Scale of Sexual Prejudice Against Bisexuals: Evidence of Validity

Nathália Nicácio de Freitas Nery[1]
Tátila Rayane de Sampaio Brito[2]
Tailson Evangelista Mariano[3]
Emerson Araújo Do Bú[4]
Cicero Roberto Pereira[4]

[1]*University of Brasília, Brasília, Distrito Federal, Brazil*
[2]*Cruzeiro do Sul University, São Paulo, São Paulo, Brazil*
[3]*Catholic University of Pernambuco, Recife, Pernambuco, Brazil*
[4]*Institute of Social Sciences, University of Lisbon, Lisbon, Portugal*

Abstract

Sexual prejudice against bisexuals is widespread in society. However, little research has been done on this phenomenon because it is difficult to measure. The aim of the current study was to validate a short version of the Biphobia Scale for the Brazilian context (EPSB-br). In the first study, the EPSB-br showed unifactorial structure and convergent validity with scales measuring beliefs and stereotypes about bisexuality. Study 2 showed the EPSB-br's convergent-discriminant validity with scales measuring religiosity, right-wing authoritarianism, social dominance orientation, and sleepiness. Finally, Study 3 demonstrated the criterion-related validity of the EPSB-br through an experimental manipulation in which participants watched a video of a pretend teacher and assigned a salary to it. Taken together, these results showed evidence of validity and reliability of the EPSB-br, which introduced a measure of prejudice against bisexual people in Brazil.
Keywords: Sexual Prejudice; Bisexual; Construct validity.

Escala de Preconceito Sexual Contra Bissexuais: Evidências de Validade

Resumo

O preconceito sexual contra bissexuais é fortemente presente na sociedade. Entretanto, este fenômeno ainda é pouco estudado, dada a dificuldade em sua mensuração. O presente trabalho teve o objetivo de validar uma versão reduzida da *Biphobia Scale* para o contexto brasileiro. No primeiro estudo, a Escala de Preconceito Sexual contra Bissexuais (EPSB-br) apresentou uma estrutura unifatorial e uma validade convergente com escalas que mensuram crenças e estereótipos sobre a bissexualidade. O Estudo 2 evidenciou a validade concorrente-discriminante da EPSB-br com a religiosidade, escalas de autoritarismo de direita, orientação à dominância social e sonolência. Por fim, o Estudo 3 demonstrou a validade de critério da EPSB-br a partir de uma manipulação experimental, na qual os participantes assistiram a um vídeo sobre um professor e atribuíram-lhe um salário. A síntese dos resultados mostrou evidências de validade e confiabilidade da EPSB-br, introduzindo uma medida de preconceito contra pessoas bissexuais no Brasil.
Palavras-chave: Preconceito sexual; Bissexual; Validade de construto.

Escala de Prejuicio Sexual Contra Bisexuales: Evidencia de Validez

Resumen

Lo Prejuicio Sexual contra Bisexuales está muy presente en la sociedad. Sin embargo, es un fenómeno poco estudiado, dada la dificultad de medirlo. Este trabajo buscó validar una versión reducida de la Biphobia Scale para el contexto brasileño. En el primer estudio, la EPSB-br presentó una estructura unifatorial y validez convergente con escalas que miden creencias y estereotipos sobre la bisexualidad. El estudio 2 evidenció la validez concurrente-discriminante de la EPSB-br con escalas de religiosidad, autoritarismo de derecha, orientación al dominio social y somnolencia. Finalmente, el Estudio 3 demostró la validez de criterio de la EPSB-br a través de una manipulación experimental, donde los participantes vieron un video sobre un maestro y le asignaron un salario. La síntesis de los resultados mostró evidencia de validez y confiabilidad de la EPSB-br, introduciendo una medida de prejuicio contra las personas bisexuales en Brasil.
Palabras clave: Prejuicio Sexual; Bisexual; Validez de constructo.

Discrimination against the LGBTQIA+ community in Brazil has been alarming throughout the years (Oliveira & Mott, 2020). According to the 2019 report made by Bahia's Gay Group (Oliveira & Mott, 2020) on LGBTQIA+ deaths, 329 LGBTQIA+ people were victims of violent murder in the country only in the year 2019, of which 1.5% were bisexuals. Simultaneously, as Jaeger et al. (2019) pointed out, bisexuality has been the target of constant delegitimization in Brazil. In addition, bisexual people are more vulnerable to the

development of psychological disorders in comparison to gay and lesbian people (Hickson et al., 2016). The aforementioned examples signal the victimization by sexual prejudice against bisexuals.

Sexual prejudice consists of negative attitudes against non-heterosexual individuals. The term "sexual prejudice" is being used in literature to replace the term "phobia", which has numerous limitations to scientific investigations (Herek & McLemore, 2013). Some of these attitudes, when specifically directed at individuals who identify as bisexual, are described by experiences of discrimination, hostility and devaluation in both LGBTQIA+ and heteronormative communities. (Ochs, 1996). Along with this, there is a strong stigma about this sexual orientation, often seen as just transitory, dirty and related to hyper-sexualized and deviant behaviors (Jaeger et al., 2019). This set of beliefs and behaviors that define sexual prejudice against bisexuals has its specificities. The studies by Garelick et al. (2017) showed that there are differences in the way this type of prejudice is practiced when compared to discrimination against lesbians and homosexuals. For example, these authors have shown that bisexuality can be seen as a threat to the binary pattern in which sexual orientations have been socially categorized throughout history, where heterosexuality is on one end and homosexuality is on the other (Callis, 2016). Ochs (1996) points out that this lack of clarity generates a feeling of discomfort and uncertainty in heterosexual, gay or lesbian people, leading to discrimination against bisexuals for not falling into one of these two categories.

