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DECOMPOSING THE IMPLICIT SELF–CONCEPT: THE RELATIVE INFLUENCE OF SEMANTIC MEANING AND VALENCE ON ATTRIBUTE SELF–ASSOCIATION

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Although past research has repeatedly demonstrated that the implicit self–concept contains a wide variety of attributes, the underlying basis of these associations is less clear. Four studies assess the extent to which self–associations are premised on semantic meaning and valence. In each study, subjects generated self–descriptive attributes and then completed identity IATs that measured the relative strength of association between their self and different versions of the generated attributes. Subjects demonstrated stronger self–associations with their personally generated attributes than with (1) attributes that differed in semantic meaning but not valence (Experiments 1 and 2) and (2) attributes that differed in valence but not semantic meaning (Experiment 3). Finally, subjects exhibited stronger self–associations with attributes that shared semantic meaning (but not valence) with their generated attributes than with attributes that shared valence (but not meaning). These results suggest that although both valence and semantic meaning contribute to the strength of association between

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attributes and the self, semantic meaning is the primary basis of association in the implicit self–concept.

The self is often considered the central organizing structure in memory (Greenwald et al., 2002; Greenwald & Pratkanis, 1984). It colors perception, acts as a filter for action, and influences motivation. To assess the cognitive structure of the self, researchers have studied how individuals perceive and process self–related information using both explicit and implicit methodologies (Greenwald & Banaji, 1995; Hetts, Sakuma, & Pelham, 1999; Higgins, 1987; Higgins, Klein, & Strauman, 1985; Markus, 1977; Markus & Nurius, 1986; Rogers, Kuiper, & Kirker, 1977; Spalding & Hardin, 1999). For example, the association between attributes and the self–concept has been shown to influence automatic evaluations (Bargh & Chartrand, 1999; Bargh, Chen, & Burrows, 1996), automatic stereotyping (Devine, 1989), and mood regulation (Chartrand & Bargh, 1999).

To increase our understanding of these processes, this project breaks down the fundamental building blocks of these self–concept effects by assessing the relative importance of semantic meaning and valence on self–attribute associations in memory. The measurement of these self–associations is frequently problematic given the human desire to perceive the self in a positive light (Brown, 1986; Greenwald, 1980; Greenwald, Bellezza, & Banaji, 1988; Greenwald & Farnham, 2000; Taylor & Brown, 1994). Given these human tendencies, it is not completely clear whether people's self–associations are driven by the underlying meaning of the concepts in question or simply by the perceived favorability of the concepts in the context at hand.

One specific implicit methodology that allows deep inspection of the structure of the self is the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998). Through the use of latency–based categorization tasks, the IAT is argued to accurately measure the strength of association between the self and various concepts in memory. To ascertain the relative influence of valence and semantic meaning in the implicit self–concept, we use the IAT to measure the degree to which people self–associate with a variety of attributes derived from their own self–descriptions.

THE IMPLICIT SELF

Every person possesses an extensive collection of characteristics, traits, and memberships that uniquely describe that person as an individual. Given the diversity of elements that can describe an individual, individuals constantly refine their beliefs about themselves and organize these beliefs into an elaborate knowledge structure or *self* (Greenwald & Pratkanis, 1984; Markus, 1983). It is thought that the associations that comprise the self are created via a variety of ways, including personal experience, social learning, media exposure, and numerous unconscious learning processes (Collins & Loftus, 1975). These self–associations may be strengthened with increased exposure, reinforcement, or 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 introspection with regards to the self (Greenwald et al., 2002; Greenwald & Pratkanis, 1984; Markus & Nurius, 1987; Rogers et al., 1977; Ruvolo & Markus, 1992).

Early research by Markus and others (Markus, 1977, 1983) observed that self–reported attributes were more strongly associated with self than were non–self–reported attributes. The current project moves beyond this basic finding and attempts to discern the underlying elements that make an attribute self–relevant. In other words, why does an individual claim an attribute to be self–descriptive in the first place? It is argued here that there are two main bases for this assessment: how positive the attribute is, and how well the attribute meshes with the individual's existing self–description. In general, the more positive the attribute is, the more likely an individual is to believe it is self–descriptive. Prior research has shown strong evidence that individuals tend to present themselves in the most positive light, both to themselves and to others (Devine, 1989; Greenwald & Banaji, 1995). Further, attributes that are consistent with existing self–descriptions are more likely to be recognized, encoded and remembered, since they fit more easily into already established mental representations of self (Markus, 1977; Markus & Sentis, 1982; Symons & Johnson, 1997).

