies (Perkins 2009) report  $R^2$  between .06 and .10, similar to previous experiments.

## EXPERIMENT 3

Although experiments 1 and 2 consistently demonstrated that pairing the self with innocuous objects improved attitude toward the objects and that the magnitude of this effect was determined by underlying levels of self-esteem and created self-object association, both experiments used a relatively artificial means of linking objects with the self (computer-based categorization). The question remains whether these implicit self-referencing effects replicate in more natural consumer settings in which the pairing of self-content with stimuli is likely more passive than the categorization used heretofore. To that end, experiment 3 tests whether implicit self-referencing occurs when advertising content is simply presented in close proximity to self-related information, without any logical or directed connection between the two. To create this passive association with naturally occurring self-content, experiment 3 manipulated whether novel brand information was presented proximately to personal information or generic information on a social networking site, with the expectation that brand response will

improve when promotion is proximate to the consumer's personal information.

## Subjects and Procedure

Eighty subjects participated across two separate data collection phases in exchange for \$12. The second data collection phase was conducted in response to a reviewer request, resulting in the nonrandom assignment of participants. After arriving at the laboratory session, subjects were informed that they would be participating in a study designed to better understand opinions toward social networking sites. After being seated in an isolation room, the subjects were informed that they would be comparing two popular social networking websites, Facebook (<http://www.facebook.com>) and Hi5.com (<http://www.hi5.com>). Facebook was selected because it is extremely popular in North America, and it was expected that most subjects would possess a personal Facebook page. In contrast, Hi5.com is very popular in other parts of the world, but not North America, and it was thought that North American subjects would not be familiar with it (none of the subjects reported having an account with Hi5.com).

Subjects were seated in front of a laptop computer (for completing measures) that was connected to a large wide-screen secondary monitor. This secondary monitor had two Internet browser windows open, one to Facebook.com and the other to Hi5.com. After reading and agreeing to an initial release statement, subjects were randomly assigned to compare the Hi5.com interface to either a generic Facebook page or their personal Facebook page. Subjects in the personal Facebook (PF) condition were instructed to sign into their own Facebook.com account. Subjects in the generic Facebook (GF) condition proceeded with the comparison task using the GF page that was already open. All subjects assigned to the PF condition possessed PF pages. Subjects in both conditions were then instructed to explore both the Facebook and the Hi5.com sites and were informed that they would later complete measures evaluating each site's functionality, user friendliness, and features. They could explore for as long as they liked but were instructed to spend equal time on both sites and learn as much about their features as possible. The time spent on each website was tracked, and no significant differences were observed in site exposure during the experiment. Both browser windows remained open as the subjects investigated them—the social networking sites were presented side by side so there was no need to close one site window to view the other.

At the top of both the Facebook page and the Hi5 page was a banner ad that featured a rotating series of promotions for unknown car brands. Each banner ad promoted a single family of auto brands, such that the brands featured on the Facebook banner ad were never featured on the Hi5 banner ad and vice versa. Subsequent response to these sets of car brands served as the critical dependent measure for the experiment (a full description of the brands used is described in the stimuli section below).

After exploring both sites, subjects were asked a series

of questions about the sites. After these questions, subjects completed two IATs, one that measured relative self-association with the two brand families and one that measured relative implicit attitude toward the two brand families. After completion of the IATs, subjects completed a battery of self-report attitude measures toward the car brands and were asked to choose which of the cars they would most like to receive as a prize in a hypothetical lottery. On completion of all measures, subjects read a debriefing statement and were paid and released.

## Banner Ad Stimuli

A set of three banner advertisements per family brand (Ace and Star) that could be embedded in either social networking site was created. These banner advertisements featured the same car brands that had been pretested and used in experiment 1. A total of six car brands were used, three from the Ace brand family (Vitz, Alzo, and Delica) and three from the Star brand family (Ozel, Aristo, and Primera). Each of these fictitious brands was paired with an image of a vehicle unknown to the subjects. These vehicles were specifically chosen from small manufacturers from foreign countries, and none of the models were sold in North America. Examples of these banner ads are presented in figure 3.

