Journal of Articles in Support of the Null Hypothesis
Vol. 16, No. 2
 1539–8714
www.jasnh.com

No Implicit-Explicit Racial Attitude Correlation in a White Sample from the rural South of the United States

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The Implicit Association Test (IAT) shows little to no correlation with explicit attitudes for a wide range of social groups. A sample of white participants from the rural, southern United States (Sumter County, Georgia) was used to investigate the possibility that more extreme scores on the IAT and the Modern Racism Scale (MRS) would lead to a stronger implicit-explicit attitude correlation. The white sample from rural Georgia scored higher on the MRS than a comparable sample from rural Pennsylvania. However, there was no significant implicit-explicit attitude correlation in the Georgia sample, which replicates the findings from early IAT studies. This negative finding suggests that restriction of range does not explain zero or small implicit-explicit attitude correlations.

Keywords: Implicit Association Test, Modern Racism Scale, implicit attitude, explicit attitude, unconscious cognition

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We thank Debbie Bloodworth, Kimberly Bradford, Matt Cannon, Brianne Faircloth, Riaz Mahmood, Maddie Michaliszyn, and Ashley Myers for helping with the data collection.
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The Implicit Association Test (IAT) is popular experimental paradigm for measuring implicit attitudes towards minority races[1] and many other social groups (Greenwald, McGhee, & Schwartz, 1998; for a nontechnical overview, see Sleek, 2018). The high degree of interest in the IAT and similar tests is motivated by the importance of measuring attitudes that are automatic, unintentional, and presumably unconscious. However, the interpretation of what the IAT results represent is still controversial even after two decades of intensive research efforts (Bartlett, 2017; Jost, 2019; Singal, 2017).

An important research question since the introduction of the IAT is the degree to which implicit attitudes correspond to explicit attitudes measured via survey-type questions. The original IAT study found a nonsignificant correlation of $r = .12$ between a black-white racism IAT and the combined results of explicit attitudes measured via the Modern Racism Scale (MRS) and the Diversity and Discrimination Scale (Experiment 3). The absence of a relationship was important evidence that the IAT and explicit attitude measures represented two different psychological processes (Greenwald et al., 1998 see p. 1477, "Explicit Versus Implicit"). This null implicit-explicit racial attitude correlation finding was replicated in subsequent studies that found small and nonsignificant IAT-explicit attitude correlations (Dasgupta, McGhee, Greenwald, & Banaji, 2000; Ottaway, Hayden, & Oakes, 2001). Another early study reported a statistically significant yet weak correlation that averaged $r = .35$ (min = .08, max = .50; Cunningham, Preacher, & Banaji, 2001, Table 1).

Later studies on implicit-explicit attitude relationships examined a broader range of biased attitudes (e.g., homosexuality, political ideologies) and used larger sample sizes through online testing or meta-analytic statistical techniques. These studies report implicit-explicit relationships that are statistically significant and small in magnitude ($r = .17$ from Axt, 2017; $r = .24$ from Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005; $r = .27$ from Nosek et al., 2007). Overall, the current view is that implicit and explicit attitudes are weakly correlated in studies with large samples (e.g., $N = 732{,}881$ for race from Nosek et al., 2007). The investigations of implicit-explicit attitude relationships are numerous, which makes a comprehensive review beyond the scope of the present study. Interested readers should refer to Nosek (2007) or recent large scale studies (Axt, 2017) for further details.

The weak relationship between implicit and explicit attitudes is open to interpretation. IAT advocates generally interpret absent or weak implicit-explicit relationships as evidence that these represent two weakly related yet distinctly different psychological constructs (Greenwald et al., 1998; Nosek & Smyth, 2007; Nosek et al., 2007). Another possibility, however, is that weak implicit-explicit attitude relationships might be caused by a statistical effect called restriction of range. For example, in Cunningham et al. (2001) the mean MRS value was significantly below the midpoint of the MRS instrument, which implies that most responses were clustered at the low end of the MRS scale. For implicit-explicit correlations, low responses on the explicit measurement raises a potential statistical limitation for establishing a noteworthy correlation. When the range of one variable in a correlation is restricted — explicit attitudes measured by the MRS in this situation — the resulting correlation coefficient will be reduced in size.