Sexual prejudice against bisexual people has been investigated over the years with a broad focus on beliefs, stereotypes and attitudes towards bisexuality and bisexual individuals. As a result, several instruments were formulated to measure such constructs. For example, Eliason and Raheim (1996) pioneered the inclusion of bisexuality in a measurement instrument that assesses individuals' opinion about lesbian, gay and bisexual people, the so-called Beliefs About Sexual Minorities Scale (BSM). In another study, Eliason (1997) evaluated biphobia in heterosexual students and, to do this, developed the Bisexuality Stereotype Scale (BSS). More recently, Garelick et al. (2017) reformulated the BSS (Eliason, 1997) when researching the relationship between religious fundamentalism, social cognition and negative attitudes toward transgender and bisexual people coming from heterosexual individuals, excluding items from the original scale that referred to positive or neutral stereotypes. In the Brazilian context, Freires

et al. (2019) adapted the Multidimensional Sexual Prejudice Scale (EMPS), demonstrating evidence of a broader measure of sexual prejudice.

To measure sexual prejudice against bisexuals not only among heterosexual samples, but also in homosexual ones, Mulick and Wright (2002) developed the Biphobia Scale, composed of 30 items ($\alpha = 0.94$) and with a unifactorial structure. Due to the variety of items referring to both affective, cognitive and behavioral reactions towards bisexual people (Mulick & Wright, 2002), we decided to focus on this scale for the development of the current research. Considering the absence of instruments to measure prejudice against bisexuals in Brazil, a fact that also reveals the various gaps in the Brazilian scientific literature about sexual prejudice against bisexuals, especially in the field of psychology (Barker, 2007), we aim to seek evidence of construct and criterion of a reduced version, adapted for the Brazilian context, of the Biphobia Scale proposed by Mulick and Wright (2002) (i.e., EPSB-br).

In the first study, we adapted the items to Brazilian Portuguese, performed an exploratory factor analysis of the scale and verified its convergent validity through comparisons with other scales that measure beliefs and stereotypes of bisexuality. Afterwards, we carried out a second study to test the adequacy of the factor structure in a different sample. In addition, we accessed the concurrent validity of the EPSB-br by analyzing its correlations with right-wing authoritarianism and social dominance orientation scales, and also its discriminant validity, with the sleepiness construct. Finally, we performed an experimental study to assess the criterion validity of the EPSB-br. The databases and materials used in this research program can be accessed on the Open Science Framework (OSF) platform through the link: https://osf.io/4ch9y/?view_only=54bdf1d67ec e4313931b894373330009.

Study 1

In this study, we aimed to validate a reduced and translated version of the Biphobia Scale into Brazilian Portuguese (EPSB-br) (Mulick & Wright, 2002). For a greater focus on the measurement of prejudice against bisexual people, 16 items from the original scale referring specifically to beliefs and stereotypes regarding bisexuality were excluded, resulting in 14 items in total. In this study, we analyzed the factor structure of the scale and explored the convergent validity of the EPSB-br with other existing measures of sexual prejudice against bisexuals.

Method

Sample

A total of 313 Brazilians participated in this study, of whom 91 were excluded for not being heterosexual. Thus, our final sample consisted of 222 heterosexual Brazilians aged between 18 and 59 years (*M* = 27.50; *SD* = 8.71). Most participants declared themselves white (52.3%), women (73.9%) and middle class (36.5%). The final sample was adequate, as it had a power of 0.99 to detect an effect greater than $r = 0.30$ with $p = 0.05$, as estimated in WebPower (Zhang & Yuan, 2018).

Materials

We used the EPSB-br, adapted and validated in the current study. It consists of a 14-item Brazilian Portuguese-translated version of the Biphobia Scale (see supplementary material in the OSF), originally validated by Mulick and Wright (2002), including items such as "I dislike bisexual people" and "Bisexual people cannot control their sexual impulses". First, a bilingual person translated the items from English into Brazilian Portuguese. Afterwards, the items in Portuguese were back-translated to check whether they were equivalent to the original scale and adequate to the Brazilian context. Responses ranged on a five-point scale, varying from 1 (strongly disagree) to 6 (strongly agree).

For convergent validity, we used two other scales. One of them was the Beliefs About Sexual Minorities Scale (BSM), validated by Eliason and Raheim (1996) and translated into Brazilian Portuguese for the present study. In this study, the participants selected among six alternatives the one that best described their beliefs regarding bisexual people, ranging from 1 ("I believe that bisexual people contribute in a positive and unique way to society") and 6 ("I hate bisexual people and I believe their lifestyle should be punished"). Another scale we used was the Bisexuality Stereotypes Scale (Eliason, 1997), with adaptations from Garelick et al. (2017). It is a 16-item scale (e.g., "Bisexuals are just gay and lesbian people who are afraid to come out as such"; "Bisexual people spread AIDS to heterosexual people"; $\alpha = .90$) that measures individuals' agreement with stereotypes about bisexual people using a Likert-type response scale ranging from 1 (strongly disagree) to 6 (strongly agree). We also used a sociodemographic questionnaire that included information on age, gender, sexual orientation, ethnicity, economic class, religion, and religiosity (see Supplementary Material in the OSF).

Procedure and Data Analysis

Participants accessed a link to an online survey on the Qualtrics platform. Initially, they read the Free and Informed Consent Term in the form of a brief presentation of the study and indicated whether they agreed with the terms. Then, they answered the EPSB-br, the Bisexuality Stereotype Scale (Garelick et al., 2017), and the BSM (Eliason & Raheim, 1996). Finally, they answered the sociodemographic questionnaire.

Data analysis was performed using the softwares JAMOVI and RStudio. Initially, we conducted a descriptive analysis of the database, followed by an exploratory factor analysis of each scale used in the study using the principal-axis factoring method (oblimin rotation) and a Pearson's correlation analysis to assess the convergent validity of the construct. Two complementary criteria were considered to indicate the number of factors in the scale: eigenvalues greater than 1.00 (Kaiser, 1960) and Horn's parallel analysis criterion (Horn, 1965). We consider values greater than 0.40 as an adequate factor loading to retain the item on the scale (Hair et al., 2006). For internal consistency, we calculated Cronbach's alpha (α) and McDonald's omega (ω), assuming values equal to or greater than 0.70 as acceptable. Missing values were excluded using Listwise (Jakobsen et al, 2017).

