

Developing and Validating an Implicit Association Test
for Attitudes Toward Transgender People

John Conway¹

Jordan R. Axt^{2,3}

Erin C. Westgate²

Kate A. Ratliff¹

¹University of Florida

²University of Virginia

³Project Implicit

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Abstract

As public awareness of issues facing transgender people increases, attitudes and social norms concerning transgender people may also change. Negative attitudes toward transgender people may change in response to greater awareness of and policy decisions toward transgender people, prompting a need for reliable measures of implicit attitudes towards transgender people. Two studies tested an Implicit Association Test (IAT; Greenwald, McGhee, & Schwarz, 1998) measuring attitudes toward transgender people. In Study 1 ($N = 692$) the transgender IAT demonstrated (a) reliable implicit preferences for cisgender and transgender people, (b) acceptable internal reliability, and (c) expected correlations with self-report transgender attitudes, advocacy for pro-transgender policy, and political orientation. Study 2 ($N = 392$) replicated these findings and showed criterion validity of the transgender IAT, even within a sample of participants who self-reported no explicit preference between cisgender and transgender people.

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Developing and Validating an Implicit Association Test for Attitudes Toward Transgender People

Estimates suggest that roughly half of one percent of the adult population identifies as transgender (i.e., having a gender identity that differs from the one assigned at birth; Tompkins et al., 2015), and between 2-5% experience some level of gender dysphoria (Gates, 2011; Van Kesteren, Gooren, & Megens, 1996). Visibility of transgender people in the past several years has grown markedly, with increasing numbers of people reporting that they personally know a transgender person (Halloran, 2015). However, transgender people continue to be victims of discrimination, including legislative efforts to restrict transgender people to using the bathroom of the gender they were assigned at birth (Associated Press, 2016) and efforts to ban transgender people from the military (Diamond, 2017). This junction offers an opportunity to understand how determinants of behaviors towards transgender people may be related to attitudes. Critically, we cannot answer these questions without established validated measures of attitudes toward transgender people.

Negative transgender attitudes and transphobia, the emotional disgust felt towards people who do not conform to society's gender expectations (Grigoriopoulos & Kordoutis, 2015; Norton & Herek, 2013; Nagoshi et al., 2008), contribute to a broad range of negative outcomes impacting transgender people, including suicide, depression, physical violence, and employment discrimination (Haas, Philip, Rogers & Herman, 2014; Grant et al., 2011; Almeida et al., 2009). Negative mental health outcomes (Nadal, Davidoff, Davis & Wong, 2014) have also been linked to such attitudes and treatment, including indignities such as incorrect pronoun use (microaggressions; Nadal, et al., 2010). Suicide risk in particular, is elevated among transgender people experiencing and perceiving gender-based discrimination (Tebbe & Moradi, 2016).

One factor for improving perception and treatment of transgender people lies in changing individuals' attitudes. Changes in attitudes occur explicitly (i.e. attitudes consciously experienced and recognized as one's own; Greenwald & Banaji, 1995), as well as implicitly (i.e. automatically activated associations; Gawronski & Bodenhausen, 2007). Historically, legal decisions that expand (or limit) rights provided to groups of people influence attitudes towards those groups; for instance, people's attitudes became more favorable *after* the Supreme Court legalized same-sex marriage (Tankard & Paluck, 2017).

Implicit and explicit attitudes towards a group may diverge (Nosek, Banaji, & Greenwald, 2002; Jost, Banaji & Nosek, 2004), change at varying rates (Westgate Riskind & Nosek, 2015; Cao & Banaji, 2016), and differentially correlate with important behaviors (Hofmann, Gschwendner, Castelli & Schmitt, 2008; c.f., Oswald et al, 2013). It is important for researchers to measure explicit and implicit attitudes towards transgender people, including 1) differences in attitudes toward transgender people, 2) how these attitudes relate to beliefs and behaviors concerning transgender people and 3) how both change over time.

