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The relationship between anti-gay prejudice and the categorization of sexual orientation

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ABSTRACT

A relatively large literature has demonstrated that sexual orientation can be judged accurately from a variety of minimal cues, including facial appearance. Untested in this work, however, is the influence that individual differences in prejudice against gays and lesbians may exert upon perceivers' judgments. Here, we report the results of a meta-analysis of 23 unpublished studies testing the relationship between anti-gay bias and the categorization of sexual orientation from faces. Aggregating data from multiple measures of bias using a variety of methods in three different countries over a period of 8 years, we found a small but significant negative relationship between accuracy and prejudice that was homogeneous across the samples tested. Thus, individuals reporting higher levels of anti-gay bias appear to be less accurate judges of sexual orientation.

1. Introduction

People extract considerable information about others' behaviors and traits from their appearance. One area in which this has recently grown to become quite established is judgments of sexual orientation. Across a variety of studies, researchers have found consistent evidence that individuals' sexual orientation can be reliably ascertained from hearing their voices (Munson & Babel, 2007), seeing the movement of their bodies (Johnson, Gill, Reichman, & Tassinary, 2007), and even just viewing photographs of their faces (Rule, Ambady, Adams, & Macrae, 2008).

Some work has noted that the magnitude of these effects varies depending on a perceiver's group membership. For example, gay men were found to judge sexual orientation more accurately from faces than straight men (e.g., Rule, Ambady, Adams, & Macrae, 2007), and an individual's race (Johnson & Ghavami, 2011) and cultural background (Valentova, Rieger, Havlicek, Linsenmeier, & Bailey, 2011) can affect the strategies by which one categorizes targets as gay versus straight (see also Rule, 2011; Rule, Ishii, Ambady, Rosen, & Hallett, 2011). Despite this group-based variability, few studies have considered the role that individual differences play in the categorization of social group memberships. Here, we sought to partly bridge this gap in the literature.

Although social categorization is relatively easy for some group distinctions (e.g., age, race, and sex; Brewer, 1988), there are a great many social categories that are distinguishable but not as obvious. Apart from sexual orientation, research has shown that a person's political affiliation and religious ideology are other "perceptually ambiguous" dimensions that can be ascertained from facial appearance (see Tskhay & Rule, 2013, for review). A spate of research beginning in the 1940s, for instance, examined the accuracy with which perceivers could distinguish Jewish people from non-Jewish people (e.g., Allport & Kramer, 1946). Moreover, many of these studies examined the extent to which individual differences in anti-Semitism related to these judgments. Some researchers found positive relationships between prejudice and accuracy, some found negative relationships, and others found no relationship at all (see Andrzejewski, Hall, & Salib, 2009). More recently, Wilson and Rule (2014) investigated how individual differences in political ideology influenced the perception and categorization of people as Democrats and Republicans, finding that individuals endorsing more conservative beliefs were more likely

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to categorize targets as Democrat outgroup members. Thus, whereas the effects of prejudice and biases on the perception of people with perceptually obvious stigmas has been well-documented (e.g., Plant & Devine, 1998), less is known about how prejudice impacts perceptions of targets whose stigma is ambiguous; with those for anti-Semitism being somewhat mixed. Investigating social categorization processes in perceptually ambiguous groups can be informative for better understanding prejudice, as individuals' ability to identify targets against whom they might be prejudiced may regulate opportunities to discriminate against them. Knowing how accurate perceivers are in their judgments of stigmatized groups might therefore allow one to anticipate potential instances of prejudice. Thus, to better understand how prejudice relates to the accuracy of social categorization, we examined the relationship between anti-gay bias and judgments of sexual orientation in the present work.

On the one hand, individuals who are more prejudiced against gay people may be more accurate in distinguishing others' sexual orientations because they are concerned with "spotting the enemy" to protect themselves against social threats (e.g., Allport & Kramer, 1946). Thus, we would expect to find that accuracy is positively related to prejudice. However, Brambilla, Riva, and Rule (2013) found that people reporting more familiarity with gay men were more accurate in categorizing sexual orientation.[1] Given that contact and familiarity with outgroup members are often preconditions to reducing prejudice (Allport, 1954; Hewstone, 2009; Page-Gould, Mendoza-Denton, Alegre, & Siy, 2010; Pettigrew & Tropp, 2006), accuracy might alternatively be higher among people with lower anti-gay prejudice. To investigate this, we conducted a series of tests in different locations and under unique conditions over a number of years. Here, we report the aggregated results of these studies focusing on the question of how anti-gay bias relates to perceivers' categorizations of sexual orientation based on photos of their faces. We tested both participants' overall accuracy in judging sexual orientation from faces as well as their individual response bias, or whether there was a systematic difference in the nature of participants' judgments (e.g., a tendency to inaccurately judge straight targets as gay, or incorrectly judge gay targets as straight), using signal detection theory (see Macmillan & Creelman, 2005, for an overview).