A set of transparent hypertext markup language frames was created that seamlessly embedded the banner advertisements in the social networking sites. The format and colors of the banner advertisements were controlled so that they looked as similar as possible. For both social networking sites, the banner advertisements appeared at the top of the page and rotated between different car brands (within the same family) every 5 seconds. An example of an embedded banner advertisement is presented in figure 4.

The presentation of the car brand families was counterbalanced such that half of the subjects saw the Star family

FIGURE 3

BANNER ADVERTISEMENTS USED IN EXPERIMENT 3



NOTE.—Color version available as an online enhancement.

FIGURE 4

## PRESENTATION OF MANIPULATED BANNER ADVERTISEMENTS IN SITU



NOTE.—Color version available as an online enhancement.

banner ad embedded in the Facebook.com site (and the Ace family banner ad embedded in the Hi5.com site), and half of the subjects saw the Ace family banner ad embedded in their Facebook.com site (and the Star family banner ad embedded in the Hi5.com site). The assignment of the Ace and the Star family brands to website type is heretofore referred to as initial brand assignment.

### Implicit Association Tests

Subjects completed two IATs, one measuring relative self-brand association and one measuring relative brand attitude toward the Ace and the Star brands. These IATs were identical to the IATs described previously, with one important difference. Instead of viewing just the brand names for the categorization tasks, subjects now viewed an image that

included the photo of the vehicle coupled with the brand name. The photos were included to facilitate recognition and eliminate the need for the brand-learning task used in experiment 1.

### Self-Reported Attitude Measures

Self-reported measures were identical to experiment 1.

### Product Choice Measure

To create a dependent variable that incorporated actual choice, a free-response choice measure was constructed using the six fictitious automobiles. Subjects were instructed that, as a result of their participation, they would be entered into a drawing in which they potentially could win one of

the vehicles presented in the experiment. Subjects were told that each of the vehicles was approximately the same price and that they would be able to choose the color of the vehicle they wanted if they won. They were then presented with an image of six vehicles and were instructed to choose the vehicle they would like to win most. After making their initial choice, they were instructed to make a second and then a third choice in the same manner.

## Results

**Data Reduction.** Eighty subjects completed the experiment. One subject was removed from the treatment condition due to inattentiveness during the lab session as indicated by the attending research assistant, and one subject was removed from the control condition due to extreme errors on the self-brand association IATs (47.5% errors). This resulted in a total of 78 subjects included for analysis.

**Pretest/Manipulation Checks.** In addition to the main experiment, a separate pretest was conducted to verify that the personal versus generic Facebook manipulation influenced self-concept activation as expected and that it did not produce unintended effects on mood, attitude toward Facebook, or perceived Facebook usability. In the pretest, 38 subjects were randomly assigned to either the personal or the generic Facebook manipulation and then completed a self-concept activation scale featuring seven Likert items (e.g., "Facebook is a part of my self-concept";  $\alpha = .91$ ), a four-item mood scale (Chronbach's  $\alpha = .84$ ; Peterson and Sauber 1983), a four-item Facebook attitude scale (attractive/unattractive, good/bad, pretty/ugly, and pleasant/unpleasant;  $\alpha = .89$ ), and a four-item Facebook usability scale (e.g., "I found the various function of the this website were well integrated";  $\alpha = .85$ ). Consistent with the goals of the manipulation, subjects reported stronger self-activation in the PF condition compared to the GF condition ( $M_{PF} = 6.5$ ,  $M_{GF} = 4.5$ ;  $F(1, 36) = 7.65$ ,  $p < .009$ ). However, logging into one's PF page did not increase positive mood ( $M_{PF} = 9.3$ ,  $M_{GF} = 9.3$ ;  $F(1, 36) = .042$ ,  $p = .84$ ), generate more positive attitudes toward Facebook ( $M_{PF} = 8.4$ ,  $M_{GF} = 7.4$ ;  $F(1, 36) = 2.63$ ,  $p > .11$ ), or influence the perceived Facebook usability ( $M_{PF} = 7.4$ ,  $M_{GF} = 6.9$ ;  $F(1, 36) = 2.24$ ,  $p > .14$ ) compared to examining a GF page.

