Measuring Self-Esteem Using the Implicit Association Test: The Role of the Other

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*In two experiments, the use of a self-other Implicit Association Test (IAT) as a measure of implicit self-esteem was examined. In Study 1, participants completed two self-other IATs: one in which the other was unspecified and one in which the other was specified to be a close friend. Esteem-IAT scores were significantly higher for the unspecified other-IAT (*d = *.82), indicating that the content of the other has a considerable influence on the overall esteem-IAT scores. Study 2 provided a conceptual replication of these results and provided some initial evidence that the valence of an unspecified other is negative. Across both studies, the nature of the mental representation of the self, as measured by an esteem-IAT, changed as a function of the mental representation of the other. The crucial role of the other-associations in the esteem-IAT calls into question its use and interpretation as a measure of self-esteem.*

Keywords: *self-esteem; implicit attitudes*

One of the major trends in social psychological research throughout the past decade has been the increasing development and use of indirect or implicit measures of constructs. Greenwald and Banaji's (1995) review of the social cognition literature highlighted the need for indirect measures of attitudes, self-esteem, and stereotypes. The response to their call for new measures has been overwhelming, and numerous indirect techniques have been developed to measure individual differences in attitudes (De Houwer & Eelen, 1998; Greenwald, McGhee, & Schwartz, 1998; Nosek & Banaji, 2001), self-esteem (Greenwald & Farnham, 2000; Hetts, Sakuma, & Pelham, 1999; Spalding & Hardin, 1999), and stereotypes (Fazio, Jackson, Dunton, & Williams, 1995; Kawakami, Dion, & Dovidio, 1998; von Hippel, Sekaquaptewa, & Vargas, 1997; Wittenbrink, Judd, & Park, 1997). Researchers have embraced many of these newly developed measures, and their use has become relatively common.

However, there are two major questions regarding these implicit measures that have yet to be resolved. The first question concerns the validity of implicit measures. Specifically, what do implicit measures measure and how should they be interpreted (for a complete review, see Fazio & Olson, 2003)? One possibility is that implicit and explicit measures tap the same underlying construct, and the alternative is that implicit and explicit systems are relatively independent of each other. This issue is of crucial importance in the interpretation of implicit measures. If implicit and explicit measures reveal the same underlying construct, then the same interpretation can be applied to implicit and explicit measures. If, however, implicit and explicit measures measure different underlying constructs, then different interpretations will be required for these two types of measures (see Karpinski & Hilton, 2001; Wilson, Lindsey, & Schooler, 2000). Further complicating matters, Fazio and Olson (2003) have argued that there may be multiple classes of implicit attitude measures, each with unique properties. Thus, conclusions based on one implicit attitude measure may not necessarily generalize to other implicit attitude measures. The second major question regarding implicit measures concerns their reliability. Recent reviews of implicit measures have revealed a mixed bag. Some measures exhibit excellent internal consistency and test-retest reliability, whereas other measures exhibit very poor reliability (see Bosson, Swann, & Pennebaker,

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2000; Cunningham, Preacher, & Banaji, 2001; Kawakami & Dovidio, 2001).

In the self-esteem domain, there have been some particularly disturbing findings regarding the reliability and validity of implicit measures of self-esteem. Bosson et al. (2000) investigated the relationship between seven implicit measures of self-esteem, four explicit measures of self-esteem, and several variables predicted to correlate with measures of self-esteem. The test-retest reliabilities of the implicit self-esteem measures displayed great variability, with only two of the implicit self-esteem measures possessing reliabilities near acceptable levels: the esteem Implicit Association Test (IAT) (r = .69) and the name-letter evaluation task (r= .63). Equally troubling is the lack of correlation between the various implicit self-esteem measures, average r = .02. Most implicit self-esteem measures also exhibited poor predictive validity, with only the IAT and name-letter evaluation task significantly predicting any of the criterion variables. These findings are not very encouraging for users of implicit measures of self-esteem, causing Bill Swann to remark, "Even the most Panglossian advocate of implicit measures of self-esteem could not help but be discouraged by our findings" (Bosson et al., 2000, p. 641).

The two bright aspects in this study were the esteem-IAT and the name-letter evaluation task. Both of these tasks exhibited adequate levels of reliability and validity. Researchers interested in self-esteem have used both of these measures in subsequent studies (Greenwald et al., 2002; Hummert, Gartska, O'Brien, Greenwald, & Mellott, 2002; Koole, Dijksterhuis, & van Knippenberg, 2001). Although the esteem-IAT and the name-letter evaluation task have exhibited promising properties, it would be prudent to examine these measures carefully given the overall level of concern regarding validity and reliability of implicit measures in general. The current studies will focus on a closer examination of the esteem-IAT.

THE IAT AS A MEASURE OF SELF-ESTEEM: A CLOSER LOOK

The IAT measures the positive and negative associations a person has with the self and with others. In one stage, participants categorize pleasant words and self-related words on the same computer key and unpleasant and other-related words on another computer key (self + pleasant / other + unpleasant). In a later stage, the tasks are reversed and participants categorize unpleasant words and self-related words on the same computer key and pleasant words and other-related words on another computer key (self + unpleasant / other + pleasant).[1] An overall IAT score is computed by taking the difference between the average response times to the two test stages (see Table 1).

TABLE 1: Study 1: Procedure of the Self-Unspecified Other-IAT

Block	*No. of Trials*	*Function*	*Items Assigned to Left Key Response*	*Items Assigned to Right Key Response*
1	40	Practice	Pleasant words	Unpleasant words
2	40	Practice	Self words	Other words
3[a]	40	Practice	Pleasant words + Self words	Unpleasant words + Other words
4[a]	40	Test	Pleasant words + Self words	Unpleasant words + Other words
5	40	Practice	Other words	Self words
6[a]	40	Practice	Pleasant words + Other words	Unpleasant words + Self words
7[a]	40	Test	Pleasant words + Other words	Unpleasant words + Self words

NOTE: IAT = Implicit Association Test.
a. There was no break between Blocks 3 and 4 and between Blocks 6 and 7. Participants experienced them as one continuous block.

The standard interpretation of the esteem-IAT is that it measures the associations one has with the self. If a person has many positive associations and few negative associations with the self, then the self + pleasant task will be very easy and response times to these trials ought to be fast. Likewise, the self + unpleasant task will be more difficult and response times to this stage ought to be slow. As a result, participants with predominantly positive self-associations will have a positive score on the esteem-IAT.

