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Short Research Note

The English Version of the Attitudes Toward Homosexuality Scale

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Abstract. The present study reports the psychometric properties of the English version of the short form of the Attitudes Toward Homosexuality Scale (ATHS; Falomir-Pichastor & Mugny, 2009). Workers from Amazon's MTurk™ (n = 235 for validation, n = 60 for test-retest) completed the short form of the ATHS, translated from French, and the Attitudes Toward Lesbians and Gay Men Scale (ATLG; Herek, 1998) and responded to a series of demographic questions. In this paper, we present evidence for a single-factor structure of the scale, along with evidence for the validity, internal consistency, and test-retest reliability of the measure. The data revealed distinct patterns in participants' ATHS scores as a function of their religious affiliation and political conservatism. Finally, positive ATHS scores predicted support for gay rights over and above that predicted by ATLG scores (Herek, 1984). The evidence presented suggests that the ATHS is a psychometrically reliable and valid tool for assessing attitudes toward homosexuality.

Keywords: sexual prejudice, anti-gay attitudes, attitudes toward homosexuality, scale, validation, homosexuality, short form

Attitudes toward nonheterosexual individuals are typically negative – certainly relative to attitudes toward heterosexuals. Negative attitudes toward lesbians and gay men are colloquially discussed as homophobia, and researchers commonly conceptualize them as sexual prejudice (Herek & McLemore, 2013). Scientific interest in the determinants and consequences of negative attitudes toward lesbians and gay men have steadily increased since the 1970s (Anderson & Holland, 2015). As a result, various instruments have emerged to capture attitudes toward homosexuality and gay individuals (Hansen, 1982; Herek, 1998; Hudson & Ricketts, 1980; Kite & Deaux, 1986; Larsen, Reed, & Hoffman, 1980; Wright, Adams, & Bernat, 1999).

Anti-gay attitudes are typically measured using self-report measures (for a systematic review, see Gray, Robinson, Coleman, & Bockting, 2013). As the literature on attitudes and their measurement matured, social psychologists began to doubt how accurately social attitudes were being reflected by these traditional self-report measures (e.g., Akrami, Ekehammar, & Araya, 2000; Dovidio & Gaertner, 1986; Ekehammar, Akrami, & Araya, 2000). In particular, individuals responding to such measures might feel compelled to avoid open expressions of prejudicial attitudes due to individual differences in motivations to control prejudice (e.g., Chen, Moons, Gaither, Hamilton, & Sherman, 2014), social desirability concerns (e.g., Crosby, Bromley, & Saxe, 1980), or impression management (e.g., Anderson, 2017). It has been argued that this might be particularly true for anti-gay attitudes (Pereira, Monteiro, & Camino, 2009). As such, researchers began to develop tools that made discretely observable differences between classical, overt attitudes and those that somehow accounted for the roles of egalitarian norms in their wording and content (Glick & Fiske, 1996; McConahay, 1986). This trend extended to anti-gay attitudes, with several measures emerging that were designed specifically to capture modern attitudes toward gay men and lesbian women, and toward homosexuality (e.g., Chonody, 2013; Falomir-Pichastor & Mugny, 2009; Morrison & Morrison, 2003; Raja & Stokes, 1998).

Falomir-Pichastor and Mugny (2009) developed a measure of anti-gay attitudes whose items assess positive attitudes toward same-sex attracted persons at the individual level, but also recognize the influence of societal level factors. The original 25-item scale was written in French and constructed in such a way that the majority of items were positively worded and reflected modern considerations of attitudes toward homosexuality (i.e., attitudes toward a broader notion of homosexuality, rather than attitudes toward gay or lesbian individuals or same-sex behaviors). Thus, the scale is labeled the Attitudes Toward Homosexuality Scale (ATHS). It has been used to empirically explore the role of several psychological constructs in the context of attitudes toward gay men and lesbian women, including the roles of gender-based self-esteem (Falomir-Pichastor & Mugny, 2009), biological theories of sexuality (Falomir-Pichastor & Hegarty, 2014), regulatory fit (Falomir-Pichastor, Mugny, Gabarrot, & Quiamzade, 2011), and in-group distinctiveness motivations (Falomir-Pichastor, Berent, Mugny, & Faniko, 2015). The major aim of this paper is to report the psychometric properties of the English version of the short form version of the ATHS.

