

Studies Showing Uses of the IAT with “Real-World” Subject Populations

VOTING, POLITICAL ATTITUDES, AND POLICY JUDGMENT (N=8)

Among undecided voters assessed one month before a local Italian election IAT measures of implicit political attitudes successfully predicted subsequent voting behavior

Arcuri, L., Castelli, L., Galdi, S., Zogmaister, C. & Amadori, A. (2008). Predicting the vote: Implicit attitudes as predictors of the future behavior of the decided and undecided voters. *Political Psychology*, 29, 369–387.

An IAT measure predicted future shift in judgments about desirability of enlarging a U.S. military base in Vicenza, Italy, for 129 residents who initially reported themselves as undecided.

Galdi, S., Arcuri, L., & Gawronski, B. (2008). Automatic mental associations predict future choices of undecided decision-makers. *Science*, 321, 1100–1102.

Votes by self-reported undecided voters in a representative sample of Italian voters (the ITANES survey) were predicted by their IAT measures of liberal–conservative ideology.

Roccatò, M., & Zogmaister, C. (2010). Can we improve electoral forecasts using the IAT? A field research. *Political Psychology*, 31, 249–274.

IAT-measured White race preference, assessed in the last week before the U.S. 2008 Presidential Election, significantly predicted intention to vote for John McCain, and did so independently of political conservatism.

Greenwald, A. G., Smith, C. T., Sriram, N., Bar-Anan, Y., & Nosek, B. A. (2009). Race attitude measures predicted vote in the 2008 U. S. Presidential Election. *Analyses of Social Issues and Public Policy*, 9, 241–253.

A natural experiment of random assignment of gender quotas for leadership positions on Indian village councils showed that presence of women leaders reduced IAT-measured stereotypes that associate male more than female with leadership.

Beaman, L., Chattopadhyay, R., Duflo E., Pande, R., & Topalova, P. (2009). Powerful women: Does exposure reduce bias? *Quarterly Journal of Economics*, 124, 1497–1540.

A Latino vs. White attitude IAT predicted individual preferences for exclusionary illegal and legal immigration policy proposals in a representative survey of American adults (N=337).

Pérez, E. O. (in press). Explicit evidence on the import of implicit attitudes: The IAT and immigration policy judgments. *Political Behavior*.

Bilingual Arab Israelis (N=44) students from several Hebrew-speaking universities in Israel showed significantly weaker anti-Jewish implicit attitude when doing an Arab–Jew attitude IAT in Hebrew than in Arabic.

Danziger, S., & Ward, R. (2010). Language changes implicit associations between ethnic groups and evaluation in bilinguals. *Psychological Science*, 21, 799–800.

French–Arabic bilingual Moroccans (N=59) and bilingual Hispanic–Americans (N=38) took attitude IATs contrasting nationality/ethnicity associated to two languages in both languages, displaying greater preference for each nationality/ethnicity when tested in a matched language.

Ogunnaike, O., Dunham, Y., & Banaji, M. R. (2010). The language of implicit preferences. *Journal of Experimental Social Psychology*, *46*, 999–1003.

MENTAL HEALTH (N=17)

A suicide-ideation IAT differentiated among adolescents who were nonsuicidal, suicide ideators and suicide attempters.

Nock, M. K., & Banaji, M. R. (2007). Prediction of suicide ideation and attempts among adolescents using a brief performance-based test. *Journal of Consulting and Clinical Psychology*, *75*, 707–715.

A self-injury IAT differentiated non-self-injuring from self-injuring adolescents and improved the prediction of self-injury beyond that achieved with demographic and psychiatric predictors.

Nock, M. K., & Banaji, M. R. (2007). Assessment of self-injurious thoughts using a behavioral test. *American Journal of Psychiatry*, *164*, 820–823.

An IAT measure of association of self with death distinguished suicide attempters from other psychiatric emergency room patients and also predicted suicide attempts by these patients in the following six months.

Nock, M. K., Park, J. L., Finn, C. T., Deliberto, T. L., Dour, H. J., & Banaji, M. R. (in press). Measuring the “suicidal mind”: Implicit cognition predicts suicidal behavior. *Psychological Science*.

An IAT measure of phobic reactions to spiders differentiated spider-phobics from controls and showed reduction in phobic associations following exposure therapy.

Teachman, B., & Woody, S. (2003). Automatic processing in spider phobia: Implicit fear associations over the course of treatment. *Journal of Abnormal Psychology*, *112*, 100–109.