Results

To check if the correlation matrix was factorable, we used the values referring to the Kaiser-Meyer-Olkin (KMO) criterion = 0.76 and the Bartlett Sphericity Test = 724 ($p < 0.001$) and then proceeded with the exploratory factor analysis. According to the Kaiser criterion, the EPSB-br presented an eigenvalue of 3.19, explaining 22.8% of the variance. In order to analyze this factor more robustly, we performed a parallel analysis that confirmed the unifactorial structure of the construct. Next, we analyzed the factor loadings of each EPSB-br item (Table 1). Four items (01, 03, 05 and 12) were excluded because they had loads lower than the minimum value of 0.40. Cronbach's alpha (α) and McDonald's omega (ω) were calculated to address the internal consistency of the scale, with $\alpha = 0.71$ and $\omega = 0.72$.

We analyzed the convergent validity of the EPSB-br through an analysis of its correlation with the Bisexuality Stereotype Scale (Garelick et al., 2017) and the BSM (Eliason & Raheim, 1996). According to Table 2, it is possible to verify moderate and significant

Table 1.
Factorial loadings of the EPSB-br's items

Items	Main Factor of the EPSB-br
10. Eu evito pessoas bissexuais.	0.757
13. Pessoas bissexuais não conseguem controlar seus impulsos sexuais.	0.720
14. Me sinto apreensivo(a) na presença de pessoas bissexuais.	0.639
11. Quando conheço uma pessoa bissexual, eu penso: "Que desperdício".	0.489
08. Eu ficaria com raiva se uma pessoa bissexual me fizesse propostas de natureza sexual.	0.488
09. Eu me sinto ansioso(a) quando tenho que interagir com pessoas bissexuais.	0.455
04. Pessoas bissexuais me deixam nervoso(a).	0.450
02. Me sinto confortável perto de pessoas bissexuais.	-0.413
07. Pessoas bissexuais não são confiáveis.	0.408
06. Pessoas bissexuais são incapazes de se manter em um relacionamento monogâmico.	0.400
12. Pessoas bissexuais querem fazer sexo com todo mundo.	0.329
05. Pessoas bissexuais merecem ser discriminadas.	0.303
01. Eu não gosto de pessoas bissexuais.	0.285
03. Eu agrediria uma pessoa bissexual por tentar flertar comigo.	0.159
Eigenvalue	3.19
% Variance	22.8
Cronbach's Alpha	$\alpha = 0.71$
McDonald's Omega	$\omega = 0.72$

positive correlations between the three scales, indicating convergence between the measures.

Discussion

Through an exploratory factor analysis, this study demonstrated that the EPSB-br has a unifactorial structure and adequate internal consistency. The final version consisted of 10 items translated into Brazilian Portuguese and adapted to the Brazilian context using the Biphobia Scale (Mulick & Wright, 2002). The EPSB-br showed significant moderate correlations with two other scales that measure beliefs (Eliason & Raheim, 1996) and stereotypes about bisexuality (Garelick et al., 2017), showing satisfactory convergent validity. In addition, a confirmatory factor analysis of the EPSB-br is needed to test in a new sample whether its single-factor structure for measuring sexual prejudice against bisexual people is indeed confirmed and to examine its discriminant validity. For this reason, we sought to overcome these limitations by developing a second study.

Study 2

In Study 2, we aimed to confirm the factor structure of the EPSB-br. In addition, we analyzed the quality of the scale items through the Item Response Theory (Primi, 2004), and explored the discriminant validity as well as the concurrent validity of the construct, using other scales of intergroup attitudes as a reference. In this sense, as presented by Duckitt & Sibley (2007), prejudice against social minorities proved to be highly related to the Right-Wing Authoritarian Scale (RWA) and the Social Dominance Orientation Scale (SDO), that is, more prejudiced individuals were more likely to score higher on such scales. Specifically, the most prejudiced people tended to be more oriented to dominate other groups, more authoritarian, traditionalist and submissive to authorities. As a result, we used these two scales in this research to address the concurrent validity of the EPSB-br, due to their high correlation with prejudice and discrimination against sexual minority groups (Whitley, 1999; Poteat & Mereish, 2012; Vilanova et al., 2018). In addition, we also

Table 2.

Bivariate Correlations between the EPSB-br and the Other Study Variables

Study 1							
	BSS				BSM		
EPSB-br	0.366**				0.383**		
Study 2							
	Religiosity	SDO	A-RWA	C-RWA	T-RWA	S-RWA	Sleep
EPSB-br	0.220**	0.546**	0.403**	-0.286**	0.584**	0.397**	-0.052

Note. EPSB-br = Sexual Prejudice Against Bisexuals Scale; BSS = Bisexuality Stereotype Scale; BSM = Beliefs on Sexual Minorities Scale; SDO = Social Dominance Orientation Scale; A-RWA = Authoritarianism; C-RWA = Challenge of Authority; T-RWA = Traditionalism; S-RWA = Submission to Authority; Sleep = Epworth Sleepiness Scale; ** $p < 0.01$.

sought to analyze the correlation between sexual prejudice against bisexuals and religiosity, as it also has a strong relationship with prejudice (Klein et al., 2018). For discriminant validity, we added the Epworth Sleepiness Scale (Bertolazi et al., 2009) because it measures a construct that is not related to prejudice against bisexuals. Therefore, we expect the EPSB-br to be positively correlated with religiosity, EAD, and EODS. In contrast, we expect the EPSB-br to be non-correlated with the Brazilian version of the Epworth Sleepiness Scale (ESE-BR) (Bertolazi et al., 2009).

Method

Sample

A total of 306 people participated in this study, of whom 87 were excluded from the sample because they were not heterosexual. Our final sample consisted of 219 heterosexual people aged between 18 and 68 years old (M = 28.94; SD = 9.85). Most of the participants declared themselves white (44.7%), women (65.3%) and middle class (34.2%). The final sample was sufficient to have a power of 0.85 to detect an effect equal to/greater than $r = 0.20$ with $p = 0.05$, as estimated in WebPower (Zhang & Yuan, 2018).