The Present Study

In previous research, Falomir-Pichastor and colleagues have showed that the ATHS is a viable measure of anti-gay attitudes in French-Swiss (Falomir-Pichastor et al., 2011, 2015; Falomir-Pichastor & Hegarty, 2014; Falomir-Pichastor & Mugny, 2009) and Spanish samples (Falomir-Pichastor, Martínez, & Paterna, 2010). In the present study, we aimed to determine some of the psychometric properties of the English version of the short form of the ATHS. More specifically, we sought to: a) determine the factor structure of the English version of the ATHS, b) provide evidence of the stability of the scale, c) provide evidence of the validity of the scale and score interpretations, and d) demonstrate participant differences in ATHS scores in an English sample. To this end, we tested the following hypotheses:

1. *Factor structure hypothesis* – Although the scale was designed to capture several components of positive modern attitudes, its use in French and Spanish have revealed a unidimensional structure. Thus, we predict that a single factor will emerge, and that the single-factor model will be confirmed in exploratory (EFA) and confirmatory (CFA) factor analyses, respectively.
2. *Reliability hypotheses* – With respect to the stability of the ATHS, we predict that estimates of internal consistency reliability (Cronbach's α), temporal stability (test-retest reliability), and composite reliability will all be high.
3. *Convergent validity hypothesis* – With respect to the question whether the ATHS indeed measures attitudes toward homosexuality, we predict that the correlation between the ATHS and a well-established measure of anti-gay attitudes will be high. More specifically, we expect to find a negative correlation between the ATHS and the Attitudes Toward Lesbians and Gay Men Scale (ATLG; Herek, 1984, 1998) because high scores on the ATHS represent positive attitudes while high scores on the ATLG represent negative attitudes. We also expect that the average variance explained will be greater than .50 (Fornell & Larcker, 1981)[1].
4. *Criterion and incremental validity hypotheses* – With respect to the question whether the ATHS can predict outcomes relevant to anti-gay attitudes, we expect that higher ATHS scores will predict scores on items that measure support for gay rights. As for the utility of the ATHS, we predict that the ATHS will account for more variance in the criterion variables than the ATLG. More specifically, we expect to find significant increases in variance for all criterion variables when ATHS is added to a regression model predicting support for gay rights.
5. *Known-groups validity hypotheses* – In previous research, differences in anti-gay attitudes were found in key sociodemographic groups. Thus, we expect ATHS scores to vary as a function of sex (Kite & Whitley, 1996), age (Herek, 2000a), religious affiliation (Anderson & Koc, 2015), and political orientation (Lewis & Gossett, 2008). Specifically, we predict that participants who are male, older, affiliated with religion, and politically conservative will obtain lower (i.e., more anti-gay) ATHS scores.

Method

Participants and Procedure

We advertised for 250 workers to participate in a "Survey on social attitudes" on Amazon's MTurk™ (https://www.mturk.com/)[2]. Participants were given US$0.50 in exchange for approximately 5 minutes of time. After giving informed consent, the participants responded to a series of demographic items followed by the anti-gay attitude measures (order of presentation was counterbalanced). The participants responded to a series of four questions related to gay rights before being debriefed and issued a code with which they could claim their payment.

After excluding 11 nonheterosexual participants (using the protocol of Falomir-Pichastor & Mugny, 2009) and honoring the requests of four workers to not have their data included in the final analysis, the final sample was comprised of 235 workers (age range: 19–75 years, M = 40.68, SD = 12.95, 114 females). Approximately half of the sample identified as religious (54.90%; 120 Christian, seven Jewish, one Muslim, one Wiccan) and the remainder identified as nonreligious (45.10%; 57 atheist, 36 agnostic, 13 "not religious"). On a scale ranging from 1 (*completely politically conservative*) to 7 (*completely politically progressive*), the sample reported being somewhat politically progressive (M = 4.40, SD = 1.87). In order to analyze the test-retest reliability of the ATHS test scores, part of the sample was contacted (via their MTurk™ accounts) to recomplete the measure for the same pay[3]. Of the 75 participants contacted, 60 completed the measure a second time; the demographics of the subsample did not differ from the main sample in any substantial way.

Measures

Scales

The measure of interest was the English version of the Attitudes Toward Homosexuality Scale (ATHS; Falomir-Pichastor &

[1] According to Fornell and Larcker (1981), if the average variance explained is less than 0.50, the variance due to measurement error is larger than the variance captured by the construct. Therefore, the indicators and the construct itself become questionable.

[2] Mechanical Turk is an online marketplace for sourcing employees to complete human intelligence tasks, such as short surveys (for a full description of MTurk™ and a discussion on this sample, see Buhrmester, Kwang, & Gosling, 2011).

[3] The participants were contacted after 2 weeks to recomplete the ATHS, but the actual recompletion timeframe ranged from 2 to 5 weeks.

Mugny, 2009). We opted to validate the short form of this scale, which is comprised of 16 statements relevant to attitudes toward gay people and homosexuality. Participants endorse the items on a Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). A high score represents positive attitudes toward homosexuality. This scale can be found in the appendix[4].