In a sample of patients meeting DSM-IV criteria for panic disorder, an IAT measure of panic-related associations predicted severity of panic symptoms, agoraphobic avoidance, and distress in response to panic stressor

Teachman, B. A., Smith-Janik, S. B., & Saporito, J. (2007). Information processing biases and panic disorder: Relationships among cognitive and symptom measures. *Behaviour Research and Therapy*, *45*, 1791–1811.

In a sample of persons diagnosed with panic disorder, change in a panic IAT over the course of a 12-week treatment predicted subsequent change in panic symptoms.

Teachman, B. A., Marker, C. D., & Smith-Janik, S. B. (in press). Automatic associations and panic disorder: Trajectories of change over the course of treatment. *Journal of Consulting and Clinical Psychology*.

An IAT measure of self–shame association significantly distinguished a sample of 60 women meeting diagnostic criteria for borderline personality disorder (BPD) from a comparison sample of healthy women (N = 60).

Rüsch, N., Lieb, K., Göttler, I., Hermann, C., Schramm, E., Richter, H., Jacob, G. A., Corrigan, P. W., & Bohus, M. (2007). Shame and implicit self-concept in women with borderline personality disorder. *American Journal of Psychiatry*, *164*, 500–508.

In a sample of women who met diagnostic criteria for borderline personality disorder (BPD), an IAT measure of self–anxiety association significantly distinguished 23 diagnosed

with comorbid posttraumatic stress disorder (PTSD) from the comparison group (N=37) not diagnosed with comorbid PTSD.

Rüsch, N., Corrigan, P. W., Bohus, M., Kühler, T., Jacob, G. A., & Lieb, K. (2007). The impact of posttraumatic stress disorder on dysfunctional implicit and explicit emotions among women with borderline personality disorder. *Journal of Nervous and Mental Disease, 195*, 537-539.

Patients (N=75) being treated for mental illness completed a Brief IAT measure of association of mental illness with shame at baseline. Stronger associations of shame with mental illness predicted a stronger belief after six months that discrimination against the mentally ill was justified.

Rüsch, N., Todd, A. R., Bodenhausen, G. V., Olschewski, M., & Corrigan, P. W. (2010). Automatically activated shame reactions and perceived legitimacy of discrimination: A longitudinal study among people with mental illness. *Journal of Behavior Therapy and Experimental Psychiatry, 41*, 60–63.

For persons diagnosed with schizophrenia, schizoaffective, or affective disorders (N=85) stronger Brief IAT-measured mental illness=guilt associations were related to just-world beliefs for self, and me=guilt associations to a genetic model of mental illness.

Rüsch, N., Todd, A. R., Bodenhausen, G. V., Corrigan, & P. W. (2010). Do people with mental illness deserve what they get? Links between meritocratic worldviews and implicit versus explicit stigma. *European Archives of Psychiatry and Clinical Neuroscience 260*:617-625.

Rüsch, N., Todd, A. R., Bodenhausen, G. V., & Corrigan, P. W. (2010). Biogenetic models of psychopathology, implicit guilt and mental illness stigma. *Psychiatry Research 179*:328-332.

In persons with schizophrenia, schizoaffective, or affective disorders (N=85), positive implicit (not explicit) attitudes to psychiatric medication predicted more insight and perceived need for treatment. Implicit self-stigma (product of *mental illness=bad* and *me=bad* associations assessed by two Brief IATs) predicted poor quality of life independently of explicit self-stigma.

Rüsch, N., Corrigan, P. W., Todd, A. R., & Bodenhausen, G. V. (2010). Implicit self-stigma in people with mental illness. *Journal of Nervous and Mental Disease 198*(2):150-153

Rüsch, N., Todd, A. R., Bodenhausen, G. V., Weiden, P. J., & Corrigan, P. W. (2009). Implicit versus explicit attitudes toward psychiatric medication: Implications for insight and treatment adherence. *Schizophrenia Research 112*:119-122.

Using an IAT measure of self=disgust associations, women with BPD and/or PTSD (N=55) showed stronger self=disgust associations than healthy female controls (N=37).

Rüsch, N., Schulz, D., Valerius, G., Steil, R., Bohus, M., & Schmahl, C. (2011 [published online ahead of print 6 December 2010]). Disgust and implicit self-concept in women with posttraumatic stress disorder and borderline personality disorder. *European Archives of Psychiatry and Clinical Neuroscience*. DOI 10.1007/s00406-010-0174-2.

Among mental health professionals judging clinical vignettes, stronger IAT-measured negative associations with "mentally ill people" predicted over-pathologizing (diagnosing mental illness for which no symptoms were present).