Materials

We used the EPSB-br, adapted in Study 1 (α = 0.82; ω = 0.82). To assess the concurrent and discriminant validity of the EPSB-br, three scales were used. One of them was the Brazilian version of the Social Dominance Orientation Scale (SDO) (Fernandes et al., 2007), originally formulated by Sidanius and Pratto (1999), composed of sixteen items (α = 0.83), such as "Some groups are simply more valuable than

others;" and "The lower groups must remain in place"; to which answers ranged from 1 (strongly disagree) to 6 (strongly agree). The Right-Wing Authoritarianism Scale (RWA) (Vilanova et al., 2018) was also used for the same purpose of convergent validity, with thirty-four items (α = .96), such as "We should crush all the negative elements that are causing problems in our society"; and "The secret to a good life is respect for authority". In addition, we used the Brazilian version of the Epworth Sleepiness Scale (ESE-BR) (Bertolazi et al., 2009), originally created by Johns (1991), so that participants indicated the probability of dozing off in six different situations, such as "Sitting and reading" and "In a car stopped in traffic for a few minutes". Participants answered ranged from 1 (would never nap) to 4 (high probability of napping). Participants' sociodemographic variables were accessed similarly as in study 1.

Procedure and Data Analysis

Data for this study were collected as in Study 1. However, after answering the EPSB-br, the participants answered the SDO, RWA and ESE-BR scales additionally. The data were analyzed using the RStudio and SPSS softwares. An analysis of the parameters *a* (discrimination) and *b* (difficulty), based on Item Response Theory (IRT), using the two-parameter model of Lord (1952) and Birnbaum (1968), and a confirmatory factor analysis, using the Weighted Least Squares Estimation Method adjusted by the Mean and Variance (WLSMV) was performed using the Mirt (Chalmers, 2012) and lavaan (Rosseel, 2012) statistical packages. In reference to parameter *a*, values above .6 are suitable. For parameter *b*, the values must vary between -3 and +3, and the more positive they are, the higher the level of sexual prejudice against bisexual people that the item

Results

Initially, we performed an analysis of the quality of the EPSB-br items based on the Item Response Theory (IRT). For this purpose, the scale items were evaluated for the parameters "a" (discrimination) and "b" (difficulty). These parameters concern, respectively, the item's ability to detect individual differences in the latent trait under study and, the sexual prejudice against bisexuals represented in each of the six Likert scale response options for each item. In Table 3, it can be seen that the ten items have appropriate values for the parameters "a" and "b" (Primi, 2004), that is, they actually measure the proposed latent variable.

To verify the degree of fit of the proposed unifactorial model for the data obtained, confirmatory factor analysis was also performed using the software RStudio. The WLSMV estimator was used for the analysis and adequate residual fit indexes were obtained [RMSEA (90% CI 0.00 - 0.03) = 0.02; SRMR = 0.06], as well as satisfactory comparative indexes (CFI = 0.98; TLI = 0.99). The ten items of the scale presented a factor loading different from zero, showing that the one-factor model had a good fit for the collected data (see supplementary material in the OSF).

Finally, correlation analyses between the EPSB-br, Religiosity, Social Dominance Orientation Scale (Sidanius & Pratto, 1999), the four factors of the Right-Wing Authoritarian Scale (Authoritarianism, Challenge to Authority, Traditionalism and Submission to Authority) from Vilanova et al. (2018) and the Epworth Sleepiness Scale (Bertolazi et al., 2009) were performed to address the concurrent and discriminant validity of the EPSB-br. Table 2 indicates that the EPSB-br showed significant positive correlations with religiosity ($r = 0.220$, $p < 0.01$), SDO ($r = 0.546$, $p < 0.01$) and the RWA factors referring to Authoritarianism ($r = 0.403$, $p < 0.01$), Traditionalism ($r = 0.584$, $p < 0.01$) and Submission to Authority ($r = 0.397$, $p < 0.01$). The Challenge to Authority construct showed a significant negative correlation ($r = - 0.286$, $p < 0.01$) to the EPSB-br. As expected, there was no significant correlation between the EPSB-br and the ESE-BR ($r = 0.052$, $p > 0.05$), as they measure constructs that are unrelated in the literature, indicating evidence of discriminant validity.

Discussion

Through an analysis of the parameters "a" (discrimination) and "b" (difficulty) based on the Item Response Theory, we identified that each item of the EPSB-br adequately assesses the intended latent trait. Furthermore, from the confirmatory factor analysis, we found that the single-factor model was satisfactorily suitable to our data. The scale showed adequate concurrent validity, given the significant correlations between the EPSB-br, religiosity, SDO and the four factors of RWA, corroborating the previous research

Table 3.
IRT Parameters a (discrimination) and b (difficulty) of the EPSB-br's Items

Items	a	b1	b2	b3	b4	b5
1	2.383	.796	1.350	1.673	2.116	2.709
2	2.226	1.376	1.897	2.290	2.386	2.736
3	1.632	.907	1.267	1.702	2.217	2.633
4	1.747	1.700	2.344	2.717	3.186	-
5	1.346	0.383	.889	1.488	2.024	2.626
6	1.980	1.276	1.837	2.380	2.761	3.113
7	2.463	1.696	2.112	2.440	2.780	2.899
8	1.675	1.322	1.735	2.251	3.062	3.171
9	2.265	1.292	1.806	2.123	2.411	2.812
10	4.677	1.261	1.642	1.909	2.496	2.682

(Klein et al., 2018; Duckitt & Sibley, 2007; Whitley, 1999; Poteat & Mereish, 2012; Vilanova et al., 2018). We also found satisfactory discriminant validity due to the lack of correlation between the EPSB-br and the sleepiness construct, measured by the ESE-BR, which is independent of sexual prejudice against bisexuals. An analysis of the criterion validity of the EPSB-br is still necessary, more specifically about its predictive power in relation to discriminatory attitudes against bisexual people. Therefore, we sought to overcome this limitation in Study 3.