To allow a test of concurrent validity, we also asked participants to respond to an anti-gay attitudes measure. We chose the short form of the popular Attitudes Toward Lesbians and Gay Men scale (ATLG-R-S5; Herek, 1998), which is comprised of 10 self-report items, 5 of which measure attitudes toward lesbians (ATL; e.g., "Lesbians just can't fit into our society") and 5 of which measure attitudes toward gay men (ATG; e.g., "I think male homosexuals are disgusting"). The participants responded on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*). A high score represents negative attitudes toward gay people, or high levels of anti-gay attitudes. High levels of internal consistency were demonstrated in the present sample (ATL α = .89, ATG α = .94, ATLG α = .95).

Finally, participants were asked to indicate their level of support for four issues related to gay rights. They endorsed items on a 5-point scale ranging from 1 (*no*) to 5 (*yes*), with higher scores representing more support for the given issue. The items were "Do you support gay marriage?" "Do you personally feel that gay couples should be allowed to adopt children?" "Do you think that gay couples should have access to IVF treatment (for example, assisted reproduction for lesbians or for the surrogate of a gay male couple)?" and "Do you think that gay people should be allowed to donate blood?" We did not treat these items as a scale, but they reached a high level of internal consistency as a set (α = .85).

Translation

The ATHS was translated from French into English using the procedure suggested by Brislin (1970) and then an iterative approach to translation was applied following the procedure suggested by Douglas and Craig (2007). Finally, in adherence with the American Psychological Association's (APA) guidelines on sensitive language (2009, p. 74), adjustments were made to some items. Specifically, instances referring to "homosexuals" were changed to "gay men and lesbians" or "gay people." According to the APA guidelines, terms like "homosexual" and "homosexuality" have been, and continue to be, associated with "negative stereotypes, pathology, and the reduction of people's identities to their sexual behavior" (p. 74; see also www.apastyle.org). Modifications to the items were minor, and the final English version is conceptually comparable to the original French version.

Results

Structure Exploration

Exploratory Factor Analysis

We first conducted an exploratory factor analysis to explore the structure of the English version of the ATHS. In this analysis, we subjected the 16 items of this scale to a principle axis factor analysis with an oblique rotation. The Kaiser-Meyer-Olkin measures verified the sampling adequacy (KMO_{scale} = .96, KMO_{items} > .92) with all values being well above the recommended limit of .5 (Field, 2009)[5]. A review of the scree plot and the eigenvalues revealed a single-factor solution, which accounted for 69.21% of the variance (single eigenvalue = 11.07; factor loadings range = [.58, .92]). All items were then included in a confirmatory analysis.

Confirmatory Factor Analysis

We then conducted a CFA, using MPLUS version 6 (Muthén & Muthén, 2010). We used a standard range of fit indices to assess model fit: comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). As the scale included both positively and negatively worded items, we controlled for acquiescence bias by modeling an uncorrelated common method variance factor that loaded onto every item fixed at 1 (Welkenhuysen-Gybels, Billiet, & Cambré, 2003).

Table 1 shows the correlations, mean scores, and standard deviations, and Figure 1 shows the tested model with standardized factor loadings. According to Kline's (2005) criteria, values of CFI above .90 are acceptable. According to Hu and Bentler (1999), values of SRMR below .06 and RMSEA below .08 are acceptable. According to Forza and Filippini (1998), values of TLI above .90 are acceptable. Initially, the model showed a mediocre fit to the data, $\chi^2(103) = 438.59$, $p < .001$; CFI = 0.92; TLI = 0.90; RMSEA = 0.12 (90% CI [0.11, 0.13]); SRMR = 0.041. Although the CFI and SRMR values were within the acceptable range, χ^2, the RMSEA value, and the confidence intervals of RMSEA raised concern. To remedy this, we examined the modification indices to see if we could improve the local fit which could in turn improve the global fit. Informed by the modification indices and following Brown's (2015) advice re-

[4] The scale has also been translated from French into Spanish, Dutch, and Italian, and from English into Turkish. The scale can be requested in these languages by contacting the authors of this paper.

[5] Monte Carlo simulations have also been used to determine that 200 cases is a minimum sample size for a model with one latent factor and 3–4 indicators with an average loading of .50 (Wolf, Harrington, Clark, & Miller, 2013). This number dropped to 100 cases when the number of indicators used was increased to 8. In our case, we have 16 indicators for one latent factor, all with average loadings of above .50. We conclude that our sample size (N = 235) comfortably meets the criteria for a minimum sample size to run this analysis.