Various measures have been used to ascertain the strength of association between the self and self–descriptive attributes, including self–reported listing tasks (Higgins, 1987; Markus & Nurius, 1986) and response time measures (Markus, 1977). In many of these studies, subjects were required to respond to preselected attributes, or to respond to attributes that were thought to be a priori schematic or aschematic. Further, these studies tended to focus on a propensity of subjects to choose or respond to attributes as evidence of positive self–bias or differences between various possible selves, but not on the semantic content of the attributes themselves. Thus, the current research explores the extent to which attribute valence and semantic meaning contribute to the association of attributes with the implicit self–concept.

To illustrate this distinction, consider the attribute *intelligent*—an attribute many people include in their self–concepts. A strong association between *self* and *intelligent* could conceivably be due to some combination two characteristics of the attribute *intelligent*: the strong positive valence associated with the attribute *intelligent* (or conversely, the strong negative valence associated with its antonym) and/or the semantic meaning of intelligent. Given that network models of memory posit that concepts are linked both to the semantic meaning of the concept and to the concept's valence (Collins & Loftus, 1975), unconscious activation of an object in memory should incorporate both semantic and valence information. As a result, it is likely that both semantic meaning and valence contribute to self–association, but their relative influence is unclear.

To assess the relative influence of semantic meaning and valence on the association of attributes with the implicit self–concept, the current project measures attribute association using the IAT. The IAT is particularly well suited to the study of the implicit self–concept since it allows researchers to unobtrusively assess the degree of association between attributes and the implicit self–concept. Unlike traditional self research that assesses explicit self cognitions (Brown, 1998), IAT–based self research is argued to reveal strength of association with the self independent of the presentation biases that often bias explicit reporting of self attributes. Moreover, implicit measurement of the self allows more direct assessment of associations that have developed via either explicit cognition (with conscious awareness) or implicit cognition (in an automatic or unconscious fashion) (Bargh, Chaiken, Govender, & Pratto, 1992; Devine, 1989; Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Greenwald & Banaji, 1995; Hetts et al., 1999). Although previous research using the IAT has used positive and negative attributes as cognitive representations of valence in memory (Greenwald et al., 2002; Greenwald & Farnham, 2000; Greenwald, McGhee, & Schwartz, 1998), or semantically meaningful representations of the self (Greenwald & Farnham, 2000), no research has examined which of these characteristics might define self–attribute associations as uncovered by the IAT.

OVERVIEW OF EXPERIMENTS

Four experiments were conducted to determine the relative influence of valence and semantic meaning on the strength of association between self–relevant attributes and the self–concept. Prior to experimental data collection, the experimenters conducted pretests to identify attributes that subjects often used in self–descriptions. Fifty common attributes were identified (these attributes are hereafter referred to as *actual*). One hundred fifty–one subjects who did not participate in the main experiments evaluated the identified actual attributes on two seven–point semantic differential items anchored with *good/bad* and *pleasant/unpleasant* respectively. Scores from the two items were averaged to produce an overall valence score for each attribute (Chronbach's alpha = .86). Any attribute scoring significantly above the midpoint on the scale was considered positive; any attribute that failed to score significantly higher than the midpoint on the scale was considered neutral/negative. Only those attributes that scored significantly higher than the midpoint were approved for use as actual attributes. This pretest produced a list of 46 positive attributes (the full list of positive attributes is provided in the first column of Table 1).