Study 3

In this study, we aimed to address a special type of criterion-related validity of the EPSB-br, which consists of analyzing whether we can predict discriminatory attitudes against bisexuals from the activation of prejudice against this target group. To this end, we used an experimental scenario in which we manipulated the sexual orientation (bisexual, straight vs. control) and gender (female vs. male) of a person who was announcing the offer of a course they would teach on the topic of interpersonal relationships. The participants' task was to evaluate this person, also inferring the remuneration they thought that the target should receive for their work. According to previous studies related to prejudice against bisexuals practiced by heterosexual people, bisexual men and women tend to be evaluated more negatively in comparison to lesbian women and homosexual men (Steffens & Wagner, 2004). However, in general, these studies show that female bisexuality is more accepted than male bisexuality (Eliason, 1997; Yost & Thomas, 2011). In addition, stereotypical attitudes and attributions toward bisexual men are often more negative and hostile than when bisexual women are targeted (Dodge et al., 2016; Mohr & Rochlen, 1999; Mulick & Wright, 2011; Steffens & Wagner, 2011; 2004; Yost & Thomas, 2011). As a result, we expect that the most prejudiced heterosexual people, as measured by our EPSB-br, will evaluate the bisexual target more negatively. That is, our hypothesis is that bisexual targets will be assigned a lower salary than heterosexual targets.

Method

Sample and Experimental Design

Initially, we invited 317 heterosexual Brazilians to participate in this study. However, 31 of them

were excluded from the analyses, as they answered the manipulation check incorrectly. Of the remaining 286 participants, 19 of these were considered extreme outliers (3SD above the mean) in the dependent variable of the present study (allocated salary). Thus, our final sample included 267 heterosexual participants, aged between 18 and 67 years old ($M = 29.54$; $SD = 9.44$). Among these, the majority declared themselves white (46.1%), women (65.5%) and lower middle class (38.6%). Participants were randomly allocated to one of six conditions according to a 2 (female or male target) x 3 (bisexual, heterosexual, or control target) between-participants experimental design. This sample has a power of 0.80 to detect an effect equal or greater than $f = 0.18$ with $p = 0.05$, as estimated in WebPower (Zhang & Yuan, 2018).

Procedure

We invited participants to collaborate in an online study through the Qualtrics platform. After agreeing to participate, they were randomly assigned to one of the six experimental conditions. Their tasks consisted of watching a 46-second video and answering questions related to it. The video served to manipulate the sexual orientation of the target person and consisted of a compilation of clips showing neutral scenarios, such as urban and rural landscapes, and with a male voice narrating a specific description for each condition. The narration described a professor who was advertising an introductory sociology course, one of which would be about relationships (see supplemental material in the OSF). This narration was adapted from a vignette used by Raja and Stokes (1998) in a study to assess the validity of the modern homophobia scale. In the current study the manipulation of the target's gender was performed through the name of the character [Flávio vs. Flávia]. The manipulation of the sexual orientation of the target [heterosexual vs. bisexual vs. control] consisted of specifying the terms "heterosexual" or "bisexual", depending on the condition, whereas, in the control condition, no mention was made of the sexual orientation of the target. After watching the video, the participants answered a set of questions that we describe below according to the described target and, finally, they were fully debriefed.

Measures

Salary Attribution. We asked participants to estimate the salary that they thought the teacher in the video should earn. To indicate the salary value in reais,

the participants had to manually drag a bar ranging from R$0 to R$100,000.00.

Sexual Prejudice Against Bisexuals. We used the 10-item EPSB-br ($\alpha = 0.71$ and $\omega = 0.72$) we adapted for the Brazilian context and is being validated in this research. As in previous studies, participants indicated to what extent they agreed with each item by using a Likert-format scale ranging from 1 (strongly disagree) to 6 (strongly agree).

Manipulation check. We used an item that asked about the sexual orientation of the target person, to which participants had to respond by selecting one of the following options: "Heterosexual", "Bisexual" or "Not informed".

Data Analysis

Data were analyzed using the SPSS and JASP software. Correlation analyses and tests of mean comparisons using ANCOVAS were performed in SPSS with the PROCESS extension. Descriptive statistics were calculated using JASP.

Results

Salary Attribution

We conducted a 2 (target's gender: male x female) x 3 (target's sexual orientation: bisexual x heterosexual x control) between-participants factorial ANCOVA, the assigned salary as a dependent variable and sexual prejudice against bisexuals as a covariate. The results showed that the main effect of target's sexual orientation was marginally significant, $F(2, 255) = 2.668$, $p = 0.071$, $\eta^2p = 0.02$. The main effect of the target's gender was not significant, $F(1, 255) = 0.213$, $p = 0.645$, $\eta^2p = .001$. The main effect of sexual prejudice against bisexuals was also not significant, $F(1, 255) = 2.396$, $p = 0.123$, $\eta^2p = 0.009$. However, and most important for testing our hypotheses, the three-way interaction between the target's gender, the target's sexual orientation, and the participants' sexual prejudice against bisexuals was significant, $F(2, 255) = 4.692$, $p = 0.01$, $\eta^2p = 0.035$. We decompose this interaction to analyze the influence of the manipulation of sexual orientation separately for each of the target's gender at different levels of participants' prejudice (Figure 1).

Female Teacher's Salary. In the condition where we described the target as being a female teacher, low prejudiced participants attributed a lower salary to the female heterosexual teacher ($M = 4841.00$; $SE = 1916.68$) in comparison to the control condition ($M = 15775.81$; $SE = 2341.76$), $b = -10914.80$, $SE = 3026.14$, $p = 0.001$. Likewise, they attributed a lower salary to the female bisexual teacher ($M = 3269.86$; $SE = 2195.60$) in comparison to the control condition ($b = -12485.95$; $SE = 3210.07$, $p = 0.001$). The higher prejudiced participants did not significantly differentiate the female teacher's salary among the three experimental conditions: control ($M = 9224.79$; $SE = 2632.30$); heterosexual ($M = 8763.34$; $SE = 1766.88$); bisexual ($M = 12695.34$; $SE = 2344.47$).

Male Teacher's Salary. When we described the target as being a male teacher, low prejudiced participants assigned a marginally higher salary in the male bisexual teacher condition ($M = 12037.29$; $SE = 2092.29$) in comparison to the control conditions ($M = 6153.78$; $EP = 2601.61$), $b = 5883.51$, $SE = 3338.57$, $p = 0.079$; and attributed a significantly higher salary in the male bisexual teacher condition in comparison to the male heterosexual teacher condition ($M = 4034.40$; $SE = 2107.02$), $b = 8002.89$; $SE = 2969.37$, $p = 0.008$. Among the higher prejudiced participants, however, the differences in the assigned salaries among the three experimental conditions were not significant: control ($M = 9302.70$; $SE = 3700.78$); heterosexual ($M = 9743.58$; $SE = 1951.97$); bisexual ($M = 9837.10$; $SE = 1707.16$).