Table 1. Mean scores, standard deviations, zero-order correlations, and factor loadings (CFA) for Items in the English Version of the ATHS (N = 235)

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	*M*	*SD*
1.	–															4.50	2.18
2.	.67	–														4.86	2.33
3.	.53	.76	–													5.31	2.18
4.	.64	.69	.69	–												5.81	1.75
5.	.62	.81	.70	.67	–											4.93	2.34
6.	.43	.44	.49	.52	.49	–										5.17	1.81
7.	.65	.62	.46	.58	.60	.51	–									4.83	2.03
8.	.62	.83	.73	.61	.81	.51	.58	–								4.32	2.28
9.	.56	.77	.82	.64	.71	.49	.52	.74	–							5.19	2.11
10.	.62	.64	.60	.77	.57	.44	.55	.56	.57	–						6.02	1.48
11.	.63	.75	.61	.58	.64	.53	.53	.73	.65	.55	–					4.42	1.97
12.	.63	.80	.77	.66	.79	.45	.54	.84	.76	.58	.71	–				4.83	2.56
13.	.70	.84	.73	.70	.79	.49	.56	.80	.73	.65	.71	.82	–			4.87	2.33
14.	.62	.87	.76	.66	.85	.45	.57	.88	.79	.57	.69	.87	.83	–		4.92	2.41
15.	.65	.78	.73	.65	.73	.58	.57	.80	.77	.57	.74	.83	.81	.80	–	4.60	2.20
16.	.97	.81	.66	.67	.70	.47	.60	.72	.72	.63	.70	.70	.73	.74	.73	4.65	2.23

Note. Items can be found in the Appendix. All correlations are significant at the level of $p < .001$.

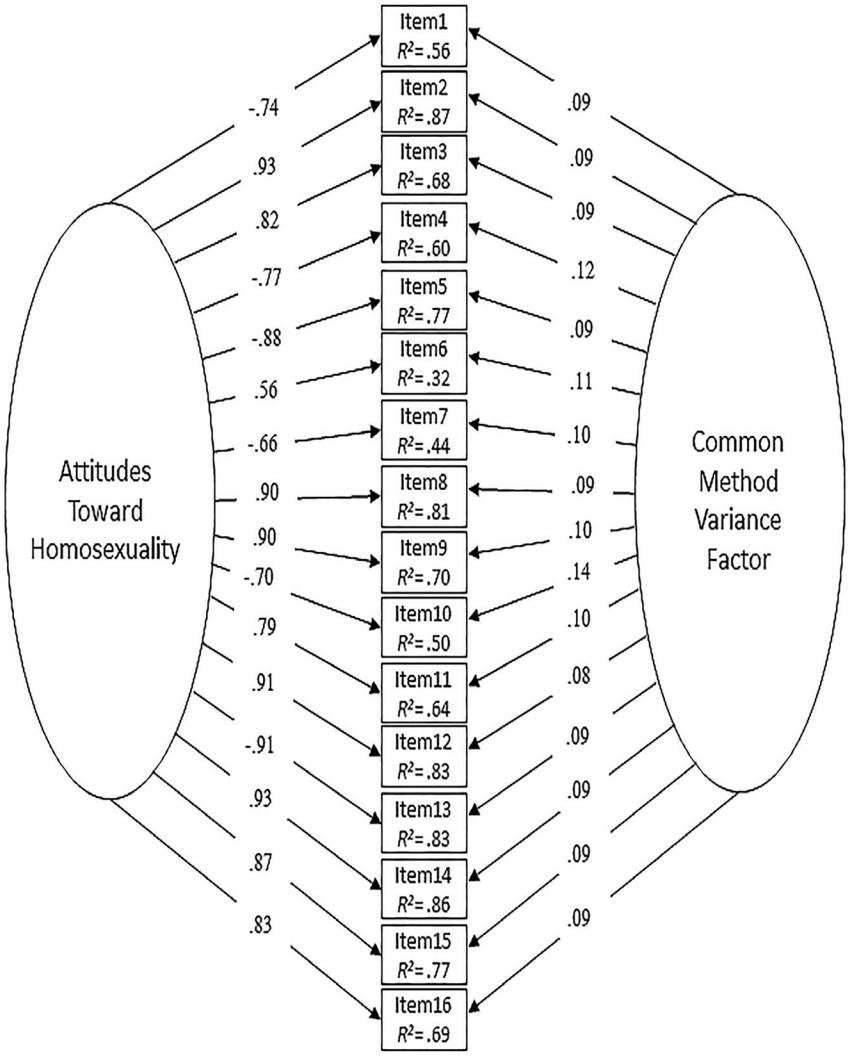

Figure 1. The figure presents the standardized factor loadings (all ps < .001) with all 16 items loading onto a single latent factor of attitudes toward homosexuality while controlling for acquiescence bias with an uncorrelated common method variance factor onto which all items were modeled fixed at 1. Residual covariances excluded for clarity.