However, there are several potentially problematic properties of the IAT as a measure of self-esteem. First, the IAT is not simply a measure of self-esteem; it is a joint measure of self- and other-esteem. Because of the IAT's bipolar nature, it is not possible to measure only the valence of associations with one's self. The esteem-IAT reveals as much about one's other-associations as it does about one's self-associations.[2] With this measurement of self-esteem, a person who has high self-esteem and high other-esteem is indistinguishable from a person who has low self-esteem and low other-esteem. Both individuals would have esteem-IAT scores near zero.

Second, although many measures of self-esteem include a social comparison component, wherein the self is evaluated in comparison to others, the IAT's comparative aspect is restrictive. Specifically, the IAT measures the strengths of self-associations in opposition to other-associations. A zero-sum game exists between the self- and the other-associations. Thinking more positively of the other necessarily causes a decrease in esteem-IAT scores, resulting in an IAT score less favor-

able toward the self. Conversely, thinking more positively of the self necessarily results in an IAT score more favorable toward the self.

Issues concerning the role of the other-associations in the esteem-IAT make it critical to understand how much the other-associations affect esteem-IAT scores. In particular, two questions are crucial to the issue of the validity of the IAT as a self-esteem measure. First, does the integration of other-associations into the self-other IAT have any effect on its measurement of self-esteem? If not, then it may be possible to use the IAT as a measure of self-esteem that is not contingent on the other. Second, if the other-associations are an important aspect of the esteem-IAT, then how do the other-associations affect the esteem-IAT? Interpretation of the esteem-IAT as a valid self-esteem measure is ambiguous until it is understood how the other-associations affect the overall esteem-IAT score.

STUDY 1

The first question to be addressed is whether the inclusion of other-associations in the esteem-IAT affects scores on the measure. Because of the design of the IAT, it seems likely, and necessary, that valence of the other affects the outcome of the esteem-IAT. As the number of positive other-associations increases (and/or the number of negative other-associations decreases), esteem-IAT scores should decrease. Conversely, as the number of negative other-associations increases (and/or the number of positive other-associations decreases), esteem-IAT scores should increase.

To test this hypothesis, the content of the other in the esteem-IAT was experimentally manipulated in a repeated measures design. In one case (the unspecified other-IAT), the content of the other was left unspecified. This unspecified other is the other that is commonly used in esteem-IATs. In a second IAT (the friend other-IAT), the other was specified to be a close other: the participant's best friend, boyfriend, or girlfriend. Based on the assumption that people have more positive (and fewer negative) associations with a close other than with an unspecified other, it was expected that unspecified other-IAT scores would reveal higher esteem than friend other-IAT scores.

Method

PARTICIPANTS

One hundred thirteen students (77 women, 36 men) from an introductory psychology course at the University of Michigan participated in exchange for course credit. Two participants were excluded from analyses for not following instructions.

PROCEDURES

Participants were tested in groups of up to 5 at a time. Each participant was seated at an individual cubicle containing a desk and a computer. After reading and signing a consent form, participants completed a personal information sheet, indicating their first and last name, and the first and last name of either a dating partner or an opposite-sex best friend. Participants were instructed to provide a name of a best friend if they did not have a dating partner. All participants then completed the self-esteem tasks in the same order: two IAT measures of esteem followed by explicit measures of self- and other-esteem.

IAT MEASURES OF ESTEEM

The IAT procedure. The IAT was administered on a 7200 Power Macintosh using Psyscope (Cohen, MacWhinney, Flatt, & Provost, 1993). The procedure followed the standard IAT paradigm (see Greenwald et al., 1998) with minor modifications (see Table 1).

The unspecified other-IAT. For this IAT, the evaluative dimension was labeled pleasant and unpleasant and the self-dimension was labeled self and other. Five target words were used for each category (see the appendix).

The friend other-IAT. This IAT was a replication of the previous IAT, with the only change being that the other was specified to be either a dating partner or opposite-sex best friend. The category label boyfriend/girlfriend/best friend replaced the label other, depending on the other listed by the participant. The other target words also were changed to represent the specified other and the sex of the specified other (see the appendix).

The order of the two IATs was the same for all participants. Participants first completed the unspecified other-IAT followed by the friend other-IAT. If the friend other-IAT was to be completed first, the participant might continue to associate their friend with the unspecified other in the second IAT. To avoid this confound, all participants completed the unspecified other-IAT first.

EXPLICIT MEASURES OF SELF- AND OTHER-ESTEEM

Participants next completed paper-and-pencil versions of the explicit measures of self-esteem: a self-semantic differential, a self-feeling thermometer, and the Rosenberg (1965) Self-Esteem Scale. For the semantic differential, participants rated self on five bipolar dimensions: *ugly/beautiful*, *bad/good*, *unpleasant/pleasant*, *foolish/wise*, and *awful/nice*. Each dimension was rated on a 7-point scale ranging from –3 (*negative pole*) to +3 (*positive pole*) ($\alpha = .77$). The self-feeling thermometer consisted of a single item, with participants rating themselves on a thermometer ranging from 0 (*cold or unfavorable*) to 100 (*warm or favorable*). For the Rosenberg scale, participants responded to each item on

a 7-point Likert-type scale ranging from 1 (*disagree strongly*) to 7 (*agree strongly*) ($\alpha = .87$).

Each of the measures was completed a second time with minor modifications as a measure of other-esteem. For the semantic differential ($\alpha = .79$) and feeling thermometer measures, participants rated their dating partner or opposite-sex best friend on the appropriate scale. The Rosenberg Self-Esteem Scale was reworded so that the items applied to the participant's dating partner or opposite-sex best friend ($\alpha = .85$).

At the conclusion of the study, all participants were thanked, thoroughly debriefed, and dismissed.

Results

IAT DATA REDUCTION

The data from 11 participants with error rates greater than 20% on either IAT were discarded. Once these participants were removed, the average error rate was 3.67% on the unspecified other-IAT and 3.60% on the friend other-IAT.