Discussion

Results showed evidence of criterion validity for the EPSB-br since the interaction between the gender, the sexual orientation of the target and sexual prejudice against bisexuals significantly influenced the assigned salary to the target, partially corroborating our hypothesis. When the target was female, the less prejudiced participants, that is, those who scored lower on the EPSB-br, attributed a lower salary to the teacher in the bisexual condition than the one in the control condition. However, this was not repeated among the higher prejudiced respondents. When the target was described as male, low prejudiced respondents attributed a higher salary to the bisexual target when compared to the control condition and the heterosexual condition. Among the higher prejudiced participants, there were no differences in salary attribution. This means that sexual prejudice against bisexuals as measured by our scale mitigates the general tendency in participants to favor the bisexual male target. It also means that the scale was
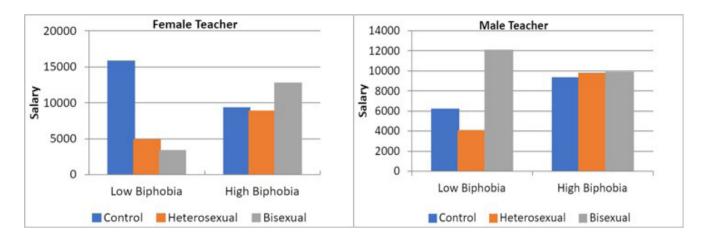
Figure 1. Attributed salary according to the experimental conditions and the level of sexual prejudice against bisexuals

sensitive and in the sense of our hypotheses only when the target was male.

General Discussion

Throughout three studies, we analyzed the psychometric characteristics of the EPSB-br for the Brazilian context. In Study 1, we demonstrated that the adapted scale was consistent with the original instrument by Mulick and Wright (2002), presented a unifactorial structure to measure prejudice against bisexual people with adequate internal consistency and convergent validity with scales that measure beliefs (Eliason & Raheim, 1996) and stereotypes (Garelick et al., 2017) about bisexuality. In addition, results allowed us to reduce the original scale to only ten items with adequate factor loadings, which is unprecedented in the national scenario of research on sexual prejudice against bisexuals.

In Study 2, we addressed the concurrent validity of the EPSB-br based on its correlation with religiosity, social dominance orientation (Sidanius & Pratto, 1999) and the factors that make up right-wing authoritarianism, such as conservatism, the challenge of authority, traditionalism and submission to authority (Vilanova et al., 2018). Furthermore, we evidenced its discriminant validity, given its lack of correlation with a measure of sleepiness (Bertolazi et al, 2009). According to our study, the more prejudiced against bisexuals the respondents were, the more religious, conservative, submissive to authority and traditionalist they also were. This may be related to the discomfort caused by the fact that bisexuality is a sexual orientation that not only challenges traditional heteronormativity, but also poses a

threat to the binary pattern of sexual orientations that is so ingrained in society (Ochs, 1996; Callis, 2016). These findings corroborate the extensive literature on prejudice against social and sexual minorities (Whitley, 1999; Duckitt & Sibley, 2007; Poteat & Mereish, 2012; Klein et al., 2018; Vilanova et al., 2018), and bring a new contribution by evidencing the relationship of these constructs also with prejudice against bisexual people.

In Study 3, we analyzed the criterion validity of the EPSB-br and found that the scale is sensitive enough to the experimental manipulation of the prejudiced target group's salience. The results, however, showed that the scale was sensitive to differentiating the prediction of salary attribution only among low prejudiced participants when the target was male. In fact, less prejudiced participants gave a higher salary to the male bisexual teacher in comparison to the targets in the control and heterosexual conditions, demonstrating a criterion validity of the scale. Nevertheless, low prejudiced participants attributed a lower salary to the female bisexual teacher in comparison to the target in the control condition, evidencing a disfavoring attitude towards bisexual women even in participants with a lower level of sexual prejudice. A possible explanation for this finding may lie in the fact that the literature points out that attitudes towards bisexual women tend to be less hostile than towards bisexual men, but more linked to sexist concepts of devaluation and sexualization of these women (Dodge et al., 2016; Mohr & Rochlen, 1999; Mulick & Wright, 2011; Steffens & Wagner, 2004; Yost & Thomas, 2011). This may indicate that the lower salary attribution to the female bisexual teacher by low prejudiced participants was due to a greater devaluation

of bisexual women in relation to bisexual men, already evidenced in the previously mentioned studies.

In general, after presenting adequate internal consistency and good convergent-divergent and criterion validity, the EPSB-br is a good option to be used in future studies about prejudice against bisexual people. As Barker (2007) points out, there is invisibility of bisexuality and, consequently, of the prejudice suffered by these individuals, resulting in a gap in the scientific literature on this extremely relevant topic. As a result, a reliable and validated measure of prejudice against bisexual people in the Brazilian context proves to be a useful and necessary tool so that further investigations can be carried out in the country.

However, this work is not free of limitations. First, because the studies were carried out online, the sample is not representative of all segments of the Brazilian population. In addition, the level of sexual prejudice against bisexuals in the samples throughout the three studies was very low, and, although it was not measured in the studies in question, one of the possible causes for this phenomenon may be social desirability. Social desirability consists of a type of response bias in which individuals have a tendency to deny the presence of socially undesirable beliefs or attitudes when answering scales (Almiro, 2017). It may be that, as a result, the participants tended to respond to the EPSB-br while trying to omit their negative assessments of bisexual people. Future studies on the subject should seek more comprehensive and diversified samples, as well as control possible biases in the response of the EPSB-br.

In sum, the results presented in this article may represent a contribution to the field of study of sexual prejudice against bisexuals by introducing, in the Brazilian context, the adaptation of a valid and reliable measure for prejudice against bisexual people. The instrument can be a tool for scientific investigations about this type of prejudice in Brazil, offering subsidies for a deeper understanding of this attitude, which is so invisible, but still present in society. This way, this work was able to fill a gap in the Brazilian scientific literature through its contributions and serve as a basis for future studies on sexual prejudice against bisexuals.