**Implicit Brand Response.** As discussed in experiments 1 and 2, implicit self-referencing should create more positive response to brands advertised in banner ads on the subject's PF page than to brands advertised on the generic Hi5.com page. No such brand preference should occur for brands advertised on a GF page. To test these hypotheses, self-brand association and implicit brand attitude were measured using the IAT, with effects calculated using the  $D$  measure. The resulting  $D$  scores were adjusted so that more positive  $D$  scores indicated more positive attitude associations with the brands paired with the subject's Facebook page. Consistent with this notion, implicit brand attitude was more positive when brand presentation was embedded within the

subject's own Facebook.com page than when it was embedded into the Hi5.com page ( $D_{att\ PF} = .26$ ,  $t(53) = 4.44$ ,  $p < .001$ ). No such difference in brand attitude was observed when subjects compared a GF to a generic Hi5.com page ( $D_{att\ GF} = -.16$ ,  $t(23) = -1.70$ ,  $p = .10$ ). To fully rule out any effect of Facebook in the observed effects, an ANOVA comparing the PF condition to the GF condition was conducted. This test revealed that the IAT brand attitude effect was significantly greater in the PF condition than in the GF condition ( $F(1, 76) = 15.12$ ,  $p < .000$ ).

**Self-Reported Attitude Measures.** An aggregate difference measure was created from individual semantic differential measures for each of the cars. Each of the six cars was rated across four items (attractive/unattractive, good/bad, pretty/ugly, and pleasant/unpleasant) and then averaged to create a single measure of individual brand attitude for each car ( $\alpha = .935$ ). These individual measures were then averaged to get an overall measure of brand attitude. Finally, a difference measure was created, such that a positive number indicated a more positive attitude toward the car brands embedded in the Facebook.com page compared to the Hi5.com page. These difference scores were not significant in either the PF condition ( $M_{PF} = -.15$ ;  $t(53) = -.59$ ,  $p = .56$ ) or the GF condition ( $M_{GF} = .37$ ;  $t(23) = 1.05$ ,  $p = .30$ ). There was also no difference in evaluation between brands advertised on subjects' PF page and brands advertised on a GF page ( $F(1, 76) = 1.33$ ,  $p = .251$ ). The absence of significant effects on explicit brand attitude suggests that the implicit measures were more sensitive to the association of personal content with the novel stimuli.

**Automobile Choice Measure.** To test whether the observed effects of self-content proximity on implicit attitude generalized to subsequent behaviors, subjects evaluated which of the presented automobiles they would be most interested in receiving as part of a hypothetical lottery. Subjects' top two automobile choices were coded in a binary fashion, such that a score of 1 indicated the choice of an automobile from the appropriate group (e.g., choosing an Ace brand car when the Ace automobiles were embedded in the subject's Facebook.com page), and a score of 0 indicated a choice of an automobile from the inappropriate group. Once coded, a composite measure was created that indicated whether a subject picked an appropriate automobile in any of the top two choices. This measure was submitted to a binomial test of proportions, with the test proportion set to .50. Consistent with predictions, subjects chose automobiles that had appeared in the banner ads embedded in their PF pages significantly more than chance (observed proportion = .72,  $Z = 3.59$ ,  $p = .001$ ). In contrast, automobiles featured in banner ads on a GF page were not chosen more frequently than chance (observed proportion = .54,  $Z = .39$ ,  $p = .84$ ).