The standard procedure for analyzing IAT data was followed (Greenwald et al., 1998). Only data from the test trials (Blocks 4 and 7) were used for purposes of data analysis. Response times smaller than 300 were recoded to be 300 ms, and responses larger than 3000 were recoded to be 3000 ms. Response times were log-transformed, and all responses within each block were averaged. An IAT score was obtained by subtracting the average Stage 4 response time (Self + Pleasant / Other + Unpleasant) from the average Stage 7 response time (Self + Unpleasant / Other + Pleasant). Positive scores indicate greater positive associations with self (and/or negative associations with other) than negative associations with self (and/or positive associations with other).

IAT MEASURES OF ESTEEM

Overall, IAT scores revealed positive esteem scores for both the unspecified other-IAT, $M_{\text{unspecified}} = 0.19$, $F(1, 99) = 123.81$, $p < .01$, $d = 1.11$, and the friend other-IAT, $M_{\text{friend}} = 0.06$, $F(1, 99) = 23.06$, $p < .01$, $d = 0.48$. The key prediction of this study was that the content of the other would influence IAT scores. Presumably, participants have more positive (and fewer negative) associations with their best friends and dating partners than with people in general. As a result of these other-associations, esteem-IAT scores should be lower when the other is specified to be a dating partner or best friend than when the other is unspecified. The results from this study provide strong support for this hypothesis. Overall, friend other-IAT scores were lower ($M_{\text{friend}} = 0.06$) than the unspecified other-IAT scores ($M_{\text{unspecified}} = 0.19$), $F(1, 99) = 34.04$, $p < .01$, $d = .82$, and this effect was not moderated by the participant's gender, $F(1, 98) = 0.26$, $p = .62$, $d = .16$ (see Figure 1).

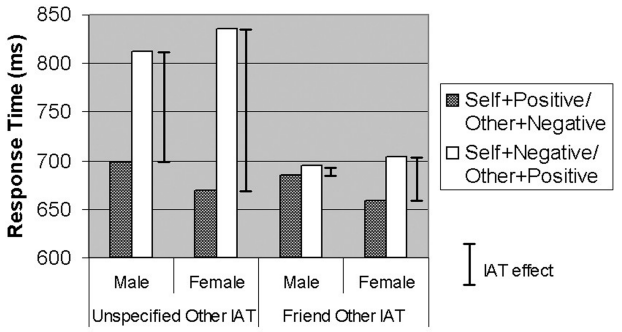

Figure 1 Response times for test blocks for the two Implicit Association Tests (IATs) in Study 1.
NOTE: The overall IAT effect is the average of the self + positive block subtracted from the average of the self + negative block (as indicated by the black lines). IAT times have been back-transformed so that they are presented on the original scale. $N = 100$.

Somewhat surprisingly, no significant correlation was observed between the two esteem-IAT measures. In fact, the direction of observed correlation was in the opposite of the predicted direction, $r(98) = -.03$, $p = .77$. Taken together, these mean level and correlation findings provide strong evidence for the hypothesis that the content of the other has a large effect on the outcome of an esteem-IAT.

Unexpectedly, mean level esteem-IAT scores were marginally higher for women than for men on both IAT measures of esteem (see top of Table 2). This result differs from previous esteem-IAT research in which no significant difference in esteem-IAT scores for men and women has been found (Bosson et al., 2000; Greenwald & Farnham, 2000; Rudman, Greenwald, & McGhee, 2001).

It is possible to conduct a more precise test of the effect of the other-associations on esteem-IAT responses by examining responses within each block of the IAT. On one hand, if changing the other used in the IAT only affects the other-associations, then only other + positive and other + negative responses will be influenced by the other manipulation. On the other hand, it is possible that changing the other used in the IAT also may affect the self-associations measured by the task. In this case, responses to both self- (self + positive, self + negative) and other-components (other + positive, other + negative) may be affected by the other manipulation.

An analysis of the within-block pattern of means supports the hypothesis that changing the content of the other changes both the other-associations and the self-associations that are measured by the esteem-IAT (see Table 3).[3] As expected, when the other was specified to be a close other, other + negative responses were slower ($d = -.21$) and other + positive responses were faster ($d =$

TABLE 2: Study 1: Descriptive Statistics for IAT and Explicit Measures of Self- and Other-Esteem

	Men (N = 30)			*Women (N = 70)*			*Male-Female Difference*		
	M	SD	d	M	SD	d	d	F (1, 98)	p
IAT measures									
Self-unspecified other	0.13	0.15	0.86	0.21	0.17	1.24	–0.48	4.81	0.03
Self-specific other	0.02	0.13	0.18	0.08	0.12	0.63	–0.43	3.97	0.05
Explicit self-esteem									
Rosenberg	6.29	0.67		5.68	0.98		0.67	9.46	0.01
Feeling thermometer	83.50	10.76		76.64	15.29		0.49	4.96	0.03
Semantic differential	9.83	3.98		9.74	3.09		0.03	0.01	0.91
Explicit self-other esteem									
Rosenberg	0.01	0.68	0.01	–0.63	1.13	–0.56	0.71	8.26	0.01
Feeling thermometer	–1.67	15.33	–0.11	–8.42	14.54	–0.58	0.46	4.40	0.04
Semantic differential	–1.38	2.85	–0.48	–0.35	3.34	–0.10	–0.32	2.12	0.15

NOTE: Implicit Association Test (IAT) measures are natural logarithms of milliseconds. Ranges of the measures: Rosenberg, 0-7; feeling thermometer, 0-100; semantic differential, –15 to +15. For each gender, *d* measures the extent to which scores differ from zero. For the male/female difference, *d* measures the extent to which men have higher scores than women.

.74), compared to responses with an unspecified other. These findings indicate that a close other is more positive and less negative than an unspecified other. Of interest, the other manipulation also affected responses to the self words. When the other was specified to be a best friend, self + positive responses were slower ($d = -.54$), whereas self + negative responses were nonsignificantly faster ($d = .15$) compared to responses with an unspecified other. In other words, specifying the other to be a best friend resulted in less positive self-associations on the esteem-IAT.

EXPLICIT MEASURES OF SELF- AND OTHER-ESTEEM

Means for the three explicit measures of self-esteem are given in the middle of Table 2. Men reported significantly higher self-esteem than did women on the Rosenberg Self-Esteem Scale and on the feeling thermometer rating. These results contrast with the IAT esteem results, which indicate that women have higher self-esteem than do men.

