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JEAN JEUS SANTOS

**PSYCHOLOGICAL ESSENTIALISM AND SEXUAL PREJUDICE: ENHANCING
THE KNOWLEDGE ON THE RELATIONSHIP BETWEEN CONCEPTIONS ABOUT
SEXUAL ORIENTATION AND SEXUAL PREJUDICE ATTITUDES**

*Essencialismo psicológico e preconceito sexual: Aprofundando o conhecimento sobre a
relação entre as concepções acerca da orientação sexual e atitudes relacionadas ao
preconceito sexual*

São Cristóvão - SE

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preconceito sexual*

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Aprovada em _____ de _____ de _____.

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Abstract

Essentialist thinking, which reflects the idea that social groups have “essences”, is one of the main factors associated with prejudice. However, the relationship between dimensions of psychological essentialism and sexual prejudice requires further explanation. The main objective of this thesis was to investigate evidence about scientific (theoretical explanations) and common-sense (lay beliefs) conceptions regarding sexual orientation related to essentialist thinking, and the relationship between the different dimensions of psychological essentialism and sexual prejudice. To achieve this objective, five studies were carried out throughout this work. Study 1, a scoping review of recent literature, showed that evidence on the factors associated with the development of sexual orientation are diffuse, so that they may be more consistent only for some theories and some categories of sexual orientations. Study 2, which sought to adapt and validate a psychometric scale on essentialist beliefs, showed that people in the Brazilian context also have essentialist beliefs about sexual orientation organized in a model with four dimensions (naturalness, discreteness, homogeneity, and informativeness), replicating the original structure of the Sexual Orientation Belief Scale (SOBS). Study 3, which aimed to test a structural model on the relationship between essentialist beliefs about sexual orientation (SOBS factors) and attitudes towards sexual diversity, showed that some essentialist beliefs, such as discreteness, are in general associated with higher negative attitudes towards sexual diversity; however, for the naturalness belief, the relationships are more contingent, so that it can be associated with both lower (through its direct effects) and higher (through its indirect effects) negative attitudes towards sexual diversity. Study 4, which sought to adapt and validate a model and a psychometric scale on sexual prejudice, showed that the opposition to same-sex parenting model and the Beliefs about Children's Adjustment in Same-Sex Families Scale (BCASSFS) have validity evidence to assess manifestations of prejudice (individual and normative opposition) in the Brazilian context. Study 5 aimed to investigate the co-occurrence of essentialist beliefs about sexual orientation (SOBS factors) in the Brazilian context and their

relationship with some specific variables, as well as sexual prejudice attitudes (including BCASSFS factors); and tested the replicability of the model proposed in Study 3 of this work. Its results provided evidence about the co-occurrence of essentialist beliefs about sexual orientation through different patterns, which are associated with different levels of conservatism and sexual prejudice attitudes. Also, the relationships observed in the model proposed in Study 3 were replicated depending on the patterns of co-occurrence of essentialist beliefs and sexual prejudice attitudes assessed. Results from these studies together contribute to improving the understanding of the relationship between dimensions of psychological essentialism and attitudes related to sexual prejudice, mainly regarding positive and negative implications of the naturalness belief. Findings from this thesis have theoretical implications by contributing to enhancing knowledge about the relationship between psychological essentialism and sexual prejudice; and may have practical implications for planning interventions aiming to reduce sexual prejudice that take into account the variables investigated in this work.

Keywords: sexual orientation; essentialism; prejudice; attitudes; beliefs.

Resumo

O pensamento essencialista, que reflete a ideia de que grupos sociais possuem “essências”, está entre alguns dos principais fatores associados ao preconceito. Porém, a relação entre as dimensões do essencialismo psicológico e preconceito sexual demandam melhores explicações. A presente tese teve como principal objetivo investigar evidências sobre concepções científicas (explicações teóricas) e do senso comum (crenças do público em geral) acerca da orientação sexual relacionadas ao pensamento essencialista, e a relação entre as diferentes dimensões do essencialismo psicológico e o preconceito sexual. Para atingir esse objetivo, foram realizados cinco estudos ao longo deste trabalho. O Estudo 1, uma revisão de escopo da literatura recente, mostrou que as evidências sobre os fatores associados ao desenvolvimento da orientação sexual são difusas, de modo que podem ser mais consistentes apenas para algumas teorias e algumas categorias de orientações sexuais. O Estudo 2, que buscou adaptar e validar uma escala psicométrica sobre crenças essencialistas, mostrou que as pessoas no contexto brasileiro também têm crenças essencialistas sobre a orientação sexual organizadas em um modelo com quatro dimensões (naturalidade, discretividade, homogeneidade e informatividade), replicando a estrutura original da *Sexual Orientation Belief Scale* (SOBS). O Estudo 3, que teve como objetivo testar um modelo estrutural sobre a relação entre crenças essencialistas sobre a orientação sexual (fatores da SOBS) e atitudes contra a diversidade sexual, mostrou que algumas crenças essencialistas, como a de discretividade, estão em geral associadas a mais atitudes negativas contra a diversidade sexual; entretanto, para a crença de naturalidade, as relações são mais contingentes, de modo que ela pode se associar tanto a menos (através de seus efeitos diretos) quanto a mais (através de seus efeitos indiretos) atitudes negativas contra a diversidade sexual. O Estudo 4, que buscou adaptar e validar um modelo e uma escala psicométrica sobre preconceito sexual, mostrou que o modelo de oposição à parentalidade por pessoas do mesmo sexo e a *Beliefs about Children's Adjustment in Same-Sex Families Scale*

(BCASSFS) têm evidências de validade para avaliar manifestações de preconceito (oposição individual e normativa) no contexto brasileiro. O Estudo 5 teve como objetivo investigar a co-ocorrência de crenças essencialistas sobre a orientação sexual (fatores da SOBS) no contexto brasileiro e sua relação com algumas variáveis específicas, e com atitudes de preconceito sexual (incluindo os fatores da BCASSFS); bem como testou a replicabilidade do modelo proposto no Estudo 3 deste trabalho. Seus resultados forneceram evidências sobre a co-ocorrência de crenças essencialistas sobre a orientação sexual através de diferentes padrões, os quais estão associados a diferentes níveis de conservadorismo e atitudes de preconceito sexual. Além disso, as relações observadas no modelo proposto no Estudo 3 foram replicadas dependendo dos padrões de co-ocorrência das crenças essencialistas e das atitudes de preconceito sexual avaliadas. Os resultados desses estudos contribuem para ampliar a compreensão sobre a relação entre as dimensões do essencialismo psicológico e atitudes relacionadas ao preconceito sexual, principalmente com relação às implicações positivas e negativas da crença de naturalidade. Os achados desta tese têm implicações teóricas, pois contribuem para aprofundar o conhecimento sobre a relação entre o essencialismo psicológico e o preconceito sexual; e podem ter implicações práticas para o planejamento de intervenções que busquem, entre seus objetivos, reduzir o preconceito sexual e que levem em conta as variáveis investigadas neste trabalho.

Palavras- chave: orientação sexual; essencialismo; preconceito; atitudes; crenças.

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Introduction

Sexual orientation refers to a dimension of sexuality that reflects aspects of identity relative to the direction of affective-sexual attraction that people may have for others with a different or similar gender/sex to their own. According to the direction of affective-sexual attraction (sexual orientation), people have different sexual identities and can identify themselves in categories such as those of straight (or heterosexual), when they are attracted only to genders/sexes other than their own; gay men or lesbian women (or homosexual), when they are only attracted to the gender/sex similar to their own; bisexual, when they are attracted to both genders/sexes different and similar to their own; asexual, when they are not attracted to people of any gender/sex.

Conceptions of orientation and identity have increasingly encompassed different aspects/dimensions of sexuality related to sexual orientation in their definitions and have further incorporated even more existing categories of sexual orientations/identities (e.g., Diamond, 2003; Kinsey et al., 1948; Klein et al., 1985; Shively & DeCecco, 1977; van Anders, 2015). Furthermore, there are many theories that propose to conceptualize sexual orientation and that focus on explaining its nature and bases. Some theories focus on the nature of sexual orientation, on how it manifests itself among people, such as the models proposed by Kinsey et al. (1948) and Klein et al. (1985), which propose measures of sexual orientation that allow individuals to be classified into different categories (Kinsey et al., 1948; Klein et al., 1985). Other theories focus on explaining the basis of sexual orientation and on factors that are associated with its development among individuals with different sexual orientations/identities. In this scope are psychoanalytic theories, learning/behavioral theories and biological theories (Drescher, 2015; LeVay, 2011, 2016; Rosário & Schrimshaw, 2014).

Conceptions about the nature of sexual orientation such as that proposed by Kinsey et al. (1948) show that it is expressed within a spectrum of attractions that can vary from an

exclusively heterosexual pole to an exclusively homosexual pole. Such expressions are evaluated based on sexual behavior (sexual practice) and sexual fantasy (sexual orientation), and there can be various levels of bisexual orientations between these two poles (Kinsey et al., 1948). Conceptions such as that by Klein et al. (1985) propose that in addition to sexual orientation being expressed via a spectrum, it can also refer to other dimensions, such as sexual attraction, sexual behavior, sexual fantasy, emotional preference, social preference, lifestyle (heterosexual/homosexual) and self-identification. This model also considers the relationship between sexual orientation and life history, evaluating those dimensions of sexuality in the past, in the present and in terms of what would be ideal for individuals Klein et al. (1985).

Conceptions about the basis of sexual orientation based on some psychoanalytic theories propose that homosexual orientation would be consequence of an interruption in the normal development process, resulting from a failure to exit the phallic phase or the Oedipal phase (Drescher, 2015; LeVay, 2011, 2016; Rosário & Schrimshaw, 2014). According to some learning or behavioral theories, the development of sexual orientation can be explained by interpersonal relationships and learning (LeVay, 2011, 2016; Rosário & Schrimshaw, 2014). So, sexual orientation would result from sexual experiences with people of different or similar genders/sexes throughout development and such processes would be explained, for example, by propositions such as the theory exotic becomes erotic (Bem, 1996) or by other theorists who have considered the possibility of conditioning (learning) homosexual orientation (Hoffmann, 2012). Biological theories propose that biological factors underlie sexual orientation, which can include effects such as those of genetic and hormonal factors and maternal immune processes early in prenatal development (LeVay, 2011, 2016; Rosário & Schrimshaw, 2014). Although there is no consensus that biological factors are the main determinants of sexual orientation, multiple studies provide evidence of their effects on groups of people with different sexual orientations (Bogaert & Skorska, 2020; Fisher et al., 2018; VanderLaan et al., 2023).

Explanations about the basis of sexual orientation are often related to explanations about the nature of sexual orientation. This is because these theories aim to elucidate how individuals develop different sexual orientations, i.e. sexual orientations that are different in nature (character). However, many of these theories focus on the basis of homosexual orientation compared to heterosexual orientation among men and are limited to explain sexual diversity, such as women's sexual orientation, bisexuality, asexuality, and other expressions of human sexuality (Bogaert & Skorska, 2020; LeVay, 2011, 2016; VanderLaan et al., 2023). This leads to questions about the validity of these theories and what is the empirical evidence that supports them, based on studies about factors proposed for each of these paradigms.

Theories about sexual orientation conceptions have important implications for institutions and public debate. An example is the use of theories such as psychoanalytic ones, in the mid-20th century, justifying the pathologization of homosexuality, given that this sexual orientation was classified as a mental disorder in the first and second editions of the Diagnostic and Statistical Manual of Mental Disorders (DSM) (Drescher, 2015). This was influential in establishing what would be classified as pathological - homosexuality - or healthy - heterosexuality. At the same time, modern theories that conceptualize homosexual orientations as a normal variation of human sexuality were used by social movements, such as the Stonewall Uprising (Duberman, 1994), and in the academic-scientific debate as decisive factors for removing homosexual orientation from the DSM III and its subsequent editions (Drescher, 2015). Such use of these modern theories by social movements and in the convention of depathologizing homosexuality is another example of the influence of theories about sexual orientation at an institutional level and in the public debate among the general public.

Biological theories are some of the modern theories about the basis of sexual orientation that consider homosexual orientation as a normal variation of human sexuality and are some of the theories that have developed the most in recent years. Accordingly, those theories that

consider the effects of different factors and different developmental paths are the most widely accepted and receive the most support from empirical studies (Bogaert & Skorska, 2020; Fisher et al., 2018; LeVay, 2011, 2016; VanderLaan et al., 2023). Biological explanations for the basis of sexual orientation have also been commonly used by individuals and social movements to advocate for the rights of sexual minorities. This advocacy has taken place through manifestations by these social movements and public personalities in favor of the rights of sexual minorities by promoting the “born this way” narrative in contexts such as the U.S. (Areseneau et al., 2013; Diamond & Rosky, 2016; Grzanka et al., 2016; Osmundson, 2011). An example of this is Lady Gaga's song “Born this way” (Gaga, 2011), which is widely disseminated in popular culture. An excerpt from this song that could translate the “born this way” conception of sexual orientation is the following:

No matter gay, straight, or bi
 Lesbian, transgender life
 I'm on the right track, baby
 I was born to survive
 No matter black, white, or beige
 Chola or Orient made
 I'm on the right track, baby
 I was born to be brave
 I'm beautiful in my way
 'Cause God makes no mistakes
 I'm on the right track, baby
 I was born this way.

Nevertheless, using the “born this way” narrative by itself (and its underlying theories) to promote rights and reduce negative attitudes towards sexual minorities has also been

questioned in scientific research and by leading scholars in this field (e.g., Diamond & Rosky, 2016; Fry et al., 2020; Hegarty, 2010; Mitchell & Dezarn, 2014; Osmundson, 2011; Walters, 2014). Criticisms of endorsing the “born this way” narrative include concerns about biased interpretations based on psychological essentialism that theories about the biological basis of sexual orientation may imply. Psychological essentialism refers to the cognitive bias that involves the idea that social categories are natural, inherent, immutable and characterized by underlying essences (Agadullina & Chumakova, 2017; Agadullina et al., 2018; Bastian & Haslam, 2006; Demoulin et al., 2006). From this perspective, it could be considered that members of specific categories (groups) share underlying attributes (essences) that determine their observable characteristics and identity (Atran, 1987; Dar-Nimrod & Heine, 2011; Gelman, 2003; Haslam et al., 2006; Medin & Ortony, 1989).

It may be that the “born this way” narrative can lead to interpretations that people with different sexual orientations/identities (e.g., heterosexual versus gay) have their sexuality defined at the beginning of life, this is an immutable characteristic and they (those who are part of different categories/groups) are fundamentally (e.g., biologically) different from each other, but similar within the same categories/groups. Therefore, in addition to notions of immutability and uncontrollability of sexual orientation, defended by those seeking to promote rights for sexual minorities (Areseneau et al., 2013; Diamond & Rosky, 2016; Grzanka et al., 2016; Osmundson, 2011), the use of this narrative can also lead to other notions with negative impacts for sexual minorities and sexual diversity (e.g., fundamentally; Hegarty, 2002).

As essentialist thinking is associated with prejudice in general (Allport, 1954), endorsement of ideas about sexual orientation that may result in essentialist conceptions raises questions about the effects that the aforementioned theories have on attitudes related to sexual prejudice. Such questions become even more complex when one takes into account evidence that essentialist beliefs about sexual orientation are multidimensional and associated with

higher and lower sexual prejudice, depending on the dimension of essentialist thinking assessed (Arseneau et al., 2013; Haslam & Levy, 2006; Haslam et al., 2002; Haslam et al., 2006; Hegarty, 2002; Hegarty & Pratto, 2001). Notably, there are some gaps in the literature regarding explanations of the relationship between essentialist beliefs about sexual orientation (mainly beliefs about its biological basis) and negative attitudes towards sexual minorities, which may be translated as sexual prejudice. In addition, research to date has focused on countries in the Global North, which leads to questions about how essentialist thinking is structured and what are its effects in other cultural contexts. These questions could be particularly valuable for countries with higher rates of indicators of outcomes related to sexual prejudice.