Table 2. Mean scores, standard deviations, and correlation coefficients for the ATHS, ATLG, support for gay rights items, and demographic items

	1	2	3	4	5	6	7	8	9	*M*	*SD*
1. ATHS	–									4.95	1.79
2. ATLG	**−.94****	–								2.65	1.80
Support for											
3. Same-sex marriage	**.89****	**−.84****	–							3.51	1.79
4. Same-sex adoption	**.91****	**−.88****	**.87****	–						3.65	1.71
5. IVF treatment	**.89****	**−.84****	**.88****	**.91****	–					3.56	1.72
6. Blood donation	**.60****	**−.54****	**.52****	**.49****	**.57****	–				4.36	1.20
Demographics											
7. Gender	.029	.010	−.06	−.06	.07	.01	–			–	–
8. Religion	**−.62****	**−.60****	**−.59****	**−.59****	**−.63****	**−.48****	**.14***	–		–	–
9. Age	−.05	.04	−.10	−.07	−.04	−.05	**.15***	−.11	–	40.68	12.95
10. Politics	**.70****	**−.64****	**.66****	**.62****	**.65****	**.38****	−.00	**.56****	−.03	4.40	1.87

Note. ATHS = Attitudes Toward Homosexuality Scale: high scores represent positive attitudes; ATLG = Attitudes Toward Lesbians and Gays Scale: high scores represent negative attitudes. Positive correlations with religion indicate a point-biserial correlation with any religious affiliation; positive correlations with gender indicate a point-biserial correlation with being male. Significant correlations are presented in **boldface**. *$p < .05$.**$p < .001$.

Table 3. Regression statistics for a series of univariate regression models predicting support for gay rights from Attitudes Toward Homosexuality Scale scores (ATHS) and Attitudes Toward Lesbians and Gay Men scores (ATLG)

Support for . . .	Constant (*SE*)	*R*	ΔR^2	*F*	R^2 change	*F* change	Cohen's f^2
Step 1 (ATLG only)							
Gay marriage	5.75 (0.11)	.84	.71	567.28*	–	–	2.47
Adoption	5.87 (0.09)	.89	.78	839.24*	–	–	3.67
IVF treatment	5.69 (0.11)	.84	.71	570.87*	–	–	2.51
Blood donation	5.32 (0.12)	.54	.31	95.35*	–	–	0.42
Step 2 (ATHS and ATLG)							
Gay marriage	0.03 (0.65)	.89	.79	422.12*	.08	$80.60^{\#\#}$	3.69
Adoption	0.43 (2.57)	.91	.83	572.29*	.05	$66.02^{\#\#}$	5.02
IVF treatment	0.33 (0.63)	.89	.78	417.52*	.07	$76.11^{\#\#}$	3.67
Blood donation	3.29 (0.78)	.56	.31	52.41*	.02	$6.97^{\#}$	0.46

Note. Excessive skewness of the independent variables (ATHS, ATLG) was corrected using logarithmic transformations. Between-subjects degrees of freedom: Step 1 = 1; Step 2 = 2. Within-subjects degrees of freedom: Step 1 = 210; Step 2 = 229. High scores on the ATHS represent positive attitudes; high scores on the ATLG represent negative attitudes. *SE* = standard error. *$p < .001$. $^{\#}p_{change} < .01$. $^{\#\#}p_{change} < .001$.

garding model respecification, we allowed a number of residuals to covary. Thus, we added one covariance at each time that made theoretical or conceptual sense and re-examined the modification indices. Finally, we decided on a model that provided an acceptable fit to the data, $\chi^2(94) = 233.05$, $p < .001$; CFI = 0.97; TLI = 0.96; RMSEA = 0.80 (90% CI [0.07, 0.09]); SRMR = 0.03. For this model, the χ^2/df ratio was 2.5, which was smaller than that of the initial model (4.25), RMSEA was within the acceptable range, and its upper bound confidence interval was less than .10. Overall, the residual analysis was nonproblematic and, in combination with the acceptable global fit indices, no further modifications were applied to this final model. Thus, we confirmed a single-factor model for the English version of the ATHS.

Reliability

To investigate the stability of the ATHS, part of the sample (n = 60) completed the ATHS at the initial administration (M = 4.68, SD = 1.83) and were contacted two weeks later to complete the ATHS a second time (M = 4.50, SD = 1.86). Analysis of the test-retest reliability of the ATHS scores revealed that the ATHS has strong temporal stability at the scale level, $r(60)$ = .96, $p < .001$, and at the item level, rs(60) .76, ps < .001. Our analysis also revealed that the ATHS test scores have strong internal consistency as evidenced by high Cronbach's α coefficients for the main sample (α = .97) and for the sample recruited for re-test reliability (Time 1: α = .96; Time 2: α = .97). Based on Cronbach's (1990) work, these should be above .80 and .70, respectively. We also computed the composite reliability of the

Table 4. Unstandardized (B) and standardized (β) regression coefficients, and semipartial correlations for predictors in regression models predicting support for gay rights from Attitudes Toward Homosexuality Scale scores (ATHS) and Attitudes Toward Lesbians and Gay Men scores (ATLG)