Existing explicit measures of transgender attitudes and transphobia (Hill & Willoughby, 2005; Willoughby, Hill & Gonzalez, 2010; Norton & Herek, 2013) and emerging measures of implicit attitudes towards transgender people (Wang-Jones, Alhassoon, Hatrup & Lowma, 2017) have measured attitudes toward transgender men and transgender women rather than measuring attitudes toward the transgender category. The current work sought to add to such available measures by creating a single implicit attitude measure for associations with transgender people as a singular group. This allows for feedback on transgender people as a focal attitude object without breaking into subtypes. Study 1 introduces a novel measure of implicit attitudes towards transgender people and provides evidence of validity in a very large sample, showing reliable

correlations with explicit transphobic attitudes as well as known group differences in transgender attitudes between LGBTQ and cisgender-heterosexual participants. Study 2 shows that the implicit attitude measures continued to predict self-reported transphobia and support for policies concerning the treatment of transgender individuals, even in a sample of participants reporting no explicit preferences for transgender versus cisgender people. These results suggest that implicit attitudes towards transgender people are measured reliably by the IAT and can be used to facilitate research related to the influence of transgender attitudes on relevant beliefs and behaviors.

Study 1

Participants

Participants were 692 volunteers at Project Implicit (<https://implicit.harvard.edu>; Nosek, 2005). We aimed for a target sample of 700 participants, which yields greater than 95% power to detect a small correlation ($r = .15$; Faul, Erdfelder, Lang, & Buchner, 2007). See Table 1 for demographics.

Predictor Variable

Implicit Attitudes Toward Transgender People. Implicit attitudes were measured using a seven-block Implicit Association Test (IATs; Greenwald, McGhee, & Schwartz, 1998; Greenwald, Banaji & Nosek, 2003; Nosek, Greenwald, and Banaji, 2005). The IAT measured the degree to which a participant associated two target concepts (“Transgender” and “Cisgender”) and two attributes (“Good words” and “Bad words”) (see Table 2 for block structure). The Transgender and Cisgender categories used images of celebrities matched on race, age and popularity (measured by Google search results; see Figure 1). IATs were scored by the *D* algorithm (Greenwald, Nosek & Banaji, 2003): response latencies <300 ms and >10,000 ms

were removed. More positive scores indicated more positive associations with cisgender versus transgender people. Prior to completing the transgender IAT, all participants completed a training task where they read information about each of the celebrities used as stimuli (see Figure 2), and then completed a 24-trial sorting task with versions of each image that were labeled as cisgender or transgender.

Twenty-four participants (3%) were excluded due to error rates following Greenwald, Nosek & Banaji's (2003) guidelines (greater than 40% in a single block or greater than 30% overall) or for too many fast trials (greater than 10%).

Outcome Variables

We tested whether the transgender IAT was correlated with self-report measures, and demonstrated known group differences between: LGBTQ and cisgender-heterosexual participants (see Table 3 for descriptive statistics).

Self-Reported Transphobia. Transphobia was measured using the 9-item Transphobia scale (7-point scale, $\alpha = .87$, Nagoshi et al., 2008). Items included "I think there is something wrong with a person who says that they are neither a man nor a woman." Higher scores indicated greater self-reported transphobia.

Self-Reported Attitudes toward Policies Affecting Transgender People. Participants rated their agreement or disagreement (7-point scale, $\alpha = .87$) with five transgender policy issues in randomized order: bathroom use, adoption rights, insurance coverage for transgender care, ability to dress in a dress code matching expressed gender, and obtaining new identification. Higher scores indicated greater agreement with policies in favor of transgender people.

Self-reported Attitudes toward Transgender People. Self-reported attitudes were measured using a two 7-point items: "Please rate how warm or cold you feel towards cisgender

people” and “Please rate how warm or cold you feel towards transgender people” as well as the difference score between the two items. Both items were measured using 7-point scales; 1 = very cold, 7 = very warm.

Political Orientation. Participants reported political orientation on a seven-point scale, from -3 = *Strongly conservative* to 3 = *Strongly liberal* ($M = 1.02$, $SD = 1.59$).

Sex, Gender, and Sexual Orientation. Participants reported their gender assigned at birth (male or female), followed by their current gender identity and sexual orientation. Participants who self-identified as either non-heterosexual or a gender identity different than what they were assigned at birth ($N = 112$) were coded as LGBTQ.

Procedure

Participants volunteered through the Project Implicit website. Upon arriving at the site, they completed demographics as part of the registration process. Participants first completed the transgender IAT and then the self-report variables in a randomized order.

Results and Discussion

Implicit and explicit attitudes towards transgender people

Participants implicitly favored cisgender people over transgender people, $M = 0.24$, $SD = 0.43$, $t(666) = 14.51$, $p < .001$, 95% CI = [.48, .64], Cohen’s $d = 0.56$. They also self-reported a preference for cisgender over transgender people, $M = 0.61$, $SD = 1.00$, $t(645) = 15.48$, $p < .001$, 95% CI = [.52, .69], $d = .61$.