Brazil is a country with high rates of indicators related to sexual prejudice (Conselho Nacional de Justiça, 2022; International Lesbian, Gay, Bisexual, Trans and Intersex Association - ILGA World, 2020). Studies have shown that there are associations between beliefs about the causes or explanations of homosexuality and prejudice against homosexuals (Lacerda et al., 2002; Pereira et al., 2011; Pereira et al., 2013; Tenório de Souza et al., 2022), support for discriminatory policies targeting homosexuals (Pereira et al., 2013) and gay conversion therapies (Tenório de Souza et al., 2022) in this country. The model of beliefs about the nature of homosexuality used in these studies is structured based on five factors about ethical-moral, religious, biological, psychological and psychosocial beliefs about the causes or explanations of homosexuality (Lacerda et al., 2002). Findings on the effects of some of these beliefs support the proposition that people's representations and attitudes about human nature (e.g., homosexual orientation) are influenced by scientific theories and lay beliefs people hold (Camino, 1998; Caminho & Pereira, 2000). In this sense, findings made about beliefs about the nature of homosexuality in the Brazilian context (Lacerda et al., 2002; Pereira et al., 2011; Pereira et al., 2013; Tenório de Souza et al., 2022) suggest that essentialist beliefs may also have different implications for sexual prejudice in this country. However, studies investigating the effects of

psychological essentialism based on other models, such as the multidimensional model of beliefs about sexual orientation, using the Sexual Orientation Beliefs Scale (SOBS), developed by Arseneau et al. (2013), are still scarce in the Brazilian context.

Working with multidimensional models using the SOBS factors Arseneau et al. (2013) may have further benefits for researching the implications of essentialist thinking for attitudes such as sexual prejudice. This is because this model can be considered more comprehensive as it deals with beliefs about the basis and nature of sexual orientation in general (and not just homosexuality), with items proposed to assess explicitly essentialist (or anti-essentialist) ideas about sexual orientation, rather than attitudes towards sexual minorities (Arseneau et al., 2013). Furthermore, in their validation study, authors found validity evidence for a model consisting of naturalness, discreteness, homogeneity and informativeness beliefs about sexual orientation in samples of sexually diverse individuals, including LGBT people (SOBS Form 2; Arseneau et al., 2013). This opens up avenues for further research on the implications of these beliefs (naturalness, discreteness, homogeneity and informativeness) both among cis-heterosexual individuals (who are already usually included in studies) and among sexual minorities.

Regarding the implications of the naturalness belief (Arseneau et al., 2013), which expresses the ideas of immutability and uncontrollability inherent in the “born this way” narrative, it is worth noting that this belief had an interesting characteristic in the initial validation study of its model. While the discreteness, homogeneity, and informativeness beliefs correlated consistently with each other in the factor analyses carried out, the naturalness belief correlated negatively (with a magnitude considered weak) only with the homogeneity belief (Arseneau et al., 2013). Furthermore, the naturalness belief did not correlate significantly with any of the other three factors (essentialist beliefs) in the confirmatory factor analysis (Arseneau et al., 2013). This suggests that the relationship between this belief and the other ones may depend on other factors and should be investigated more thoroughly.

Additionally, the implications of the belief in naturalness on sexual prejudice may also depend on the cultural context and its symbolic/political application. For example, research in the U.S. has shown that the dissemination of the “born this way” narrative even through artistic compositions (music) reinforces genetic explanations of homosexuality that relate to evaluations of the rights of homosexual people (Jang & Lee, 2014). However, research comparing the beliefs and attitudes of American and British participants found more complex results in this regard (Hegarty, 2002). In this case, it was observed that beliefs about the immutability of sexual orientation were associated with greater tolerance towards gay men and lesbian women only among American participants, but not among British participants. Furthermore, among both groups, this immutability-tolerance relationship was significant only among individuals who consistently considered that the immutability beliefs would be manifested by more tolerant people (Hegarty, 2002). So, when these findings are considered in relation to other contexts, such as Brazil, it raises the question of whether the naturalness belief is also generally associated with lower sexual prejudice. Or whether this relationship may also depend on other factors. Such factors may include the symbolic/political use of this belief to justify conceptions such as that sexual orientation (particularly non-heterosexual ones) is an option (meaning choice) or an orientation itself (resulting from complex processes that do not depend on deliberate choices); which is still an important issue for some people.

There are other questions that can also be taken into account for a deeper understanding of the implications that psychological essentialism may have for sexual prejudice. Some of these questions that require further investigation have to do with 1) the possibility of sexual prejudice being manifested by people of different sexual orientations/identities and 2) the possibility of sexual prejudice being manifested through different dimensions.

Addressing the first question mentioned above, it is known that sexual prejudice has been classically conceptualized as attitudes of heterosexual people against people with

homosexual behavior or who identify as gay, lesbian or bisexual, or against communities formed by these people (Herek, 2000, 2004). However, the way in which sexual prejudice has been operationalized and studied may lead to interrogation of whether non-heterosexual people could also express these negative attitudes in interpersonal relationships. Then, the possibility that arises is that non-heterosexual people may also manifest attitudes of sexual prejudice in their relationships, at an interpersonal level, and such attitudes should be conceptualized differently from those attitudes they manifest towards themselves, at an intrapersonal level, and characterize internalized homophobia (Meyer, 1995; Weinberg, 1972). Thus, among non-heterosexual people, it may be that the internalization of sexual stigma against sexual minorities (Herek, 2004) can be manifested against oneself, through internalized homophobia and against other people who are part of sexual minorities groups, equivalent to sexual prejudice more commonly studied among heterosexual people.

Interestingly, a number of studies that found evidence of validity for models of attitudes related to sexual prejudice also included non-heterosexual and non-cisgender people in their samples (e.g., Ching & Wu, 2023; Costa et al., 2015; Costa et al., 2016; García-Berbén et al., 2022; Guimarães et al., 2023; Ramos & Cerqueira-Santos, 2021). To some extent, these findings support the proposition that there are attitudes of sexual prejudice that can be manifested by both cisgender and heterosexual individuals, as well as by people from sexual minority groups. However, conceptualizations and investigations that offer more robust empirical evidence for such assumptions are still needed. Even so, scientific research that explores this possibility of operationalizing sexual prejudice can provide important insights for understanding the implications of psychological essentialism for these attitudes. This is because there is already evidence that some essentialist beliefs are common to both heterosexual-cisgender and LGBT people (Arseneau et al, 2013). So, it remains to be answered the implications of these beliefs on attitudes of sexual prejudice that are also common among these sexually diverse people.

Addressing the second question, it is known the modern forms of sexual prejudice have been more common than explicit, old-fashioned manifestations of these attitudes (e.g., Cowan et al., 2005; Morrison & Morrison, 2003; Steffens, 2005). Traditional (old-fashioned) prejudice involves an emphasis on biological justifications for hostility (Morrison et al., 2005). Further, some models that have recently been proposed to assess sexual prejudice are multidimensional (e.g., Del Castillo et al., 2003; Frias-Navarro & Monterde-i-Bort, 2012; Gato et al., 2012; Raja & Stokes, 1998; Ramos & Cerqueira-Santos, 2021). Some of the dimensions of prejudice assessed in these models are, for example, the subtle prejudice and explicit prejudice (Del Castillo et al., 2003); individual opposition and normative opposition to same-sex parenting (Frias-Navarro & Monterde-i-Bort, 2012); and proximal attitudes and distal attitudes towards homosexuality (Ramos & Cerqueira-Santos, 2021). Therefore, it may be enlightening to investigate how different dimensions of essentialist thinking (especially the naturalness belief) relate to some of these different sexual prejudice attitudes.

The present research proposal

As it is known, scientific theories and common-sense explanations can influence conceptions about sexual orientation at an institutional level (e.g., removal of homosexuality from DSM III; Drescher, 2015) and among people in general (e.g., attitudes towards homosexuality; Lacerda et al., 2002). Moreover, conceptions that people have about their sexual orientation can underlie their negative attitudes towards sexual minorities (e.g., Camino & Pereira, 2000; Drescher, 2015; Herek, 2007; Lacerda et al., 2002; LeVay, 1996; Marmor, 1998; Pereira et al., 2011; Pereira et al., 2013; Tenório de Souza et al., 2022). However, the effect of conceptions that reflect essentialist thinking on different attitudes related to sexual prejudice is still not completely clear. This applies mainly to essentialist beliefs such as the naturalness belief, which is based on the idea that sexual orientation has a biological basis and reflects the “born this way” narrative. Since the findings from empirical research are not conclusive and

there are both arguments in favor of the idea that this type of conception may have positive implications for sexual minorities (e.g. LeVay, 1996; Whitley, 1990), and concerns about promoting this type of conception and narrative (e.g. Hegarty, 2002; Stein, 2001).

In view of this scenario, the present doctoral work was developed based on the following research question: How does the relationship between psychological essentialism and sexual prejudice occur when considering the effects of different essentialist beliefs about sexual orientation, especially the naturalness belief, on different attitudes related to sexual prejudice? The following specific questions also formed the basis of this work:

1. What evidence about the main factors associated with the development of sexual orientation is available in recent scientific literature on the subject?
2. What are the main essentialist beliefs about sexual orientation that people in the general population (with different sexual orientations/identities) hold in the Brazilian context?
3. What implications dimensions of psychological essentialism (beliefs) about sexual orientation have on attitudes related to sexual prejudice?

In order to answer the aforementioned research questions, this work aimed to investigate evidence about scientific (theoretical explanations) and common-sense (lay beliefs) conceptions of sexual orientation related to essentialist thinking, and the relationship between the different dimensions of psychological essentialism and sexual prejudice. To this end, theoretical models on factors associated with the development of sexual orientation and essentialist beliefs about sexual orientation were considered, as well as the effects of different essentialist beliefs about sexual orientation, especially the belief in naturalness, on different attitudes reflecting sexual prejudice. As such, this work had the following specific objectives:

1. Investigate evidence about the main factors associated with the development of sexual orientation found in studies published in recent scientific literature.

2. Investigate beliefs about sexual orientation that reflect dimensions of psychological essentialism among people with different sexual orientations/identities in the Brazilian context.
3. Investigate implications of different essentialist beliefs about sexual orientation on different sexual prejudice attitudes, based on models that take into account the independent effects of these different dimensions of psychological essentialism and their effects, especially of the naturalness belief, when they are endorsed simultaneously.

In order to answer the research questions and achieve the objectives of this work, a multimethod research was carried out through five studies: a systematic literature review (scoping review); two psychometric studies to adapt and validate instruments to measure psychological variables; an empirical study with a variable-centered approach to test a structural model; and an empirical study with a person-centered approach to investigate latent profiles and a variable-centered approach to test the structural model proposed in the previous study of this work. Studies that made up this thesis and the order in which they were presented were:

Study 1 - Scoping review of recent scientific literature on studies and evidence about factors associated with the development of sexual orientation.

Study 2 - Psychometric study that adapted and produced validity evidence for a scale of essentialist beliefs about sexual orientation in the Brazilian context.

Study 3 - Empirical study that investigated a multidimensional model of psychological essentialism and how their dimensions can associate with attitudes towards sexual diversity.

Study 4 - Psychometric study that adapted and produced validity evidence for a model of sexual prejudice and a scale to assess it in the Brazilian context.

Study 5 - Empirical study that investigated the co-occurrence of essentialist beliefs about sexual orientation and their relationship with psychosocial variables and sexual prejudice attitudes; as well as tested the replicability of the model proposed in Study 3, on the relationship between essentialist beliefs and attitudes towards sexual diversity, in groups with different latent profiles.

Study 1 was carried out in order to investigate evidence about scientific theoretical conceptions about the basis of sexual orientation. Study 2 sought to adapt to the Brazilian context and investigate validity evidence for a psychometric scale of essentialist beliefs (common-sense conceptions) that was used in subsequent studies of this work and may be used in other future studies. Study 3 was carried out in order to investigate empirical evidence about the relationship between essentialist beliefs about sexual orientation and attitudes related to sexual prejudice from a new theoretical perspective that advances the understanding of the structural relationship between these variables; as well as in order to contribute to deepening knowledge about the possible effects of the naturalness belief about sexual orientation. Study 4 sought to adapt to the Brazilian context and investigate validity evidence for a scale to assess sexual prejudice based on a model that had not yet been tested in the Brazilian context; it also sought to offer a model of sexual prejudice attitudes to be used in the next study in this work. Finally, Study 5 was carried out in order to investigate additional empirical evidence for the relationships between essentialist beliefs about sexual orientation and attitudes related to sexual prejudice, as found in Study 3. As for Study 5, the data analysis involved a person-centered analytical approach in addition to the variable-centered approach used in the other studies.

Study 3 and Study 5 also investigated whether specific factors had potential to moderate the structural relationships investigated. Study 3 investigated whether the relationships between essentialist beliefs about sexual orientation and their implications for attitudes towards sexual diversity varied according to the participants' sexual orientation/identity (cis-heterosexual and LGBT+ identity). Given that there may be characteristics that are more informative than or additional to sexual orientation/identity in explaining the implications of dimensions of psychological essentialism for sexual prejudice, Study 5 sought to advance on this issue. This last study also employed a person-centered analytical approach (latent profile analysis) which made it possible to establish groups with similar patterns regarding their endorsement of

different dimensions of psychological essentialism simultaneously. Therefore, in this case, categorization of participants did not depend on individual variables defined a priori, which in themselves offer greater risks of being understood as essentialized characteristics (such as cis-heterosexual and LGBT+ identity). The categories of individuals with different latent profiles were defined in a more contingent way, based on the probability estimates found in the analyses and characterized according to the participants' background variables that showed statistically significant effects in differentiating the groups.

Each study that makes up this work is reported in full detail in the following chapters. All of them have been written in scientific article format and studies 1 to 5 have already been published or submitted for publication in scientific journals of Psychology or related areas. After reporting the studies in chapters 1 to 5, it is presented a section integrating findings from studies that comprise this work. This section revisits the objectives of this work, how they were achieved and outlines its conclusions, based on findings from studies carried out. Throughout the studies that make up this work, sexual prejudice was conceptualized and operationalized as attitudes that can be manifested by both heterosexual people and people from sexual minority groups. Analyses were performed to check whether there was validity evidence for the sexual prejudice models adopted across groups with different sexual orientation/identity (e.g., multigroup factor analyses in Study 3 and Study 4). In the section integrating findings from studies that comprise this work this is an issue that is also revisited.

Content of each chapter is organized in such a way as to reflect the report of each study in the same way as they were submitted to the scientific journals. For this reason, references, appendices and supplementary material for each study are presented at the end of each chapter. For this reason, some tables also appear with the same sequence of numbers, but they differ between those in the main text and in the supplementary materials of the manuscript. In the end of this work, appendices and annexes present materials used in more than one of the studies

reported throughout the chapters. This includes terms of free and informed consent, the approvals of the research by a local ethics committee and the detailed instruments used in each of the data collections with human participants.

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CHAPTER I - STUDY 1

Factors Associated with the Development of Sexual Orientation: A Scoping Review¹

Abstract: The most widely accepted theoretical models to explain the development of sexual orientation nowadays are those that consider effects of various factors and mechanisms that interact in complex ways. The aim of this study was to investigate factors associated with the development of sexual orientation and evidence about the effects of these factors in recent scientific literature. A theoretical model that takes into account effects of different factors, and their interactions, on the development of sexual orientation was used as reference. A scoping review was carried out, based on PRISMA-ScR, with searches made in SCOPUS, PubMed, PsycINFO and SciELO. A total of 74 scientific articles reporting results of empirical studies were analyzed and submitted to a thematic categorical content analysis. Studies on genetic factors, hormonal factors, immunological mechanisms, neuropsychophysiological differences, social environment factors and multifactorial studies were identified. These studies had different designs, which allowed them to produce evidence at different levels. However, not all found significant effects for influences of the factors investigated. The findings of this review showed that factors theoretically related to the development of sexual orientation receive empirical support from only some studies. This reflects the complexity of the factors and interactions behind sexual orientation.

Keywords: sexual orientation, biological factors, social environment, development.

Introduction

Over the last few decades, struggles by social groups and advances in science have contributed to the depathologization of homosexuality among medical-scientific entities. This movement began in the U.S., but has spread beyond that country. Progress in this area includes

¹This study has been submitted and is under review for possible publication in the journal *Revista de Psicologia da IMED*. The paper was written in collaboration and co-authored by Audálio Fernandes dos Reis Júnior and Marcos Arthur Rocha de Avelar Macedo, undergraduate Psychology students at Federal University of Sergipe.

the removal of homosexuality from the classification of mental disorders in the Diagnostic and Statistical Manual of Mental Disorders III (DSM III) and in the International Classification of Diseases-10 (ICD-10). The results of these transformations have had important repercussions in combating social stigma about homosexuality and promoting the rights and well-being of non-heterosexual people (Drescher, 2015; Herek, 2007). However, the changes were not automatic and some professionals and legislators continue to oppose the recognition of homosexuality as a normal variation of human sexuality (Drescher, 2015; Herek, 2007).