	Step 1				Step 2				
	B [95% CI]	*SE B*	β	*p*	*B* [95% CI]	*SE B*	β	*p*	sr^2
Gay marriage									
ATLG	**−0.84 [−0.91, −0.77]**	**0.04**	**−0.84**	**<.001**	−0.13 [−0.29, 0.04]	0.09	−0.13	.146	−.05
ATHS					**0.78 [0.61, 0.95]**	**0.09**	**0.77**	**<.001**	**.27**
Adoption									
ATLG	**−0.84 [−0.90, −0.78]**	**0.03**	**−0.89**	**<.001**	**−0.30 [−0.44, −0.15]**	**0.07**	**−0.31**	**<.001**	**−.11**
ATHS					**0.59 [0.45, 0.73]**	**0.07**	**0.62**	**<.001**	**.22**
IVF treatment									
ATLG	**−0.81 [−0.87, −0.74]**	**0.03**	**−0.85**	**<.001**	−0.14 [−0.30, 0.03]	0.08	−0.14	.097	−.05
ATHS					**0.72 [0.56, 0.89]**	**0.08**	**0.75**	**<.001**	**.27**
Blood donation									
ATLG	**−0.36 [−0.43, −.0.29]**	**0.04**	**−0.54**	**<.001**	−0.11 [−0.31, 0.10]	0.10	−0.16	.291	−.10
ATHS					**0.27 [0.07, 0.48]**	**0.10**	**0.41**	**.009**	**.24**

= *Note.* Significant findings presented in **boldface**. Excessive skewness of the independent variables (ATHS, ATLG) was corrected using logarithmic transformations. Between-subjects degrees of freedom: Step 1 = 1; Step 2 = 2. Within-subjects degrees of freedom: Step 1 = 210; Step 2 = 209. High scores on the ATHS represent positive attitudes; high scores on the ATLG represent negative attitudes. *SE* = standard error.

latent factor based on the formula proposed by Raykov (1997). The composite reliability was .97, higher than the recommended value of .70 (Hair, Black, Babin, & Anderson, 2014). Accordingly, the English version of the ATHS can be deemed a stable measure.

Validity

The mean scores, standard deviations, and correlation coefficients for the ATHS, the ATLG, the gay rights support items, and the relevant demographic variables are presented in Table 2. The responses to both measures of anti-gay attitudes were skewed, but fixed using logarithmic transformations. We conducted the analyses on transformed variables, but report the raw scores for ease of interpretation.

Convergent Validity

The convergent validity of the ATHS was demonstrated by a high concurrent validity coefficient, $r(235) = -.94$, $p < .001$, suggesting that the ATHS is indeed a measure of anti-gay attitudes. Further analyses revealed that there was little asymmetry between the correlation strength of the ATHS with attitudes toward gay men (ATG subscale), $r(235) = -.94$, $p < .001$, and with attitudes toward lesbians (ATL subscale), $r(233) = -.89$, $p < .001$. In addition, we calculated the average variance explained (AVE) using the standardized item loadings from our final CFA model: The AVE was .67 larger than recommended minimum value of AVE .50 (Fornell & Larcker, 1981).

Criterion and Incremental Validity Hypotheses

A series of hierarchical multiple regression analyses (MRAs) were used to explore whether the ATLG scores (Step 1) and the ATHS score (Step 2) predicted scores on items about support for gay rights (based on ordinary least square regression models). The data were screened for normality and 14 cases were treated as outliers (9 on ATHS, 5 on ATLG; Tabachnick & Fidell, 2007).[6] Their exclusion made no meaningful difference to the results of the analyses. Excessive skewness of the independent variables (ATHS and ATLG) was corrected using a logarithmic transformation.

The regression statistics for each regression model predicting support for gay rights from ATLG and ATHS scores are presented in Table 3. After correcting for multiple testing from the same body of data using the Bonferroni method ($\alpha_{corrected} = .013$), all four regression models revealed that the ATLG scores accounted for large and significant amounts of the variance in support for gay rights in Step 1. The addition of ATHS in Step 2 showed significant increases in predicted variance for all criterion variables, suggesting that the ATHS predicts variance over and above that accounted for by the ATLG.

Importantly, in all of the MRAs, in the final model, the ATHS predicted at least twice the amount of uniquely contributed variance predicted by the ATLG, and for three out of four of the criteria, inclusion of the ATHS in the model revealed that the ATLG was no longer a significant predictor. All coefficients are presented in Table 4. This evidence suggests that the English form of the ATHS (1) is capable of predicting criteria that are

[6] Following the recommendations of Tabachinick and Fidell (2007), values exceeding ± three standard deviations from the mean were replaced with ± three standard deviations from the mean.