For each of the approved actual attributes, the experimenters developed three corresponding words that differed from the actual word either in valence, semantic meaning, or both valence and semantic meaning. The first set of constructed attributes included pure antonyms—attributes that possessed a valence and

TABLE 1. Experiment 2 Word List

Actual	Opposite (Opp)	Sim.Def/Opp.Val	Opp.Def/Same Val
Ambitious	Lazy	Cutthroat	Easygoing
Analytical	Illogical	Calculating	Free–thinking
Artistic	Technical	Artsy	Scientific
Attractive	Ugly	Showy	Unassuming
Beautiful	Ugly	Showy	Unassuming
Caring	Uncaring	Overbearing	Self–loving
Compassionate	Unfeeling	Bleeding Heart	Unchanging
Competitive	Passive	Driven	Laid Back
Conservative	Liberal	Traditional	Activist
Creative	Unimaginative	Artsy	Orthodox
Curious	Apathetic	Snooping	Unconcerned
Cute	Ugly	Sappy	Unassuming
Dependable	Unreliable	Unswerving	Varying
Determined	Weak	Stubborn	Easygoing
Driven	Apathetic	Obsessed	Relaxed
Emotional	Unfeeling	Thin–Skinned	Unaffected
Feeling	Uncaring	Bleeding Heart	Stable
Flexible	Stubborn	Submissive	Steadfast
Fun	Boring	Rambunctious	Relaxed
Funny	Humorless	Silly	Profound
Goal–Oriented	Unfocused	Intense	Carefree
Hardworking	Lazy	Overachiever	Relaxed
Helpful	Unhelpful	Meddlesome	Challenging
Honest	Dishonest	Blunt	Guarded
Humble	Arrogant	Meek	Proud
Humorous	Humorless	Silly	Profound
Independent	Dependent	Loner	Team–Oriented
Intelligent	Unintelligent	Brainy	Deliberate
Joyful	Unpleasant	Rowdy	Even–tempered
Kind	Mean	Patronizing	Challenging
Knowledgeable	Ignorant	Brainy	Basic
Logical	Illogical	Calculating	Free–thinking
Loyal	Disloyal	Unyielding	Independent
Mature	Childish	Stuffy	Young at heart
Neat	Messy	Clean–Freak	Accommodating
Outgoing	Reserved	Showy	Inconspicuous
Patient	Impatient	Passive	Proactive
Playful	Serious	Silly	Deep
Relaxed	Stressed	Lazy	Active
Self–Reliant	Dependent	Loner	Team–Oriented
Sensitive	Unfeeling	Bleeding Heart	Unwavering
Skinny	Fat	Gangly	Stout
Spontaneous	Reserved	Foolhardy	Consistent
Strong	Weak	Aggressive	Flexible
Strong–willed	Weak–willed	Stubborn	Flexible
Thoughtful	Mindless	Brooding	Decisive

meaning opposite to the corresponding actual attribute (e.g., for the actual attribute *ambitious*, an opposite attribute would be *lazy*). These words are hereafter referred to as *opposite*. The second set of attributes included attributes that possessed a similar valence but a meaning opposite to the corresponding actual attribute (e.g., for the actual attribute *ambitious*, a similarly valenced but opposite meaning attribute is *easygoing*). These attributes are hereafter referred to as *ODSV* (Opposite Definition/Same Valence*)*. The final set of attributes included attributes that possessed an opposite valence but similar meaning to the corresponding actual attribute (e.g., for the actual attribute *ambitious*, an opposite valence but similar meaning attribute would be *cutthroat*). These attributes are hereafter referred to as *SDOV* (same definition/opposite valence*)*. The complete attribute lists appear in Table 1.

To ensure that the generated attributes differed from the actual attributes on the intended dimensions, manipulation checks were conducted to assess degree of semantic similarity and valence. The first manipulation check assessed whether the opposite and ODSV attributes were perceived to differ from the actual attributes in meaning. A single–item scale ("how similar is the word _____ to the word _____") was used to assess semantic similarity between the generated attributes and the original actual attributes from which they were derived. This manipulation check confirmed that the opposite and ODSV attributes were considered dissimilar to the subject–generated actual attributes ($p < .001$), while the SDOV attributes did not significantly differ from the subject–generated actual attributes ($p > .10$).

A second manipulation check assessed the relative positivity of the actual attributes and the three lists of generated attributes. Subjects responded to a two–item seven–point semantic differential scale anchored by *good/bad* and *pleasant/unpleasant*. Responses to both items were averaged to obtain a measure of perceived valence for each of the generated attributes (Chronbach alpha = .91). As intended, subjects reported more positive attitudes toward actual attributes than toward opposite or SDOV attributes (actual M = 5.98, opposite M = 2.59, $t(87) = 19.41$, $p < .001$; SDOV M = 3.39, $t(88) = 15.48$, $p < .001$). Subjects also evaluated the ODSV attributes more positively than the opposite or SDOV attributes (*ODSV* M = 5.25, opposite $M = 2.59$, $t(81) = 11.98$, $p < .001$; SDOV $M = 3.39$, $t(82)$

= 4.11, $p < .001$). Both opposite and SDOV attributes were judged to be significantly more negative than the midpoint of the scale (both *p* values < .001).