The process of d depathologization of homosexuality, through its removal from manuals classifying mental disorders (e.g., DSM III) and diseases (e.g., ICD-10), has been strongly influenced by theories that have explained the basis of this sexual orientation over time (Drescher, 2015). These theories have treated homosexuality and conceptualized this sexual orientation mainly as: pathology; immaturity; and normal variation of sexuality. Theories relating homosexuality to pathology and immaturity were the basis for the inclusion of this sexual orientation in the first two editions of the DSM. On the other hand, theories proposing that homosexuality reflects a normal variation in sexuality were the basis for removing this category of sexual orientation from DSM III (Drescher, 2015). In recent years, a number of biological theories and explanatory models have been developed about the basis of sexual orientation and, in general, propose to deal with homosexuality as a normal variation of sexuality. There are arguments supporting the idea that these biological theories and models can promote benefits for sexual minorities (LeVay, 1996; Whitley, 1990). And research in this area has continually investigated the main factors that can influence the development of sexual orientation based on these theories.

Studies on the biological factors associated with the development of sexual orientation have provided evidence for models proposing that genetic factors (which are also considered biological factors) are among those that explain the basis of sexual orientation in men (Fisher

et al., 2018; Sanders et al., 2021). Although it is recognized that explanations of the specific genes that influence this aspect of sexuality are still limited. A genome-wide association study, based on the genetic material of more than 450,000 individuals, found that there are many loci that contribute to individuals' sexual behavior, but it was also found that their effects/associations are small in magnitude (Ganna et al., 2019). Thus, the literature supports genetic explanations for different sexual orientations, but studies also point out the imprecision of knowledge about the effects of these factors (Ganna et al., 2019; Fisher et al., 2018; Sanders et al., 2021).

Research has shown that the hormones involved in sexual development are also among the factors that influence the development of sexual orientation, in terms of same-sex or opposite-sex attraction (Fisher et al., 2018). For example, there is evidence that the ratio of the length of the second and fourth fingers of the hands (2D:2D) is associated with differences in sexual orientation in women, with heterosexual women having a higher ratio (fewer differences) than lesbian women (Grimbos et al., 2010). In addition, literature shows that there is an association between laterality and sexual orientation, since homosexual men and women are less likely of being right-handed (Lalumière et al., 2000). As 2D:2D ratio is a physical marker and laterality is a behavioral marker of neurodevelopment in early life, it is assumed that sexual orientation has its basis in early neurodevelopment and can be influenced by the effect of hormones that act in the differentiation of 2D:2D ratio and laterality. Studies on effect of exposure to different levels of sex hormones (or markers of their effects) provide evidence to support hormonal explanations on sexual orientation, with findings more consistent among women (Daae et al., 2020; Harris, et al., 2020; Tasos, 2022).

Another explanation that has been proposed for the basis of sexual orientation is the one that considers the effect of maternal immunological processes and that homosexuality in men is predicted, to some extent, by birth order (Blanchard, 2001). Studies show that men who have

same-sex attraction tend to have a greater number of older biological maternal brothers; this phenomenon is known in the literature as the Fraternal Birth Order Effect (FBOE; Blanchard, 2001, 2004, 2018a, 2018b). The FBOE is explained by the presence of a possible maternal immune response; it is hypothesized that consecutive pregnancies of male fetuses lead mothers to produce antibodies to proteins that affect neurological development related to male sexual orientation (Blanchard & Bogaert, 1996; Blanchard, 2001, 2004; Bogaert & Skorska, 2011; Bogaert et al., 2018).

As is shown in the literature, there is evidence for theories and hypotheses about the possible effects of different factors that potentially influence the development of sexual orientation. Therefore, theoretical models explaining sexual orientation are considered more coherent when they consider that it has multifactorial bases, and not just genetic, hormonal, immunological, or other bases. The book “Gay, straight, and the reason why: The science of sexual orientation” compiles evidence about the various biological factors associated with the development of sexual orientation, in its two editions (LeVay, 2011,2016). Its author, Simon LeVay, analyzes and discusses the findings of studies carried out over several years, points out their potential and limitations, and argues that there is evidence showing that the development of sexual orientation is influenced by biological factors that act early in life, from gestation onwards. LeVay bases himself on an explanatory model of the development of sexual orientation that integrates different elements of a prenatal hormonal theory. According to this model (LeVay, 2011, 2016), sexual orientation results from sexual differentiation of the brain that makes individuals have sexual attraction to the opposite sex, the same sex, or both sexes. Brain differentiation mediates the effects of prenatal sex hormones (e.g. testosterone), which in turn can be influenced by genetic factors and epigenetic processes (random variability and environmental influences). Genes and epigenetic processes can have direct effects on brain

differentiation - by modifying the intensity or type of brain responses to these hormones; or indirect effects mediated by hormones - by altering their production or action.

At least two points should be highlighted in LeVay's model (2011, 2016). The first is that the social environment is considered an element of epigenetic processes, although its effects on sexual orientation are necessarily mediated by neuroendocrine processes. Thus, the possibility of socio-environmental factors influencing sexual orientation to some extent is not disregarded. However, the imprecision about the effects of socio-environmental factors in the model is to some extent reflected in the literature on the effects of these factors, which is more controversial. Since there are studies that suggest the existence of effects of these factors (e.g., Harrison et al., 2008; Langstrom, Rahman, Carlstrom, & Lichtenstein 2010) and others that have not found consistent results in this direction (e.g., Brakefield et al., 2014; Xu et al., 2020). The second point is because the model was based mainly on experimental studies carried out with animals, in which manipulations were carried out to investigate the hypothesized relationships. Although LeVay (2011, 2016) discusses the results of many studies with human beings that support the relationships predicted in his model, more evidence is still needed on the validity of the model among people. Therefore, it remains the question of what is the evidence from recent studies to support this model and what progress has been made in terms of explanations about the effects of the different factors that are associated with the development of sexual orientation.

A recent review of the scientific literature (Bogaert & Skorska, 2020) found some evidence about the effects of factors that were included in LeVay's model (2011, 2016). However, this study consisted of a brief literature review, which only included research on biological factors and does not make clear the systematization used for selecting studies. Given that it is important to explore the recent state of the art on this topic and broaden knowledge in this area, as this can contribute to overcoming mistaken assumptions that underpin negative

attitudes towards homosexuality and sexual diversity (Drescher, 2015; Herek, 2007; LeVay, 1996; Marmor, 1998). The current study aimed to investigate factors associated with the etiology² and development of sexual orientation, as well as evidence about the effects of these factors, in recent scientific literature. It sought to investigate all the possible factors predicted in LeVay's (2011, 2016) model, including factors from the social environment, using a systematized method that could reduce biases in the search procedures and analyses of the literature reviewed.

Method

Study design

A scoping review of recent studies on the etiology and development of sexual orientation was carried out, based on the guidelines of the Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR; Tricco et al., 2018). This type of review was chosen because it makes it possible to map the existing literature on a given subject in relation to its nature, extent and findings, as well as making it possible to synthesize research evidence following systematized protocols (Arksey & O'Malley, 2005). All the stages of the review were carried out independently by at least three researchers, unless it is mentioned that it took place differently. The researchers met at the end of each stage to assess correspondence between the evaluations and divergent cases were analyzed together in order to reach a consensus.

Databases and terms used for searches

Searches were carried out in the electronic databases SCOPUS, PubMed (MEDLINE), PsycINFO and SciELO. These databases were chosen so that publications could be found in

²In this study, using the term “etiology” does not imply disease or any pathologizing conception, but rather the basis of sexual orientation, in line with the literature on the subject (e.g., Marmor, 1998; Rosario & Schrimshaw, 2014). It will be used in the same way as “causes” and in parallel to the expression “development of sexual orientation”.

journals in interdisciplinary areas (SCOPUS and SciELO), as well as in the Health Sciences (PubMed/MEDLINE) and Psychology (PsycINFO) areas.

Search strings were constructed with the assistance of a librarian at the university to which the researchers are affiliated. As the use of the terms indexed in each database resulted in very different strings, it was chosen to use a string with a standard set of terms that included keywords chosen by the authors, based on the literature reviewed for the project. Searches differed only in the procedures for filling in the search fields in each database, but they were done in equivalent ways across databases in order to maintain the systematization of searches. The set of keywords employed was: (“Sexual Orientation” OR “Sexual Attraction” OR “Sexual Arousal”) AND (Aetiology OR Etiology OR Neurodevelopment OR Brain OR Hormones OR Genes OR Genetics OR Genetic OR “Birth Order” OR “Older- Brother Effect” OR “Social Influence” OR “Social Influences” OR “Social Network” OR “Social Networks” OR “Social Networking” OR “Environmental influence” OR “Environmental influences” OR “Environmental Effect” OR “Environmental Effects” OR “Sexual Experience” OR “Sexual Experiences” OR “Life History”).

The first subset of terms in the string was employed to search for texts on sexual orientation, and the second to search for texts on factors associated with the etiology and development of sexual orientation. In SCOPUS, searches were carried out on titles, abstracts, and keywords, limited to articles, reviews and short searches. In PubMed, searches were carried out specifically in MEDLINE, in the options of titles, abstracts and other terms. In PsycINFO, searches were carried out on titles, abstracts, and keywords, limited to peer-reviewed journals. In SciELO, searches were carried out on abstracts and, in addition to English, terms were also entered translated into Portuguese and Spanish. All searches were limited to “from 2017 onwards”, since the great majority of relevant studies carried out up to 2016 were reviewed in LeVay's work (2011, 2016). So, the searches covered the period from 2017 to March 20, 2023.

Inclusion and exclusion criteria

The inclusion criteria for this review were as follows: 1) articles published in scientific journals that work with blind peer review; and 2) articles that were about empirical studies whose objectives were to investigate factors associated with the etiology of sexual orientation or that presented evidence confirming or not the effects of these factors. Selection based on the first criterion was automated by applying the corresponding filters to the databases. The files with the sets of records from each database were exported to the EndNote software and the duplicate records were deleted in two stages: first using the automated EndNote option; and then manually by one of the researchers who removed the remaining duplicates. Selection based on the second inclusion criterion was based on the researchers' assessment of the records. The exclusion criteria were then applied to define the sample of studies to be reviewed. Exclusion criteria were: 1) studies related to other aspects of sexual orientation, such as the constitution of sexual identity; 2) studies that did not evaluate primary empirical data (i.e., were only other systematic reviews or meta-analyses); and 3) studies conducted with other species of animals and not with humans.

Data extraction and analysis

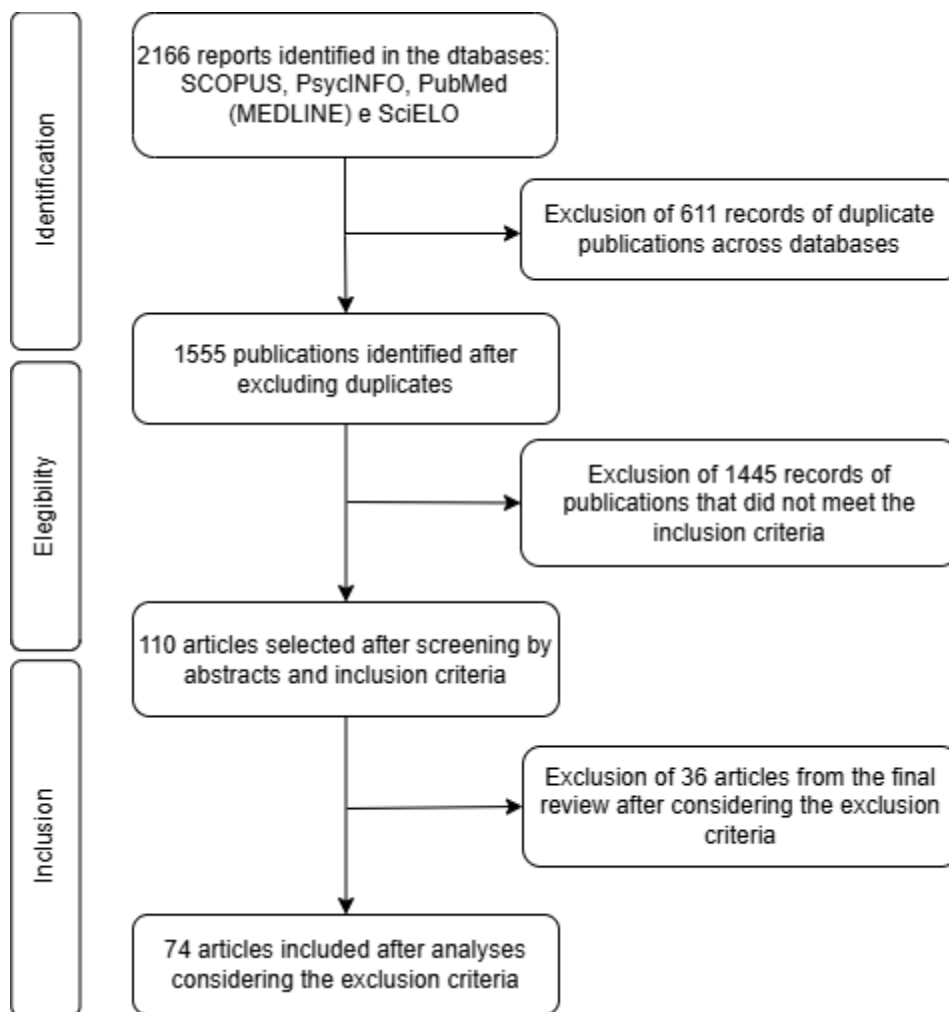
In order to extract data from the selected articles, the researchers used a standard structured tool (Microsoft Excel spreadsheet). The following data was extracted: authors, year of publication, place of study, sample size and characteristics (in terms of sexual orientation categories included), design and main factor (or factors) associated with the etiology of sexual orientation addressed in the study. Data collected were subjected to descriptive and frequency analyses in order to organize bibliometric data and characterize the articles selected. To analyze what was the focus of the studies and identify the factors associated with the etiology of sexual orientation in the studies, the thematic categorical content analysis technique (Bardin, 2016) was applied to organize data according to the similarities of the themes and identify the

categories of which they are part. These analyses were carried out on the basis of a deductive method and categories were previously defined based on the literature (LeVay, 2011, 2016): genetic factors; hormonal factors; maternal immunological mechanisms; neuropsychophysiological differences (neurophysiological, cognitive or personality differences that reflect brain differences); social environment factors; multifactorial studies (studies about two or more of the other factors).

Results

Study selection process

Searches in the databases returned 2166 records. There were 1205 records in SCOPUS, 375 records in PsycINFO, 335 records in PubMed (MEDLINE) and 251 records in SciELO. Initially, 611 records were excluded as a result of duplications between the databases and 1555 were left to be screened by abstract. After this stage, 110 articles were selected according to the inclusion criteria, which advanced to the text retrieval stage. It was not possible to retrieve the full text online for only one of the articles (Ye et al., 2018), even after multiple attempts to search on the internet and contact the authors of the study by email. After a more detailed evaluation and applying the exclusion criteria an additional of 35 articles were eliminated, which consisted of: studies related to other aspects of sexual orientation, such as the constitution of sexual identity, or only theoretical studies or literature review (n=10); studies that did not evaluate primary empirical data (systematic reviews or meta-analyses; n=16), and studies carried out only with other animals and not with human beings (n=10). Thus, the final sample of this review was made up of 74 articles. Figure 1 shows the flowchart of the study selection process.