References

Almiro, P. A. (2017). Uma nota sobre a desejabilidade social e o enviesamento de respostas. *Avaliação Psicológica*, *16*(3), 1-4. https://dx.doi.org/10.15689/ap.2017.1603.ed

Barker, M. (2007). Heteronormativity and the exclusion of bisexuality in psychology. In V. Clarke & E. Peel (Eds.), *Out in psychology:* Lesbian, gay, bisexual, trans, and queer perspectives (pp. 86–118). Wiley.

Bertolazi, A. N., Fagondes, S. C., Hoff, L. S., Pedro, D., Barreto S. S. M., & Johns, M. W. (2009). Portuguese-language version of the Epworth sleepiness scale: validation for use in Brazil. *Jornal Brasileiro de Pneumologia*, *35*(9), 877-883. https://dx.doi.org/10.1590/S1806-37132009000900009

Birnbaum, A. (1968). Some latent trait models and their use in inferring and examinee's ability. In F. M. Lord & M. R. Novick (Eds.), *Statistical theories of mental test scores* (pp. 17-20). Addison-Wesley.

Callis, A. (2016). Beyond bi: Sexual fluidity, identity, and the post-sexual revolution. In N. L. Fischer & S. Seidman (Eds.), *Introducing the new sexuality studies.* (pp. 215–224). New York, NY: Routledge

Chalmers, R. P. (2012). mirt: A Multidimensional Item Response Theory Package for the R Environment. *Journal of Statistical Software*, *48*(6), 1-29. https://dx.doi.org/10.18637/jss.v048.i06

Dodge, B., Herbenick, D., Friedman, M. R., Schick, V., Fu, T-C. (Jane), Bostwick, W., Bartelt, E., Muñoz-Laboy, M., Pletta, D., Reece, M., & Sandfort, T. G. M. (2016). Attitudes toward Bisexual Men and Women among a Nationally Representative Probability Sample of Adults in the United States. *PLOS ONE, 11(10), e0164430.* https://dx.doi.org/10.1371/journal.pone.0164430

Duckitt, J., & Sibley, C. G. (2007). Right wing authoritarianism, social dominance orientation and the dimensions of generalized prejudice. *European Journal of Personality, 21*(2), 113–130. https://dx.doi.org/10.1002/per.614

Eliason, M. J. (1997). The Prevalence and Nature of Biphobia in Heterosexual Undergraduate Students. *Archives of Sexual Behavior, 26*(3), 317–326. https://dx.doi.org/10.1023/a:1024527032040

Eliason, M. J., & Raheim, S. (1996). Categorical Measurement of Attitudes About Lesbian, Gay, and Bisexual People. *Journal of Gay & Lesbian Social Services, 4*(3), 51–65. https://dx.doi.org/10.1300/j041v04n03_03

Fernandes, S., Da Costa, J., Camino, L., & Mendoza, R. (2007). Valores Psicossociais e

Orientação à Dominância Social: Um Estudo Acerca do Preconceito. *Psicologia: Reflexão e Crítica*, *20*(3), 490-498. https://doi.org/10.1590/S0102-79722007000300017

Freires, L. A., Rezende, A. T., Loureto, G. D. L., Santos, W. S., Mendes, L. A. C., & Gouveia, V. V. (2019). Escala Multidimensional de Preconceito Sexual: Propriedades Psicométricas para o Contexto Brasileiro. *Psicologia: Ciência e Profissão. 39*(3), 222-235. https://doi.org/10.1590/1982-3703003228490

Garelick, A. S., Filip-Crawford, G., Varley, A. H., Nagoshi, C. T., Nagoshi, J. L., & Evans, R. (2017). Beyond the Binary: Exploring the Role of Ambiguity in Biphobia and Transphobia. *Journal of Bisexuality*, 1–18. https://dx.doi.org/10.1080/15299716.2017.1319890

Hair, J., Babin, B. J., Anderson, R. E., & Black, W. C. (2018). *Multivariate Data Analysis* (8th edition). Cengage India.

Herek, G. M., & McLemore, K. A. (2013). Sexual prejudice. *Annual review of psychology, 64*, 309-333. https://doi.org/10.1146/annurev-psych-113011-143826

Hickson, F., Davey, C., Reid, D., Weatherburn, P., & Bourne, A. (2016). Mental health inequalities among gay and bisexual men in England, Scotland and Wales: a large community-based cross-sectional survey. *Journal of Public Health*, *39*(2), 266-273. https://dx.doi.org/10.1093/pubmed/fdw021

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika*, *30*, 179-185. https://doi.org/10.1007/BF02289447

Jaeger, M. B., Longhini, G. N., Oliveira, J. M. de, & Toneli, M. J. F. (2019). Bissexualidade, bifobia e monossexismo: problematizando enquadramentos. *Revista Periódicus*, *2*(11), 1–16. Recuperado de https://periodicos.ufba.br/index.php/revistaperiodicus/article/view/28011

Jakobsen, J. C., Gluud, C., Wetterslev, J. et al. (2017). When and how should multiple imputation be used for handling missing data in randomised clinical trials – a practical guide with flowcharts. *BMC Medical Research Methodology, 17,* 162 https://doi.org/10.1186/s12874-017-0442-1

Johns, M. W. (1991). A New Method for Measuring Daytime Sleepiness: The Epworth Sleepiness Scale.