A more suitable explicit comparison to the IAT might be obtained by subtracting explicit measures of self-esteem from explicit measures of other-esteem. These difference scores are directly comparable to IAT scores in that positive numbers indicate higher self-esteem in comparison to an other and negative numbers indicate higher esteem of an other in comparison to the self.

Means for the three explicit measures of self-other esteem are given at the bottom of Table 2. Across all three measures, explicit self-other esteem ratings were negative, indicating more positive regard for one's best friend or dating partner than for one's self (average $d = -.35$). These findings are diametrically opposed to the esteem-IAT findings that revealed that participants had more positive associations with the self than with their dating partner or best friend. These effects of explicit self-other esteem were moderated by gender, but the direction of the effect was inconsistent.

THE RELATIONSHIP BETWEEN EXPLICIT AND IAT MEASURES OF ESTEEM

In these data, there was no evidence for a correlation between the esteem-IAT and explicit measures of self-esteem (see top of Table 4). No correlation was observed between any of the explicit measures of self-esteem and either the unspecified other-IAT (average $r = -.05$) or the friend other-IAT (average $r = -.06$).

However, it may be more appropriate to examine correlations between the esteem-IATs and explicit self-other measures of esteem. All of these measures can be interpreted as a measure of self- versus other-esteem. Furthermore, all explicit measures of other-esteem were specifically targeted toward the participant's best friend or dating partner. If matching the content of the other so that responses may be interpreted as a measure of the self compared to one's friend increases the correlation between the measures (see Fishbein & Ajzen, 1974, 1975), then a stronger correlation should emerge between the friend other-IAT and the explicit measures of self-other esteem than between the unspecified other-IAT and the explicit measures of self-other esteem. No support for this matching hypothesis was found in the data (see bottom of Table 4). None of the observed correlations with explicit self-other esteem approached significance for either the unspecified other-IAT (average $r = -.01$) or the friend other-IAT (average $r = .06$). Overall, these correlations provide no evidence for any correlation between the esteem-IAT and explicit measures of self-esteem.

TABLE 3: Study 1: Within-Block Analysis of the IAT

					Comparison With Unspecified Other		
			M	SD	d	F*(1, 99)*	p
Block 4	Self + positive	Unspecified other	6.52	.14			
		Friend other$_{adj.}$	6.59	.15	–.54	28.75	< .01
	Other + negative	Unspecified other	6.55	.14			
		Friend other$_{adj.}$	6.57	.14	–.21	4.56	.04
Block 7	Self + negative	Unspecified other	6.66	.19			
		Friend other$_{adj.}$	6.64	.15	.15	2.41	.13
	Other + positive	Unspecified other	6.79	.20			
		Friend other$_{adj.}$	6.65	.15	.74	54.87	< .01

NOTE: $N = 100$. Implicit Association Test (IAT) measures are natural logarithms of milliseconds. *d* measures the extent to which response times in the unspecified-other condition differed from responses in the friend-other condition, after adjusting friend-other response times for practice effects.

TABLE 4: Study 1: Correlations Between IAT and Explicit Measures

	Self-IAT Measures	
Measure	*Unspecified Other-IAT*	*Specific Other-IAT*
Explicit self-esteem		
Rosenberg	–.07	–.01
Feeling thermometer	–.06	–.09
Semantic differential	–.01	–.09
Explicit self-other esteem		
Rosenberg	–.02	.09
Feeling thermometer	–.11	.01
Semantic differential	.08	.08

NOTE: *N*s = 98 to 100. IAT = Implicit Association Test.

Discussion

Two main findings emerged from Study 1. First, as expected, overall esteem-IAT scores were affected by the content of the other. IAT esteem scores were significantly higher when the other was unspecified than when the other was specified to be a close friend, and this effect of the content/valence of the other on the esteem-IAT was a relatively large effect, $d = .82$. This result provides clear evidence that the esteem-IAT is influenced by the content of the other and the associations one has with that other. Second, and somewhat unexpectedly, the self-associations measured in the task also were influenced by the content of the other. Participants also had fewer positive self-associations when a close other was the comparison category than when an unspecified other was the comparison; that is, not only did the esteem-IAT measure other-associations, but the self-associations it did measure depended on the mental representation of the other used in the task.

These findings confirm that the IAT is sensitive to contextual effects (see also Blair, Ma, & Lenton, 2001; Dasgupta & Greenwald, 2001). When the content of the other is manipulated, the esteem-IAT shows effects in the predicted directions. However, these context effects are problematic if the IAT is to be used and interpreted as a measure of self-esteem. Only half of the information measured by the esteem-IAT is self-relevant; the remaining half pertains to associations regarding the other (see also Blanton, Jaccard, & Gonzales, 2003b). In addition, not only are overall IAT scores affected by the content of the other, but also the nature of the mental representation of the self changed as a function of the mental representation of the other. When a more positive other was specified in the esteem-IAT, the representation of the self became less positive and nonsignificantly more negative. The evaluative self-associations measured by the IAT may not be the chronically accessible evaluative self-associations and beliefs that typically constitute self-esteem, but they may be associations activated in response to the other used in the task. In light of these findings, if the esteem-IAT is to be meaningfully interpreted as a measure of self-esteem, then the contaminating effects of the other-associations must be controlled or removed.

STUDY 2

The first goal of Study 2 was to provide a conceptual replication of the Study 1 findings. It is possible that the findings in Study 1 were due to the use of a close other rather than a more general positively valenced other. To eliminate this interpretation, general-other esteem-IAT scores were compared to esteem-IAT scores that specified the other to be a more general positively valenced other. Furthermore, that the self-associations measured by the esteem-IAT were influenced by the content of the other is consistent with the claim that the content of the other affects esteem-IAT scores, but this finding was not an a priori prediction. Study 2 provided an opportunity to replicate this effect.

A second goal of Study 2 was to determine the proper interpretation of esteem-IAT scores when the other is left unspecified. An initial step would be to understand the valence of the other that is brought to mind in the standard, unspecified other-esteem-IAT. Studies using the esteem-IAT have typically found high levels of implicit self-esteem (Bosson et al., 2000; Greenwald & Farnham, 2000; Rudman et al., 2001). Based on the current analysis, these findings could be due to high implicit self-esteem or they could be due to use of a very negative other in the task. Gaining a greater understanding of the valence of the unspecified other will help with the interpretation and understanding of all esteem-IAT effects.