Figure 1*Flowchart of the studies selection process***Frequency and general characteristics of the studies reviewed**

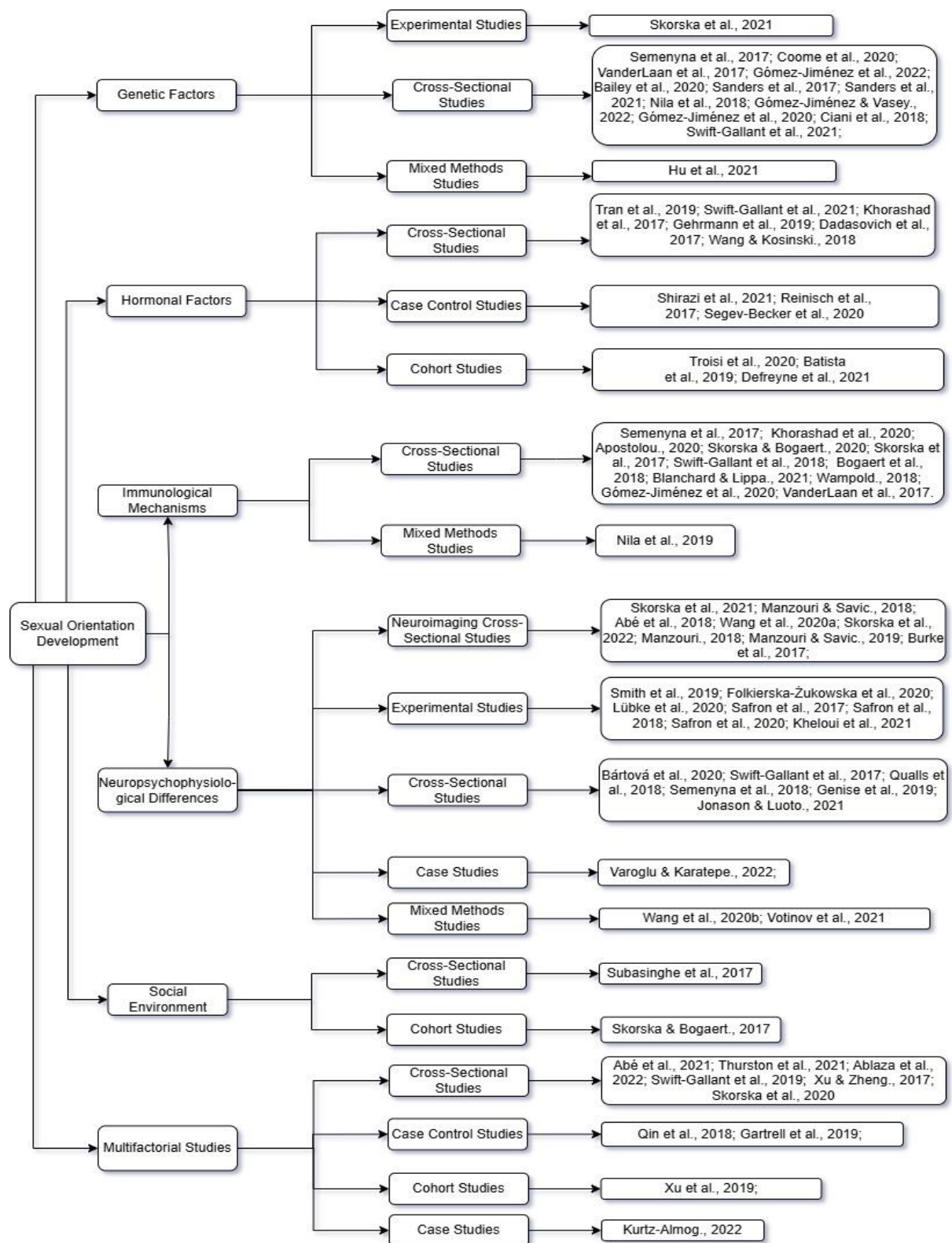
A total of 14 studies on genetic factors, 12 on hormonal factors, 12 on maternal immunological mechanisms, 24 on neuropsychophysiological differences, 2 on social environmental factors, and 10 multifactorial studies were identified. The multifactorial studies were on: hormonal factors and maternal immunological mechanisms (n=2); genetic factors and social environment factors (n=2); hormonal factors and neuropsychophysiological differences (n=1); neuropsychophysiological differences and genetic factors (n=1); genetic factors and maternal immunological mechanisms (n=1); genetic factors, hormonal factors and maternal

immunological mechanisms (n=1); hormonal factors and social environment factors (n=1); neuropsychophysiological differences, hormonal factors and social environment factors (n=1).

Studies on genetic factors had characteristics such as cross-sectional designs (n=12; two of which were genome-wide association studies), experimental methods (n=1) or were considered to be mixed (n=1). Studies on hormonal factors had characteristics such as cross-sectional designs (n=6), being case-control studies (n=3) and cohort studies (n=3). Studies on maternal immunological mechanisms had characteristics such as cross-sectional designs (n=11; one with laboratory immunological tests) or were considered mixed (n=1). Studies on social environment factors had characteristics such as having a cross-sectional design (n=1) or being longitudinal cohort studies (n=1). Studies on neuropsychophysiological differences had characteristics such as being image studies (n=8), having experimental methods (n=7), cross-sectional designs (n=6) or were considered mixed (n=2), as well as being case studies (n=1). Multifactorial studies had characteristics such as cross-sectional designs (n=6), being case-control studies (n=2), cohort studies (n=1), and case studies (n=1). Figure 2 shows in detail the categorization of the studies reviewed by factor and by methodological characteristics identified.

Figure 2

Categorization of the studies reviewed, by factor and methodological characteristics identified



Note. Categorization on the third level of the flowchart includes characteristics of methods and/or designs of studies according to what could be identified in the information available in the articles reviewed.

It was noted that the studies tended to recruit less studied populations and more diverse samples, compared to research discussed in previous literature (e.g., LeVay, 2011, 2016). They included participants from less studied countries, such as Thailand (n= 5), China (n=5), Brazil (n=4), Mexico (n=4), Samoa (n=3), Israel (n=2), Iran (n=2), Indonesia (n=2), Czech Republic (n=2), Greece (n=1), Turkey (n=1), Argentina (n=1), among others. With regard to the diversity of the samples, the studies involved several participants who were heterosexual and lesbian women, bisexual people and transgender people. They also included samples from populations with a third gender category that includes androphilic men and gynephilic women with different levels of gender conformity to the sex assigned at birth, such as: fa'afafines, in Samoa; saoraphet song, toms and dees, in Thailand; and muxe gunaa and muxe nguiiu, in Mexico. (Table S1, in the supplementary materials to this article, shows this detailed information for each study reviewed).

Thematic analysis of studies in each category

Genetic factors

Studies on genetic factors provided evidence both favorable and contrary to theories on explanations for the maintenance of non-heterosexual orientations over generations and their relationship with specific genes. They investigated differences in reproduction or fertility patterns between families of individuals with different sexual orientations; personality characteristics associated with evolutionary explanations for the maintenance of genes possibly associated with same-sex attraction; and direct observation of the genomes of individuals from different groups.

Although individuals with same-sex attraction may have a lower direct reproductive rate, there may be indirect reproductive advantages for these people, which result from their greater investment in caring for their family members and/or higher fertility rates among close relatives. This proposition regarding the kin selection hypothesis has received partial support from studies

(A. Camperio Ciani et al, 2018; Jiménez et al., 2020a; Jiménez & Vasey, 2022; Nila et al, 2018; Semenyna et al., 2017; Swift-Gallant et al., 2022; VanderLaan et al., 2017), however, findings in this direction are not unanimous in the literature (Coomer et al., 2020; Jiménez et al., 2022; Skorska et al., 2021). Gender non-conformity is linked to genetic variability related to sexual orientation among men with same-sex attraction (Bailey et al., 2020). However, although new genetic loci associated with the etiology of sexual orientation have been identified (Hu et al., 2021; Sanders et al., 2017), they are different from those associated with gender non-conformity (Sanders et al., 2021). Therefore, a clear understanding of the relationship between sexual orientation, gender (non)conformity and underlying genetic factors is not yet possible.

Hormonal factors

Studies on hormonal factors analyzed how exposure to prenatal or postnatal hormones influences sexual orientation and, in addition to men, included women, people with sexual development different from those considered more typical, and transgender people (Batista et al., 2019; Dadasovich et al., 2017; Defreyne et al., 2021; Gehrman et al., 2019; Khorashad et al., 2017; Segev-Becker et al., 2020; Shirazi et al., 2021; Wang & Kosinski, 2018). Studies on prenatal hormones investigated issues such as the relationship between gender non-conformity and preferences for sexual positions during intercourse among gay men, with results showing effects of hormone exposure on these preferences (Swift-Gallant et al., 2021). Some evidence was found for predictions of hormonal theories, such as that men who are more exposed to certain types of hormones related to female sexual development in the prenatal period are more likely to have a non-heterosexual orientation in adulthood (Reinisch, Mortensen, & Sanders, 2017; Troisi et al., 2020). Although the estimates in the study by Troisi et al. (2020) were imprecise, which made it impossible to make inferences for the general population based on their results.

The studies reviewed also presented findings that differed from one another. Some of them showed that high exposure to specific types of prenatal hormones is related to the occurrence of bisexual orientation, regardless of the individual's gender (Reinisch et al, 2017). Both low and high exposure to prenatal androgens is associated with childhood gender nonconformity in males, which is an important correlate of same-sex attraction (Swift-Gallant et al., 2021). Hormones can have different effects on sexual orientation depending on gender and the level of exposure at specific periods of development (Tran, Kossmeier, & Voracek, 2019; Troisi et al., 2020). And postnatal hormones can also have an effect on sexual orientation. Studies on the use of testosterone by transgender people during the hormonal transition process, for example, show that sex steroids are involved in the modulation of sexual attraction that is reflected in sexual orientation characteristics (Dadasovich et al., 2017; Defreyne et al., 2021). However, as the effect of postnatal hormones is much less well known, more studies on their effects are needed to have a better understanding of their influence on sexual development throughout life.

Maternal immunological mechanisms

Most studies on maternal immunological processes investigated the effects of FBOE and found significant relationships in many cases, including in samples from populations that had been less studied in research prior to those reviewed in this study. With regard to advances in knowledge about this factor, it is worth highlighting the findings on FBOE among individuals born male who are identified as transgender and androphilic in countries such as Brazil (VanderLaan et al., 2017), Mexico (Jiménez et al., 2020b) and Samoa (Semenyna et al., 2017). Literature shows that FBOE's influence may only be linked to some specific groups of non-heterosexual men, suggesting that many other factors may underlie sexual orientation in other groups (Apostolou, 2020; Skorska & Bogaert, 2020; Swift-Gallant et al., 2018). In Swift-Gallant et al's (2018) study, the effect of this factor was observed only among gay men with a

preference for being receptive in sexual relations. However, in this study, FBOE was not associated with measures of gender nonconformity (Swift-Gallant et al., 2018). So, even though the effect of this factor is observed among people with high levels of gender nonconformity (Semenyna et al., 2017; Jiménez et al., 2020b; VanderLaan et al., 2017), data is inconclusive about its effect on these gender characteristics and same-sex attraction, which may be associated with different processes arising from the FBOE.

Evidence is being added on the effects of factors known in literature as the older sister effect and the only child effect. Studies show that men with a greater number of older sisters are more likely to have same-sex attraction, but this effect is not consistent among transgender women or men with lower levels of gender conformity (Khorashad et al., 2020; Swift-Gallant et al., 2018; Wampold, 2018). And sometimes being an only child is also associated with a higher likelihood of same-sex attraction among men (Blanchard & Lippa, 2021; Bogaert et al., 2018; Skorska et al., 2017; Skorska & Bogaert, 2020). Although all these birth order and family configuration effects (being born after older brothers or sisters, or having no siblings) imply the effect of maternal immunological mechanisms that act on brain development related to sexual differentiation, they have alternative explanations with some specificities between each other (Blanchard & Lippa, 2021; Bogaert *et al.*, 2018; Khorashad *et al.*, 2020; Nila *et al.*, 2019; Skorska *et al.*, 2017; Skorska & Bogaert, 2020; Swift-Gallant *et al.*, 2018; Wampold, 2018).

Neuropsychophysiological differences

Studies on neuropsychophysiological differences showed mixed evidence, both favorable and contrary, for theories on cross-sex shift, which propose that non-heterosexual people have neuropsychophysiological characteristics that are more similar to those of heterosexual people with biological sexes other than their own. Studies that compared characteristics of non-heterosexual people with those of heterosexual people show results that partly support the assumptions that reverse sex shift exists, although this is not consistent across

all non-heterosexual participants (Bártová et al., 2020; Genise et al., 2019; Jonason & Luoto, 2021; Kheloui et al., 2021; Lübke et al., 2020; Qualls et al., 2018; Safron et al., 2018; Semenyna et al., 2018; Swift-Gallant et al., 2017). According to a number of these studies, brain correlates of sexual orientation and gender identity are distinct from each other, as different regions of the brain are associated with aspects of sexual orientation and gender identity. Therefore, the proposition that there are sets of gender traits, with androphilia linked to femininity and gynephilia linked to masculinity, has no robust empirical support when associations between neuropsychophysiological differences and aspects of sexual orientation, biological sex and/or gender are evaluated together.

Many studies on neuropsychophysiological differences investigated differences between brain characteristics, such as volume and thickness of regions of the cerebral cortex related to the development of sexual orientation. They assessed the association between the structure and functioning of different areas of the brain and sexual attraction or arousal (Abé et al., 2018; Burke et al., 2017; Folkierska-Żukowska et al., 2020; Manzouri & Savic, 2018a, 2018b; Safron et al., 2020; Safron et al., 2017; Skorska et al., 2021; Skorska et al., 2022; Varoglu & Karatepe, 2022; Votinov et al., 2021; Wang et al., 2020a, 2020b). And their results partially support theories of reverse sex change, as not all of them found significant differences in the theoretical directions.

Part of the literature on brain differences included samples of transgender people, or those with lower levels of gender conformity, and investigated areas associated specifically with the bases of gender nonconformity/dysphoria and sexual orientation (Semenyna et al., 2018; Manzouri & Savic, 2019; Skorska et al., 2021; Skorska et al., 2022). Their findings showed that people from these samples have more brain differences in areas related to self-perception, compared to cisgender people. And people with same-sex attraction show little or no differentiation in areas identified in previous studies as dysmorphic between men and women.

It was found that, according to brain responses, patterns of sexual attraction in men are more specific than in women (Safron et al., 2020). Also, some brain regions are associated with specific sexual orientations, such as the cerebral midline, which is associated with same-sex attraction in men (Manzouri & Savic, 2018b). However, processes underlying the development of these relationships still need to be better understood (Manzouri & Savic, 2018b). Studies highlight the importance of more research with groups of different sexual orientations and systematized investigations of explanations for these differences, in order to better understand the context that they exist (Semenyna et al., 2018; Skorska et al., 2021; Skorska et al., 2022; Wang et al., 2020a, 2020b; Manzouri & Savic, 2018b; Safron et al., 2018; Smith et al., 2019; Skorska et al., 2022).

Social environment factors

Studies on social environment factors stood out for being less frequent in the literature (only two articles were included in this category) and only one of them found an association between social environment factors and sexual orientation (Subasinghe et al., 2017). Specifically, significant correlations were found between unwanted sexual experiences and variables such as sexual orientation and reports of same-sex relationships. However, the study design does not allow inferring causality in the relationships investigated (Subasinghe et al., 2017), which also occurred in many of the other studies reported. The other study analyzed within this category presented a more robust design, with data from a representative longitudinal cohort of American adolescents, and found no evidence of the effect of the social environment factors investigated on differences in sexual orientation (Skorska & Bogaert, 2017). In this study, it was specifically investigated whether variables related to stress and nutrition at puberty were associated with the participants' sexual orientation, and no significant effects were observed among either males or females. Therefore, according to these findings, there is no consistent evidence on the effects of the social environment factors and life history investigated.

Multifactorial studies

Multifactorial studies investigated different factors from the previous categories simultaneously, which in some cases had significant effects even in the face of multivariate analysis or with mixture models, but with more diffuse results in general. One study, for example, found that different markers for the effects of genetic factors, hormonal factors and maternal immunological processes were associated with sexual orientation among men from the same sample (Swift-Gallant et al., 2019). It is worth noting that in this study a subgroup also emerged, which was the one with the greatest number of men with same-sex attraction, in which none of the markers investigated had significant effects.