Cisgender-heterosexual participants had stronger implicit preferences for cisgender to transgender people ($M = 0.29$, $SD = 0.41$) than LGBTQ participants ($M = 0.02$, $SD = 0.45$), $t(663) = 6.24$, $p < .001$, $CI_{diff} = [.16, .32]$, $d = 0.65$. Cisgender-heterosexual participants also self-

reported stronger cisgender preferences ($M = 0.68$, $SD = 0.78$) than LGBTQ participants ($M = -0.26$, $SD = 1.38$), $t(664) = 6.17$, $p < .001$, 95% $CI_{diff} = [.16, .32]$, $d = 0.24$.

Criterion validity of the transgender IAT

Stronger implicit preferences for cisgender (vs transgender) people were reliably associated with greater explicit preference for cisgender people relative to transgender people, $r = 0.25$, 95% $CI = [.17, .32]$, $p < .001$, more positive attitudes toward cisgender people, $r = 0.09$, 95% $CI = [.01, .17]$, $p = .02$, more negative attitudes toward transgender people, $r = -0.16$, 95% $CI = [-.23, -.08]$, $p < .001$, less support for pro-transgender policies, $r = -0.19$, 95% $CI = [-.27, .12]$, $p < .001$, greater self-reported transphobia, $r = 0.30$, 95% $CI = [.23, .37]$, $p < .001$, and more conservative political orientation, $r = -0.17$, 95% $CI = [-.25, -.09]$, $p < .001$. See table 3 for full correlation matrix.

Summary and discussion

The transgender IAT showed moderate internal reliability ($r = .60$, 95% $CI = [.55, .65]$), was correlated with general preference for cisgender to transgender people, replicated known group differences between LGBTQ and straight participants in attitudes towards transgender people, and showed reliable, small-to-moderate associations with self-reported transgender attitudes and policy support for transgender issues. The reliability was comparable to a pilot study ($N = 237$; see Online Supplement for full write-up).

In Study 2, we investigated whether the transgender IAT would be related to transgender policy support even in samples with no self-reported preference between cisgender and transgender people.

Study 2

Participants

Participants were 392 US-only volunteers at Project Implicit. Participants were first presented with a relative preference item measuring attitudes toward cisgender and transgender people simultaneously; only participants reporting no preference for transgender versus cisgender people (32%) were eligible to continue. The study was restricted to self-identified liberals and conservatives (collected from their Project Implicit research registration).

Predictor Variables

Participant political orientation, gender, and sexual orientation identity were measured using the same materials as in Study 1.¹

Outcome Variables

Implicit Attitudes Toward Transgender People. Implicit attitudes were measured using the transgender/cisgender IAT from Study 1 (reliability: $r = 0.56$, 95% CI = [.49, .63]). Twelve participants (3%) were excluded using the same criteria as Study 1.

Self-reported transphobia ($M = 2.75$, $SD = 1.16$, $\alpha = .84$), attitudes towards transgender policies ($M = 5.90$, $SD = 1.31$, $\alpha = .85$), attitudes toward transgender people ($M = 5.27$, $SD = 1.31$) and attitudes toward cisgender people ($M = 5.26$, $SD = 1.31$) items were measured using the same materials as in Study 1

Procedure

Aside from the screening item, procedures were identical to Study 1.

¹ Participants reported political party affiliation (Democrat or Republican). The original analysis plan split liberals and conservatives but that we collapsed across that factor for “ease of presentation.” Due to constraints around sampling, we were also only able to recruit 400 of the planned 800 participants.

Results and Discussion

Participants implicitly favored cisgender people over transgender people, $M = 0.18$, $SD = 0.43$, $t(379)=8.02$, $p < .001$, 95% CI = [.31, .52], $d = 0.41$. Using a difference score from the two thermometer items, participants did not self-report a preference for cisgender over transgender people, $M = 0.01$, $SD = 0.85$, $t(365)=0.31$, $p = .76$, 95% CI = [-.09, .12], $d = .02$.