2. Method

Data were aggregated from 23 samples of participants tested at different times and geographic locations over a period of 8 years. Although the studies varied slightly in their specific purpose (e.g., additional questions asked or moderators tested), they all intended to investigate the relationship between individuals' anti-gay bias and their performance in categorizing targets as gay and straight. Table 1 provides a summary of the 23 samples and their characteristics.

All of the studies were conducted between 2006 and 2014 with over half of data collection efforts taking place in 2012. Most of the studies were conducted with participants from the US but nearly half came from other nations (i.e., Canada and Italy). All materials and procedures for the studies conducted in Italy were in Italian whereas those in the US and Canada were always in English. The majority of studies collected data from participants in the researchers' laboratories but eight studies were conducted online using Amazon's Mechanical Turk.

2.1. Stimuli

All but two studies used stimuli borrowed from Rule and Ambady (2008), consisting of 45 faces of self-identified gay men and 45 self-identified straight men that were downloaded from Internet dating websites (see the original work for more details). One study using these stimuli used only 40 faces from each group. Of the two studies not using these faces, one used 90 of the female faces used by Rule, Ambady, and Hallett (2009), half of which were of self-identified lesbian women and the other half of which were of self-identified straight women acquired in a manner similar to that of Rule and Ambady, as described in Rule et al. (2009). The other study not using Rule and Ambady's photos also developed the stimuli in a similar manner. The main distinction of these new images was that the targets were all men reporting an age of 65 years or greater (see Tskhay, Krendl, & Rule, 2015). Of these 88 photos, 44 were self-identified gay men and 44 were self-identified straight men.

2.2. Prejudice measures

An important difference between the studies was the instrument used to measure participants' anti-gay bias. Of the 20 studies measuring anti-gay bias using an explicit self-report scale, the majority ($n = 12$) used the 25-item Index of Homophobia (IHP; Hudson & Ricketts, 1980); four of which also included an in-house measure entitled the Motivation to Avoid Sexual orientation Disclosure (MASD) as a second measure (Tskhay & Rule, 2012). The MASD consisted of five items intended to measure individuals' desire to avoid acknowledging the non-heterosexual orientation of others (see Appendix for items and descriptive statistics). The overall inter-item reliability across all respondents from the four MASD samples was acceptable (Cronbach's $\alpha = .63$) and correlated well with the same participants' scores on the IHP (all $r_{Spearman} \geqslant .53$, all p's $< .001$), we therefore continued to include this as an additional measure of explicit prejudice. Two studies used the 20-item Modern Homonegativity Scale (MHS; Morrison & Morrison, 2002) and one study used the 20-item Attitudes Towards Lesbians and Gays Revised scale (ATLG-R; Herek, 1998).

Pilot testing showed that the original ATLG (Herek, 1988) did not produce acceptable reliabilities among Italian samples of participants. Thus, five items (questions 11, 13, 17, 19, and 20) that did show good reliability when combined were plucked from the original measure and adapted for use in the four samples measuring explicit prejudice in Italy, as well as in one of the US samples tested for cross-cultural comparison (overall Cronbach's $\alpha = .79$); hence, we will refer to this measure as the ATG-5.[2] In the case of the Italian study that examined categorizations of women's sexual orientation, the ATL version of this five-item measure was adapted (Cronbach's $\alpha = .75$) and is referred to here as the ATL-5. The most recent two studies conducted in Italy also asked participants to complete a six-item version of the Modern Racism Scale (MRS; McConahay, Hardee, & Batts, 1981) that was adapted for gay (cf. Black) men as the target group; the fourth item about economic gains was omitted because it was not deemed relevant in the Italian context (Cronbach's $\alpha = .60$). Three studies used a version of the Implicit Association Test (IAT; Greenwald, McGhee, & Schwartz, 1998) designed to measure anti-gay bias (e.g., Inbar, Pizzarro, Knobe, & Bloom, 2009) and another three studies used both the

[1] Other studies examining perceiver variability in judgments of sexual orientation found that women's accuracy in judging men's sexual orientation varied as a function of their menstrual cycle, showing state-level individual variability (Rule, Rosen, Slepian, & Ambady, 2011), and that political ideology (mostly in aggregated groups of liberals and conservatives) significantly affected perceivers' use of stereotypes in their judgments but not their accuracy (Stern, West, Jost, & Rule, 2013).