It was found that having more older siblings (regardless of gender, but mainly older brothers) is associated with non-heterosexual orientation (Ablaza et al., 2022). And non-heterosexual individuals tend to be more ambidextrous or left-handed than heterosexuals (Skorska et al., 2020; Swift-Gallant et al., 2019; Xu & Zheng, 2017). However, Skorska et al. (2020) found that homosexual men and *sao* prophet songs, in Thailand, tend to be more “extremely right-handed” compared to their heterosexual counterparts. This suggests the effect of dosing at low or very high levels as a neuroendocrine factor related to the development of laterality and sexual orientation. Yet, regarding neurological development, an association was found between cognitive performance on a mental rotation task and sexual orientation in men, but these differences were not as consistent among women (Thurston et al., 2021). Likewise, associations were found between brain differences and polygenic characteristics with sexual orientation (measured through sexual behavior), but with very mixed results (Abé et al., 2021).

Studies analyzed in this category found that a number of social factors can have an impact on sexual development. It was observed that parental absence from birth, socioeconomic vulnerability during pregnancy and at birth, and poorer relationships with parents were associated with non-heterosexuality among women (Xu et al., 2019). A case study showed that

altered exposure to hormones was associated with life history situations, which together impacted behavior and sexual orientation (Kurtz-Almog, 2022). Being a child and growing up in families with lesbian mothers has been shown to be associated with more same-sex sexual experiences, greater likelihood of reporting same-sex attraction and having a minority sexual identity (Gartrell et al., 2019). In this study, the authors speculate on the possible effects of both genetic factors and the social environment to explain the impacts on the sexual orientation of the individuals studied, but do not reach a precise conclusion (Gartrell et al., 2019). Similar considerations can be made for the study by Qin et al. (2018), which found associations between experiences of physical, emotional, and sexual abuse during childhood, genetic variations, and male homosexuality, but again the research design did not allow to conclude on causality relationship between the variables.

Discussion

Overall, a large number of studies were found on the delimited factors and the research designs were analyzed as an indicator of the level of evidence for the effects investigated in this literature review. Studies analyzed showed varying levels of evidence, with designs ranging from cross-sectional studies to longitudinal cohort studies. This applies mainly to those that investigated biological factors. Results show that recent studies do not fully support the predictions of theories about the biological factors that explain the etiology of sexual orientation. Some of them found no significant effects for these factors, or found effects only in specific contexts. The factors studied explain only part of the basis of sexual orientation and their effects tend to occur in some groups of people. These findings are corroborated by other studies, since these issues are highlighted in other reviews of the literature on this subject (e.g., Bogaert & Skorska, 2020; LeVay, 2011, 2016).

However, there have been some advances in recent research and there are findings that broaden discussions made by LeVay (2011, 2016). For example, evidence has been found that

exposure to both lower and higher levels of prenatal hormones (mainly androgens) is associated with same-sex attraction in men. This increases the understanding that the relationship between sexual differentiation related to the development of sexual orientation and exposure to these hormones may not necessarily be linear. The organizational function of prenatal sex hormones in brain development has generally received support from the literature. However, some studies have also been found which suggest that exposure to postnatal hormones has effects on the activation of sexual characteristics such as sexual attraction and, consequently, on sexual orientation.

In addition to evidence on the FBOE, evidence was found to support the hypotheses about the existence of the older sister effect and the only child effect, similarly considered as factors associated with the etiology of sexual orientation, which have already been investigated in other studies (e.g., Blanchard, 2012; Blanchard & Lippa, 2021). These findings show that effects of these epigenetic factors may be more multifaceted than initially proposed, since the immunological hypotheses explaining each of these effects are distinct from one another. Furthermore, as maternal immunological mechanisms can be related to both random genetic variability and environmental factors, these mechanisms can be understood as epigenetic factors regarding the etiology of orientation that are still poorly understood. This is illustrated by results from the study by Xu and Zheng (2017), which was carried out with a sample of the Chinese population and found no support for the FBOE, which suggested the possible effects of the environment on these factors. Because explanations given for these results were that the birth control policy implemented in that country since 1980 has reduced the proportion of older brothers per family. Thus, etiology of sexual orientation in that population is probably influenced by other factors, and not those related to the FBOE, which in this case was influenced by public policies and deliberate decisions in that country.

This also applies, to some extent, to the knowledge about the social factors that influence the development of sexual orientation, since the literature on their effects remains scarce and the results diffuse. Among the studies reviewed, some have shown supportive evidence, while others have shown evidence that refutes the explanations for the effects of these factors. Given that, as some authors highlight (e.g. LeVay, 2011, 2016; Rosario & Schrimshaw, 2014), environmental factors may have more influence on the development of other sexual orientation dimensions, such as sexual identity and behavior, then further research in this direction may provide clearer results.

Literature on the effects of genetic factors and neuropsychophysiological differences on sexual orientation tends to be more controversial. Studies have not shown consistent evidence for genetic and evolutionary hypotheses proposed to explain the maintenance of same-sex attraction over history. However, other studies have found significant associations between characteristics related to sexual orientation and some genes or locus in the human genome. Though results of these associations have not been as consistent. This is in line with studies that were not part of this review, but which also highlight the limitations of knowledge about genes and their direct effects on different sexual orientation dimensions (Ganna et al. 2019; Fisher et al., 2018; Sanders et al., 2021).

The lack of consensus in the findings on neuropsychophysiological differences between individuals and groups of different sexual orientations in general leads to more questions about the effects of biological factors on sexual development. Mainly for prenatal factors, which are believed to have organizational effects on neurological development. This is because many biological theories and hypotheses are based on the idea that brain differences, in structure and functioning, are mediators of the effects of biological factors on the manifestation of sexual orientation (e.g., LeVay, 2011, 2016). Yet, according to the studies reviewed, it is not possible to conclude that there are neuropsychophysiological differences that are clearly associated with

sexual orientation. This also revives the debate about whether or not there are brain differences between males and females, with evidence supporting (e.g., Ruigrok et al., 2014) and refuting (e.g., Joel et al., 2015) this claim.

Findings from this review are largely in line with those of a literature review with meta-analysis by Frigerio et al. (2021), which investigated structural, functional, and metabolic characteristics of the brains in heterosexual people compared to those in homosexual people. This meta-analysis found that most of the neuroanatomical, neurophysiological, and neurometabolic characteristics in homosexual people resemble those of their heterosexual peers with the same sex and not those of their heterosexual peers with the opposite sex assigned at birth. This highlights the importance of building knowledge about the development of sexual orientation that does not necessarily rely on the assumption that these brain (or neuropsychophysiological) differences exist between individuals and groups with different sexual orientations.

Although studies are not conclusive about the effects of biological factors in explaining people's sexual orientation in general, this does not necessarily mean that these factors have completely no effect on this dimension of sexuality. A large body of literature suggests that these factors help to explain the basis of sexual orientation more accurately in some groups, such as men, than in others, such as women. As this is a discussion that LeVay addresses in the last chapter of the second edition of his book (LeVay, 2016), the results of this review show that there is still scant evidence on factors associated with the basis of people's sexual orientation in general. This is true when considering individuals with different sexual orientations and varying levels and directions of sexual attraction. The multifactorial studies reviewed have provided further evidence suggesting that sexual attraction can be influenced by different factors. Since, these factors can interact with each other, even with elements of the social environment and life history, or act in relatively independent ways. This shows how the basis of orientation can have

dynamic elements and relationships, as the effects of only a few factors are known. And these factors, in turn, explain only part of the variability of sexual orientation, and not sexual diversity among people in general.

Final considerations

This study investigated factors associated with the etiology and development of sexual orientation, as well as evidence about their effects, based on the design of the research reported in the selected articles. Since searches were conducted in electronic databases from January 2017 to March 20, 2023, assuming that most of the previous studies were reviewed by LeVay (2011, 2016). This review covered findings from recent scientific literature on various factors associated with the etiology and development of sexual orientation, based on the model proposed by LeVay (2011, 2016). Yet, this review has some limitations that should be considered in order to grasp its findings.

It is worth noting that although the searches in this study were carried out in four important databases from different domains in order to find studies from different areas, articles from journals not indexed in these databases are not included in this review. Regardless, this review included many articles published in the stipulated period of time, which should represent most recent publications. Because the scope of the literature on the etiology of sexual orientation is broad, for this study the option was to investigate specifically the literature on sexual orientation dimension relative to sexual attraction. It is important that future reviews evaluate factors and evidence on other dimensions of sexual orientation, such as sexual identity development and sexual behavior.

Findings from this review show that effects of the different factors proposed by LeVay (2011, 2016) receive empirical support only from some of the recently published studies. However, as the author points out in his book, the knowledge produced to date indicates that these factors do not fully explain the etiology of sexual orientation even in the specific groups

where their effects are observed. Therefore, it is not yet possible to fully explain underlying factors in the development of sexual orientation according to the model used as reference in this review. Though other theoretical models also do not fully explain the etiology and development of this dimension of sexuality, nor do they necessarily aim to do so. Based on the theoretical framework employed in this review and the studies reviewed, it is possible to state that the basis of sexual orientation, in general, are not determined solely by environmental or biological factors, in an exclusive way. It is probably that sexual orientation is influenced by complex interactions between different factors, throughout life, in ways that are not precisely predictable, but which reflect the legitimacy of sexual diversity - and sexual orientations - among people.

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Supplementary Materials

Table S1. Detailed characteristics of the studies reviewed

Author and year	Place	Participants	Methodological characteristics	Factor studied
Semenyna, S.W. <i>et al.</i> , (2017)	Samoa	282 Participants (191 Fa'afafine and 191 gynephilic men)	Cross-sectional	Genetic
Coome, L. A. <i>et al.</i> , (2020)	Thailand	1623 Participants (494 heterosexual men, 204 homosexual men, 12 bisexual men 181 saopraphet song, 283 heterosexual women, 59 homosexual women, 53 bisexual women, 180 toms and 154 dees)	Cross-sectional survey with interviews	Genetic
Hu, S. H. <i>et al.</i> , (2021)	China. Plus meta-analysis with samples of European ancestry	4791 Participants (1478 homosexual men and 3313 heterosexual men, 13 heterosexual men and 13 homosexual men post-mortem. Meta-analysis of Europeans: 188,825 men only; 408,995 men and women)	Mixed study - genome-wide association study + meta-analysis + expression profile of polymorphic genetic genes in neuropsychophysiological tissues + tests using mouse assays	Genetic
Vanderlaan. D. P. <i>et al.</i> , (2017a)	Samoa	470 Participants (113 men, 127 women and 230 fa'afafines)	Cross-sectional retrospective	Genetic
Skorska, M. N. <i>et al.</i> , (2021)	Thailand	208 Participants (208 heterosexual men)	Experimental	Genetic
Gómez Jiménez, F. R. <i>et al.</i> , (2022)	Thailand and Mexico	331 Participants (271 sisters of gynephilic men and 66 sisters of androphilic men)	Cross-sectional	Genetic
Bailey, J. M. <i>et al.</i> , (2020)	U.S.	2059 Participants (1959 homosexual men and 100 heterosexual men)	Cross-sectional retrospective	Genetic
Sanders, A. R. <i>et al.</i> ,	Participants	2038 Participants (1077	Cross-sectional	Genetic

(2017)	with European ancestry	homosexual men and 1231 heterosexual men)		
Sanders, A. R. <i>et al.</i> , (2021)	Participants with European ancestry	826 Participants (791 homosexual men and 33 heterosexual men)	Cross-sectional	Genetic
Nila, S. <i>et al.</i> , (2018)	Indonesia	178 participants (62 heterosexual men, 82 homosexual men and 34 bisexual men)	Cross-sectional	Genetic
Gómez Jiménez, F. R. & Vasey, P. L. (2022)	Mexico	Study 1: 514 Participants (106 muxen, 106 muxes, 172 gynephilic men and 130 androphilic women). Study 2: 161 Participants (65 sisters of heterosexual men, 57 sisters of cisgender homosexual men and 39 sisters of transgender homosexual men)	Cross-sectional survey	Genetic
Gómez Jiménez, F. R. <i>et al.</i> , (2020a)	Mexico	398 Participants (171 heterosexual cisgender men, 112 homosexual cisgender men, 115 androphilic transgender men)	Cross-sectional	Genetic
Ciani, A. C. <i>et al.</i> , (2018)	Italy	1458 Participants (808 heterosexual men, 487 homosexual men and 163 bisexual men)	Cross-sectional	Genetic
Swift-Gallant, A. <i>et al.</i> , (2021)	Canada, U.S., Australia, United Kingdom and New Zealand	496 Participants (350 gay men and 146 straight men)	Cross-sectional retrospective	Genetic
Tran, U. S. <i>et al.</i> , (2021)	Austria	2368 (sample 1) and 1565 (sample 2) men	Cross-sectional	Hormonal

		and women with different sexual orientations		
Wang, Y., & Kosinski, M. (2018)	U.S.	Study 1 to 4: 14776 Participants (3947 homosexual men and 3947 heterosexual men, 3441 lesbian women and 3441 heterosexual women) Study 5: 6075 Participants (6075 homosexual men)	Cross-sectional - with evaluation by deep neural networks and human judges	Hormonal
Swift-Gallant, A. <i>et al.</i> , (2021)	U.S and Canada	125 Participants (125 homosexual men)	Cross-sectional retrospective survey	Hormonal
Shirazi, T. N. <i>et al.</i> , (2021)	U.S.	1767 Participants (97 people with Isolated GnHR Deficiency (IGD) and 1670 control patients)	Case-control	Hormonal
Troisi, R. <i>et al.</i> , (2020)	U.S.	5154 Participants (3306 women and 1848 men)	Longitudinal cohort	Hormonal
Thurston, L. T. <i>et al.</i> , (2021)	Thailand	980 Participants (210 heterosexual men, 144 homosexual men, 113 sao praphet song, 204 heterosexual women, 78 bisexual and lesbian women, 112 toms and 109 dees)	Cross-sectional - with a mental rotation task	Hormonal
Reinisch, J. M. <i>et al.</i> , (2017)	Denmark	68 Participants (34 men and 34 women)	Control-case - with a cohort of individuals exposed to progesterone	Hormonal
Batista, R. L. <i>et al.</i> , (2019)	Brazil	144 Participants (122 women with 46 XY DSD and 22 men with 46 XY DSD)	Retrospective cohort	Hormonal
Khorashad, B. S. <i>et</i>	Iran	37 Participants (19	Cross-sectional study -	Hormonal

<i>al.</i> , (2017)		women with CAIS and 18 women with CAH)	with retrospective data collection from a cohort of individuals with CAH and CAIS	
Defreyne, J. <i>et al.</i> , (2021)	Netherlands, Belgium and Italy	902 Participants (469 transgender women 433 transgender men)	Cross-sectional retrospective longitudinal	Hormonal
Gehrmann, K. <i>et al.</i> , (2019)	7 European countries	91 Participants (91 men with CAH)	Cross-sectional cohort	Hormonal
Dadasovich, R. <i>et al.</i> , (2017)	U.S.	122 participants (112 transgender men in the quantitative study and 14 transgender men in the qualitative study)	Mixed cross-sectional - with survey and focus group	Hormonal
Segev-Becker, A. <i>et al.</i> , (2020)	Israel	100 Participants (38 women with CAH and 62 women in the control group)	Prospective case-control - based on a questionnaire	Hormonal
Vanderlaan, D. P. <i>et al.</i> , (2017b)	Brasil	261 Participants (118 transgender women and 143 cisgender men)	Cross-sectional case-control	Maternal immunological mechanisms
Semenyna, S.W. <i>et al.</i> , (2017)	Samoa	462 Participants (231 fa'afafine and 231 heterosexual men)	Cross-sectional retrospective	Maternal immunological mechanisms
Khorashad, B. S. <i>et al.</i> , (2020)	Iran	349 Participants (92 transgender men and 107 homosexual transgender women, 72 heterosexual men and 78 heterosexual women)	Cross-sectional survey with face-to-face interviews and analysis of medical records	Maternal immunological mechanisms
Apostolou, M. (2020)	Greece	1617 Participants (683 women and 934 men)	Cross-sectional survey	Maternal immunological mechanisms
Skorska, M. N. & Bogaer, A. F. (2020)	U.S.	19820 Adolescent participants (Wave I=19820 and Wave IV=14172)	Cross-sectional with longitudinal data from a cohort	Maternal immunological mechanisms
Skorska, M. N. <i>et al.</i> ,	Canada	126 participants (54	Cross-sectional	Maternal