1 We use the term "black" in this paper to describe people of African descent. This decision was based on evidence of an equal preference for the terms "black" and "African-American" in the United States and that neither term is viewed as offensive (Oliver, 2017; Sigelman, Tuch, & Martin, 2005).

A potentially important influence upon the measured size of explicit race attitudes is social-cultural influences. Numerous studies document significant regional attitude differences in the United States between the South and other areas (collectively referred to as the North for brevity). Pettigrew (1959) found that white people from rural North Carolina and rural Georgia (black population percentage of 10 to 45%) had more negative attitudes towards black people compared to four comparable cities in New England (black percentage < 1%). Several subsequent studies show a long-term decrease in overt racism, particularly in regard to desegregation and civil rights issues. In spite of this general decrease, substantial regional differences in explicit attitudes still exist, with southern samples consistently having greater degrees of explicit racism (Griffin & Hargis, 2008; Sheatsley, 1966; Tuch, 1987). Some of the long term decrease might be influenced by social desirability, which might make southern white participants less likely to express racist attitudes on explicit attitude surveys (Kuklinski, Cobb, & Gilens, 1997). In contrast to explicit attitude research, IAT studies comparing racial attitudes between the North and the South are lacking, leaving regional differences in implicit attitudes uncertain.

The present study is a replication of early IAT studies on race attitudes with the key difference being an exploration of regional differences. One sample was drawn from rural Sumter County, Georgia, which had slightly more black people (52.6%) than white people (43.6%) in the 2010 census ("QuickFacts: Sumter County, Georgia: United States," 2010). This region was also noted for significant inter-racial conflicts during the civil rights movement of the 1960s. The primary research question was to investigate the possibility that white participants from the rural South would show higher, more extreme scores on both the IAT and the MRS. These higher scores could, in turn, lead to stronger correlations between implicit and explicit attitudes. This outcome would address the possibility that the small, nonsignificant implicit-explicit correlations reported in early IAT studies is caused by a restriction of range effect. For comparison purposes, a similar sample was also collected from an area in rural Pennsylvania with a much smaller proportion of black people (4.2%; "QuickFacts: Cumberland County, Pennsylvania: United States," 2010).

Method

Participants

The participants were 188 undergraduate students enrolled in Introductory Psychology classes at Georgia Southwestern State University (Americus, Georgia; $N = 124$) or Shippensburg University (Shippensburg, Pennsylvania; $N = 64$). The participants were almost entirely a traditional college age (18 to 22). The Georgia sample was 23% black, 65% white ($N = 80$), and 12% other races/ethnicities. The Pennsylvania sample was 8% black, 81% white ($N = 52$), and 11% other races/ethnicities. The participants were randomly assigned to race IAT experiments with either face stimuli (Georgia: $N = 40$; Pennsylvania: $N = 25$) or name stimuli (Georgia: $N = 41$; Pennsylvania: $N = 27$).

The sample size decisions were based on a combination of theoretical and practical factors. The sample sizes were larger (Greenwald et al., 1998 Ns = 32, 32, and 26; Ottaway et al., 2001 Ns = 56, 33) or comparable in size (Cunningham et al., 2001 $N = 99$; Dasgupta et al., 2000 $N = 75$) to the early laboratory-based research that this study was modeled

upon. We also hypothesized that a larger effect size on both implicit and explicit attitudes would decrease the need for a large sample size to reach statistical significance, although an a priori analysis of statistical power was not performed. Fewer overall participants were sampled from Pennsylvania due to the higher proportion of white participants in this region. The practical limitation on sample size was individualized testing of each participant under strictly controlled laboratory conditions. This approach is slow (only a few participants tested per week) and laborious compared to the online testing methods used in later studies.

Materials and Protocol

The data were collected on Dell Optiplex desktop computers with the Windows XP operating system. The LCD monitors on both computers (Georgia and Pennsylvania) were set to an 85 Hz refresh rate, a 1024 x 768 screen resolution, and identical contrast and brightness settings. The experimental software for presenting stimuli and recording response times was Eprime version 1.4 (Psychology Software Tools Inc., Pittsburgh, PA). The response times were measured via the "i" (right) and "e" (left) keys on the computer keyboard.