Sleep, 14(6), 540-545. https://doi.org/10.1093/sleep/14.6.540

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement, 20*(1), 141-151. https://doi.org/10.1177/001316446002000116

Klein C., Lühr M., Streib H. (2018). Extant Empirical Research on Religiosity and Prejudice. In: Streib H., Klein C. (Eds.) *Xenophobia and Religion. Biographical and Statistical Paths for a Culture of Welcome*. Springer, Cham. https://doi.org/10.1007/978-3-319-74564-0_2

Lord, F. M. (1952). The relation of the reliability of multiple-choice tests to the distribution or item difficulties. *Psychometrika, 17*, 181-194. https://doi.org/10.1007/BF02288781

Mohr, J. J., & Rochlen, A. B. (1999). Measuring attitudes regarding bisexuality in lesbian, gay male, and heterosexual populations. *Journal of Counseling Psychology, 46*(3), 353–369. https://doi.org/10.1037/0022-0167.46.3.353

Mulick, P. S., & Wright Jr, L. W. (2002). Examining the Existence of Biphobia in the Heterosexual and Homosexual Populations. *Journal of Bisexuality*, *2*(4), 45-64, https://doi.org/10.1300/J159v02n04_03

Mulick, P. S., & Wright Jr, L. W. (2011). The Biphobia Scale a Decade Later: Reflections and Additions. *Journal of Bisexuality*, *11*(4), 453-457. https://doi.org/10.1080/15299716.2011.620486

Nunnally, J. C. (1978). *Teoria psicométrica* (2ª ed.). McGraw-Hill.

Ochs R. (1996). Biphobia: it goes more than two ways. In: Firestein B (Ed.). *Bisexuality: The Psychology and Politics of an Invisible Minority* (pp. 217–39). Thousand Oaks, CA: Sage. Retrieved from: https://robynochs.com/biphobia-it-goes-more-than-two-ways/

Oliveira, J. M. D., & Mott, L. (2020). *Mortes violentas de LGBT+ no Brasil – 2019: Relatório do Grupo Gay da Bahia*. Editora Grupo Gay da Bahia.

Poteat, V. P., & Mereish, E. H. (2012). Ideology, Prejudice, and Attitudes Toward Sexual Minority Social Policies and Organizations. *Political Psychology, 33(2),* 211–224. https://doi.org/10.1111/j.1467-9221.2012.00871.x

Primi, R. (2004). Avanços na interpretação de escalas com a aplicação da Teoria de Resposta ao Item. *Avaliação Psicológica, 3*(1), 53-58. Retrieved from http://pepsic.bvsalud.org/scielo.php?script=sci_arttext&pid=S1677-04712004000100006&lng=pt&tlng=pt.

Raja, S., & Stokes, J. (1998). Assessing Attitudes Toward Lesbians and Gay Men: The Modern Homophobia Scale. *International Journal of Sexuality and Gender Studies. 3*, 113-134. https://doi.org/10.1023/A:1023244427281

Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software, 48*(2), 1-36. http://www.jstatsoft.org/v48/i02/.

Sidanius, J., & Pratto, F. (1999). *Social Dominance: An Intergroup Theory of Social Hierarchy and Oppression.* Cambridge University Press. https://doi.org/10.1017/CBO9781139175043

Steffens, M. C., & Wagner, C. (2004). Attitudes toward lesbians, gay men, bisexual women, and bisexual men in Germany. *Journal of Sex Research, 41*(2), 137–149. https://doi.org/10.1080/00224490409552222

Vilanova, F., Sousa, D. A., Koller, S. H., & Costa, A. B. (2018). Adaptação Transcultural e Estrutura Fatorial da Versão Brasileira da Escala Right-Wing Authoritarianism. *Trends in Psychology, 26*(3), 1299-1316. https://doi.org/10.9788/tp2018.3-07pt

Whitley, B. E., Jr. (1999). Right-wing authoritarianism, social dominance orientation, and prejudice. *Journal of Personality and Social Psychology, 77(1),* 126–134. https://doi.org/10.1037/0022-3514.77.1.126

Yost, M. R., & Thomas, G. D. (2011). Gender and Binegativity: Men's and Women's Attitudes Toward Male and Female Bisexuals. *Archives of Sexual Behavior, 41*(3), 691–702. https://doi.org/10.1007/s10508-011-9767-8

Zhang, Z., & Yuan, K. H. (2018). *Practical Statistical Power Analysis Using Webpower and* R (Eds). Granger, IN: ISDSA Press. [https://webpower.psychstat.org]

About the authors:

Nathália Nicácio de Freitas Nery
Master's Candidate in Psychology at the University of Brasília (UNB). Bachelor degree in Psychology from the Federal University of Paraíba.
ORCID: https://orcid.org/0000-0002-1412-9425
E-mail: nath_nery@hotmail.com.br

Tátila Rayane de Sampaio Brito
PhD in Social Psychology from the Federal University of Paraíba, with a doctoral internship at the Universidad Complutense de Madrid. Master's degree in Social Psychology from the Federal University of Paraíba. Bachelor degree in Psychology from Federal University of Piauí. Professor at the Department of Psychology at Cruzeiro do Sul University – São Paulo.
ORCID: https://orcid.org/0000-0002-1282-5558
E-mail: tatila.rayane@hotmail.com

Tailson Evangelista Mariano
PhD in Social Psychology from the Federal University of Paraíba. Master's degree in Social Psychology from the Federal University of Paraíba. Bachelor degree in Psychology from Federal University of Piauí. Professor at the Department of Psychology at the Catholic University of Pernambuco and Researcher at the Laboratory of Cyberpsychology and Digital Humanities. Collaborating researcher at the Media Psychology Laboratory (UFPB). Member of the International Society for Research on Aggression.
ORCID: https://orcid.org/0000-0001-6716-0250
E-mail: tailson.mariano@unicap.br

Emerson Araújo Do Bú
PhD Candidate in Social Psychology at the Faculty of Psychology of the University of Lisbon/Institute of Social Sciences of the University of Lisbon. Master's degree in Social Psychology from the Federal University of Paraíba. Bachelor degree in Psychology from the Federal University of Campina Grande
ORCID: https://orcid.org/0000-0003-3864-3872
E-mail: emerson.bu@campus.ul.pt

Cicero Roberto Pereira
PhD in Experimental Social Psychology from the University Institute of Lisbon. Researcher at the Institute of Social Sciences of the University of Lisbon and Professor of Social Psychology at the Department of Psychology at the Federal University of Paraíba.
ORCID: https://orcid.org/0000-0003-3406-3985
E-mail: cicero.pereira@ics.ulisboa.pt

Contact:

Tátila Rayane de Sampaio Brito
Av. Doutor Ussiel Cirilo, 225, Vila Jacuí
São Paulo-SP, Brasil
CEP: 08060-070