(2017)		mothers of homosexual men and 72 mothers of heterosexual men)		immunological mechanisms
Swift-Gallant, A. <i>et al.</i> , (2018)	Canada, U.S., Australia, United Kingdom and New Zealand	334 Participants (91 heterosexual men and 243 homosexual men)	Cross-sectional retrospective survey	Maternal immunological mechanisms
Nila, S. <i>et al.</i> , (2019)	Indonesia	178 participants and photographs of 45 gay men, 29 straight men and 38 straight women	Mixed - Experimental with photo evaluation and cross-sectional with sibling composition evaluation	Maternal immunological mechanisms
Bogaert, A. F. <i>et al.</i> , (2018)	Canada	154 Participants (54 mothers of homosexual men, 72 mothers of heterosexual men, 16 women without children and 12 men)	Cross-sectional with immunological tests and comparison groups	Maternal immunological mechanisms
Blanchard, R. & Lippa, R. A. (2021)	Worldwide - Sponsored by the British Broadcasting Corporation	87,798 Participants (8279 homosexual men and 79519 heterosexual men)	Cross-sectional	Maternal immunological mechanisms
Wampold, C. H. (2018)	U.S. and Canada	243 Participants (243 men who have sex with men)	Cross-sectional	Maternal immunological mechanisms
Gómez Jiménez, F. R. <i>et al.</i> , (2020b)	Mexico	438 Participants (124 Muxe nguiiu, 120 muxe gunaa and 194 gynephilic men)	Cross-sectional retrospective survey (interviews) over 5 years	Maternal immunological mechanisms
Skorska, M. N. <i>et al.</i> , (2021)	Canada	47 Participants (17 cisgender girls, 14 cisgender boys and 16 adolescents with gender dysphoria assigned female at birth)	Cross-sectional imaging	Neuropsychophysiological differences
Votinov, M. <i>et al.</i> , (2021)	Germany	74 Participants (21 homosexual men, 16 heterosexual men, 19	Mixed cross-sectional - imaging and self-report study on gender and	Neuropsychophysiological differences

		homosexual women, 18 heterosexual women)	personality roles and expression	
Qualls, L. R. <i>et al.</i> , (2018)	U.S.	177 participants (118 heterosexual men and women, 59 homosexual men and women)	Cross-sectional survey	Neuropsychophysiological differences
Smith, E. <i>et al.</i> , (2019)	Germany	75 Participants (17 heterosexual men, 20 homosexual men, 20 heterosexual women and 18 lesbian women)	Experimental	Neuropsychophysiological differences
Manzouri, A. & Savic, I. (2018a)	Sweden	140 Participants (40 heterosexual men and 40 heterosexual women, 30 homosexual men and 30 homosexual women)	Cross-sectional imaging	Neuropsychophysiological differences
Abé, C. <i>et al.</i> , (2018)	Suécia	154 Participants (29 heterosexual women and 37 non-exclusive heterosexual women)	Cross-sectional imaging	Neuropsychophysiological differences
Wang, Z. <i>et al.</i> , (2020)	China	100 Participants (53 homosexual men and 47 heterosexual men)	Mixed - cross-sectional imaging and neuropsychological assessment - with images of whole brain anatomical networks and neuropsychological assessment	Neuropsychophysiological differences
Kheloui, S. <i>et al.</i> , (2021)	Canada	87 Participants (20 non-heterosexual women, 20 heterosexual women, 26 non-heterosexual men, 21 heterosexual men)	Experimental imaging - evaluation in cognitive tests experimental design with 4 hormonal evaluations in a stress-inducing test	Neuropsychophysiological differences
Bártová, K. <i>et al.</i> , (2020)	Brazil and Czech Republic	1336 Participants (386 heterosexual women, 110 homosexual women, 297	Cross-sectional survey	Neuropsychophysiological differences

		heterosexual men and 245 homosexual men)		
Swift-Gallant, A. <i>et al.</i> (2017)	Canada, U.S., Australia, United Kingdom and New Zealand	333 Participants (91 heterosexual men and 242 homosexual men - 91 receptive; 115 versatile; 36 insertive)	Cross-sectional survey with retrospective data	Neuropsychophysiological differences
Wang, D. & Kosinski, M. (2020)	China	92 Participants (29 homosexual men, 29 heterosexual men, 17 homosexual women and 17 heterosexual women)	Cross-sectional imaging - mapping study using magnetic resonance imaging	Neuropsychophysiological differences
Skorska, M. N. <i>et al.</i> , (2022)	Canada	49 Participants (17 transgender men with gender dysphoria, 17 cisgender cisgender girls and 15 cisgender boys)	Cross-sectional imaging	Neuropsychophysiological differences
Folkierska-Żukowska, M. <i>et al.</i> , (2020)	Poland	90 Participants (23 gender conforming homosexual men, 22 gender non-conforming homosexual men, 22 heterosexual men and 22 heterosexual women)	Mixed experimental study - with functional imaging analysis during a mental rotation task and retrospective self- reporting	Neuropsychophysiological differences
Manzouri, A. & Savic, I. (2018b)	Sweden	103 Participants (30 homosexual men, 38 heterosexual women and 35 heterosexual men)	Cross-sectional imaging - with mapping - multimodal MRI study	Neuropsychophysiological differences
Lübke, K. T. <i>et al.</i> , (2020)	Germany	80 Participants (20 heterosexual men, 20 homosexual men, 20 homosexual women and 20 heterosexual women)	Experimental imaging - experimental design with visual stimuli, neurophysiological monitoring and self- reported empathy	Neuropsychophysiological differences
Safron, A. <i>et al.</i> , (2017)	U.S.	62 and 60 Participants (42 heterosexual men,	Mixed experimental - with functional imaging	Neuropsychophysiological differences

		36 bisexual men and 44 homosexual men)	evaluation and self-reporting	
Safron, A. <i>et al.</i> , (2018)	U.S.	66 participants (26 heterosexual women, 26 bisexual women and 24 homosexual women)	Mixed experimental study of functional imaging and self-report response	Neuropsychophysiological differences
Safron, A. <i>et al.</i> , (2020)	U.S.	102 participants (26 heterosexual men, 25 homosexual men, 26 heterosexual women and 25 homosexual women)	Mixed experimental study of functional imaging and self-reported response	Neuropsychophysiological differences
Semenyna, S.W. <i>et al.</i> , (2018)	Canada	Study I: 443 Participants Study II: 600 Participants	Cross-sectional survey	Neuropsychophysiological differences
Manzouri, A. & Savic, I. (2019)	Sweden	207 Participants (27 transgender women, 40 transgender men, 80 cisgender heterosexual men and women and 60 cisgender homosexual men and women)	Cross-sectional imaging study - with mapping - multimodal MRI study	Neuropsychophysiological differences
Genise, G. <i>et al.</i> , (2019)	Argentina	418 teenage participants (145 boys and 273 girls)	Cross-sectional survey	Neuropsychophysiological differences
Varoglu, A. O. & Karatepe, H. T. (2022)	Turkey	One straight woman	Case study	Neuropsychophysiological differences
Burke, S. M. <i>et al.</i> , (2017)	Sweden	206 Participants (40 transgender men, 27 transgender women, 29 cisgender homosexual men, 30 cisgender homosexual women, 40 cisgender heterosexual men and 40 cisgender heterosexual women)	Cross-sectional imaging	Neuropsychophysiological differences
Jonason, P. K. & Luoto, S. (2021)	40 countries. U.S., Canada, Brazil, Czech Republic and	4023 Participants (3675 heterosexual men and women, 115 homosexual men and	Cross-sectional survey	Neuropsychophysiological differences

	others	women, 233 bisexual men and women)		
Subasinghe, A. K. <i>et al.</i> , (2017)	Australia	639 Participants (639 adolescent women)	Cross-sectional - with retrospective cohort data	Social environment
Skorska, M. N. & Bogaer, A. F. (2017)	U.S.	14786 Participants (6412 heterosexual men, 126 gay men, 6267 heterosexual women and 75 lesbian women)	Longitudinal cohort	Social environment
Ablaza, C. <i>et al.</i> , (2022)	Netherlands	9,073,496 Participants (9013420 heterosexual participants and 60076 non-heterosexual participants)	Cross-sectional study, with several cohorts (controlled effect) and a national probabilistic sample	Multifactorial (maternal immunological mechanisms and genetic)
Kurtz-Almog, L. (2022)	Israel	One Participant	Case study	Multifactorial (social environment and hormonal)
Quin, J. B. <i>et al.</i> , (2018)	China	1120 Participants (583 heterosexual men and 537 homosexual men)	Case-control study with retrospective analysis	Multifactorial (genetic and social environment)
Abé, C. <i>et al.</i> , (2021)	United Kingdom	18645 Participants (17920 heterosexual participants, 725 non-heterosexual participants)	Cross-sectional brain imaging and genome	Multifactorial (genetic and neuropsychophysiological differences)
Xu, Y. <i>et al.</i> , (2019)	United Kingdom	5007 Participants (2,290 heterosexual boys, 29 bisexual boys, 30 homosexual boys, 2,585 heterosexual girls, 56 bisexual girls and 17 homosexual girls)	Prospective cohort - longitudinal	Multifactorial (various biological and social environment factors)
Swift-Gallant, A. <i>et al.</i> , (2019)	Canada, U.S.A., Australia, United Kingdom and	580 Participants (163 heterosexual men and 417 non-heterosexual men)	Cross-sectional retrospective survey	Multifactorial (genetic, maternal immunological mechanisms and hormonal)

	New Zealand			
Xu, Y. & Zheng, Y. (2017)	China	1858 Participants (873 men and 985 women)	Cross-sectional survey	Multifactorial (maternal immunological mechanisms and hormonal)
Skorska, M. N. <i>et al.</i> , (2020)	Thailand	661 Participants (282 heterosexual men, 201 homosexual men and 178 are praphet song)	Cross-sectional survey	Multifactorial (maternal immunological mechanisms and hormonal)
Gartrell, N. <i>et al.</i> , (2019)	U.S.	152 Participants (76 children of lesbian women and 76 children of heterosexual women)	Longitudinal case-control cohort study	Multifactorial (genetic and social environment)

Note. The “Methodological characteristics” column in the table includes characteristics of methods and/or designs of studies according to what could be identified from the information in the articles reviewed.

CHAPTER II - STUDY 2

Sexual Orientation Beliefs Scale (SOBS): Adaptation and Validity Evidence in the Brazilian Context³

Abstract: The main purpose of this study was to adapt the SOBS - Form 2 (SOBS-F2) in the Brazilian context and to examine its validity. This study included two national surveys with two independent samples (Sample A, $N = 868$, data collection conducted in March 2022; Sample B, $N = 1038$, data collection conducted from July to August 2022). The materials used were a version of the SOBS-F2 adapted to the Brazilian context, a scale to measure sexual prejudice and a questionnaire on the participants' sociodemographic characteristics. The results of exploratory factor analysis in Sample A showed that the original structure of the scale was maintained in the Brazilian sample. The results of confirmatory factor analysis in Sample B attested to the replication of the same model, which presented satisfactory fit indices. Analyses of convergent, discriminant, and criterion validity in both samples also showed that all factors of the SOBS adapted version (SOBS-F2A) were associated with correlated variables, as indicated in the literature. Altogether, these results show that the SOBS-F2A presented good validity evidence. By confirming the replication of the model proposed by the original SOBS-F2, this study enhances knowledge regarding different types of essentialist beliefs about sexual orientation and provides an instrument with good psychometric properties for measuring these beliefs in the Brazilian context. This work broadens knowledge in this field, and it has implications for practical work, such as counseling psychology and psychotherapy, educational interventions, advocacy work and policy-making.

Keywords: Brazil; sexual prejudice; sexual orientation; essentialist beliefs; factor analysis; validity; scale.

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Introduction

Knowing people's conceptions about sexual orientation contributes to understanding misconceptions that lead to related prejudices (Cerqueira-Santos et al., 2021; Lacerda et al., 2002; LeVay, 1996; Marmor, 1998; Pereira et al., 2013; Pereira et al. 2011). In the mid-20th century, Allport (1954) proposed that beliefs are an important component of prejudice. Years later, this proposal was extended by other scholars who indicated that essentialist thinking accentuates differences and inferiorization between groups (e.g., Rothbart & Taylor, 1992; Leyens et al., 2000). Essentialist beliefs, which are sometimes referred to as psychological essentialism, are based on the ideas that social categories are natural, inherent, unchanging, and characterized by underlying essences (Agadullina & Chumakova, 2017; Agadullina et al., 2018; Bastian & Haslam, 2006; Demoulin et al., 2006). This study seeks to enhance knowledge about the structure of the essentialist beliefs that people hold about sexual orientation. Such knowledge will contribute to a better understanding of how essentialist beliefs affect attitudes toward sexual orientation.

It was long understood that believing in the immutability of sexual orientation (rather than believing that it is a choice) was an important predictor of more positive attitudes towards gay men and lesbians. However, in general, these conceptions are based on biological essentialist beliefs, which have a more complex relationship with different outcomes of sexual prejudice than initially was thought (Haslam & Levy, 2006; Hegarty, 2002; Hegarty & Pratto, 2001). Additionally, more recent studies indicate that other types of essentialist beliefs better explain such outcomes (Diamond & Rosky, 2016; Fry et al., 2020; Grzanka et al., 2016; Hegarty, 2010; Hubbard & Visser, 2015; Tierney et al., 2021). Studies have been developed to investigate the structure of how these beliefs are organized and to validate psychometric instruments that assess the variability of essentialist beliefs, including beliefs about sexual orientation (e.g. Arseneau et al., 2013; Haslam & Levy, 2006; Hegarty, 2002; Hegarty & Pratto,

2001) as well as more specific beliefs about the aetiology of homosexuality (Frias-Navarro, 2009; Smith et al., 2011), that is, about what would cause homosexuality among the possible factors related to the origin of sexual orientation.

Among studies that have investigated essentialist beliefs about sexual orientation with multidimensional structures, Hegarty and Pratto (2001) and Hegarty (2002) proposed a model consisting of two factors regarding the immutability and fundamentality of sexual orientation. On the other hand, Haslam and Levy (2006) present, through three studies, validity evidence for a model in which these beliefs are organized into three factors: immutability, discreteness, and universality. Among studies that have specifically investigated beliefs about the aetiology of homosexuality, mutually equivalent bifactor models are proposed: beliefs about genetic aetiology and learned aetiology (Frias-Navarro, 2009), and aetiological beliefs about nature and nurture (Smith et al., 2011). In both models, the factors indicate that homosexuality occurs due to biological predisposition and due to social reactions or interactions with the environment, respectively.

Recently, Arseneau et al. (2013) also proposed a model consisting of four dimensions, each of which constitutes one of the factors of the Sexual Orientation Beliefs Scale (SOBS). The SOBS is a multidimensional scale that measures different types of essentialist beliefs about the aetiology and nature of sexual orientation. It is an instrument consisting of two different versions: Form 1 (SOBS-F1), with validity evidence to be applied only to the LGBT population; and Form 2 (SOBS-F2), with validity evidence to be applied to the general population, including heterosexual and LGBT people (Arseneau et al., 2013).

The SOBS-F2, specifically, consists of four subscales that have been organized into four correlated factors (Arseneau et al., 2013): discreteness, with 6 items reflecting beliefs that sexual orientation is characterized by clear boundaries between categories, which are exclusive, and an individual can only associate with one of them; homogeneity, with 6 items reflecting

beliefs that people with the same sexual orientation are similar to each other and distinct from those in other sexual orientation categories; naturalness, with 11 items reflecting beliefs that sexual orientation is innate, biologically based, defined early in life, immutable and stable across cultures; and informativeness, with 8 items reflecting beliefs that it is important to know people's sexual orientation because it makes it possible to know a lot about them.

The SOBS-F2 allows the assessment of different types of beliefs that can co-occur and relate in a positive and negative way simultaneously to sexual prejudice (Fry et al., 2020; Grzanka et al., 2016; Tierney et al., 2021). Studies have identified considerable variability in the endorsement of different types of beliefs concerning the constructs assessed by the SOBS-F2. Differences have been found between groups of distinct sexual orientations, with heterosexuals displaying more beliefs related to discreteness, homogeneity, and informativeness, while nonheterosexuals display more beliefs related to naturalness (Agadullina et al., 2018; Grzanka et al., 2016; Hubbard & Visser, 2015). Bisexual individuals exhibit fewer beliefs related to discreteness (Hubbard & Visser, 2015; Morgenroth, Kirby, Gee, & Ovet, 2021) and naturalness (Morgenroth et al., 2021) than homosexual individuals. More essentialist beliefs related to discreteness, homogeneity, and informativeness (Agadullina et al., 2018; Grzanka et al., 2020; Hoyt et al., 2018) and fewer beliefs related to naturalness (Agadullina et al., 2018; Hoyt et al. 2018) are observed among people with higher identification with conservative positions or conservatism. More beliefs related to discreteness (Haslam & Levy, 2006) and fewer beliefs related to naturalness/immortality tend to occur among more religious people (Haslam & Levy, 2006; Horvath & Ryan, 2003; Whitehead, 2010).