Peris, T. S., Teachman, B. A., & Nosek, B. A. (2008). Implicit and explicit stigma of mental illness: Links to clinical care. *Journal of Nervous and Mental Disease, 196*, 752-760.

A study of 2,329 Dutch patients (aged 18–65) with depression and anxiety disorders establishes that IAT-measured self-depressive associations and self-anxious associations predicted these disorders differentially and independently of parallel explicit (self-reported) measures.

Glashouwer, K., & de Jong, P.J. (2010). Disorder-specific automatic self-associations in anxiety and depression: Results of the Netherlands Study of Depression and Anxiety. *Psychological Medicine*, 40, 1101–1111.

In the study of 2,329 Dutch patients, IAT depression and anxiety measures significantly correlated with suicidal ideation and past suicide attempt; interactions between the IAT measures and parallel explicit beliefs explained criterion variance beyond that explained by the explicit measures.

Glashouwer, K.A., de Jong, P.J., Penninx, B.W.J.H., Kerkhof, A.J.F.M., van Dyck, R., & Ormel, J., (2009). Do automatic self-associations relate to suicidal ideation? *Journal of Psychopathology and Behavioral Assessment*. Published online, August, 2009.

MEDICAL (including substance abuse) (N=12)

ER and general internal medicine resident physicians' implicit bias against Black patients predicted fewer recommendations for thrombolysis for Black than White myocardial infarction patients.

Green, A.R., Carney, D.R., Pallin, D.J., Ngo, L.H., Raymond, K.L., Iezzoni, L.I., & Banaji, M.R. (2007). The presence of implicit bias in physicians and its prediction of thrombolysis decisions for black and white patients. *Journal of General Internal Medicine*. 22, 1231–1238.

The laboratory of Reinout Wiers in Netherlands has produced numerous results showing the use of IAT measures in understanding adolescents at risk to develop serious alcohol and other drug problems. Here are a few references to this large body of work.

Wiers, R. W., Eberl, C., Rinck, M., Becker, E. S., & Lindenmeyer, J. (2011). Retraining automatic action tendencies changes alcoholic patients' approach bias for alcohol and improves treatment outcome. *Psychological Science*, 22, 490–497.

Thush, C., Wiers, R. W., Ames, S. L., Grenard, J. L., Sussman, S., & Stacy, A. W. (2007). Apples and oranges? Comparing indirect measures of alcohol-related cognition predicting alcohol use in at-risk adolescents. *Psychology of Addictive Behaviors*, 21, 587–591.

Wiers, R. W., Houben, K., & de Kraker, J. (2007). Implicit cocaine associations in active cocaine users and controls. *Addictive Behaviors*, 32, 1284–1289.

Thush, C., & Wiers, R. W. (2007). Explicit and implicit alcohol-related cognitions and the prediction of future drinking in adolescents. *Addictive Behaviors*, 32, 1367–1383.

Wiers, R. W., Van Woerden, N., Smulders, F. T. Y., & de Jong, P. J. (2002). Implicit and explicit alcohol-related cognitions in heavy and light drinkers. *Journal of Abnormal Psychology*, 111, 648–658.

An IAT measure of attitudes of 5th-grade children toward smoking showed variations as a function of parental smoking, and was responsive to effects of tobacco-prevention activities.

Andrews, J. A., Hampson, S. E., Greenwald, A. G., Gordon, J., & Widdop, C. (in press). Using the Implicit Association Test to assess children's implicit attitudes toward smoking. *Journal of Applied Social Psychology*.

An IAT measure of physicians' implicit race bias, in combination with a measure of their self-reported bias, predicted patients' satisfaction with the patient–physician interaction.

Penner, L. A., Dovidio, J. F., West, T. V., Gaertner, S. L., Albrecht, T. L., Dailey, R. K., & Markova, T. (2010). Aversive racism and medical interactions with Black patients: A field study. *Journal of Experimental Social Psychology, 46*, 436-440.

A sample of medical doctors selected from a larger group of persons who completed Black–White race IATs on the Internet, showed an implicit preference for White Americans relative to Black Americans.

Sabin, J. A., Nosek, B. A., Greenwald, A. G., & Rivara, F. P. (2009). Physicians’ implicit and explicit attitudes about race by MD race, ethnicity and gender. *Journal of Health Care for the Poor and Underserved, 20*, 896–913.

Mothers who had more positive IAT-measured implicit attitudes toward smoking had adolescent children (mean age = 13.4 years) with more positive implicit attitudes, which in turn predicted their smoking initiation 18-months later.