The stimuli used in this study were obtained from previous studies of race IAT effects to closely duplicate the methods used in early IAT studies. The face IAT experiment used black and white face stimuli made available by Brian Nosek (http://projectimplicit.net/nosek/stimuli/). The name IAT used stimuli from Appendix A of Greenwald et al. (1998). Positive words (honest, peace, laughter, happy, friend, health) and negative words (abuse, crash, rotten, pollute, grief, vomit) were from a race IAT experiment on the Project Implicit web site (http://implicit.harvard.edu/).

The E-prime software testing began with basic demographic questions about age, sex, handedness, and race (1 = African-American, 2 = White, 3 = other). Next, a standard IAT protocol was used in both experiments. In brief, blocks 1 and 2 were practice blocks that involved sorting stimuli into the categories of European-American vs. African-American people, then good vs. bad, respectively. Blocks 3 and 4 simultaneously presented both sorting categories. Block 5 was a practice block in which the sides for the white vs. black people sorting task were switched. In blocks 6 and 7, the combined sorting task was employed again. The order of whether congruent trials were presented in either blocks 3 and 4 or blocks 6 and 7 was counterbalanced across participants. In all trials, the participants were allowed to proceed directly to the next trial when incorrect responses were made.

After finishing the IAT, the participants filled out the Modern Racism Scale (McConahay, 1983), which is an explicit measure of prejudice towards black people that has been used in previous IAT studies (e.g., Greenwald et al., 1998). This explicit attitude data was collected after the IAT in order to decrease possible demand characteristics that might influence the IAT results. The MRS is composed of seven indirect questions that are rated on a five point scale, with anchors of −2 = Strongly Disagree to +2 = Strongly Agree. The scores from each question were transformed from −2 to +2 into 1 to 5, respectively, for the data analysis. Higher scores on the MRS indicated a higher degree of prejudice, with 35 being the maximum possible transformed score.

Data Analysis

The analyses focused upon white participants partly due to white participants having the largest sample size. In addition, the emphasis upon white attitudes towards black people is also consistent with the emphasis of early IAT studies and regional explicit attitude studies, both of which have been based upon mostly white participants.

The IAT results were transformed into the recommended *D* statistic, which is similar to common effect size measures (Greenwald, Nosek, & Banaji, 2003). The name and face IAT results were very similar. Therefore, the samples from these two IATs were combined for the subsequent descriptive and correlational analyses.

The IAT and the MRS scores were compared between the Georgia and Pennsylvania samples with a Welch's independent samples *t*-test due to unequal sample sizes and a recent recommendation for using Welch's *t*-test over the classic Student's *t*-test (Delacre, Lakens, & Leys, 2017). The significance cutoff for all *t*-tests was two-tailed. The *t*-tests and the correlation coefficients were calculated with JASP version 0.9.2 (https://jasp-stats.org/). Bayes factors for the t-tests were determined via an online calculator provided by Jeffrey Rouder (http://pcl.missouri.edu/bf-two-sample) using the default scale r effect size value of .707. The data and data analyses are available at the Open Science Framework: https://osf.io/uh8xf.

Results

The descriptive statistics by sample and racial group are shown in Table 1. The white participants from Georgia scored slightly higher on the IAT than the white Pennsylvania sample (M = .56 vs. M = .41, respectively), but this effect was weak and possibly unreliable, $t(126.0) = 1.84$, $p = .068$, Cohen's $d = .32$, $BF_{01} = 1.14$. The MRS scores of the white Georgia sample were clearly higher than the Pennsylvania sample, $M = 18.6$ vs. $M = 15.8$ ($t(123.7) = 3.74$, $p < .001$, $d = .65$), with very strong evidence for the alternative hypothesis, $BF_{10} = 88.67$.

The higher explicit attitude scores from Georgia did not, however, lead to an implicit-explicit correlation. The white participants from both samples had no IAT-MRS correlation, with $r(78) = -.03$, $p = .79$ for the Georgia sample and $r(50) = -.04$, $p = .75$ for the Pennsylvania sample. The respective Georgia and Pennsylvania BF_{01} values were 6.9 and 5.5, thereby showing moderate support for the null hypothesis (Table 2). In contrast, there was a weak IAT-MRS relationship when both samples (Georgia and Pennsylvania) and all races were pooled, $r(185) = .16$, $p = .028$, although a Bayesian analysis suggests no evidence ($BF_{10} = .995$; Table 2).