Cisgender-heterosexual participants had stronger implicit preferences for cisgender to transgender people ($M = 0.23$, $SD = 0.41$) than LGBTQ participants ($M = -0.06$, $SD = 0.44$), $t(375)=5.21$, $p < .001$, $CI_{diff} = [.18, .40]$, $d = 0.27$. Cisgender-heterosexual participants also self-reported stronger preferences ($M = 0.09$, $SD = 0.81$) for cisgender people than LGBTQ participants ($M = -0.33$, $SD = 0.93$), $t(361) = 3.66$, $p < .001$, 95% $CI_{diff} = [.19, .64]$, $d = 0.19$.

Criterion validity of the transgender IAT

Stronger implicit preferences for cisgender (vs transgender) celebrities were not reliably associated with more positive attitudes toward cisgender people, $r = -0.07$, 95% CI = [-.17, .04], $p = .20$, but were reliably associated with more negative attitudes toward transgender people, $r = -0.15$, 95% CI = [-.25, -.05], $p < .001$, less support for pro-transgender policies, $r = -0.18$, 95% CI = [-.27, -.08], $p < .001$, greater self-reported transphobia, $r = 0.27$, 95% CI = [.18, .36], $p < .001$, and more conservative political orientation, $r = -0.25$, 95% CI = [-.35, -.16], $p < .001$. See table 4 for full correlation matrix.

In Study 2, even among a sample equated on explicit relative preferences of transgender vs. cisgender people, the transgender IAT showed group differences between heterosexual and LGBTQ participants, and was correlated with greater levels of self-reported transphobia as well as policy beliefs concerning the treatment of transgender people.

General Discussion

We examined a transgender IAT, and demonstrated that it relates to support for pro-transgender policies and even predicts transphobia in a sample claiming to have no explicit preference for cisgender versus transgender people. This finding emphasizes the importance of implicit assessments of transgender attitudes, especially given potential changes in social norms. Knowing people's explicit preferences for cisgender versus transgender people may not be enough; implicit attitudes provide additional information that people may not always be willing (or able) to self-report.

Researchers may find this transgender IAT useful in further understanding the development of transgender attitudes and the causes or consequences of transphobia. To aid in that goal, we have made the data reported here available, and have programmed an Inquisit version of the transgender IAT that can be downloaded at <http://bit.ly/2y6LJdp>.

A strength of the present research is its large sample sizes and inclusion of LGBTQ participants. However, there is an unfortunate lack of data from transgender participants. Study 1, was planned to compare transgender and cisgender participants and was unable to do so due to sample size constraints. Instead, we collapsed all LGBTQ participants into one category, which oversimplifies the attitudes toward transgender people held within the LGBTQ community. An additional potential limitation lies in the use of celebrities as stimulus items, as participants may have had pre-existing associations. It is important to note that, 1) it is unlikely that participants had prior associations with all celebrities, and 2) more importantly, past research suggests that category labels in the IAT (transgender people/cisgender people) are far more important than the exact stimuli used (Dasgupta & Greenwald, 2001).

This research is a step in developing a new measure for studying how transgender attitudes form and change. This tool may also be useful to both researchers and the public in raising awareness of transphobia. While the transgender community has been historically under-researched and under-represented in psychological literature, that is changing (Tompkins et al., 2015). Future research can build upon these studies and contribute to greater awareness by addressing how transphobic attitudes impact the daily lives of transgender people.

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Table 1
Participant demographic information (in percentages)

Demographic Variable	Pilot	Study 1	Study 2
Age			
Mean	37.7	33.2	35.3
<i>SD</i>	15.7	13.3	14.9
Current Gender Identity			
Male	37.8	28.7	29.2
Female	61.0	68.1	69.7
Trans man	N/A	0.1	0.0
Trans woman	N/A	0.1	0.0
Genderqueer	N/A	1.2	0.3
Other/Unknown	N/A	1.2	0.3
Missing Data	1.2	0.4	0.5
Sexual Orientation			
Heterosexual	N/A	82.5	82.1
Lesbian or Gay	N/A	4.5	5.3
Bisexual	N/A	7.8	7.3
Queer	N/A	2.7	1.6
Other/Unknown	N/A	1.9	2.9
Missing Data	N/A	0.6	0.5
Ethnicity			
Hispanic/Latino	8.6	9.7	9.7
Non-Hispanic/Latino	77.9	74.0	79.2
Unknown	6.5	7.8	6.3
Missing Data	7.0	8.5	4.7
Race			
American Indian	0.5	0.3	1.3
East Asian	2.5	2.2	2.1
South Asian	4.0	1.5	2.6
Pacific Islander	0.2	0.1	1.3
Black	7.2	9.1	6.6
White	74.6	72.2	75.3
Multi-racial (Black-white)	1.7	1.6	1.1
Multi-racial (Other)	5.2	5.8	5.8
Unknown	2.5	5.2	3.7
Missing Data	1.6	1.8	0.3
Political Identification			
Strongly Conservative	2.1	2.2	5.0
Moderately Conservative	7.6	6.4	17.6
Slightly Conservative	6.0	4.5	21.8
Moderate/neutral	26.4	24.9	0.0
Slightly liberal	8.6	10.2	11.1
Moderately liberal	26.0	27.4	26.3
Strongly liberal	18.0	18.1	18.2
Missing Data	5.4	6.3	0.0
Total <i>N</i>	947	668	380