It is recognized that the problem of sexual prejudice demands special attention to attitudes and beliefs regarding the sexual orientation of sexual minorities, such as gay men and lesbians. However, it is understood that concern only with “the causes and characteristics” of nonheterosexual orientations can reinforce misconceptions of the normality of heterosexuality.

This reinforces the idea that heterosexuality does not demand interest if it is assumed to be hegemonic based on heteronormativity and heterosexism (Herek, 2004, 2007; Costa & Nardi, 2015). Thus, working with the SOBS-F2 has the advantage of investigating beliefs with items that to some extent propose thinking more about the aetiology and nature of various sexual orientations. It also makes it possible to assess beliefs of sexual minority groups (instead of only heterosexuals) about sexual orientation.

The potential of the SOBS-F2 to contribute to a better understanding of the relationship between different types of essentialist beliefs about sexual orientation and sexual prejudice is evident. It is an instrument with several factors that simultaneously measures distinct constructs related to beliefs about the aetiology and nature of sexual orientation categories through its factors, which can be used as independent subscales. Additionally, the SOBS-F2 is an instrument that shows good psychometric properties to be applied to diverse samples, including those of different sexual orientations. However, the importance of further investigations to evaluate whether its factor structure is maintained in different cultural contexts, as well as in samples with different schooling levels, stands out since only university students participated in its specific initial validation study.

In Brazil, there have been no studies investigating any of these types of essentialist beliefs about sexual orientation. This, it is important to research how such beliefs are organized in this context and to develop standardized instruments to assess these beliefs. Investigating the implications of these beliefs in sexual prejudice in the Brazilian context is of considerable relevance due to the prevalence of this type of prejudice in this country, as described by recent studies (Cantelli & Nogueira, 2020; Santos & Cerqueira-Santos, 2020, 2022; Rufino et al., 2022; Stucky et al., 2020). Therefore, this study aimed to adapt the SOBS-F2 in the Brazilian context and to examine its validity. Initially, we sought to perform the translation and cross-

cultural adaptation of the SOBS-F2, and then, an empirical study was conducted to collect data for the production of validity evidence of the adapted instrument.

Method

Procedures

First, during the planning of this study, contact was made with the authors of the original scale to communicate our proposal to adapt it for the Brazilian context; the authors responded by encouraging the development of the work. The SOBS-F2 was translated and adapted into the Brazilian context in accordance with the recommendations of Borsa et al. (2012): translation of the instrument into the new language; synthesis of the translated versions; evaluation of the synthesis by expert judges; evaluation of the instrument by the target audience; reverse translation; and pilot study.

To examine the validity of the adapted version of the instrument, two online surveys were conducted. A non-probability design and convenience sampling technique was used at this stage of the study. Potential participants were able to click a link that directed them to read the informed consent form (ICF) and complete a questionnaire with the research instruments. The samples were recruited at two different times: Sample A was recruited in March 2022, and Sample B was recruited from July to August 2022. The link to the surveys was disseminated on social networks (Facebook, Instagram, and WhatsApp). The inclusion criteria were as follows: over 18 years old, and living in Brazil. After becoming aware of the ICF and indicating consent to participate in the research, participants were directed to answer the questionnaire and the other instruments online. All were informed that they could stop their participation in the surveys at any time, which would indicate their withdrawal from participating in this study; therefore, only responses of participants who answered all items were considered for analysis.

No specific check questions were used to validate the quality of the data. However, the online questionnaire was presented in separate blocks with the items of each instrument.

Between each block there were instructions on what to do to progress through the questions and reminders about the importance of continuing to give truthful answers in the following questions. This procedure was used to increase the chances that only participants who were reading the instructions thoroughly and who were committed to completing the entire questionnaire would complete the surveys. In addition, no financial or other compensation was provided to participants in this research.

This article presents part of the results of a larger study that was approved by the Research Ethics Committee of the university to which the authors are affiliated (Opinion number 5.159.509 and 5.531.979), and it was performed in accordance with Resolutions 466/2012 and 510/2016 of the National Health Council.

Participants

The samples consisted of two independent groups of Brazilian individuals who were assessed at different times. Sample A consisted of 868 participants who had a mean age of 31.81 years old ($SD = 12.27$) and an age range of 18 to 70 years old; 48.3% of the sample were young people aged 18 to 27 years old. Participants who identified themselves as cisgender women (49.9%), heterosexual (54.7%) and white (57.5%) were more prevalent. Also, those who reported having higher education (46.9%) and having no religion but believing in God (26.5%) were more prevalent. The sample included participants from all Brazilian states, with those from the Southeast Region being more frequent (38.9%).

Sample B consisted of 1038 participants who had a mean age of 33.38 years ($SD = 10.94$) and an age range of 18 to 71 years old; 36.5% of the sample were young people aged 18 to 27 years old. This sample was mainly composed of cisgender men (48.2%). Regarding other characteristics, the majority of the participants identified as heterosexual (56.1%) and white (59.9%). Furthermore, individuals who had higher education (41.9%), had no religion but believed in God (26%) and resided in the southeast region of Brazil (40.9%) were also those

who participated the most. Overall, both samples were well diversified in terms of the distribution of participants by sociodemographic characteristics. Table 1 shows the detailed distribution of participants by sociodemographic characteristics in each of the samples.

Table 1. Participants sociodemographic characteristics and distribution by sample

Characteristics	Sample A (<i>N</i> = 868)		Sample B (<i>N</i> = 1038)	
	<i>n</i>	%	<i>n</i>	%
Age				
18-27	419	48.3	379	36.5
28-37	198	22.8	309	29.8
38-47	122	14.0	205	19.7
48-57	96	11.1	135	13.0
58-67	32	3.7	9	0.9
68-71	1	0.1	1	0.1
Gender				
Cisgender woman	433	49.9	474	45.7
Cisgender man	369	42.5	500	48.2
Transgender woman	8	0.9	8	0.8
Transgender man	8	0.9	9	0.9
Non-binary	29	3.3	33	3.2
Queer	9	1.0	6	0.6
Transvestite	2	0.2	1	0.1
Other	10	1.2	7	0.7
Sexual orientation				
Heterosexual	475	54.7	582	56.1
Bisexual	151	17.4	197	19.0
Homosexual	146	16.8	180	17.4
Pansexual	44	5.1	45	4.4
Asexual	28	3.2	23	2.2
Queer	9	1.0	3	0.3
Other	15	1.7	8	0.8
Ethnicity/race				
White	499	57.5	621	59.9
Parida*	282	32.5	317	30.5

Black	67	7.7	73	7.0
Asian**	11	1.3	11	1.1
Indigenous	2	0.2	4	0.4
Other	7	0.8	12	1.2
Schooling level				
Fundamental incomplete	10	1.2	7	0.7
Fundamental complete	9	1.0	9	0.9
Incomplete high school	16	1.8	24	2.3
Complete high school	175	20.2	175	16.8
Incomplete undergraduate	222	25.6	263	25.3
Complete undergraduate	328	37.8	435	41.9
Master's degree	72	8.3	96	9.3
Doctoral degree	36	4.1	29	2.8
Religion				
No religion, but believe in God	230	26.5	269	26.0
No religion and don't believe in God	207	23.8	259	25.0
Catholic	228	26.3	208	20.0
Evangelical	56	6.5	71	6.8
Spiritist	47	5.4	69	6.6
African matrix religion	38	4.41	58	5.6
Protestant	19	2.2	26	2.5
Other	43	5.0	78	7.5
Region of residence				
Southeast	338	38.9	425	40.9
Northeast	276	31.8	271	26.1
South	196	22.6	214	20.6
Midwest	35	4.0	82	7.9
North	23	2.6	46	4.5

*Mixed race - mostly black and white.**Participants who declared themselves as yellow people of Asian descent

Instruments

A sociodemographic questionnaire was used to collect information such as age, gender, sexual orientation, ethnic/racial self-identification, schooling level, religion, and state of residence. This part of the questionnaire included three questions about three aspects related to religiosity: frequency of religious practice, importance of religious/spiritual beliefs, and influence of religious/spiritual assumptions on decisions. These items were answered using five-point scales. The responses to these three items were summed, their arithmetic mean was extracted, and their final scores were treated as an indicator of the participants' level of religiosity.

This questionnaire also included a question about political orientation: "Which political orientation do you identify with more?". The response options ranged from "Extreme Left" to "Extreme Right", plus one option "I do not have a defined political position". Responses to this question were treated as an indicator of political conservatism, calculated using a seven-point scale where the "Extreme Right" response option represented the maximum score. That option indicating that the participant might not have a defined positioning was recoded as "Center" positioning, which was equivalent to the midpoint of this measure.

An adapted version of the SOBS-F2 was used to measure multidimensional essentialist beliefs about sexual orientation. The original instrument, which was constructed and validated in the USA by Arseneau et al. (2013), underwent rigorous translation and cross-cultural adaptation procedures for the Brazilian context. The adapted version was applied, maintaining the original structure, with 31 items that are answered through a five-point Likert-type scale. More details about the psychometric properties and characteristics of this instrument are presented in the results section of this article.

The Attitudes towards Homosexuality (ATHO) scale was used to measure sexual prejudice. The ATHO scale was validated in Brazil by Ramos and Cerqueira-Santos (2021).

This scale measures negative attitudes towards sexual diversity and presents validity evidence to be applied to the general population, including nonheterosexual people. It consists of seven items that are organized in a bifactor model, with adequate fit for both the unifactorial structure (overall Homophobic Attitudes, $\alpha = 0.88$) and a two-factor structure (Distal Attitudes, $\alpha = 0.85$; Proximal Attitudes, $\alpha = 0.82$). Items on the ATHO scale are answered using a seven-point Likert-type scale, with higher scores indicating higher levels of homophobia manifested by prejudice against sexual diversity (Ramos & Cerqueira-Santos, 2021). The two-factor structure was adopted in this study, and the factors presented the following internal consistency values: Sample A - Distal Attitudes $\alpha = 0.90$; Proximal Attitudes $\alpha = 0.89$. Sample B - Distal Attitudes $\alpha = 0.93$; Proximal Attitudes $\alpha = 0.93$.

Data analysis

To evaluate the factor structure of the SOBS-F2 in its version adapted to Brazil, exploratory factorial analysis (EFA) was performed with Sample A ($N = 868$). The Kaiser Meyer Olkin (KMO) and Bartlett's sphericity tests were performed to evaluate the correlations among the items of the matrix and its suitability to be submitted to factoring procedures. In line with literature recommendations, considering the ordinal nature of the data, a polychoric matrix and robust diagonally weighted least squares (RDWLS) extraction method were used (Asparouhov & Muthen, 2010). The number of factors to be retained was defined based on the results of the parallel analysis technique, with random permutation of the observed data (Timmerman & Lorenzo-Seva, 2011), and Robust Promin rotation was used, which is an oblique rotation method suitable for models where it is expected that factors will be correlated and which corrects for sampling error, leading to more stable solutions across samples (Lorenzo-Seva & Ferrando, 2019). Only items with a loading of $> |0.30|$ were considered for the final model suggested by the AFEs. Items with loadings $> |0.30|$ in more than one factor (cross-loading) were also excluded in subsequent analysis. Such procedures were carried out

until a stable factorial solution was reached. Although it was expected that the four-factor model of the SOBS would be reproduced in the Brazilian context, we decided to perform this analysis with Sample A to investigate whether results from an exploratory analysis with this specific sample would replicate the multifactorial structure of the original scale.

Confirmatory factor analysis (CFA) of the resulting model of the EFA (Model 1) and alternative models were conducted with the data from Sample B ($N = 1038$). The estimation method used was RDWLS. The fit indices of the tested models were evaluated based on the values of the Tucker–Lewis Index (TLI), Comparative Fit Index (CFI), Goodness-of-Fit Index (GFI) and Root Mean Square Error of Approximation (RMSEA). For a model to be considered adequate, the following values were admitted: TLI, CFI and GFI > 0.90 ; RMSEA < 0.08 , with an upper limit of the 90% confidence interval < 0.10 (Brown, 2015). Changes to the alternative models were performed based on interpretation of the modification indices (MI) and based on theoretical assumptions in the literature to obtain the most adequate structure. To identify possible sources of problems in the specification of a model, MI with values > 50.00 were prioritized. The reliability indices of the scale factors were evaluated using Cronbach's alpha and composite reliability (CR) values. The main reason for applying this type of analysis was to assess whether the factor structure resulting from the EFA would be replicable in an independent sample (Sample B) from the same population (Brazilian context). This CFA made it possible to observe other indices that allowed assessing the quality of the fit of the data in the proposed model. As the MI indicate changes in the model that increase the fit of the specific data analyzed in the respective study (Sample B), the contributions of the interpretation of these indices made it possible to achieve a more precise structure that is more likely to be replicated in other samples of future studies.

To assess external validity indices of the adapted version of the SOBS-F2, Pearson's correlation analysis was performed between factors of the best-fitting model (which was

constructed during factor analysis) and other measures used in the study. Correlations were performed with participants' scores on the ATHO (on both factors) and on indices of political conservatism and religiosity. These analyses of the associations between constructs aimed to produce convergent and discriminant validity evidence. One-way analyses of variance (ANOVAs) were conducted to investigate differences in mean scores on the factors of the adapted version of the SOBS-F2 between groups. Participants were grouped by sexual orientation: heterosexual; homosexual; and other sexual orientations (bisexual, pansexual, asexual, and others). Participants were also grouped by religious beliefs: Christians (Catholics, Evangelicals, and Protestants); participants of other beliefs⁴ (religions such as African religions, Spiritualists, others, as well as those who reported believing in God without having a religion); and atheists (participants who reported having neither religion nor believing in God). Furthermore, participants were grouped by schooling level: up to high school; incomplete undergraduate; and complete undergraduate (graduates and postgraduates). When significant differences were identified, the Bonferroni and Games-Howell post hoc tests were performed to identify which groups differed from each other. These between-group difference analyses aimed to produce criterion validity evidence.

Data tabulation and descriptive analyses were performed in SPSS software (IBM SPSS Statistics 23.0). EFA were conducted in FACTOR software (factor.12.1.2.0WIN64.exe). CFA and bivariate analyses were conducted in JASP software (JASP-0.16.1-64bit.msi). The CR values were calculated using an online calculator available on The Statistical Mind website at the following address: http://www.thestatisticalmind.com/calculators/comprel/composite_reliability.htm. For the purposes of transparency and openness, materials and analysis plan used in this study can be

⁴ Participants of other religious beliefs, such as Muslims and Jews, were not treated separately because the frequency of participation was very low, which also occurs in the general population of Brazil, and this would result in very small groups.

made available by emailing the corresponding author. This study's analysis plan was not preregistered.

Results

Translation and content adaptation of the scale

Initially, the SOBS-F2 items were translated into Portuguese by two independent Brazilian translators with full command of the English language. The translations were synthesized into a single version by the researchers responsible for this study, using the versions of both translators that were considered most appropriate. In this step, for item 15, the expression "comes out of the closet" was used as equivalent to "comes out"; item 18 was adapted to "Sexual orientation is innate (the person is born with it already defined)"; and for item 24, the term "quantities" was used as equivalent to "percentages". Next, the synthesis of the translations was sent to two experts in psychology and sexual diversity.

After analysing the content of the translations' synthesis, the researchers met with the experts to continue the process of adapting the translated version of the scale. Regarding the changes resulting from this step, the term "lesbian" was added to item 4. The wording of item 6 was modified to enhance clarity: "It makes sense that people can identify with two sexual orientations at the same time". The term "own" was added to in items 13 and 14. The term "assume" was replaced by "declare" for item 15, resulting in the following wording: "If someone 'comes out of the closet' (declares himself or herself gay or lesbian), that person has probably always been attracted to the same sex". There was a discussion about the ambiguity of the translation of the term "useful" in item 26, which led to the decision to use the term "adequate" as the most coherent equivalent.