Although the actual and ODSV attributes were evaluated more positively than the SDOV and opposite attributes, we did not observe perfect equivalence between attitudes toward the actual attributes and their ODSV counterparts (actual $M = 5.98$, ODSV $M = 5.21$, $t(86) = 5.04$, $p < .001$). Although statistical equivalence between the actual attributes and the ODSV attributes was desirable, it should be noted that both sets of attributes were rated significantly more positively than the midpoint on the averaged attribute attitude scale (actual $M = 5.98$, $t(47) = 22.02$, $p < .001$; ODSV $M = 5.18$, $t(41) = 7.96$, $p < .001$), and it is argued that the difference in measured attitude between the actual attributes and the ODSV attributes, while statistically significant, cannot account for the magnitude of the IAT effect found in Experiment 1 (described below).

To assess the relative influence of semantic meaning and valence, four experiments were conducted using these generated word lists. To help describe these experiments, we will again use the actual word *ambitious* as an example. The first two experiments assessed the influence of changing semantic meaning while keeping valence constant. Specifically, Experiment 1 compared the self–associations of positive attributes that were semantically incongruent (e.g., ambitious versus easygoing). Experiment 2 used a similar comparison in the domain of negative attributes (e.g., cutthroat versus lazy). Experiment 3 assessed the influence of changing valence while keeping semantic meaning constant (e.g., ambitious versus cutthroat). Finally, Experiment 4 directly compared the relative influence of changing valence while keeping semantic meaning constant (cutthroat) to changing semantic meaning while keeping valence constant (easygoing).

INDIVIDUALIZED IAT DESIGN

The Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) was used to measure strength of association between the target attributes and the implicit self–concept. Although the first published research using the IAT methodology was designed to measure implicit attitudes towards different objects or groups (insects vs. flowers, Blacks vs. Whites; Greenwald, McGhee, & Schwartz, 1998), researchers have expanded the IAT to effectively measure self–esteem and the self (Greenwald & Farnham, 2000), stereotypes and attitudes (Banse, Seise, & Zerbes, 2001; Greenwald et al., 1998; Kuehnen et al., 2001), ingroup/outgroup associations (Ashburn–Nardo, Voils, & Monteith, 2001) and gender identity (Greenwald et al., 2002). The current research uses IATs designed to ascertain self association with various sets of descriptor attributes.

In a computer–controlled environment, subjects categorize *target concepts* (the objects of interest in memory, for example *self* or *other*) and *attributes* (potential descriptors of the target concepts, for example *intelligent* or *lazy*) in two task configurations: each target concept and attribute pairing is assigned to one of two input keys in the first task (self and intelligent assigned to one key, other and lazy assigned to another key), then the pairs are crossed for the second task (other and intelligent, self and lazy). To the extent that one of the target concept/attribute pairs is more strongly associated in memory, subjects should respond more quickly when that target concept/attribute pair (self and intelligent) is assigned to the same key compared to when the crossed pair is assigned to that key (self and lazy). The difference in response times between the two target concept/attribute configurations is interpreted as a relative difference in the strength of association between the target concept (self) and the two attributes (intelligent versus lazy). Thus, faster responses when self and intelligent are paired together compared to when self and lazy are paired together suggests that individuals have a stronger association between self and intelligent than self and lazy.

Using the four sets of attributes in Table 1, several idiosyncratic self IATs can be constructed. To ensure that individuals were presented with actual attributes that were representative of their own selves, a customized IAT was designed for each subject. In Experiments 1 and 3, individuals categorized their own idiosyncratic attributes in comparison with sets of words that were generated specifically for each individual's actual attributes.

Experiments 2 and 4 required categorization of attributes that were chosen based on the subjects' actual self–descriptive attributes, but did not include those actual attributes.