The implicit nature of the IAT makes it impossible to ask participants about the content of the other. Hence, a more indirect method of determining the valence of the other must be employed. In this study, participants completed three self-other IATs. In the first IAT, the other was left unspecified. This case replicates the unspecified other-IAT used in Study 1. To determine the valence of the other used in this task, responses to the unspecified other-IAT were compared to responses on two specified-other IATs. In a second self-other IAT, the other was specified to be Santa Claus. It was assumed that participants would have many positive (and few negative) associations with Santa Claus. In the final case, the other was specified to be Adolf Hitler. It was assumed that participants would have many negative (and few positive) associations with Hitler.

By comparing where the unspecified other-IAT falls, in relation to the Santa other-IAT and the Hitler other-IAT, an inference can be made about the valence of the unspecified other. If responses on the unspecified other-IAT are close to responses on the Santa other-IAT, the valence of the unspecified other must have been very positive—similar to Santa. If responses on the unspecified other-IAT are close to responses on the Hitler other-IAT, then the valence of the unspecified other must have been very negative—similar to Hitler. Finally, if responses on the unspecified other-IAT are clearly between responses on the Santa other- and Hitler other-IATs, then the valence of the unspecified other must be of neutral or mixed valence.

Method

PARTICIPANTS

Fifty-four students (44 women, 10 men) from an introductory psychology course at Temple University participated in exchange for course credit.

PROCEDURES

Participants were tested in groups of up to three at a time. Each participant was seated at a desk with a computer. All participants completed the tasks in the same order: three IAT measures of esteem followed by explicit measures of self-esteem.

IAT MEASURES OF ESTEEM

The IAT was administered on a Gateway desktop with a 1.5 Gz Pentium 4 processor using Medialab software. The IAT procedure was identical to the procedure described in Study 1, with one minor change: The number of trials in the practice blocks was reduced from 40 to 20.

All participants completed three esteem-IATs in the same order: an unspecified other-IAT, a Santa other-IAT, and a Hitler other-IAT. As in Study 1, participants completed the IATs in a fixed order with the unspecified other-IAT first out of concern that the specific others might influence the content or valence of the unspecified other if the order were counterbalanced. Because the evaluative dimension never changed, participants completed the practice block of evaluative target words only for the first IAT. For subsequent IATs, this stage was deemed redundant and was omitted. Category and target words used in the three IATs are listed in the appendix.[4]

EXPLICIT MEASURES OF SELF-ESTEEM

As in Study 1, participants completed the Rosenberg Self-Esteem Scale ($\alpha = .88$), a self-feeling thermometer, and a self-semantic differential ($\alpha = .82$). Because no advantage was gained by computing self-other measures of esteem in Study 1, measures of other-esteem were not obtained in this study.

Results

IAT DATA REDUCTION

The data from 6 participants with a combined error rate across the three IATs of greater than 36% were discarded. Once these participants were removed, the average error rate was 5.14% on the unspecified other-IAT, 2.93% on the Santa other-IAT, and 3.81% on the Hitler other-IAT.

IAT scores were computed using the same procedure as employed in Study 1.

IAT MEASURES OF ESTEEM

Average responses on each of the three IATs were significantly greater than zero, all Fs$(1, 47) > 42.32$, ps$ < .01$ (see Figure 2). Also, for each IAT, women were found to have higher esteem scores than men (see top of Table 5). Although these gender differences failed to reach significance, all Fs$(1, 47) < 1.46$, ps$ > .23$, the effect size for the unspecified other-IAT was in the medium range, $d = -.46$. In this case, lack of statistical significance is likely due to the small number of men in the sample ($n = 8$) rather than the lack of a difference in IAT scores between men and women. Thus, consistent with Study 1, there is some

TABLE 5: Study 2: Descriptive Statistics for IAT and Explicit Measures of Self- and Other-Esteem

	Entire Sample (N = *48*)			*Gender Differences*		
				Male	*Female*	
	M	SD	d	(N = *8*)	(N = *40*)	d
IAT measures						
Unspecified other	.19	.12	1.59	.11	.20	–.46
Santa other	.11	.11	0.96	.01	.11	–.09
Hitler other	.20	.13	1.60	.17	.21	–.24
Explicit self-esteem						
Rosenberg	5.87	1.01		5.90	5.87	.03
Feeling thermometer	83.83	14.29		83.75	83.85	–.01
Semantic differential	5.84	0.79		5.80	5.85	–.06

NOTE: Implicit Association Test (IAT) measures are natural logarithms of milliseconds. Ranges of the measures: Rosenberg, 0-7; feeling thermometer, 0-100; semantic differential, –15 to +15. For entire sample, *d* measures the extent to which IAT scores differ from zero. For the male/female differences, *d* measures the extent to which men have higher scores than women.

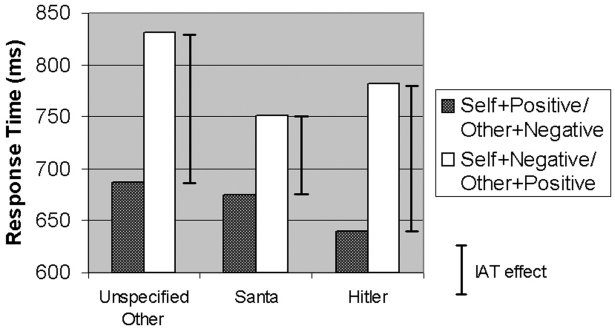

Figure 2 Response times for test blocks for the three Implicit Association Tests (IATs) in Study 2.
NOTE: The overall IAT effect is the average of the self + positive block subtracted from the average of the self + negative block (as indicated by the black lines). IAT times have been back-transformed so that they are presented on the original scale. *N* = 48.

evidence for women having greater esteem-IAT scores than men.

In contrast to Study 1, positive correlations emerged between the unspecified other-IAT and the specified other esteem-IATs (see Table 7). A significant positive correlation was observed between the unspecified other-IAT and the Hitler other-IAT, $r(46) = .38$, $p < .01$, and a marginally significant positive correlation was observed between the unspecified other-IAT and the Santa other-IAT, $r(46) = .26$, $p = .07$. However, the Santa other-IAT and the Hitler other-IAT failed to correlate with each other, $r(46) = .03$, $p = .83$.