Table 5. Unstandardized (B) and standardized (β) regression coefficients, and semipartial correlations for each demographic predictor in a multiple regression model predicting scores on the Attitudes Toward Homosexuality Scale (ATHS)

	B	*SE B*	β	sr^2
Sex	−0.50	0.16	−0.01	.01
Religious affiliation	**1.25**	**0.19**	**0.35**	**.28***
Age	0.00	0.01	0.01	.01
Politics	**0.48**	**0.05**	**0.51**	**.40***

Note. Constant = 0.92 (*SE* = 0.43). Significant findings are presented in **boldface**. Excessive skewness of the dependent variable (the ATHS) was corrected using a logarithmic transformation. Dummy coded variables: Gender (0 = female, 1 = male); Religion (0 = nonreligious, 1 = religious). N = 235. High scores on the ATHS represent positive attitudes. *$p < .001$.

indicative of outcomes relevant to anti-gay attitudes[7] and (2) can do so more effectively than the commonly used ATLG.

Known-Groups Validity

The demographic variables were regressed against ATHS scores in a multiple forced entry regression to examine expected group differences. In combination, these demographic variables accounted for a significant 57% of the variance in attitudes toward homosexuality, $F(4, 230) = 76.33$, $p < .001$, Cohen's $f^2 = 1.33$, which can be considered a large effect.[8] Political orientation (conservative) and religious affiliation were strong predictors of negative attitudes toward homosexuality, uniquely accounting for 17.56 and 8.06% of the variance in attitudes, respectively. The regression coefficients and squared semipartial correlations for each predictor of the multiple regression analysis predicting ATHS scores are presented in Table 5.

Discussion

This paper reports the psychometric properties of the English version of the 16-item short form of the Attitudes Toward Homosexuality Scale (ATHS). The findings presented here confirm our hypotheses and suggest that the scale is a valid and reliable measure. As with the initial (French) version, the English version of the ATHS has a single factor comprised of items that assess participants' reactions to homosexuality. We have provided evidence that this scale is highly reliable as demonstrated by internal consistency estimates of above .96 and a test-retest coefficient of .96, both of which are well above the suggested cutoffs (Cronbach's $\alpha > 0.8$, test-retest coefficients > 0.7). The validation process was threefold. First, we found a high level of concurrent validity with the well-used but somewhat outdated ATLG.[9] Second, we found criterion validity in that positive attitudes measured by the ATHS predicted support for various aspects of gay rights (as well as incremental validity in that the predictive power of the ATHS was higher than that of the ATLG). Third, we found a high level of known-groups validity to the extent that more religious and more politically conservative members of the sample reported more anti-gay attitudes.

The psychometric properties presented here match those presented in Falomir-Pichastor and Mugny's (2009) pilot study on the ATHS: a unidimensional structure, strong internal consistency, and high convergent validity with the ATLG, $r(67) = -.73$, $p < .001$. The present research extends the previous findings to also include evidence of temporal stability and two additional components of validity – criterion and known-groups validity. Interestingly, and contrary to our hypotheses, the ATHS scores failed to demonstrate group differences as a function of sex or age. Although both sex and age have previously driven differences in levels of anti-gay attitudes, we present two arguments against this concern. First, it has previously been argued that, while classical anti-gay attitudes tend to be linked to morality (Morrison & Morrison, 2003) and the belief that sexual orientation is chosen (Yip, 2004), modern anti-gay attitudes tend to be linked to notions of equality and social justice (i.e., attempts to shift the status quo; Satcher & Leggett, 2007). For example, a meta-analysis by Kite and Whitley (1996) revealed that men were more negative than women toward gay men and lesbian women, and toward same-sex behaviors, but that there were no gender differences regarding support for gay civil rights. More recently, Anderson, Georgantis, and Kapelles (2017) found that neither sex nor age predicted support for marriage equality. Thus, if men and older individuals are less concerned with impeding change in social justice, then it stands that they would also be less concerned with forms of anti-gay attitudes that reflect modern considerations in attitudes toward

[7] We recognize that two of the prediction criteria (viz., attitudes toward gay marriage and adoption) are somewhat reflective of items that are directly measured by items in the ATHS (Items 12 and 14, respectively). However, the remaining prediction criteria reflect contentious contemporary issues that reflect attitudes toward homosexuality not directly measured by items in the ATHS. For the sake of transparency, we have reported them all, and note that they produce the same pattern of results. Furthermore, we conducted the same MRAs with versions of the aggregated ATHS and ATLG scores (i.e., the independent variables) that excluded scale items whose content overlapped with the criterion variables. The pattern of results did not differ in meaningful ways so, for the sake of parsimony, we reported the version using the standard versions of the scale.

[8] Effect sizes for this multiple regression were based on the effects for the overall model (i.e., calculated from the observed R^2) and were calculated using software by Soper (2015) based on the work of Cohen (1988).