[2] Due to a miscommunication, the US test of the ATG-5 used only a 5-point (versus 7-point) scale; participants' responses were therefore rescaled by multiplying each original score by 1.4. The same error occurred across the two iterations of the MHS and was also resolved by multiplying the scores on the 5-point version by 1.4.

Table 1
Study characteristics, participant demographics, and significance tests for each sample.

Year	Nation	Setting	Bias	*N*	Men	White	GLB	Age	Accuracy		Response bias		Explicit prejudice			Implicit prejudice		
								M (SD)	*M* (SD)	*t*	*M* (SD)	*t*	*M* (SD)	$\rho_{A'}$	$\rho_{B''}$	*M* (SD)	$\rho_{A'}$	$\rho_{B''}$
2006	US	Lab	MHS	66	.53	.80	.05	20 (1)	.68 (.09)	16.20***	.17 (.20)	6.74***	.44 (.17)	.04	−.14	.47 (.45)	.10	.06
2009	US	Lab	IHP	46	–	–	–	–	.66 (.11)	9.96***	.10 (.21)	3.39**	.51 (.07)	−.04	.28	–	–	–
2010	Canada	Lab	MHS	65	–	–	–	–	.64 (.10)	10.50***	.19 (.22)	7.01***	.56 (.19)	−.12	.00	–	–	–
2011	Canada	Lab	IHP	52	.23	–	–	–	.63 (.10)	9.33***	.06 (.09)	4.35***	.38 (.18)	−.01	.26	–	–	–
2011	Canada	Lab	IHP	15	.53	–	–	–	.60 (.12)	3.22**	.04 (.10)	1.69	.38 (.15)	−.14	.11	–	–	–
2012	Canada	Lab	IHP, MASD	112	.41	–	.04	19 (3)	.63 (.10)	13.64***	.15 (.18)	8.80***	.43 (.14)	−.15	.02	–	–	–
2012	US	Online	IHP, MASD	78	.38	.78	.13	36 (3)	.64 (.13)	9.82***	.09 (.26)	3.19**	.39 (.19)	−.22	.00	–	–	–
2012	Canada	Lab	IHP, MASD	101	.33	–	.04	19 (3)	.63 (.11)	12.41***	.11 (.17)	6.74***	.43 (.13)	−.08	−.06	–	–	–
2012	US	Online	IHP	40	.55	.80	.13	37 (13)	.64 (.12)	7.51***	.07 (.25)	1.74	.45 (.21)	−.27	.11	–	–	–
2012	US	Online	IHP	60	.37	.77	.12	36 (14)	.64 (.12)	8.61***	.00 (.23)	0.10	.40 (.21)	−.26*	−.18	–	–	–
2012	US	Online	IHP	91	.47	.79	.08	36 (14)	.66 (.10)	15.71***	.07 (.24)	3.00**	.45 (.20)	−.15	−.01	–	–	–
2012	US	Online	IHP	52	.46	.75	.06	34 (14)	.66 (.12)	10.30***	.11 (.20)	3.78***	.38 (.18)	−.22	−.33*	–	–	–
2012	Canada	Lab	IHP, MASD	91	.33	.48	.08	–	.67 (.10)	15.40***	.19 (.23)	7.89***	.41 (.16)	−.15	−.09	–	–	–
2012	US	Online	IHP	98	.41	.74	.11	34 (13)	.64 (.11)	12.90***	.08 (.20)	3.84***	.42 (.24)	−.05	−.04	–	–	–
2012	US	Online	ATLG-R	506	.54	.75	.12	30 (10)	.66 (.11)	33.32***	.09 (.19)	10.06***	.37 (.18)	−.12**	−.08	–	–	–
2012	Italy	Lab	ATG-5	31	1.00	–	.00	22 (4)	.63 (.11)	6.48***	.13 (.17)	4.35***	.44 (.17)	−.56**	−.52**	–	–	–
2012	Italy	Lab	ATL-5	81	.00	–	.05	22 (2)	.65 (.09)	14.43***	.19 (.20)	8.49***	.36 (.16)	−.21	−.16	–	–	–
2013	US	Online	ATG-5	121	.50	.73	.08	34 (12)	.60 (.12)	9.18***	.08 (.20)	4.47***	.44 (.26)	−.10	−.13	–	–	–
2013	Italy	Lab	IAT	50	1.00	–	.00	23 (3)	.63 (.09)	9.60***	.09 (.13)	5.06***	–	–	–	.88 (.49)	−.25	−.23
2014	US	Lab	IAT	95	.37	–	.01	48 (25)	.56 (.10)	5.59***	.14 (.19)	6.92***	–	–	–	.54 (.45)	.01	−.02
2014	US	Lab	IAT	104	.38	–	–	35 (22)	.65 (.10)	14.57***	.13 (.21)	6.47***	–	–	–	.43 (.36)	−.04	.06
2014	Italy	Lab	ATG-5, MRS, IAT	40	.50	–	–	23 (2)	.58 (.13)	3.90***	.13 (.23)	3.68**	.37 (.20)	.12	−.05	.83 (.49)	−.01	−.15
2014	Italy	Lab	ATG-5, MRS, IAT	40	.50	–	–	23 (3)	.59 (.12)	4.66***	.10 (.13)	4.68***	.57 (.05)	−.12	−.46**	.75 (.55)	.23	.16