EXPERIMENT 1

DESIGN AND OVERVIEW

Experiment 1 was conducted to determine whether subjects would reveal differential self–associations amongst attribute categories that varied in terms of semantic meaning yet were similar in valence. Thus, Experiment 1 compelled subjects to categorize self–representative words with actual self–attributes (e.g., ambitious) versus attributes that were opposite in semantic meaning but similar in valence (e.g., easygoing). By controlling valence, the influence of semantic meaning on the self–attribute association could be observed.

Subjects. Students from an introductory class at a large west coast university participated for class credit. After coding responses to pre–selection instruments, 33 students were qualified to participate in the experiment. The selection process is described below.

Higgins' Selves Questionnaire. During the first week of classes, all subjects were assigned the Higgins' Selves Questionnaire (1987). Subjects were instructed to generate a list of up to ten one–word attributes that describe their actual self–domain. The instructions were as follows:

"On this page, please make a list of one–word attributes that describe the type of person you think you actually are. This is called your actual self. Please limit yourself to one–word attributes. Please try to fill in as many of the blanks as you can." Beneath the instructions, ten blank lines were provided for the subjects to provide attributes. Students completed the Higgins' Selves Questionnaire, and submitted them during the first week of class, three weeks prior to data collection.

Subject Qualification . Subject's responses on the Higgins' Selves Questionnaire were coded for inclusion in individualized IATs. Subjects were qualified to participate in the experiment if they generated at least three positive actual self–domain attributes that were on the original list of 46 acceptable actual attributes.

IAT Procedure. Three weeks after the completion of the Higgins' Selves Questionnaire, subjects completed a customized IAT procedure that incorporated each subject's self–reported idiosyncratic self–domain attributes. Each of these IATs used three attributes that the subject self–reported as descriptive of their self–domain (e.g., ambitious), and three words that were opposite in definition, yet the same valence as the subject's provided attribute (e.g., easygoing). In addition to these attributes, each IAT also incorporated target concepts that represented either self (e.g., me, my, mine, I, self) or other (e.g., you, yours, your, other, them). The procedure was consistent with previous administrations of the IAT (Greenwald, McGhee, & Schwartz, 1998). Instructions for performing the IAT were presented both on–screen and orally by the experimenter.

Experiment 1 (and all subsequent experiments in this report) was designed to address a potential confound in IAT research related to the target category names used in the IAT. Specifically, some research (De Houwer, 2001; Fazio & Olson, 2003) has found that target category names can affect subject performance on the IAT, while other researchers (Brendl, Markman, & Messner, 2001) have shown that the stimulus items within a category influence interpretation of the target category (Mitchell, Nosek, & Banaji, 2003; Nosek, Greenwald, & Banaji, 2005b). Nosek and colleagues (Nosek, Greenwald, & Banaji, 2005a) suggest that the truth is somewhere between these extremes. Regardless, it is possible that the category names could influence responses. To address this issue, subjects performed a computer–based learning task prior to completion of the individualized IATs. The learning task required subjects to memorize two categories presented on the computer screen, innocuously titled "Category R" or "Category K" (various letters were used). The two categories contained three attributes each. These attributes were chosen so that one of the categories ("Category R", for example) included the subject's provided attributes, while the other category ("Category K") included attributes that were semantically different but identical in valence to the subject's generated attributes. Subjects were unable to proceed in the experiment for 30 seconds while the two categories were presented. They were presented concurrently on the screen, side by side. Following the 30 second exposure, the subjects completed two additional categorization tasks, allowing them to practice categorizing the stimulus items under the newly learned category names. Subjects then completed the IAT described above, were debriefed, and released.

The D Measure. The generated data was analyzed using the *D* measure (Greenwald, Nosek, & Banaji, 2003). The calculation of the *D* measure allows its use as an effects size, similar to Cohen's *d* (Cohen, 1977). Specifically, data from the combined practice and combined test blocks was included in the analysis. All trials with greater than 10,000 ms latencies were deleted, and subjects with more than 10 percent of their response latencies below 300 ms were removed from the dataset. Standard deviations were calculated for the practice (blocks 3 and 6) and test (blocks 4 and 7) data, and means were calculated for each of the practice and test blocks (3, 4, 6, and 7). Two difference scores were then calculated (one between blocks 3 and 6, and one between blocks 4 and 7). These difference scores were divided by their associated standard deviation, and then these quotients were averaged.

