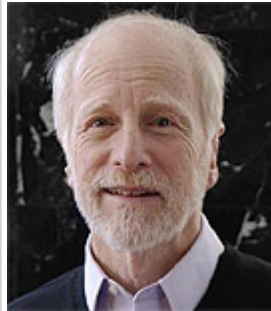


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AUTHOR COMMENTARIES - 2009

March 2009



Anthony Greenwald

Featured Paper from *Essential Science Indicators*SM

According to the fifth bimonthly update of *Essential Science Indicators* from Thomson Reuters, the paper ranked at #4 among Psychiatry & Psychology papers is "Measuring individual differences in implicit cognition: The Implicit Association Test" (Greenwald AG, McGhee DE, Schwartz JLK, Journal of Personality and Social Psychology 74[6]: 1464-80, June 1998), with 927 citations. In the Web of Science®, this paper shows 1,025 cites.

The paper's lead author, Dr. Anthony Greenwald, is a Professor in the Department of Psychology and Adjunct Professor of Marketing and International Business at the University of Washington in Seattle.

In the interview below, ScienceWatch.com talks with Dr. Greenwald about this paper and its impact on the research community.

What factors prompted you to do this study?

In 1995, Mahzarin Banaji and I published a theoretical paper (also highly cited, approaching 900 citations) that described an emerging field of research that we named "implicit social cognition." The paper synthesized an intriguing subset of work of the previous decade or so on long-established social psychological topics of attitudes, stereotypes, and self-esteem. Our new approach was to show that attitudes, stereotypes, and self-esteem could operate outside of awareness (i.e., "implicitly").

In the paper (Greenwald AG, Banaji MR, "Implicit social cognition: Attitudes, self-esteem, and stereotypes," *Psychological Review*, 102: 4-27, 1995; available on my [web page](#), we lamented the lack of measures that could assess individual differences in this implicit aspect of social cognition. In our research, then supported by National Science Foundation, we were trying to develop such measures.

Would you sum up this paper's methods and findings for our readers?

The procedure that became the IAT was one of several methods that were being tried out in my lab at the University of Washington.

I programmed a computer to present a series of names of flowers and insects. The task was to classify each as rapidly as possible. Flower names required a key press with left hand, insect names a key press with right hand. The next task was similar, but with a series of pleasant words (left key) and unpleasant words (right key). I was the first subject, and I found both of these tasks to be quite easy. Next I combined the two—left key for either pleasant words or flower names, and right key for either

unpleasant words or insect names. I remember thinking that this "combined" task was surprisingly easy. I didn't understand why it should be so easy to keep track of response assignments for four different categories.

The final task of the procedure was a combined task that differed from the previous one just by switching the key assignments for flower and insect names. This new task required left-key responses for either pleasant words or insect names, and right key responses for either unpleasant words or flower names. Immediately, I could see that this was a difficult task. After completing it (slowly), my first thought was that if I just repeated it a few times I would get good at it. An even greater surprise was the discovery that practice didn't help.

It appeared that this new procedure was doing what we wanted for a measure of associations corresponding to attitudes (in this case, attitudes toward flowers and insects). What was happening was that, when assignment of concepts to keys was consistent with established associations (i.e., pleasant and flower on the same key) performance could be fast. If the assignments were at odds with established associations (flower and *un*pleasant on the same key) performance would be slow. The performance speed variations could work nicely as a measure of the strengths of these evaluative (attitude) associations.

It was a relatively short step to construct a test in which the concepts of Black and White race (represented by well known names of Black and White celebrities) replaced flower names and insect names. I was again the first subject at this task. I was both distressed and elated to discover that my performance was much faster when White names and pleasant words had the same response. The distress was because I was not expecting to find that I had a stronger association of White than Black with pleasant. The elation was because I could immediately see that this task was producing strong enough effects so that it might work as a measure of the strengths of the associations corresponding to race attitudes.

The co-authors of that first IAT article were Debbie McGhee and Jordan Schwartz, both of whom were graduate students who helped in collecting the data from the first experiments in 1994 and 1995, still a few years before the name "Implicit Association Test" was given to the method.