Sherman, S. J., Chassin, L., Presson, C., Seo, D.-C., & Macy, J. T. (2009). The intergenerational transmission of implicit and explicit attitudes toward smoking: Predicting adolescent smoking initiation. *Journal of Experimental Social Psychology, 45*, 313–319.

In a Midwestern U. S. community sample (N=449; age range: 30-54), those with stronger negative IAT-measured implicit attitudes toward smoking were significantly more likely to quit smoking 18 months later, especially if they had high levels of previous experienced failure to control smoking.

Chassin, L., Presson, C., Sherman, S. J., Seo, D.-C., & Macy, J. T. (in press). Implicit and explicit attitudes predict smoking cessation: Moderating effects of experienced failure to control smoking and plans to quit. *Psychology of Addictive Behaviors*.

Comparison of 65 heroin abusers on methadone maintenance treatment (MMT) and 38 not on MMT showed that the latter showed significantly weaker implicit self-identification with heroin use.

Geng, L., & Qian B. (2011). Implicit and explicit cognition of Chinese heroin abusers. *Social Behavior and Personality, 39*, 433–444.

EMPLOYMENT & JOB PERFORMANCE (N=7)

IAT correlated with hiring managers’ ethnic bias in inviting Swedish vs. Arab–Muslim job applicants for hiring interviews.

Rooth, D-O. (2010). Automatic associations and discrimination in hiring: Real world evidence. *Labour Economics, 17*, 523–534.

An IAT measure of implicit bias against injecting drug users (IDUs) predicted intention to change jobs of nurses working with IDUs.

von Hippel, W., Brener, L., & von Hippel, C. (2008). Implicit prejudice toward injecting drug users predicts intentions to change jobs among drug and alcohol nurses. *Psychological Science, 19*, 7–11.

An IAT measure of Australian pilots’ attraction toward risk-taking behavior (e.g., low-altitude flight) was the best predictor of their engaging in risky behavior in a flight simulator test.

Molesworth, B. R. C., & Chang, B. (2009). Predicting pilots’ risk-taking behavior through an Implicit Association Test. *Human Factors, 51*, 845–857.

An IAT measure of association of self with the trait of collaborative (vs. independent) predicted a biotech firm’s employees’ collaborative engagement with organizationally distant colleagues.

Srivastava, S., & Banaji, M. R. (in press). Behind the front: Collaborative networks and implicit cognition in organizations. *American Sociological Review*.

Hiring managers (N=153) holding more negative IAT-measured automatic stereotypes about the obese were less likely to invite an obese applicant for an interview.

Agerström, J., & Rooth, D.-O. (2011). The role of automatic obesity stereotypes in real hiring discrimination. *Journal of Applied Psychology, 96*, 790-805.

For German semi-professional basketball players (N = 54) an implicit measure of aggressiveness predicted performance outcome (court playing time and coach’s judgments on game performance) over and above an explicit measure of aggressiveness.

Teubel, T., Asendorpf, J. B., Banse, R., & Schnabel, K. (2011). Implicit but not explicit aggressiveness predicts performance outcome in basketball players. *International Journal of Sport Psychology, 42*, 390–400.

Implicit attitudes about one’s job predict unique variance in supervisor-rated job performance (controlling for self-reported job satisfaction) in a sample of medical professionals (N=54).

Leavitt, K., Fong, C.T., & Greenwald, A.G. (2011). Asking about well-being gets you half an answer: Intra-individual processes of implicit and explicit job attitudes. *Journal of Organizational Behavior, 32*, 672–687.

DEVELOPMENT & EDUCATION (N=3)

Nation-level aggregate IAT measures of a gender–science stereotype predicted nations’ sex differences in 8th-grade science and mathematics achievement, supporting the possibility of a causal role of the stereotypes in creating the sex differences.

Nosek, B. A., Smyth, F. L., Sriram, N., Lindner, N. M., Devos, T., Ayala, A., Bar-Anan, Y., Bergh, R., Cai, H., Gonsalkorale, K., Kesebir, S., Maliszewski, N., Neto, F., Olli, E., Park, J., Schnabel, K., Shiomura, K., Tulbure, B., Wiers, R. W., Somogyi, M., Akrami, N., Ekehammar, B., Vianello, M., Banaji, M. R., & Greenwald, A. G. (2009). National differences in gender-science stereotypes predict national sex differences in science and math achievement. *Proceedings of the National Academy of Sciences*, in press.

Mothers’ (but not fathers’) IAT-measured Black–White race preference predicted racial preferences of their 3-to-6-year-old children, but parents’ self-reported race attitudes did not predict their children’s preferences.