Note. $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$. Setting refers to whether participant data were collected in the laboratory or online via Amazon's Mechanical Turk; bias refers to the instruments used to measure participants' anti-gay bias: ATG-5 = five-item measure developed in Italy based on the 10-item Attitudes Towards Gays scale (Herek, 1988), ATL-5 = five-item measure developed in Italy based on the 10-item Attitudes Towards Lesbians scale (Herek, 1988), ATLG-R = Attitudes Towards Lesbians and Gays scale Revised (Herek, 1998), IAT = Implicit Association Test (Greenwald et al., 1998), IHP = Index of Homophobia (Hudson & Ricketts, 1980), MASD = Motivation to Avoid Sexual Discrimination (Tskhay & Rule, 2012), MHS = Modern Homonegativity Scale (Morrison & Morrison, 2002), MRS = Modern Racism Scale modified for gay male targets (McConahay et al., 1981); men refers to the percentage of men in each sample; white refers to the percentage of White participants in each sample; GLB refers to the percentage of participants identifying as gay, lesbian, or bisexual; age is in years; accuracy corresponds to A' scores; response bias corresponds to B'' scores; explicit prejudice reports the rescaled explicit anti-gay bias score; implicit prejudice reports the IAT *D* scores.

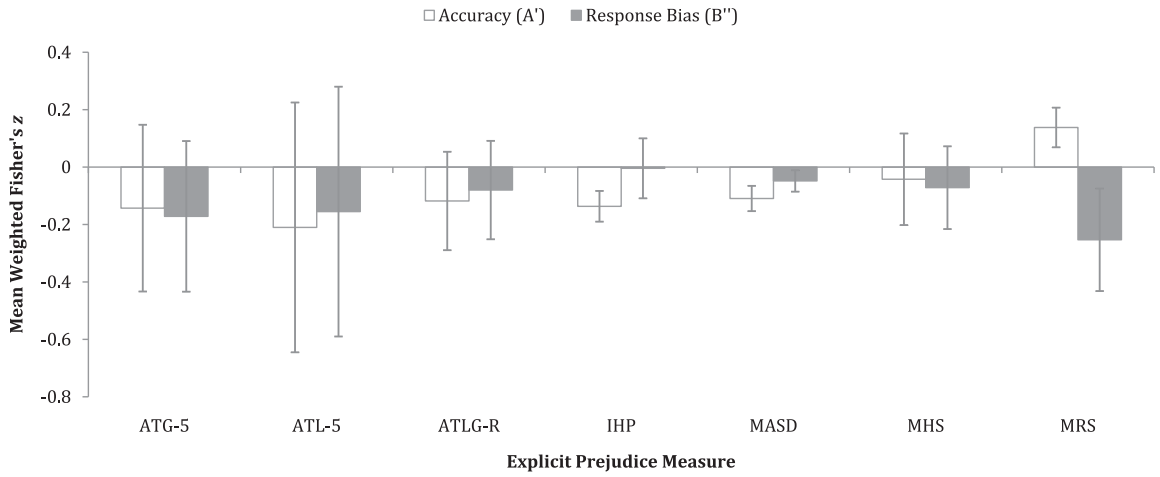

Fig. 1. Mean weighted Fisher's *z* scores representing the relationships between categorization accuracy (*A′*) and response bias (*B″*) with explicit prejudice, as measured using each of the ATG-5 [five-item measure developed in Italy based on Herek's (1998) Attitudes Towards Gays subscale], ATL-5 [five-item measure developed in Italy based on Herek's (1998) Attitudes Towards Lesbians subscale], ATLG-R (Attitudes Towards Lesbians and Gays scale Revised; Herek, 1998), IHP (Index of Homophobia; Hudson & Ricketts, 1980), MASD (Motivation to Avoid Sexual orientation Disclosure; Tskhay & Rule, 2012), MHS (Modern Homonegativity Scale; Morrison & Morrison, 2002), and MRS (Modern Racism Scale modified for gay male targets; McConahay et al., 1981). Error bars denote 95% confidence intervals.