"Research of the last decade using the IAT has yielded the conclusion that many people possess a substantial collection of 'hidden' attitudes and stereotypes..."

How was the paper received by the research community when it was first published?

I can't think of an occasion in which I have seen so many of my psychologist colleagues pick up a new research method and start to make use of it. Wide adoption of the method was helped because it required no more equipment than a standard desktop computer. I am sure that part of the interest others had in using the method was that many thought the task must be producing such strong results because of something other than its sensitivity to association strengths. Quite a few researchers conducted experiments with the aim of showing that something else was artifactually causing the strong effects observed with the method. At the same time, even more saw the method's potential to be used to measure associations on a wide variety of socially relevant associations.

How does the IAT compare with other methods?

The IAT has some features in common with other "reaction time" measures that have been used as indicators of automatic aspects of human cognition. It also has the advantage of producing stronger effects than other tasks, which provides the key to it being useful in measuring individual differences. The IAT has properties somewhat like standard clinic blood-pressure measures. It is subject to multiple influences, but nevertheless has enough sensitivity and validity to be useful. Other available techniques are less well validated and produce weaker effects, leaving them less useful in detecting individual differences.

Ever since the IAT was developed, other researchers have been trying to develop superior measures. I have been trying to do that too (without success beyond producing a few modifications in the IAT that have increased its research usefulness). Nevertheless, it is reasonable to expect that some of those efforts will ultimately succeed.

Where have you taken this research since the publication of this paper?

There are two main new developments. One is a meta-analysis of 10 years of research on "predictive validity" of IAT measures—the ability to predict interesting behavior. The meta-analysis is now in **press** in *Journal of Personality and Social Psychology*, the leading international journal of social psychology (Greenwald AG, Poehlman TA, Uhlmann E, Banaji MR, "Understanding and using the Implicit

Association Test: III. Meta-analysis of predictive validity," *Journal of Personality and Social Psychology* 2009.

"I can't think of an occasion in which I have seen so many of my psychologist colleagues pick up a new research method and start to make use of it."

The other is a brief version of the IAT (in [press](#)), which will make it easier to use IAT in research conducted on the Internet and in surveys, for which the time required by the original form of the measure was excessive (Sriram N, Greenwald AG, "The Brief Implicit Association Test," *Experimental Psychology*, 2009).

What would you like the "take-away lesson" about your work to be?

Research of the last decade using the IAT has yielded the conclusion that many people possess a substantial collection of "hidden" attitudes and stereotypes (i.e., associations measured by the IAT that don't match self-reported measures of the same constructs—the difference typically taking the form of the IAT measure showing stronger negative attitudes and stereotypes). Research using the IAT has also established that these hidden associations predicted discriminatory behavior (which is presumably often unintended).

Many would like to know how to block effects of these associations on behavior. Ideally, some simple procedure could eliminate or modify the associations. But no such magic bullet has yet been found. For the present, the best method of avoiding unintended discrimination resulting from hidden biases is to be aware of possessing the hidden biases and to disrupt their undesired effects on behavior.

[Self-administration of the IAT](#) is a good method of assessing one's own hidden biases. Disrupting effects of hidden biases on behavior requires understanding of how various situations allow the possibility of unintentional discrimination. Providing such understanding is a reasonable and desirable goal of diversity training. ■

Anthony G. Greenwald, Ph.D.
Professor, Department of Psychology
Adjunct Professor, Marketing and International Business
University of Washington
Seattle, WA, USA

Anthony Greenwald's current most-cited paper in *Essential Science Indicators*, with 927 cites:

Greenwald AG, McGhee DE, Schwartz JLK, "Measuring individual differences in implicit cognition: The Implicit Association Test," *J. Personal. Soc. Psychol.* 74(6): 1464-80, June 1998. Source: [Essential Science Indicators](#) from [Thomson Reuters](#).

KEYWORDS: IMPLICIT COGNITION, IMPLICIT ASSOCIATION TEST, AUTOMATIC ATTITUDE ACTIVATION, STEREOTYPES, SELF, VARIABILITY, PREJUDICE, WORDS, IMPLICIT SOCIAL COGNITION, UNINTENDED DISCRIMINATION.

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