Results. Experiment 1 required categorization of words representing the self (e.g., me, my, mine) with actual attributes (e.g., ambitious) versus attributes that were opposite in definition yet similar in valence (e.g., easygoing). A significant IAT effect obtained, $D = .48$, $SD = .33$, $t(32) = 8.46$, $p < .001$, indicating that subjects responded more quickly when self items and actual attributes (e.g., ambitious) were assigned to the same key than when self words and attributes that were semantically different but similar in valence (e.g., easygoing) were assigned to the same key. Note in Experiment 1 that, while the actual and ODSV attributes were statistically different in terms of valence, both sets of words were significantly more positive than the midpoint on the rating scale, suggesting that subjects perceived both sets of words positively.

The *D* measure may be converted to an effects size *d* (similar to Cohen's *d*) for comparative purposes by dividing it by its standard deviation. Performing this calculation produces a statistic equal to 1.47, considered a large effect by convention (Cohen, 1977).

DISCUSSION

Experiment 1 provides evidence that semantic meaning is an important determinant of attribute self–association. As mentioned earlier, although the ODSV attributes scored marginally lower in valence than did the actual attributes, the overwhelming difference between the actual and ODSV attributes was in semantic meaning. As a result, it is unlikely that the large IAT effect found in Experiment 1 is due to the slight difference in valence, and it therefore is argued that the semantic differences between the attribute sets are driving this IAT effect.

The observation that semantic meaning influences self–associations in memory is consistent with self–verification theory (Swann, 1990). Self–verification theory suggests that individuals usually consider it more important to be known (in terms of descriptive characteristics) than to be evaluated positively, except in cases of threat or uncertainty. Given that no threat is present in Experiment 1, self–verification may contribute to the observed effect.

To test the effect of semantic meaning in a domain less influenced by self–verification, a second experiment was conducted that manipulated semantic meaning in a *negative* context. Specifically, Experiment 2 compared subject self–association with attributes that are similar in definition but opposite in valence to subject self–association with attributes that are opposite in both semantic meaning and valence. If the results of Experiment 1 are due to semantic meaning in general, then these negative, yet semantically consistent, attributes should be more closely associated with the self than are similarly negative attributes that are semantically inconsistent.

EXPERIMENT 2

Subjects. Students from an introductory class at a large west coast university participated for class credit. After coding responses to pre–selection instruments, 39 students were qualified to participate in the experiment.

IAT Procedure. The procedure for Experiment 2 was similar to Experiment 1. In this experiment, the attribute categories included words that were either opposite in valence and definition from the subject–provided attributes, or were identical in semantic meaning to those attributes but negatively valenced. Thus, the negative valence of both attribute sets is constant, allowing any observed effects to be attributed to the differences in semantic meaning between the attribute categories

IAT Scoring. The IAT scoring procedure was identical to Experiment 1.

Results. Experiment 2 required categorization of the self–related words (me, mine, my) with opposite attributes (e.g., lazy) versus words that were similar in definition yet opposite in valence (e.g., cutthroat). A significant IAT effect obtained, $D = .27$, $SD = .47$, $t(38) = 3.61$, $p = .001$, indicating that subjects responded more quickly when self items and attributes that were similar in semantic meaning yet opposite in valence (e.g., cutthroat) were assigned to the same key than when self words and attributes that were but opposite in both semantic meaning and valence (e.g., lazy) were assigned to the same key. Similar to Experiment 1, calculation of the effects size d yields a statistic of .58, a medium to large effect size.

DISCUSSION

Similar to Experiment 1, Experiment 2 varies one of the two components of the attribute category, semantic meaning. However, different from Experiment 1, the valence of both compared attribute categories was negative, suggesting that semantic meaning has influence across the full range of positive and negative attributes.

EXPERIMENT 3

Experiments 1 and 2 provide evidence that semantic meaning is a critical component of the propensity to self–associate with various attributes. However, this does not mean that valence is not expected to play an important role in the self–association of attributes. As discussed earlier, it is expected that, all things being equal, valence should influence self–attribute associations, given that individuals are motivated to consider themselves in the most positive light, both for self and social presentation reasons.