IAT and one or more of the explicit measures of prejudice, for which we modeled both sets of relationships.[3] This commonly-used version of the IAT (e.g., Anselmi, Vianello, Voci, & Robusto, 2013; Gabriel, Banse, & Hug, 2007) asks participants to respond to pairings of images and words related to sexual orientation (e.g., a picture of a two-groom wedding-cake topper) with the same positive and negative words common to other variants of the IAT (e.g., "terrible"). Greater response latencies to gay-related images paired with positive words versus gay-related images paired with negative words therefore suggest stronger implicit anti-gay bias.

2.3. Procedure

Aside from the differences described above, the studies varied mostly in terms of additional measures that we did not analyze here. For instance, two studies included the Traditional Beliefs about Gender and Identity scale (Dasgupta & Rivera, 2006), four studies included measures of individuals' motivation to control their prejudice both internally (the Internal Motivation Scale; IMS) and externally (the External Motivation Scale; EMS) developed by Plant and Devine (1998) but adapted here for gay men as the targets of prejudice, and five studies asked participants to report information about their familiarity with gay men using unvalidated (usually one-item) measures. A few of the studies differed in procedure: two used mousetracking (Freeman & Ambady, 2010) as a dependent measure, one used a joystick-based approach-avoidance task (e.g., Marsh, Kleck, & Ambady, 2005) prior to categorizing the faces and completing the anti-gay bias measure, and one pair of studies differed only in whether the anti-gay bias data were collected before or after the categorization task. All of the remaining studies were either independent attempts to answer the same question of whether categorization performance relates to anti-gay bias, or were replications of studies in different geographic locations or using different measures of anti-gay bias.

These differences aside, all of the studies had a common core procedure. Participants viewed the gay (lesbian) and straight targets' faces in random order on a computer screen and input dichotomous responses categorizing each man (woman) as likely to be gay (lesbian) or straight based on their "gut instinct" of what most people in society would think. These procedures were modeled on past research examining the categorization of sexual orientation from faces (e.g., the self-paced condition in Rule & Ambady, 2008). Participants were not given feedback about their accuracy and were not given information about the proportion of gay (lesbian) versus straight faces in the sample. After completing the categorization task, participants were then asked to complete the anti-gay bias measure (except in one sample where this preceded the categorization task, as noted above) and then completed demographic questions about themselves, except in two studies where no demographic information was collected. The final aggregate sample therefore consisted of 2035 participants, most of whom were White, heterosexual women around 30 years of age.

2.4. Analytic strategy

Participants' categorizations of targets as gay (lesbian) and straight were analyzed using analyses based on signal detection theory (Macmillan & Creelman, 2005). The proportion of each participant's categorizations of gay targets as gay was arbitrarily assigned to represent the hit rate and, in complement, the proportions of participants' categorizations of straight targets as gay served as the false alarm rate. These values were then used to calculate measures of accuracy (*A′*) and response bias (*B″*). *A′* has a possible range from 0 to 1 with chance guessing represented by .5; hence, participants' *A′* scores are functionally equivalent to measures of percent correct values that have been adjusted for guessing. *B″* carries a range from −1 to 1 wherein negative values indicate a tendency towards false alarms (i.e., more likely to err towards categorizing straight targets as gay in the present analyses) and positive scores indicate a tendency towards misses (i.e., more likely to err towards categorizing gay targets as straight). The midpoint of 0 indicates the absence of a directional bias. *B″* was not normally distributed in any of the samples and *A′* was not normally distributed in most of the samples. We therefore used Spearman correlations in our analyses.

Our primary dependent variables of interest were the accuracy and response bias of participants' categorizations and how these related to their (implicit and/or explicit) levels of anti-gay bias. A critical difference between the explicit and implicit measures is that the explicit measures had clear boundaries (e.g., a maximum possible score) whereas the IAT did not. We therefore consider the two separately in subsequent analysis by referring to them as *explicit prejudice* and *implicit prejudice*, respectively.