[9] The wording of certain ATLG items, constructed in 1984, are arguably problematic in a contemporary context. For example, items such as "The idea of male homosexuality marriage seems ridiculous" is now outdated given that marriage equality has been reached in many countries around the world. Although Item 12 of the ATHS (i.e., "Gay couples should have the right to marry") taps a similar element of the construct, it is done so in a more subtle way.

homosexuality. Second, we also conducted the same regression analysis on the sample's ATLG scores, and these findings also failed to demonstrate group differences as a function of sex or age.[10] Thus, this partial lack of support for the known-groups validity hypothesis might be an anomaly of the sample and indeed has also been the case in other studies validating anti-gay attitude scales (e.g., Chonody, 2013). In either case, the remaining findings provide more than sufficient evidence supporting the validity of ATHS test scores.

When selecting a scale for measuring anti-gay attitudes, there are several elements that warrant consideration. The ATHS is an appropriate choice for researchers who wish to use a short measure (n_{items} = 16) of attitudes toward homosexuality that captures a wide range of elements that contribute to anti-gay attitudes. The positively scored outcome and proportionately larger number of positively worded items make for a less abrasive measure and could result in fewer dropouts and less missing data, which are frequent problems experienced by researchers of socially charged issues, such as anti-gay attitudes. If there are theoretical reasons for expecting different attitudes toward gay men than toward lesbians, then the ATHS is less appropriate than a scale such as the ATLG with its 2-factor structure. However, given that the correlation between attitudes toward gay men and toward lesbians is consistently high (Herek, 2000b), this is usually of limited concern. Although there are a range of measures of anti-gay attitudes available, the majority were designed to measure classical attitudes while the ATHS reflects modern considerations in attitudes toward homosexuals. Thus, in accordance with Kerr and Holden (1996), we agree that having multiple valid scales available for use is necessary to further research and practice in the field.

This study has some limitations. A primary limitation concerns the evidence for the incremental validity of the ATHS. Specifically, the items concerning the "gay rights" of gay marriage and adoption share considerable, problematic overlap with two ATHS items (Items 12 and 14, respectively). This calls into question the capacity of the ATHS to predict specific anti-gay attitudes. However, since this problem is not related to the analyses predicting support for blood donation or IVF treatment, we believe that unconfounded incremental validity for the ATHS exists in these analyses. In the interest of brevity, we did not present the full statistical output comparing the results with Items 12 and 14 included and then excluded from the analyses, but it can obtained from the first author.

A second concern is that the ATHS items are ambiguous about the sex of the gay target (e.g., terms like "gay people" or "gay bars" do not specify whether the reference is to gay men or lesbian women). However, this could be either a limitation or a strength of the scale. Both statistically and conceptually, the wording of items in this scale allows a uni-dimensional (and non-gender-specific) version of attitudes toward homosexuality. We would like to highlight the instructions we presented to participants when administering the scale (i.e., "Indicate the extent of your agreement or disagreement with the following statements about gay men and lesbian women") and would suggest that researchers using the ATHS do the same. On a related note, some items (e.g., "I would be embarrassed if a gay person made sexual advances toward me") imply the target's sex because they are contingent on the participant's own sex. However, if this had resulted in multiple factors (i.e., one nongendered and one gendered), these factors would have been revealed in factor analysis. Thus, based on the evidence presented in this paper, we remain convinced that the ATHS is useable. Finally, we acknowledge that although we have justified the sample size used in this study, one could still argue that the sample size rendered the analyses underpowered.

We conclude this paper by affirming that the English version of the ATHS is a psychometrically reliable and valid tool for assessing attitudes toward homosexuality.

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[10] These statistics are available in full from the authors. In the interest of brevity, they were not included in the manuscript as they do not contribute to the reporting on the psychometric properties of the ATHS.

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Appendix

Attitudes Toward Homosexuality Scale – English version

Indicate the extent of your agreement or disagreement with the following statements about gay men and lesbian women (1 = *strongly disagree,* 7 = *strongly agree*).

1. I prefer not to go to gay bars or nightclubs. (R)
2. Homosexuality is a natural expression of affection and sexuality.
3. Gay couples should have the same tax benefits (for example, joint income taxation) as straight couples.
4. Gay people disgust me. (R)
5. Homosexuality is incompatible with starting a family. (R)
6. I feel empathy for gay people.
7. I would be embarrassed if a gay person made sexual advances toward me. (R)
8. Gay couples (with or without adopted children) represent an enrichment to the traditional family model.
9. Gay couples should have the right to a residence permit if the partner is a foreigner.
10. I am embarrassed by gay people. (R)
11. I would be happy if my children had a gay or lesbian teacher.
12. Gay couples should have the right to marry.
13. Homosexuality goes against human nature. (R)
14. Gay couples should have the right to adopt children.
15. I am in solidarity with gay people.
16. It would not bother me at all if my child was gay or lesbian.

(R) These items are negatively worded and should be reverse scored before average scores are aggregated.