Thus, Experiment 3 was designed to assess whether changes in attribute valence alone could produce differential self–attribute association. IATs in this experiment pitted actual self–attributes (e.g., ambitious) against attributes that were similar in semantic meaning but opposite in valence (e.g., cutthroat). By holding semantic meaning constant, it should be obvious whether attribute valence affects self–attribute association.

Subjects. Students from an introductory class at a large west coast university participated for class credit. After coding responses to pre–selection instruments, 33 students were qualified to participate in the experiment.

IAT Procedure. Experiment 3 was identical to Experiment 1, with the exception of the attribute characteristics.

IAT Scoring. The IAT scoring procedure was identical to Experiment 1.

Results: Experiment 3 required categorization of the self–related words (me, mine, my) with actual attributes (e.g., ambitious) versus words that were semantically different yet similar in valence (ODSV; e.g., cutthroat). A significant IAT effect obtained, $D = .64$, $SD = .49$, $t(33) = 7.61$, $p < .001$, indicating that subjects responded more quickly when self items and their actual attributes (e.g., ambitious) were assigned to the same key than when self words and attributes that were semantically similar but opposite in valence (e.g., cutthroat) were assigned to the same key. Similar to Experiment 1, calculation of the effects size d yields a statistic of 1.31, a large effect size.

DISCUSSION

The results of Experiment 3 suggest that attribute valence is an important determinant of implicit self–association. From a theoretical standpoint, this is consistent with prior findings that describe attitudes as direct links between an object and an evaluative component in memory (Fazio, Chen, McDonel, & Sherman, 1982; Fazio, Powell, & Herr, 1983; Fazio et al., 1986). These results suggest that the affective component of the mental representation of an object may be automatically activated when a person is primed with that object. Consistent with these findings, the present research reveals these semantic (object) and valence (evaluation) components in memory. Further, this result is also consistent with recent theorizing about the structure of self (Greenwald et al., 2002), suggesting that attributes associated with the self share links with a valence concept in memory. To the extent that attributes are positive and associated with the self, it is expected that the positive valence associated with those attributes would contribute to self–esteem.

Further, comparison of effects size supports the notion that semantic meaning is a relatively stronger contributor to self–association than valence, with the difference in effects size between Experiment 1 and Experiment 3 equal to .16, a small but meaningful difference. However, a stronger test of the relative influence of semantic meaning and valence on self–associations is possible: directly compare attributes that are semantically similar but negative (compared to the subject's self–reported attributes) to a set of attributes that are semantically different yet positive.

Experiment 4 was designed to directly test the relative importance of valence and semantic meaning on responses to the IAT, and thus the strength of association between attributes and the self in memory. Experiment 4 has the potential to provide specific evidence of the influence of either semantic meaning or valence as the primary source of information upon which the attributes are categorized.

EXPERIMENT 4

Experiment 4 required categorization of self with attributes that were similar in definition yet opposite in valence (e.g., cutthroat) versus attributes that were opposite in definition and similar in valence (e.g., easygoing) to each subject's self–generated idiosyncratic attributes. Similar to Experiment 2, subjects no longer used their own actual self–attributes, but categorized attributes generated from their original actual attributes.

Subjects. Students from an introductory class at a large west coast university participated for class credit. After coding responses to pre–selection instruments, 57 students were qualified to participate in the experiment.

IAT Procedure. The procedure was identical to Experiments 1 through 3. A procedural error in the IAT software required the dropping of nine subjects.

IAT Scoring. The scoring of the IAT was identical to Experiments 1 through 3.

Results. Experiment 4 required categorization of the self with attributes that were similar in definition yet opposite in valence (e.g., cutthroat) versus attributes that were opposite in definition and similar in valence (e.g., easygoing) to the idiosyncratic words that each subject generated (e.g., ambitious). A significant IAT effect was obtained, $D = .24$, $SD = .36$, $t(47) = 4.59$, $p < .001$, indicating that subjects responded more quickly when self items and SDOV attributes (e.g., cutthroat) shared a response key than when self items ODSV attributes (e.g., easygoing) shared a response key.