[3] The mean relationship between implicit and explicit prejudice was $\rho = .07$ (SD = .20, 95% CI [−.15, .29]).

For explicit prejudice, we first examined the five separate measures and their respective relationships to accuracy and response bias. Our goal was to compare the magnitude of these relationships across the measures for heterogeneity, with the intention of computing a unified summary estimate of explicit anti-gay prejudice should they show similar relationships. None of the explicit prejudice measures were normally distributed, so we therefore correlated each with accuracy and response bias using Spearman correlations. The resulting correlation coefficients were then converted to Fisher's z scores and subsequently weighted according to the sample size of each study using standard meta-analytic procedures (i.e., each z was multiplied by $N - 3$; Rosenthal, 1991). The means and 95% confidence intervals for each measure aggregated across studies are presented in Fig. 1.

Tests of heterogeneity suggested that the various explicit prejudice measures did not significantly vary in their relationships with either categorization accuracy [$Q(6) = 0.59$, $p > .99$] or response bias [$Q(6) = 0.95$, $p = .99$]. We therefore rescaled the scores for each measure by dividing every score by the maximum possible value on the respective measure's scale. Once aligned to the same metric (i.e., 0–1), we then averaged the scores across measures for the participants that completed more than one measure of explicit prejudice, producing an overall explicit prejudice score for that participant. We then continued to analyze the data using meta-analytic techniques to assess the relationship between prejudice and categorizations of sexual orientation.[4]

3. Results

3.1. Accuracy

One-sample t-tests showed that participants were significantly more accurate than chance in categorizing targets as gay and straight in all 23 samples (see Table 1). More pertinent, we calculated correlations between participants' A' and prejudice scores within each sample. In aggregate, the mean correlation suggested a significant inverse relationship between explicit prejudice and accuracy such that individuals reporting lower levels of explicit prejudice achieved greater accuracy in their categorizations: $M = -.14$, SD = .16, 95% CI [−.21, −.08]. Moreover, despite the differences between the samples in terms of when, where, and how they were collected, these relationships were almost all in the same direction and relatively homogeneous: $Q(19) = 17.41$, $p = .56$. Accuracy was not related to implicit prejudice, however ($|M| < .01$, SD = .13, 95% CI [−.10, .11]), and the relationship between accuracy and implicit prejudice did not significantly vary between the samples: $Q(5) = 5.79$, $p = .45$.

3.2. Response bias

Participants' mean response bias scores were positive in all of the samples, indicating a tendency to categorize targets as straight more often than gay (see Table 1). In all but three of the samples, this bias was significantly greater than 0 (i.e., the null hypothesis of no bias).

Neither explicit prejudice ($M = -.08$, SD = .20, 95% CI [−.16, .01]) nor implicit prejudice ($M = -.02$, SD = .13, 95% CI [−.12, .09]) related to response bias when aggregated across the samples. This relationship was relatively uniform for implicit prejudice [$Q(5) = 4.86$, $p > .99$], but showed significant variability for explicit prejudice: $Q(19) = 43.50$, $p < .001$, $I^2 = 56\%$.

Examination of sample characteristics as potential moderators showed that the relationship between response bias and explicit prejudice significantly varied according to the nation in which the data were collected: $F(2,17) = 5.01$, $p = .02$, $\eta^2_{partial} = .37$. Bonferroni-corrected post hoc comparisons revealed that the relationship between response bias and explicit prejudice was significantly stronger in the Italian ($M = -.32$, SD = .26, 95% CI [−.57, −.07]) versus Canadian ($M = .04$, SD = .13, 95% CI [−.06, .14]) samples ($|M_{Difference}| = .36$, $SE = .12$, $p = .02$, 95% $CI_{Bonferroni\text{-}adjusted}$ [−.67, −.05]) and marginally stronger in the Italian versus American ($M = -.05$, SD = .17, 95% CI [−.16, .05]) samples: $|M_{Difference}| = .27$, $SE = .11$, $p = .07$, 95% $CI_{Bonferroni\text{-}adjusted}$ [−.55, .02]; the American and Canadian samples did not differ ($|M_{Difference}| = .09$, $SE = .09$, $p > .99$, 95% $CI_{Bonferroni\text{-}adjusted}$ [−.34, .15]). The relationship between response bias and explicit prejudice did not significantly vary according to any other sample characteristics (all p's $\geqslant .10$).