**Mediation Analysis and Model Testing.** To assess the role of self-brand association in the relationship between initial brand assignment (pairing of Ace or Star brand family with Facebook) and automobile choice, mediation analysis

was performed using RMediation (Tofghi and MacKinnon 2011). RMediation is a bootstrapping technique that computes a confidence interval for mediated effects rather than using stepwise regression à la Baron and Kenny (1986). RMediation allows for the direct testing of the mediation chain of interest (in the current example, initial brand assignment → self-brand association → brand choice). For this analysis, initial brand assignment was coded as a dichotomous variable, while automobile choice was coded into three states: subjects who self-associated with the Star brand and then picked the Star brand in the automobile choice question, a subject who self-associated with the Ace brand and then picked the Ace brand on the automobile choice question, and subjects who picked brands that were not in the category with which they were initially self-associated. RMediation builds the confidence interval using the distribution-of-product method (MacKinnon et al. 2002) of the two relationships of interest, in this case, the unstandardized regression coefficient ( $a = .17$ ,  $p = .02$ ) and standardized errors ( $s_a = .07$ ) for the relationship between the instrumental variable (initial brand assignment) and the mediating variable (self-brand association), the unstandardized regression coefficient ( $b = .82$ ,  $p = .043$ ) and standardized errors ( $s_b = .40$ ) for the relationship between the mediating variable (self-brand association) and the criterion variable (brand choice), and finally the correlation coefficient between the unstandardized regression coefficients (.31). Mediation is indicated if the calculated 95% confidence interval does not include zero (MacKinnon et al. 2007). RMediation revealed a confidence interval that did not include zero (upper limit = .395, lower limit = .00012,  $p = .053$ ), suggesting that self-brand association mediated the relationship between initial brand assignment and product choice in the PF condition. This pattern of mediation was not found in the GF condition, as no significant relationship was found between initial brand assignment and self-brand association ( $a = -.19$ ,  $p = .16$ ) or between self-brand association and automobile choice ( $b = .08$ ,  $p = .80$ ). It should be noted that although self-brand association mediated the effect of initial brand assignment on product preference, no main effect of PF on self-brand association was observed on the IAT ( $D_{sb\ PF} = .01$ ,  $t(53) = .51$ ,  $p = .62$ ).

## Discussion

The results of experiment 3 support and extend the results reported in the first two experiments. First and foremost, experiment 3 demonstrates that implicit self-brand association effects can develop in completely passive contexts that involve no deliberative categorization with the self. The extension of implicit self-referencing to passive contexts is particularly relevant to the evolution of the Internet to a self-presentation medium. Social networking naturally encourages the development and maintenance of self-related information, and this creates a fertile ground for the cultivation of implicit self-referencing. Experiment 3 also extends our understanding of the implicit self-referencing process by demonstrating that newly formed self-brand associations

mediate the relationship between brand exposure and actual brand choice. In the context of social media, the presence of this mediation is quite important, as it clearly signals implicit self-association as a critical mechanism in the process. Absent this effect, the observed results could be attributed to a simple inference that products advertised on one's PF page had been prescreened for the consumer due to past behavior or interest. However, the mediated results indicate that the observed behaviors are instead a consequence of general self-association.

One surprising result from experiment 3 was the absence of a significant effect of implicit self-referencing on self-reported attitude, an effect that was observed in experiments 1 and 2. The disassociation of explicit and implicit response in experiment 3 suggests that implicit self-referencing may differentially influence impulsive and reflective processing as suggested by current two-system models of social cognition (Gawronski and Bodenhausen 2006; Strack and Deutsch 2004). Strack and Deutsch (2004) posit that reflective processing encourages individuals to cogitate on retrieved information and thereby generate declarative knowledge. In contrast, impulsive processing shapes the underlying associations between concepts, associations that directly influence measures of association and behavior but which may only indirectly influence self-reported attitude. When implicit self-referencing prompts sufficiently strong changes to these underlying associations, one should observe changes not only to implicit associations and behavior but also to self-reported attitude (as was observed in experiments 1 and 2). However, when manipulations of implicit self-referencing are more subtle (as in experiment 3), one would expect the effects to be more pronounced on associational measures and behavior than on self-reported attitude.