One main issue to be addressed in this study was the valence of the other in the unspecified other-IAT. The valence of unspecified other can be inferred by comparing responses on the unspecified other-IAT to responses on the Santa other and Hitler other-IATs. First, as expected, responses to the Hitler other-IAT were significantly greater than responses to the Santa other-IAT, $F(1, 47) = 14.62$, $p < .01$, $d = 0.77$. This finding suggests that participants had more positive associations (and/or fewer negative associations) with Santa than with Hitler. The second, and critical, comparison was to identify where responses to the unspecified other-IAT fell in comparison to the Santa other- and Hitler other-IATs. Surprisingly, a comparison of the average IAT scores revealed that the unspecified other-IAT scores were significantly greater than Santa other-IAT scores, $F(1, 47) = 16.43$, $p < .01$, $d = 0.71$, but were not different from Hitler other-IAT scores, $F(1, 47) = 0.19$, $p = .66$, $d = 0.07$. Although this method cannot reveal the content of the unspecified other, it can be inferred that the valence of the other in the unspecified other-IAT was not different from the valence of Hitler. In other words, this result provides evidence consistent with interpretation that the other in the unspecified other-IAT was negative.

As in Study 1, a more fine-grained analysis was conducted to examine the effects of the other manipulation on the self and other responses separately (see Table 6).[5] Compared to the Santa other-IAT scores, the unspecified other scores revealed more positive self-associations ($d = .66$) and more negative other-associations ($d = .38$). As expected, the unspecified other was more negative than Santa, and in reference to this more negative unspecified other, the self became more positive. In other words, the responses on the Santa other-IAT replicate the findings with the close other-IAT scores from Study 1. Compared to the Hitler other-IAT scores, the unspecified other scores revealed more positive self-associations ($d = .45$), more negative self-associations ($d = .74$), and no difference in other-associations ($|d|$s < .10). As with the overall IAT scores, these results provide some evidence that the valence of the unspecified other was similar to the valence of Hitler. If the valence of the unspecified other is similar to Hitler, then the self-associations measured also should be similar across the two IATs. However, the self-associations were found to be both more positive and more negative in relationship when the other was unspecified, compared to Hitler.

EXPLICIT MEASURES OF SELF-ESTEEM AND THEIR RELATIONSHIP WITH IAT MEASURES

The overall means of the three explicit measures of self-esteem, along with a breakdown by gender, are presented at the bottom of Table 5. All explicit measures of self-esteem revealed relatively high levels of self-esteem with no evidence for gender differences, all Fs$(1, 46) < 1$.

TABLE 6: Study 2: Within-Block Analysis of the IAT

		Comparison With Unspecified Other				
		M	SD	d	F*(1, 47)*	p
Self + positive	Unspecified other	6.51	.18			
	Santa other$_{adj.}$	6.60	.16	–.66	20.99	< .01
	Hitler other$_{adj.}$	6.57	.15	–.45	9.61	< .01
Other + negative	Unspecified other	6.56	.18			
	Santa other$_{adj.}$	6.61	.15	–.38	6.98	.01
	Hitler other$_{adj.}$	6.57	.15	–.10	0.52	.47
Self + negative	Unspecified other	6.67	.18			
	Santa other$_{adj.}$	6.67	.16	.01	0.01	.95
	Hitler other$_{adj.}$	6.78	.18	–.74	26.42	< .01
Other + positive	Unspecified other	6.77	.21			
	Santa other$_{adj.}$	6.75	.20	.10	0.49	.49
	Hitler other$_{adj.}$	6.76	.17	.07	0.21	.65

NOTE: $N = 48$. Implicit Association Test (IAT) measures are natural logarithms of milliseconds. *d* measures the extent to which response times in the unspecified-other condition differed from responses in the responses in the specified-other condition, after adjusting specified-other response times for practice effects.

TABLE 7: Study 2: Correlations Among All Measures

	IAT Measures			*Explicit Measures*		
	1	*2*	*3*	*4*	*5*	*6*
IAT measures						
1. Unspecified other	1.00					
2. Santa other	.26*	1.00				
3. Hitler other	.38**	.03	1.00			
Explicit self-esteem						
4. Rosenberg	.03	–.06	.01	1.00		
5. Feeling thermometer	–.14	–.08	–.06	.68**	1.00	
6. Semantic differential	.12	–.04	.06	.72**	.69**	1.00

NOTE: $N = 48$. IAT = Implicit Association Test.
*$p < .10$. **$p < .01$.

The three measures of explicit self-esteem were significantly positively correlated with each other, average $r = .70$ (see Table 7). However, consistent with the results of Study 1, the explicit measures of self-esteem failed to correlate significantly with any of the IAT measures of esteem, average $r = –.02$.

Discussion

Study 2 provided a conceptual replication of Study 1. Overall, esteem-IAT scores were significantly higher when the other was unspecified than when the other was specified to be Santa Claus. In addition, use of Santa Claus as the other also influenced the self-associations measured in the task. Participants had fewer positive self-associations when Santa was the comparison category than when an unspecified other was the comparison. Across both studies, when the other was positively valenced, esteem-IAT scores dropped in comparison to an unspecified other because the other became less negative and the self became less positive. When a negative other was used as the comparison (Hitler), the self had fewer negative associations than when an unspecified other was the comparison, but unexpectedly, the self also had fewer positive associations. In sum, these results are largely consistent with the hypothesis that changing the other in the esteem-IAT also changes the nature of the self, such that the self is contrasted with the other.

Surprisingly, results from this study are consistent with the interpretation that the unspecified other is more negative than Santa and similar in valence to Hitler. When participants completed an unspecified other-IAT, the mean level results were nearly identical to the results from a Hitler other-IAT. In addition, across both studies, the strongest observed correlation with the unspecified other-IAT was between the unspecified other-IAT and the Hitler other-IAT. Although the content of the unspecified other is likely to be different from Hitler, the valence of the other may be similar. Thus, the finding that most people have very positive implicit self-esteem when measured with the esteem-IAT may not be due to high implicit self-esteem but the comparison of the self to a very negative other.