Discussion

The Georgia sample had higher scores on the MRS than the Pennsylvania sample, which is consistent with previous regional studies comparing explicit attitudes between the North and the South (e.g., Griffin & Hargis, 2008). However, there was no implicit-explicit attitude correlation. These null correlation results replicate the findings of early race IAT experiments (Dasgupta et al., 2000; Greenwald et al., 1998; Ottaway et al., 2001). Pooling all of the participants (both regions and all races) together yielded a weak, positive correlation ($r = .16$) that is comparable to the findings from studies with large samples

or multiple samples (r = .17 to .27; Axt, 2017; Hofmann et al., 2005; Nosek et al., 2007). However, this overall correlation may be statistically unreliable because it provides little to no support for the alternative hypothesis from a Bayesian perspective.

The most straightforward interpretation is that the lack of implicit-explicit correlation is not attributable to a restriction of range effect. The current Georgia results from the MRS are slightly above the midpoint of the MRS scale, which suggests a greater degree of score variability than earlier studies (cf. Cunningham et al., 2001). The Georgia sample also scored higher than the Pennsylvania sample on the IAT, although this effect was weak and potentially unreliable. This greater range of scores should lead to a larger implicit-explicit correlation if the limitation of earlier studies was a restriction of range problem. However, this hypothesized larger correlation was not obtained, thereby raising doubt about a restriction of range explanation. Although this interpretation is reasonable, it is worth noting that the Georgia sample only has small increases in the IAT and the MRS compared to the Pennsylvania sample. For example, the Georgia MRS was only about 3 points (approximately 17%) higher than the Pennsylvania MRS. This modest difference

Table 1. *Descriptive statistics for the Georgia (top) and Pennsylvania (bottom) samples by race for the IAT and the MRS. The IAT results are expressed as the D statistic, in which values above zero represent attitudes against black people.*

A. Georgia Sample

	IAT			MRS		
	Black	**White**	**Other**	**Black**	**White**	**Other**
N	28	80	15	28	80	15
Mean	-0.05	0.56	0.37	14.93	18.55	16.67
Median	0.010	0.68	0.40	15.00	18.00	16.00
Std. Deviation	0.42	0.52	0.38	3.90	4.62	4.03
Minimum	-1.05	-0.94	-0.31	7	10	11
Maximum	0.55	1.50	0.93	24	33	26

B. Pennsylvania Sample

	IAT			MRS		
	Black	**White**	**Other**	**Black**	**White**	**Other**
N	5	52	7	5	52	7
Mean	0.18	0.41	0.12	15.00	15.81	15.29
Median	0.13	0.38	0.33	17.00	16.00	15.00
Std. Deviation	0.19	0.40	0.69	3.67	3.75	6.82
Minimum	-0.01	-0.65	-0.87	11	9	7
Maximum	0.49	1.26	1.06	18	23	28

might not have much impact on a restriction of range situation, thus leaving open the possibility that restriction of range is an influence for the lack of a strong implicit-explicit correlation.

There are other possible statistical or measurement reasons that might explain small implicit-explicit correlations. Many IAT studies on implicit-explicit correlations are based on thousands of participants who have taken the IAT through online testing (e.g., Nosek, 2007). Thus, there is a possibility that traditional experiments based on small samples will be severely underpowered or unstable for detecting a weak relationship. A post hoc power analysis was performed using GPower (version 3.1.9.2) to estimate the sample size needed for r = .17 (from Axt, 2017), a = .05, and b = .80. The resulting estimate was for $N = 266$, which is similar to the general recommendation for N = 250 from Schönbrodt & Perugini (2013). It seems likely, therefore, that the present sample sizes were underpowered. We regret that we were unable to obtain larger sample sizes due to the resource limitations imposed by traditional laboratory-based experimentation. The study of small implicit-explicit relationships might demand more subjects than traditional data collection approaches can reasonably accomplish. However, traditional laboratory testing might be feasible if multiple testing stations were used to simultaneously test several people, like 5 to 10 at a time.