Finally, it is unclear why no implicit self-brand association was observed in experiment 3, while this effect was observed under similar conditions in experiment 2. One reason may be the relative subtlety of the manipulation in experiment 3. Rather than actively categorize the target objects to be linked in memory, as was required in experiment 2, subjects merely observed the target objects (car brands) while interacting with the social media websites in a natural setting. Moreover, the results of the mediation analysis and the observed significant implicit attitude suggest that, even though the manipulation was not strong enough to generate the self-brand association observed in experiment 2, exposure to the advertisements did affect brand choice, and this choice was mediated by subjects' self-brand association.

## GENERAL DISCUSSION

The purpose of these studies was to test whether pairing the self with an innocuous or unknown object would facilitate the creation of positive attitudes toward those objects and to assess the process by which such effects occur. The results suggest that such pairings do indeed improve object evaluation, that implicit self-esteem moderates this effect, and that created self-object association mediates choice behavior.

Further, this effect seems to result from not only basic self-categorization tasks (experiments 1 and 2) but also passive exposure to objects proximate to self-related content (experiment 3). In experiment 1, subjects were exposed to a list of fictitious brand names for 30 seconds and then completed two blocks of 32 trials, seeing each brand name four times in each block. In experiment 2, subjects completed two blocks of 40 trials in a similar fashion. The observation of these effects after a relatively trivial manipulation suggests that the act of self-association may be automatic under certain conditions. As discussed earlier, previous researchers (Gawronski et al. 2007) have generated similar effects with either ownership of the target object or deliberative self-association. In the current research, these automatic attitudes were observed not only without any ownership of the target object but also without an explicit connection of the object to the self.

These results also suggest a number of interesting subsequent research questions. First, what is the nature of these automatically formed brand attitudes resulting from nonvolitional processes? Specifically, are they long lasting, similar to well-established brand attitudes? Although some current research (Olson and Fazio 2006; Walther et al. 2009) suggests that attitudes created by methodologies such as evaluative conditioning can lead to long-lasting attitudes, it is unclear whether attitudes resulting from nonvolitional self-association are similar. It could be the case that attitudes resulting from nonvolitional self-association require further reinforcement after initial formation. Second, what sorts of marketing phenomena are likely to trigger nonvolitional versus volitional self-associations? Experiment 3 sheds some light on this question, suggesting that just the appearance of a novel brand (in this case, within an embedded web advertisement) is enough to create the self-association required for attitude formation. However, most marketing efforts attempt to get the consumer to actively engage in self-relevant cognition on his or her similarity or relevance to the brand. Previous research on consumption-based self-referencing suggests that the process of relating attributes of the product or advertisement to the self can increase recall of the information presented in the ad and increase product evaluations. However, those earlier experiments were executed under high-involvement, high-cognition conditions, with few exceptions (Meyers-Levy and Peracchio 1996). The current results suggest that, in some instances, a form of self-referencing occurs without any conscious attention or awareness. To the extent that a person's self is unconsciously activated, perhaps by the unattended processing of a self-relevant object, persuasive message, or advertisement, it is possible that a link between the self and the product or brand referenced in the ad or message could form with little or no conscious cognition. Should that link form, the current research suggests that a positive attitude toward the

product or brand would be the result. Again, further research is required to tease apart the boundary conditions that separate nonvolitional versus volitional self-associations.