In the current studies, generic pronouns (*he*, *hers*, etc.) were used as target words to be associated with the generic category other, and the valence of the other category was found to be negative. In other studies, however, other target words were specifically chosen to be neutral in valence. One approach is use the category label *not-self* along with neutral target words (e.g., *it*, *that*) (Jordan, Spencer, Zanna, & Hoshino-Brown, in press). A second approach is to use ideographic target words for the unspecified other category that are selected by each participant to be familiar, not self-identified, and neither strongly liked or disliked (e.g., see Greenwald & Farnham, 2000). Findings with the ideographic and neutral other target words are generally similar to those reported with generic pronoun target words. On one hand, because the ideographic items are neutral, it is difficult to argue that the valence of the other category is negative. The similarity of the results with the ideographic and pronoun other target word esteem-IATs would appear to be inconsistent with the conclusion that the generic other category is negative in valence. On the other hand, De Houwer's (2001) analysis of IAT effects suggests that the IAT measures associations with the categories used in the task (in the case of the esteem-IAT, self and other) rather than associations with the individual target words used as exemplars of the categories. From this perspective, it may be possible for participants to have a negative representation of others

in general (the category), despite the fact that target words are neutral. However, the negative valence of the unspecified other category was an unexpected finding and should be interpreted cautiously.

If the negativity of an unspecified other is replicated and is established to be reliable, then it leads to the question of why people make such downward comparisons on the esteem-IAT. One possibility is that participants attempt to make the self/other discrimination as easy as possible by calling to mind an other that is extremely dissimilar from the self. Given that most people, at least in Western cultures, have very positive self-views, the most dissimilar other would be an extremely negative other. Of interest, this interpretation suggests that responses on the IAT may not be independent from motivated processing.

GENERAL DISCUSSION

The number of implicit or indirect measures used to assess attitudes and self-esteem has increased dramatically since Greenwald and Banaji (1995) highlighted the need for these new measures. Certainly, the development of implicit measures is vitally important if psychologists wish to understand implicit processes and to avoid the problems associated with self-report measures. Yet, these measures must display a sufficient level of reliability and validity before they should be fully embraced by researchers and practitioners. The esteem-IAT is one newly developed measure of self-esteem that has been found to have reasonable reliability and some degree of validity (Bosson et al., 2000; Greenwald & Farnham, 2000).

However, the current studies raise some troubling questions regarding the validity of the IAT as a self-esteem measure. Across both studies, overall responses to the esteem-IAT were strongly influenced by the content of the other. Also, the nature of the self, as measured by the esteem-IAT, changed as a function of the other. In general, the self was contrasted with the other so that in the presence of a positive other, the self had fewer positive associations, whereas in the presence of a negative other, the self had fewer negative associations. These findings are problematic if the IAT is to be interpreted as a valid measure of self-esteem. A measure of self-esteem should reveal more about a person's self-evaluations than about the evaluations of others, and this is not the case for the IAT measure of esteem. Increasing the number of positive associations (or decreasing the number of negative associations) with the other results in lower esteem-IAT scores.

Even if the IAT were used to capture social comparison aspects of esteem, rather than self-esteem in general, the IAT is restrictive in its use of social comparison. Some instances of social comparison lead to contrast effects, whereas other instances lead to assimilation effects (Pelham & Wachsmuch, 1995; Tesser, 1988; Wood, 1989). Yet by the nature of its design, the IAT measurement of esteem is restricted to contrast effects with others. Increasing the number of positive associations one has with an other facilitates responding in the self + unpleasant / other + pleasant stage and disrupts responding in the self + pleasant / other + unpleasant stage, which results in a lower esteem-IAT score. Conversely, if the number of positive associations one has with an other are decreased (or the number of negative associations are increased), responses in the self + unpleasant / other + pleasant stage will be slowed and responses to the self + pleasant / other + unpleasant stage will be facilitated, resulting in a higher esteem-IAT score. Within the bipolar framework of the esteem-IAT, it is not possible to increase positive feeling toward the other without decreasing the overall IAT measure of esteem (a contrast effect); no assimilation effects are possible.

A new operationalization of self-esteem is required if the IAT is to be used as a measure of esteem, in which the self is considered in opposition to an other. This new definition of esteem may be useful and may lead to a greater understanding of the self and self-associations, but it needs to be understood separately from the traditional understanding of self-esteem. First, the IAT measure of esteem should not be referred to as a measure of self-esteem but as a measure of self-versus-other-esteem because it reveals as much about other-associations as it does about the self. Referring to the esteem-IAT (as has been the convention throughout this article) rather than the self-IAT or the self-esteem IAT highlights the distinction between traditional definitions of self-esteem and the IAT's self-versus-other definition of esteem. Second, because of the differences in definition and measurement between self-esteem measures and the esteem-IAT, the esteem-IAT should not be expected to behave like a self-esteem measure. For example, because the valence of the other heavily influences the esteem-IAT, it is not surprising that the esteem-IAT fails to correlate (or correlates weakly at best) with other implicit and explicit measures of self-esteem.

Viewed in this light, the development of the esteem-IAT may offer an opportunity for testing new theories and hypotheses concerning self-versus-other-esteem. In some cases, it may be found that the self-versus-other-esteem measured by the esteem-IAT functions similarly to self-esteem. But in other cases, the esteem-IAT may act very differently from self-esteem measures, failing to predict outcomes predicted by self-esteem measures and predicting new outcomes that were previously not predictable. For example, the esteem-IAT may be a useful new tool to understand dyadic interactions. A self-specific other-esteem-IAT, where the other is specified to

be a dating partner or spouse, may be able to predict aspects of relationship quality and/or certain behaviors performed by the dyad. Even in this case, however, use of the IAT is limited because it forces researchers to assume that relationship quality is predicted by both evaluations of self and evaluations of dating partner. It is entirely possible that relationship quality is influenced by self-evaluations only, by other-evaluations only, or by the interaction of self- and other-evaluations. If one pursued a traditional measurement strategy and assessed evaluations of self and other separately, these competing causal theories could be tested. This approach is not possible with the IAT because it confounds measurement of self and other.