DISCUSSION

Experiment 4 directly contrasts valence and semantic meaning as they related to response to the IAT. Further, the changes in procedure address the potential for the target concept category names to influence responses to the IAT. The results of experiment 4 suggest that attribute associations with the self are semantic, rather than based on the valence of those attributes. In other words, people exhibited a stronger self–association with attributes that semantically describe themselves, yet are negative in nature (e.g., cutthroat) compared to attributes that are semantically opposite, but positive in nature (e.g., easygoing). This finding demonstrates that the semantic component of the attribute is the critical piece of information in defining the self–attribute association. This is not to say that valence has no influence on responses to the IAT or is not an important component of self–associations in memory. However, it appears that the valence of self–associated attributes is less important relative to the semantic information encoded in that self–attribute.

GENERAL DISCUSSION

These four experiments, taken together, suggest that semantic meaning and valence influence the strength of attribute association with the implicit self–concept. Further, when the influence of semantic meaning and valence are directly compared (Experiment 4), the results indicate that semantic meaning is the primary basis of association in the implicit self–concept. Although previous explorations of the self–concept have included descriptions of the characteristics of those attributes linked to the self, this is the first set of results that attempt to tease apart the relative influence of semantic meaning and valence on implicit self–concept associations.

These findings are consistent with current models of social memory, where attributes are connected to both the objects that they describe, as well as the valence associated with those objects (Greenwald et al., 2002). Based on cognitive consistency theory (Festinger, 1957; Heider, 1958; Osgood & Tannenbaum, 1955), Greenwald and his colleagues suggest that the self is at the center of the social knowledge structure, with valence as a distinct concept in memory. Attributes that describe the person, according to this model, share a link with both the self and valence nodes. Based on this conceptualization, it is suggested that the semantic meaning of an attribute is directly associated with the self, while the valence exists as a component of the attribute. Thus, to the extent that attribute valence is but a component of the overall understanding of the attribute, it stands to reason that semantic meaning would be more influential when measuring associations in memory.

Further, these results are consistent with recent findings (Rudman, Greenwald, & McGhee, 2001) suggesting that self–relevant gender stereotypes are represented in memory in a self–favorable form due to the tendency to associate self with positive or desirable traits. For example, only men revealed strong versus weak gender stereotypes, whereas women did not, unless the category items representing *strong* and *weak* were similar in valence. Further experimental results found that these stereotypes were predicted by the self–concept, such that individuals whom associated themselves with a particular attribute (e.g., strong) also associated that attribute with their own gender. Taken in total, these results suggest that at least some types of stereotypes in memory are the result of self–relevant associations, and that both semantic meaning and valence affect the construction of these stereotypes.

Further research is needed to understand to what extent the relative importance of semantic meaning and valence in self–relevant attribute associations affects stereotype formation. The current results are a first step in that direction.

The current research also contributes to our understanding of the IAT methodology in two ways. First, it is clear that associations revealed using the IAT reflect both semantic meaning *and* valence information, at least in cases where attributes are used as examples of distinct categories and not just as exemplars designed to elicit attitudinal responses as has been the case in previous IAT research. Second, it is argued that the IAT is tapping into the semantic meaning that people associate with their own self. This finding expands both the domain of its application as well as our understanding of what precisely is measured in memory when using the IAT. In the current research, the IAT seems to be measuring associations between semantic information contained in these attributes and the person's self at an individual level, in the sense that the self–attributes that are used in the IAT are generated by the individual, and are therefore idiosyncratic to that individual.

Finally, these results also speak to an important characteristic of IAT creation. Attitude IATs are useful because the objects that represent pleasant and unpleasant concepts in an attitude IAT are not related to the categories that they are expected to represent. For example, implicit measures of attitudes toward insects versus flowers (Greenwald, McGhee, & Schwartz, 1998) or self–esteem (Farnham, Greenwald, & Banaji, 1999) use attributes like "gift," "happy," etc. to represent pleasant and unpleasant concepts. As long as all of the representative attributes are not primary descriptors of the target concepts, there should be no problem. On the other hand, as Experiment 3 clearly shows, allowing categories to vary in terms of valence will be reflected in the IAT. This result is similar to the findings of Rudman and colleagues (Rudman et al., 2001). Thus, when IATs are constructed to measure associations in memory that explore the semantic characteristics of categories, rather than valence, it is suggested that the stimuli used to represent the categories of interest should be controlled in terms of valence, so that potential findings can be clearly interpreted.

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