Note. Percentages for race, gender, political identification, and ethnicity may not sum to 100 due to rounding error.

Table 2

Block structure of the Transgender IAT in studies 1 and 2

Block	Trials	Trial stimuli	Example Pairings
Training	24	Only images	Cisgender/Transgender (categories)
1	20	Only images	Cisgender/Transgender (categories)
2	20	Only words	Good words/Bad words (categories)
3	20	Words and images	Transgender People+Bad words/Cisgender People+Good words
4	40	Words and images	Transgender People+Bad words/Cisgender People+Good words
5	28	Only images	Transgender/Cisgender (categories)
6	20	Words and images	Cisgender People+Bad words/Transgender People+Good words
7	40	Words and images	Cisgender People+Bad words/Transgender People+Good words

Correlations among Measured Variables in Study 1

Table 3

Correlations among Measured Variables in Study 1

Measure	Mean	SD	1	2	3	4	5	6
1. IAT D-score	0.24	0.43	-	(.01, .17)	(-.23, -.08)	(-.27, -.12)	(.23, .37)	(-.25, -.09)
2. Preference for cisgender	5.43	1.31	0.09	-	(.36, .48)	(-.10, .05)	(.01, .17)	(-.14, -.02)
3. Preference for transgender	4.90	1.44	-0.16	0.42	-	(.32, .45)	(-.56, -.45)	(.19, .33)
4. Policy Advocacy	5.77	1.45	-0.19	-0.02	0.39	-	(-.68, -.59)	(.43, .55)
5. Self-reported transphobia	2.90	1.29	0.30	0.09	-0.50	-0.64	-	(-.52, -.39)
6. Political Orientation	1.02	1.59	-0.17	-0.06	0.26	0.49	-0.46	-

Note. All correlations significant at $p < .05$.

Table 4

Correlations among Measured Variables in Study 2

Measure	Mean	SD	1	2	3	4	5	6
1. IAT D-score	0.18	0.43	-	(-.17, .04)	(-.25, -.05)	(-.27, -.08)	(.18, .36)	(-.35, -.16)
2. Preference for cisgender	5.25	1.31	*-0.07	-	(.75, .83)	(.11, .30)	(-.31, -.12)	(.12, .31)
3. Preference for transgender	5.26	1.31	-0.15	0.79	-	(.24, .42)	(-.45, -.27)	(.23, .41)
4. Policy Advocacy	5.90	1.31	-0.18	0.20	0.33	-	(-.61, -.46)	(.39, .55)
5. Self-reported transphobia	2.75	1.16	0.27	-0.22	-0.36	-0.54	-	(-.54, -.66)
6. Political Orientation	0.46	1.99	-0.25	0.22	0.32	0.47	-0.60	-

Note. * denotes a correlation where $p > .05$. All other correlations significant at $p < .05$.







Category	Items
Cisgender celebrities	
Transgender celebrities	

Figure 1. Transgender and cisgender celebrities used as stimuli in the transgender IAT

In this categorization task, you will sort images of both transgender and cisgender people. These are images of real people, some of whom you may know. To further familiarize yourself with these images, we provided a short description of each. This page contains the transgender images and the next page contains the cisgender images.

"Cisgender" refers to people who feel there is a match between the sex they were assigned at birth and the gender they feel themselves to be. "Transgender" refers to people who feel there is a mismatch between the sex they were assigned at birth and the gender they feel themselves to be.

Transgender Person	Name and Description
	Chaz Bono is a musician and actor.
	Chris Mosier is a triathlete.
	Laverne Cox is an actress.
	Caitlyn Jenner is a television personality.

Press the button below to learn about the cisgender images.

Continue

Figure 2. Transgender celebrity training materials