Yet, the esteem-IAT also should be used with caution even when a researcher is correct in assuming that a psychological criterion is influenced by evaluations of self and other. When an unspecified other is used in opposition to the self, the results of Study 2 suggest that the other may not be a neutral or average other but may be a negative other. Esteem-IAT scores will be high for most participants when respondents compare themselves to an extremely negative other. These high scores are not necessarily indicative of high self-esteem and may only reflect that the object of comparison was negative. These findings suggest that it is difficult to interpret the mean level esteem-IAT scores as reflecting one's level of self-esteem. Recent findings on the malleability of implicit attitude measures (Blair et al., 2001; Dasgupta & Greenwald, 2001; Wittenbrink, Judd, & Park, 2001) suggest that even small differences in testing environments have the potential to result in differences in the context of a general other. Extreme care should be used in standardizing the thoughts and context of participants prior to and during the completion of an esteem-IAT.

There are a number of studies that have found evidence for theoretically predicted hypotheses regarding implicit self-esteem using the esteem-IAT. For example, esteem-IAT scores have been found to predict cognitive reactions to failure (Greenwald & Farnham, 2000), to be stable over the lifespan (Hummert et al., 2002), and to predict the lack of negative emotion words used in a self-descriptive essay (Bosson et al., 2000). However, as has been highlighted in this article, the esteem-IAT is at best a very noisy measure of self-esteem (because half of the information it measures is not self-relevant) and is likely to be a measure of a different concept entirely, self-versus-other-esteem. Because the esteem-IAT is influenced by both self- and by other-evaluations, one should expect prediction only when criteria are influenced in opposite directions by self-evaluations and by other-evaluations (see Blanton, Jaccard, & Gonzales, 2003b). When the esteem-IAT is used as a measure of self-esteem, one may find evidence for theoretically predicted hypotheses but also may fail to find evidence for true hypotheses or may severely underestimate the effect size of true effects as a consequence of using the esteem-IAT as a measure of self-esteem. Thus, to test specific hypotheses about self-esteem, alternative measures of self-esteem are preferable to the esteem-IAT.

For researchers and practitioners interested in implicit or indirect measures of self-esteem, at the moment, there are several alternative measures either in use or under development. The name-letter evaluation task is a reasonably reliable measure that has been found to predict a number of self-esteem-related effects (Bosson et al., 2000; Koole et al., 2001; see also Pelham, Mirenberg, & Jones, 2002). The Go/No-Go Association Task (GNAT) (Nosek & Banaji, 2001) is related to the IAT but measures positive and negative associations with a single attitude object. The GNAT could be modified to assess the positive and negative associations with the self. However, because of its similarity to the IAT, the GNAT shares a number of other methodological and psychometric concerns with the IAT that call into question its validity as a self-esteem measure (see Blanton, 2003a, 2003b). Finally, initial studies using Evaluative Movement Assessment (Brendl, Markman, & Messner, 2003) and the Breadth-Based Adjective Rating Task (Karpinski, 2003) show considerable promise as indirect measures of self-esteem.

Clearly, there is a great deal of interest in indirect measures of self-esteem. It is also clear that much work is needed in the theoretical and methodological development of these measures.

APPENDIX
Target Words Used in the IAT Tasks

Target Words for Study 1

Evaluative Dimension[a]			*Self-Dimension*	
			Other	
Pleasant	*Unpleasant*	*Self*	*Unspecified Other*	*Boyfriend/Girlfriend/Best Friend*
cheer	death	participant's first name	her	friend's first name
happy	filth	participant's last name	him	friend's last name
health	jail	me	them	he/she
laughter	murder	I	they	him/her
peace	sickness	myself	people	his/hers

Target Words for Study 2

Evaluative Dimension[b]			*Self-Dimension*		
			Other		
Pleasant	*Unpleasant*	*Self*	*Unspecified Other*	*Santa Other*	*Hitler Other*
brilliant	awkward	participant's first name	he	Christmas	Adolf
diamond	failure	participant's first name[c]	him	North Pole	Germany
joy	hate	participant's last name	his	Reindeer	Jews
sunrise	slum	me	hers	St. Nick	Nazi
truth	stink	myself	people	Winter	WWII

a. Evaluative words were taken from Greenwald, McGhee, and Schwartz (1998).
b. Evaluative words were taken from Greenwald and Farnham (2000).
c. Participants saw their first name twice as often as the other self words.

NOTES

1. For the current studies, the self-dimension was labeled self and other (as in Greenwald et al., 2002; Rudman, Greenwald, & McGhee, 2001). In other studies, the self-dimension was labeled me and not me (see Bosson, Swann, & Pennebaker, 2000; Greenwald & Farnham, 2000). The logic outlined in this article for the categories self and other applies equally well to either situation.

2. This problem is not unique to the esteem–IAT but is a general problem with all IAT research. Blanton, Jaccard, and Gonzales (2003a, 2003b) elaborate on this issue with regard to a black-white IAT and a math-arts identification IAT.

3. Practice effects were observed across the two IATs. When response times to the single-stage practice blocks (Blocks 1, 2, and 5) were examined, response times were on average 0.08 log-ms faster (52 ms faster) for the specific-other IAT compared to the unspecified-other IAT, $t(99) = 8.61$, $p < .01$, $d = .86$. To compare across the IATs, responses to the specific-other IAT were adjusted by adding 0.08 to the log-transformed reaction times. (Note that this problem is not observed when comparing overall IAT scores because the IAT score is a difference score of times in two blocks. If the practice effects were constant across all blocks, then any practice effect would be eliminated by taking a difference of times in two blocks.)

4. Evaluative words were obtained from Greenwald and Farnham (2000). Specified-other words were selected to be associated with the specific other used in the task (rather than selecting words to be representative of the specific other used in the task). For example, reindeer is associated with Santa Claus but is not representative of Santa Claus.

5. Once again, practice effects were observed across the three IATs. When response times to the single-stage practice blocks (Blocks 1, 2, and 5) were examined, response times were, on average, 0.09 log-ms faster (57 ms faster) for the Santa-other IAT and 0.11 log-ms faster (67 ms faster) for the Hitler-other IAT compared to the unspecified-other IAT, $t(47) = 4.74$, $p < .01$, $d = .68$, and $t(47) = 5.28$, $p < .01$, $d = .76$, respectively. To compare across the IATs, responses to the specific-other IATs were adjusted by adding 0.09 to the Santa-other and 0.11 to the Hitler-other log-transformed reaction times.

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