The null hypothesis outcome could have other explanations in addition to a small sample size. A possible measurement issue is that recent findings suggest direct questions of explicit racism mightbe more sensitive than indirect questions (Axt, 2017). For example, a direct question would be "I strongly prefer European Americans to African Americans". However, the most popular approach to measuring explicit attitudes has been to use indirect measures (e.g., the MRS) to account for social desirability influences that might decrease the size of responses to direct questions (Paulhus, 1984). Accordingly, the use of indirect questions such as the MRS seems to be an unlikely explanation for the null correlation findings. Another possibility is that extraneous variables like testing formats (structural fit) between the implicit and explicit measures are typically quite different, thereby decreasing an implicit-explicit correlation (Payne, Burkley, & Stokes, 2008).

Table 2. *Correlation coefficients between the IAT and the MRS for the samples by race, where GA = Georgia and PA = Pennsylvania*

				95% Credible Interval	
Group	***r***	**BF_{10}**	**BF_{01}**	**Lower**	**Upper**
GA – Black	.179	.349	2.862	-.198	.496
GA – White	-.030	.145	6.918	-.244	.188
GA – Other	.760	43.09	.023	.339	.903
PA – Black	-.577	.836	1.196	-.888	.444
PA – White	-.045	.182	5.501	-.306	.224
PA – Other	.160	.481	2.077	-.552	.703
Overall	.160	.995	1.005	.017	.295

Studies of unconscious information processing often use null sensitivity results as an operational definition of unconsciousness. For example, the results of masked semantic priming studies are interpreted as unconscious processing if evidence of semantic priming is obtained when the participants lack sensitivity to the prime stimuli, such as being unable to report the prime stimulus (e.g., Marcel, 1983). The lack of reportable prime stimulus sensitivity is essentially a null hypothesis outcome – a failure to find a significant effect – that is used to interpret the priming effects as being unconsciously mediated. In a similar manner, the lack of a strong implicit-explicit correlation has been viewed as evidence for two distinctly different processes, with one being conscious (explicit attitudes captured by the MRS and similar surveys) and the other being unconscious (implicit attitudes captured by the IAT). Although this interpretation is plausible, we have reservations about the use of negative evidence for inferring the unconscious status of cognitive processes. This view is consistent with other investigators (Newell & Shanks, 2014; Uhlmann, Pizarro, & Bloom, 2008), including Greenwald (Draine & Greenwald, 1998; p. 287), who point out that reliance on a null hypothesis for establishing unconscious processing can be problematic. We agree with this view and urge caution when interpreting negative findings as evidence for unconscious cognition. For further treatment of this complex issue, please refer to extensive theoretical reviews on inferring the unconscious status of cognitive processing (Newell & Shanks, 2014; Timmermans & Cleeremans, 2015; Uhlmann et al., 2008).

The positive IAT evidence for two separate cognitive processes, implicit vs. explicit, has emphasized correlational modelling approaches. For example, Cunningham et al. (2001) report stronger relationships between multiple implicit attitude measures (r = .63) than the correlation with explicit attitude measures (r = .35 with MRS). This pattern shows consistency and construct evidence for an implicit process (see also Bar-Anan & Nosek, 2014). More recent modeling studies have been consistent with this two process view, with two process models having a better data fit than a single process model (Nosek & Smyth, 2007). Similarly, a large-scale meta-analysis shows that implicit and explicit attitudes make separate contributions to predicting relevant social behaviors. In particular, it was noted that "predictive validity of IAT measures significantly exceeded that of self-report measures" for black-white behavioral interactions (Greenwald, Poehlman, Uhlmann, & Banaji, 2009 p. 17). Although these studies provide positive evidence, we regard such correlational evidence as preliminary. More direct experimental evidence is needed to confirm that implicit attitudes operate independently of conscious awareness. Future studies could, for example, could explore the possibility of implicit attitude activation in response to heavily masked stimulus conditions where the participants have little to no measurable behavioral sensitivity to the experimental stimuli.

In closing, the present study replicates previous findings of no relationship between implicit and explicit attitudes in small samples collected via traditional, laboratory-based techniques. This null relationship occurred even though the rural Georgia sample showed higher scores on an explicit attitude variable than a comparable sample from another region. Thus, it seems unlikely that a restriction of range problem is responsible for weak implicit-explicit attitude relationships, but this possibility cannot be entirely ruled out due to negative findings.

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Received: 6.12.2019
Revised: 9.25.2019
Accepted: 9.26.2019