3.3. Sample characteristics

Finally, for exploratory purposes, we examined the relationship between characteristics of the samples and each of accuracy, response bias, explicit prejudice, and implicit prejudice. Few relationships were statistically significant. Accuracy in categorizing sexual orientation declined over the years examined [$r_{Spearman}(21) = -.46$, $p = .03$]. Samples with an older average age showed lower response bias [$r_{Spearman}(16) = -.58$, $p = .01$], and participants sampled online ($M = .13$, $SE = .01$) showed a greater response bias than those sampled in the lab [$M = .07$, $SE = .01$; $t(21) = 3.02$, $p = .007$, $r = .55$]. Samples with a higher percentage of White participants reported higher levels of explicit prejudice [$r_{Spearman}(9) = .71$, $p = .02$], and participants sampled in Italy ($M = .82$, $SE = .04$) showed greater implicit prejudice than those sampled in the US [$M = .48$, $SE = .03$; $t(4) = 6.85$, $p = .002$, $r = .96$].

4. Discussion

Individual differences in anti-gay bias predicted the accuracy of perceivers' judgments of sexual orientation. Aggregating across 23 samples of participants collected in three nations over a period of 8 years, the prevailing effect was that individuals' explicitly self-reported prejudice against gay men and lesbian women was negatively related to their performance in categorizing sexual orientation from faces. Among the smaller set of samples measuring implicit anti-gay bias, the relationship was not significant, perhaps because there is some evidence that the IAT measures stereotype knowledge more than the actual endorsement of prejudicial attitudes (e.g., Karpinski & Hilton, 2001; but see Olson & Fazio, 2003). This meta-analysis represents the first study to test the relationship between anti-gay prejudice and the accurate perception of sexual orientation.

Although perceivers reporting greater levels of anti-gay bias were less accurate in their judgments of sexual orientation, their bias did not appear to affect the strategies they used in making these judgments. Consistent with previous research, participants showed a tendency to categorize more targets as straight than gay, perhaps due to the greater proportion of straight versus gay people in society (see Savin-Williams, 2006). Thus, participants generally tend to miss gay targets by assuming they are straight rather than committing false alarms in which they miscategorize straight people as gay.

Earlier findings might lead one to expect that bias against a group should produce these categorization errors (e.g., Castano, Yzerbyt, Bourguignon, & Seron, 2002). Although no such relationship was observed in the overall sample here, we did observe significant differences between the samples in the relationship between response bias and explicit prejudice. Specifically, participants sampled in Italy did show a significant relationship between explicit anti-gay prejudice and response bias. Participants in Italy espousing

[4] Notably, performing these analyses using multilevel modeling rather than meta-analysis returns similar results.

greater anti-gay bias were less prone to categorize gay faces as straight, perhaps due to vigilance about the potential danger of mistaking a disliked individual for an ingroup member (see Leyens & Yzerbyt, 1992). Although we do not know for certain what might motivate this behavior, our observation of cross-national differences in the relationship between participants' prejudice and their response bias scores remains an interesting topic for future investigation where this might be addressed more systematically than was possible here. Specifically, given the variability in national attitudes towards same-sex behavior (e.g., Tskhay & Rule, in press), it may be informative to address how national levels of anti-gay prejudice relate to the categorization strategies and accuracy of its citizens. Although some research has addressed this with a small number of countries (Rule, Ishii, et al., 2011; Valentova et al., 2011), a more comprehensively global investigation may be productive. For example, one next step could be to test the categorizations of individuals living in nations at the extreme end of anti-gay bias where homosexuality is a capital crime and same-sex behavior may be a foreign notion because the topic is not discussed.

The relationship we observed between accuracy and prejudice was also consistent with previous work conducted in other domains. For instance, Andrzejewski et al. (2009) found that anti-Semitism was negatively related to the accuracy of categorizing targets as Jewish and non-Jewish. Similarly, Brambilla et al. (2013) reported that individuals more familiar with gay men categorized sexual orientation more accurately. To the extent that familiarity with a group may be inversely associated with prejudice against that group (e.g., Allport, 1954), these data may be consistent with the present research.