Given that a great deal of consumer experience occurs with low cognitive involvement and attention (Bargh 2002), the potential for such implicit self-referencing is vast. Objects and brands that are present in a consumer's living environment could easily become associated with the consumer's sense of self without the consumer actually using or owning the product. Although this repeated self-association in many ways mirrors a mere exposure effect (Bornstein 1992; Bornstein and D'Agostino 1992; Zajonc 1968), the current results clearly depend on a degree of implicit self-association and not just frequent exposure. In each of the current experiments, stimuli paired with "others" are seen just as frequently as are stimuli paired with the self, but only those stimuli paired with the self engender more positive responses.

As evidenced by experiment 3, social networking provides a particularly rich domain for potential implicit self-referencing effects. Consumers are increasingly comfortable posting a wealth of personal information online. Such digital extroversion certainly creates opportunities for marketers to effectively target and embed their appeals. Moving beyond focused targeting, the provision of self-related content also creates the potential for greater attachment and loyalty to online properties, simply due to implicit self-referencing. Most importantly, these effects appear to begin at very low levels of processing with only passive pairings of self and content.

More broadly, any advertising that targets groups that are associated with the consumer's self-concepts may also produce trivial self-association. If a brand is repeatedly paired with one of a consumer's identity groups, that brand should become associated with the consumer's self-concept by proxy. The current results suggest that such an association should produce more favorable responses to the brand, absent any ownership or usage of the brand. More broadly, the positive effects of this self-association should occur without any inference process as would be expected in classic models of balance theory (Heider 1958). Future research should investigate whether the effects of implicit self-association extend to secondary and tertiary associations.

The effects discussed also suggest that mere ownership (Beggan 1992; Heider 1958) could be reconceived in terms of potential automatic associations with the self. A self-reported attitude may be the result of an automatic linking of an object to the self, resulting in the formation of a secondary link between that object and positive valence. When a person is repeatedly exposed to an object, an association with self may develop. This self-association could in turn lead to the formation of a link between positive valence and the object.

## APPENDIX

### GENERAL PROCEDURE FOR IMPLICIT ASSOCIATION TESTS, ALL EXPERIMENTS

The IAT procedure has five steps. While we describe here the implicit brand attitude IAT used in experiment 1, all of the IATs used in this article follow the same basic procedure but differ in which stimuli are included. The implicit brand attitude measures the strength of association between a set of target concepts (in this case, Ace and Star brand names) and a set of attributes (in this case, the concepts of pleasant and unpleasant). First, the subject sorts items representative of the attribute categories pleasant (e.g., good, wonderful, or fabulous) and unpleasant (e.g., bad, horrible, or terrible). Categorization is accomplished using a computer keyboard, such that respondents press the D key when an item representing pleasant is displayed or press the K key when an item representing unpleasant is displayed. This initial categorization task comprises 20 separate trials. The second step is similar to the first but requires the categorization of the target concepts of interest, in this case, the fictitious brand names. In the third step, these categorization tasks are combined such that a respondent is required to press the same response key (the D key) when one of the fictitious brands (e.g., Ace) or a pleasant attribute is displayed or press a competing response key (the K key) when the other fictitious brand (e.g., Star) or an unpleasant attribute is displayed. This third block comprises 64 trials total. The fourth step requires sorting the brand names once again but with the response key assignment reversed, so that subjects who initially categorized the Ace brand using the D key now respond to that category using the K key and vice versa. There are 40 trials included in step four. Finally, the fifth step is identical to the third step, with the exception that the brand name key assignments mirror the fourth step: a respondent is required to press the same response key (the D key) when a brand name representing Star or a pleasant attribute is displayed or press the competing response key (the K key) when a brand name representing Ace or an unpleasant attribute is displayed.

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CORRECTION.—Since this article was published online on September 20, 2011, corrections have been made. In the experiment 1 procedures, "gift" is now listed with the pleasant attributes of joy, sunrise, warmth, and gold. In the description of the experiment 3 product choice measure, participants chose from six vehicles, not eight. Corrected on March 27, 2012.