Castelli, L., Zogmaister, C., & Tomelleri, S. (2009). The transmission of racial attitudes within the family. *Developmental Psychology, 45*, 586-591.

A study of 247 children in 1st through 5th grades showed that, as early as 2nd grade, IAT measures showed the American cultural stereotype that math is more for boys than girls.

Cvencek, D., Meltzoff, A. N., & Greenwald, A. G. (2010, in press). Math–gender stereotypes in elementary-school children. *Child Development*.

FORENSICS (N=10)

Among sex offenders (N=46) living in a halfway house, those rated as in danger of relapse by their therapists, and those rated to be exclusively pedophile, showed greater child-erotic association than did their contrast groups.

Steffens, M. C., Yundina, E., & Panning, M. (2008). Automatic associations with "erotic" in child sexual offenders: Identifying those in danger of reoffence. *Sexual Offender Treatment*, 3, Issue 2 [Online].

An IAT measure revealed that pedophiles have an association between children and sex, whereas nonpedophilic offenders have an association between adults and sex.

Gray, N.S., Brown, A.S., MacCulloch, M.J., Smith, J., Snowden, R.J. (2005). An implicit test of the associations between children and sex in pedophiles. *Journal of Abnormal Psychology*, 114, 304–308.

This article includes an overview of studies using indirect measures, including the IAT, in studies of sex offenders. In addition to the two listed just above, the citations following Snowden et al (2011) just below are included in this review.

Snowden, R.J., Craig, R. L., & Gray, N.S. (2011). Indirect behavioral measures of cognition among sexual offenders. *Journal of Sex Research*, 48, 192–217.

Mihailides, S., Devilly, G. J., & Ward, T. (2004). Implicit cognitive distortions and sexual offending. *Sexual Abuse: A Journal of Research and Treatment*, 16, 333–350.

Nunes, K. L., Firestone, P., & Baldwin, M. W. (2007). Indirect assessment of cognitions of child sexual abusers with the Implicit Association Test. *Criminal Justice and Behavior*, 34, 454–475.

Banse, R., Schmidt, A. F., & Clabour, J. (2010). Indirect measures of sexual interest in child sex offenders: A multi-method approach. *Criminal Justice and Behavior*, 37, 319–335.

Gannon, T. A., Rose, M. R., & Williams, S. E. (2009). Do female child molesters hold implicit associations between children and sex? A preliminary investigation. *Journal of Sexual Aggression*, 15, 55–61.

The IAT method successfully distinguished truth-tellers from criminal liars, including drug users, traffic offenders, and murderers.

Sartori, G., Agosta, S., Zogmaister, C., Ferrara, S. D., & Castiello, U. (2008). How to accurately assess autobiographical events. *Psychological Science*, 19, 781–788.

In a small sample (N=14) “when a doping substance was detected in the hair of an athlete who denied doping use, their self-report[ed] . . . negative attitude . . . contrasted sharply with a more positive estimate of their implicit doping attitude.”

Petróczi, A., Aidman, E. V., Hussain, I., Deshmukh, N., Nepusz, T., Uvacsek, M., Tóth, M., Barker, J., & Naughton, D. P. (2010) Virtue or pretense? Looking behind self-declared innocence in doping. *PLoS ONE*, 5, e10457. doi:10.1371/journal.pone.0010457

A nation-wide U.S. study in which trial judges (N=133) completed a Black–White race attitude IAT found that “judges harbor the same kinds of implicit biases as others; that these biases can influence their judgment; but that given sufficient motivation, judges can compensate for the influence of these biases”.

Rachlinski, J. J., Johnson, S. L., Wistrich, A. J., & Guthrie. C. (2009). Does unconscious racial bias affect trial judges? *Notre Dame Law Review*, 84, 1195-1246.

RELATIONSHIPS (N=2)

An IAT variant (GNAT) measure of romantic attraction successfully predicted the resistance to breakup of committed relationships.

Lee, S., Rogge, R. D., & Reis, H. T. (2009). Assessing the seeds of relationship decay: Using implicit evaluations to detect the early stages of disillusionment. *Psychological Science*, in press.

In an experience sampling study of gays, lesbians, and bisexuals (N=31), an IAT measure of anti-gay implicit attitudes predicted greater rumination, emotion suppression, and psychological distress in response to stigma-related stressors.

Hatzenbuehler, M. L., Dovidio, J. F., Nolen-Hoeksema, S., & Phillips, C. E. (2009). An implicit measure of anti-gay attitudes: Prospective associations with emotion regulation strategies and psychological distress. *Journal of Experimental Social Psychology*, *45*, 1316–1320.