Logical as it may seem for prejudice to negatively predict the accuracy of distinguishing ingroup and outgroup members, this is not always the case. In their meta-analysis of the relationship between anti-Semitism and the categorization of Jewish group membership, Andrzejewski et al. (2009) confirmed the results of earlier work showing that prejudice against Jewish people was at one point a *positive* predictor of the ability to identify who is Jewish. Although this relationship has changed, perhaps due to shifts in norms about the acceptability of anti-Semitic views, the possibility that the vigilance cultivated by prejudice against a group could bolster one's accuracy may be reasonable. Thus, the present work helps to resolve what has until now been an open question about the relationship between anti-gay prejudice and the ability to identify others' sexual orientations. By showing that prejudice decreased the accuracy of categorizing sexual orientation from faces, we extended the evidence for the impact of individual differences in prejudice upon the accurate perception of ambiguous groups. Specifically, we found that sexual prejudice was a negative predictor of accurately judging sexual orientation from nonverbal cues. Individuals who are biased against gay people may therefore be less able to identify them. This may be important to consider in terms of prejudice because it could imply that incidents of discrimination against gay people may be higher if their sexual orientation were more legible. Future research might therefore consider the extent to which the legibility of a gay man's sexual orientation influences prejudice against him (see Lick & Johnson, in press).

Thus, our data nicely fit previous findings showing that interpersonal sensitivity is associated with positive attitudes (Hall, Andrzejewski, & Yopchick, 2009). Indeed, previous research has demonstrated that those who do not endorse social stereotypes are better at decoding emotions from faces than those who do endorse stereotypes (Carter, Hall, Carney, & Rosip, 2006). Our findings are consistent with such theorizing and extend them beyond emotion recognition to include social categorization. Although this work did not provide support for the "spot the enemy" hypothesis (Allport & Kramer, 1946)—predicting that more prejudiced individuals should express greater levels of accuracy in order to reject social threats—we did find that more prejudiced individuals were less prone to categorize gay faces as straight. This aligns with the ingroup overexclusion effect (Leyens & Yzerbyt, 1992), suggesting that individuals with higher levels of prejudice might be less willing to categorize outgroup faces (i.e., gay men) as members of the ingroup (i.e., straight).

Indeed, by lending clarity to the relationship between anti-gay bias and categorization performance, our findings may open opportunities for future work. Some limitations of the present research include that the overall effect observed is, by conventional standards, somewhat small (e.g., Cohen, 1988). Although this is the benefit of meta-analysis, whereby the significance of small effects can be ascertained through multi-study aggregation, it also speaks to the fact that few of the samples included here would have evidenced a statistically significant relationship between anti-gay bias and categorization accuracy independently. The present data also focused exclusively on studies examining the judgment of sexual orientation from faces. However, there is considerable research showing that sexual orientation can be judged with greater accuracy from other cues, such as the voice (Tskhay & Rule, 2013). Perhaps the relationship between accuracy and prejudice would be stronger when based on these more legible cues, or when all of the cues are aggregated—as in real-life interactions. In addition, the majority of the present samples used the very same set of male stimuli using similar methods. Generalization to other targets and a greater variety of methodological approaches would be helpful for validating the present results and may even lead to stronger associations with prejudice, given that these particular stimuli have been associated with more conservative rates of accuracy in past work (Tskhay & Rule, 2013). Next steps in this research might therefore include broader samples of targets to allow generalization to other groups and to individuals who vary in the expression of their sexual orientation to account for the role that legibility plays in both prejudicial attitudes and discriminatory behavior against sexual minorities. This may be fruitfully accomplished by also considering samples of perceivers from nations where sexual orientation is taboo, allowing for an examination of the extent to which knowledge about a stigmatized group is requisite for identifying its members (see Brambilla et al., 2013). It would also be informative to investigate how the accuracy of judging sexual orientation manifests in acts of discrimination against sexual minorities in everyday life.

These points considered, we hope that the current findings will help to encourage future research on individual differences in the perception and categorization of groups without obvious physical markers. To date, such work has been scant. Yet, as demonstrated here, research in this area may be valuable for establishing a greater understanding of the processes underlying person perception and for capturing a more complete picture of the nuances and boundaries of accuracy in social categorization.

Appendix A.

See Table A1.

Table A1
Motivation to Avoid Sexual orientation Disclosure (MASD) scale.

Item	*M*	SD
If one of my family members was gay, I would want to know about it[a]	4.13	1.15
If a close friend was struggling with his or her sexuality, I would want them to talk to me about it[a]	3.96	1.23
I do not like to talk about issues related to sexual orientation	2.23	1.25
I would find it inappropriate if one of my classmates mentioned he was gay while asking a question in class	2.62	1.35
I think gay men should not announce their sexual identity in public	1.95	1.17

Note. All items anchored at 1 (*Not at all true of me*) and 5 (*Very true of me*).
[a] Items reverse-scored.

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