In the next step, the translated and adapted scale was evaluated by a group of individuals representing the target audience of this study ($N = 8$), who completed the scale and assessed the comprehensibility of the items. The considerations involved points that had already been

discussed with the experts in the previous step, with all items being considered clear without recommendations for further changes. The reverse translation into the original language was carried out by two independent Brazilian translators with full command of the English language, one of whom had recent lived in the U.S. The synthesis of the reverse translations showed that, in general, the items content of the adapted version remained similar to that of the original version.

A pilot study was carried out with 16 individuals from the general population, which confirmed the understandability of the instrument; only one adjustment was recommended in item 22, i.e., to replace the term "Biology" with "Biological factors". The final version of the adapted scale (the back-translation) was still sent to two authors of the original scale to assess the similarity of the items with the original ones. These authors considered the adapted version adequate, although they questioned the use of the term "to define" in items 17 and 18. It was argued that throughout the previous adaptation stages, this term proved to be the most appropriate for the translation of "to set" in the scale to be applied in the Brazilian context, and therefore, the authors were in agreement. Once these adaptation stages were concluded, we proceeded to investigate the validity of the adapted instrument.

Exploratory factor analysis

First, it was analysed whether the dataset of Sample A ($N = 868$), with the 31 items of the original scale, was adequate for factoring, according to polychoric matrix analyses. Sample adequacy measures recommended removal of item 16, as it had a correlation index < 0.50 at the lower bound of the 90% confidence interval. After the exclusion of item 16, the matrix with the remaining 30 items proved to be adequate for the factoring procedure, according to the analysed indices (KMO = 0.84; Bartlett's test of sphericity, $\chi^2 [435] = 9857; p < 0.01$).

Continuing with the EFA of the data with the 30 items, the results of the parallel analysis indicated the existence of four latent factors, with the distribution of the items reproducing the

four factors of the original model. However, items 23 and 30 did not load on any of the factors. Items 13, 14 and 20 presented cross-loading, loading both on the naturalness factor (the factor they were originally part of) and on the discreteness factor. Therefore, these 5 items were excluded so that a new analysis could be performed.

The results of the new EFA with the 25 items, with each saturating only on a single factor with factor loadings $> |0.30|$, again suggested a four-factor solution with the distribution of items similar to the last one and to the original model. However, item 21 did not saturate on any of the factors ($\lambda < |0.30|$ on all factors). Once again, it was decided to exclude this item so that a new analysis could be performed with the remaining 24 items.

The results of this next EFA with the 24 items continued to indicate a four-factor solution with the distribution of items similar to the two last ones and to the original model. All items in this set presented factor loadings $> |0.30|$ with no cross-loading between factors. Therefore, it was understood that a stable factor solution was reached. Regarding the number of items in each factor of this model compared to that of the original scale, Factor 1 loaded seven of the eight informativeness items; Factor 2 loaded five of the eleven naturalness items; Factor 3 loaded all six discreteness items; and Factor 4 loaded all six homogeneity items. It was decided that the names of the factors of this model would remain the same as the original scale, given the similarity of their structures. It is important to note that although the naturalness factor did not carry any items that explicitly refer to the stability of different sexual orientations across cultures (universality), items that clearly reflect beliefs about a biological aetiology of sexual orientation, which characterize it as innate, precociously fixed and immutable, remained part of this factor.

All four factors together were found to explain 61.38% of the variance, which is a value considerably higher than the value found in the original scale study (41.60% of the variance; Arseneau et al., 2013). The informativeness, discreteness, and homogeneity factors presented

positive correlations with each other, with magnitudes ranging from moderate to weak. The naturalness factor was only correlated with the homogeneity factor; this association was negative and weak, but it was still statistically significant. Table 2 shows the factor loadings of the items, the explanation of variance, internal consistency and correlation matrix of the factors.

Table 2. Factorial loads of items, explained variance, reliability and correlations between factors

Item	F1	F2	F3	F4
24 - Sexual orientation is an important characteristic of people.	0.79	0.21	-0.20	-0.20
25 - Knowing a person's sexual orientation says a lot about them.	0.73	-0.09	0.13	0.12
26 - It is appropriate to group people according to their sexual orientation.	0.55	-0.03	-0.05	0.21
27 - A person's sexual orientation is an important attribute.	0.91	0.01	-0.15	-0.16
28 - It is possible to know a lot about a person when you know her/his sexual orientation.	0.71	-0.11	0.18	0.14
29 - If you don't know a person's sexual orientation, you can't say you really know that person.	0.56	-0.04	0.17	0.09
31 - Most people consider their sexual orientation to be important to them.	0.33	0.20	-0.09	-0.11
15 - If someone "comes out" (declaring themselves as gay or lesbian), that person has probably always been attracted to the same sex.	-0.01	0.58	0.10	0.14
17 - Sexual orientation is defined early in life.	0.08	0.61	0.12	0.04
18 - Sexual orientation is innate (the person is born with it defined).	-0.03	0.78	0.01	0.14
19 - Social and environmental factors are the main cause of a person's sexual orientation.	0.15	-0.48	0.10	0.02
22 - Biological factors are the main cause of someone's sexual orientation.	0.12	0.36	0.11	0.05
1 - Sexual orientation is a category with distinct boundaries: Either a person is gay/lesbian or heterosexual.	-0.06	-0.15	0.77	0.23
2 - People who identify as bisexual are confused about their true sexual orientation.	-0.03	-0.19	0.71	0.23
3 - Sexual orientation is a category with clear boundaries: Either a person is gay/lesbian, or bisexual, or heterosexual.	-0.03	-0.03	0.77	0.10
4 - It is possible to be "partially" or "somewhat" gay/lesbian or heterosexual.	0.07	-0.18	-0.38	0.17
5 - A person has only one true sexual orientation.	0.01	0.18	0.86	-0.14

6 - It makes sense that people can identify with two sexual orientations at the same time.	-0.04	-0.07	-0.77	0.27
7 - People who share the same sexual orientation have common goals.	0.03	0.00	-0.01	0.73
8 - People with the same sexual orientation have the same fate.	-0.01	-0.05	0.07	0.77
9 - People with the same sexual orientation seem to be connected by some kind of invisible bond.	-0.03	0.12	-0.10	0.74
10 - People who have the same sexual orientation are very similar to each other.	-0.03	0.06	-0.04	0.87
11 - There are more similarities than differences among people who have the same sexual orientation.	-0.01	0.07	-0.06	0.76
12 - People who have the same sexual orientation often interact with each other.	0.10	0.12	-0.12	0.44
Explanation of variance (%)	26.75	13.59	12.15	8.90
Composite Reliability	0.85	0.71	0.87	0.87
Cronbach's alpha	0.79	0.65	0.79	0.78
Factor correlation matrix				
F1	-	0.07	0.23*	0.38*
F2		-	0.06	-0.12*
F3			-	0.40*
F4				-

Note. F1: Informativeness. F2: Naturalness. F3: Discreteness. F4: Homogeneity.

*Significantly different from zero in the population.

Confirmatory factor analysis

The results of a CFA of Model 1 (resulting from the EFAs, with the 24 items distributed into four factors) suggested a satisfactory fit according to the fit indices: GFI (0.94) and RMSEA (0.08 [0.07, 0.08]). However, the other indicators did not reach the expected values to support the adequacy of the model fit, with TLI = 0.86 and CFI = 0.88. Item 31 presented a factor loading $< |0.30|$ ($\lambda = 0.23$). Therefore, it was decided to exclude it from the set to test a new model with the remaining 23 items (Model 2).

The results of this CFA of Model 2 showed an improvement in the values of all fit indices. The GFI (0.95) and RMSEA (0.08 [0.07, 0.08]) values remained satisfactory; however, the TLI (0.87) and CFI (0.89) values had not yet reached the expected values. In this structure, an MI with a very high value (209.61) was observed, indicating a high covariance between the residuals of item 24 and item 27 ($r = 0.75$). Given the semantic proximity between the contents of these two items (item 24: Sexual orientation is an important characteristic of people; item 27: A person's sexual orientation is an important attribute), it was understood that there could be an overlap between them. Therefore, it was decided to exclude item 24 because it had the lowest factor loading, which was also slightly below 0.30 (item 24 $\lambda = 0.29$; item 27 $\lambda = 0.50$). This exclusion resulted in a new model with 22 items (Model 3).

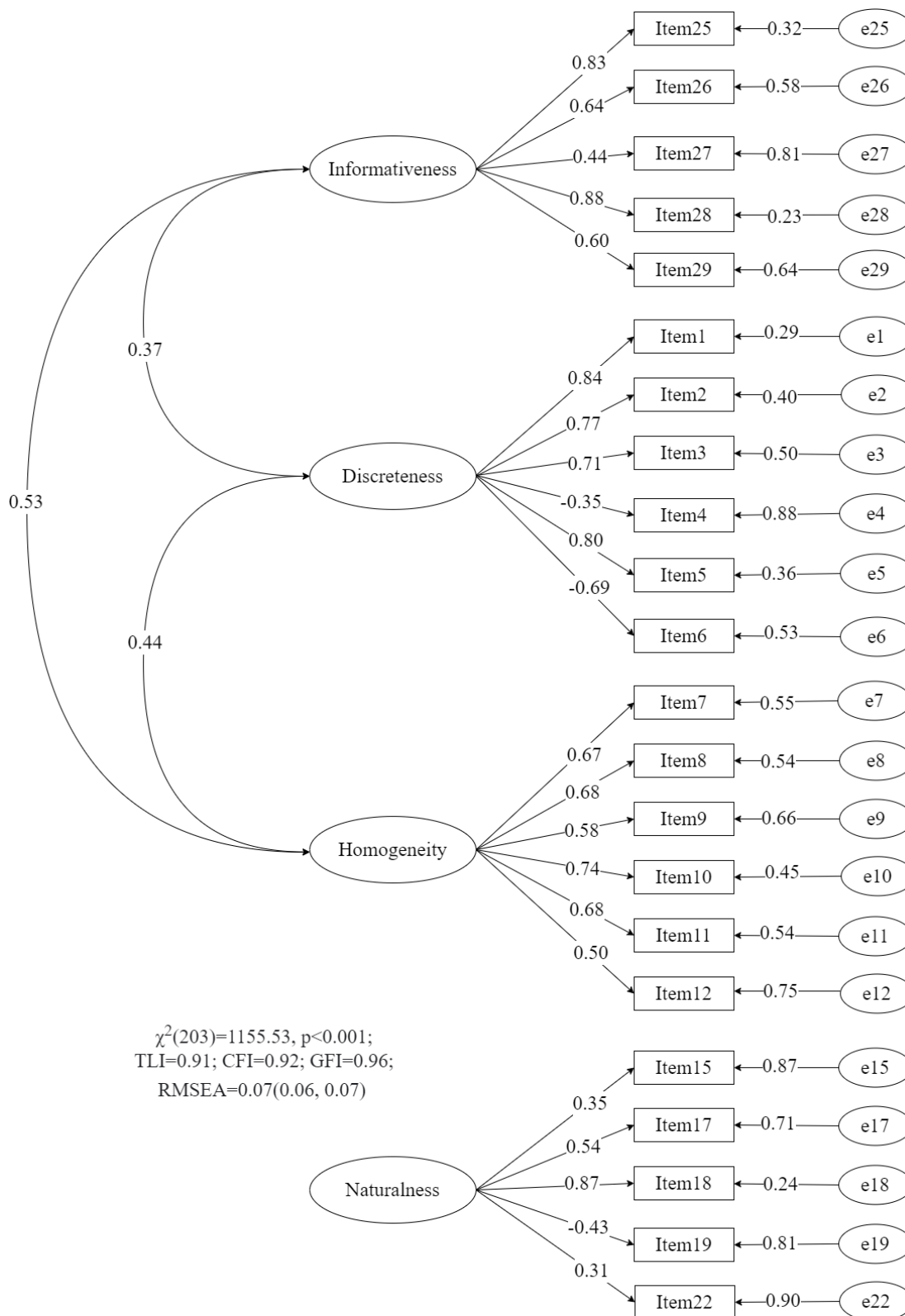
The results of the CFA of Model 3 indicated an adequate fit according to all indices evaluated (TLI = 0.91; CFI = 0.92; GFI = 0.96; RMSEA=0.07 [0.06, 0.07]). Factors 1, 3 and 4 (informativeness, discreteness, and homogeneity, respectively) had moderate to strong correlations with each other (Factor 1 and Factor 3: $r = 0.37, p < 0.01$; Factor 1 and Factor 4: $r = 0.53, p < 0.01$; Factor 3 and Factor 4: $r = 0.44, p < 0.01$). Factor 2 (naturalness) showed no significant correlations with any of the other factors (Factor 2 and Factor 1: $r = 0.01, p = 0.87$; Factor 2 and Factor 3: $r = -0.04, p = 0.31$; Factor 2 and Factor 4: $r = -0.04, p = 0.36$).

Regarding the internal consistency of the four factors of Model 3, the following indices were observed: informativeness, $\alpha = 0.81$ and CR = 0.82; naturalness, $\alpha = 0.62$ and CR = 0.64; discreteness, $\alpha = 0.85$ and CR = 0.85; and homogeneity, $\alpha = 0.80$ and CR = 0.81. The internal consistency indices of all factors proved to be adequate, although the naturalness factor showed a slightly lower value than expected. Overall, the results of all internal validity evidence parameters analysed indicated that Model 3 proved adequate for the adapted version of the SOBS-F2, now titled Sexual Orientation Beliefs Scale - Form 2 Adapted version (SOBS-F2A). Figure 1 shows the factor structure of the SOBS-F2A with all model parameters (Appendix A

shows SOBS-F2A with items written in Portuguese and renumbered based on the order shown in Figure 1).

Figure 1

SOBS-F2A factorial structure with all model parameters



Convergent and discriminant validity

The results of bivariate correlation analysis showed that all SOBS-F2A factors showed significant correlations of different magnitudes when using the measures of sexual prejudice, religiosity and political conservatism. Discreteness and homogeneity factors showed a positive correlation with the measures of homophobic attitudes, religiosity, and political conservatism in both samples. The informativeness factor showed a positive correlation with the measures of homophobic attitudes and religiosity in both samples (but in the first sample, the magnitude of the correlation with religiosity can be considered null) and with the measure of political conservatism in Sample B. These relationships indicate the existence of a positive association of various intensities with these constructs. Such results of correlations between theoretically related constructs may characterize convergent validity evidence.

The naturalness factor showed a weak negative correlation with the proximal homophobic attitudes measure only and negative correlations (which can be considered of null magnitude) with the religiosity and political conservatism measures in Sample A. This factor showed a weak negative correlation with both measures of homophobic attitudes, religiosity, and political conservatism in Sample B. These results indicate that the relationship between beliefs of naturalness and these other constructs is negative, and such an association tends to have a weak or null magnitude. These results of absence or weak correlation between theoretically little related constructs characterize discriminant validity evidence. Table 3 shows means, standard deviations, and bivariate correlation indices for all these variables.

Table 3. Means, standard deviations and bivariate correlation indices between variables

		1	2	3	4	5	6	7	8	
Sample A (N = 868)	Sample B	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	<i>M</i>	
	(N = 1038)	<i>DP</i>	<i>DP</i>	<i>DP</i>	<i>DP</i>	<i>DP</i>	<i>DP</i>	<i>DP</i>	<i>DP</i>	
		2.33	3.36	2.53	2.22	2.36	2.41	2.51	3.26	
		(0.87)	(0.76)	(0.97)	(0.76)	(1.87)	(1.87)	(1.21)	(1.52)	
1	<i>M</i>	2.33	-	0.01	0.28**	0.42**	0.32**	0.31**	0.14**	0.18**
	<i>(DP)</i>	(0.80)								
2	<i>M</i>	3.30	0.08*	-	-0.03	-0.02	-0.24**	-0.21**	-0.16**	-0.14**
	<i>(DP)</i>	(0.74)								
3	<i>M</i>	2.54	0.21**	0.13**	-	0.35**	0.68**	0.71**	0.26**	0.55**
	<i>(DP)</i>	(0.82)								
4	<i>M</i>	2.31	0.38**	0.08*	0.24**	-	0.36**	0.39**	0.17**	0.28**
	<i>(DP)</i>	(0.71)								
5	<i>M</i>	2.31	0.22**	-0.13**	0.50**	0.27**	-	0.80**	0.37**	0.59**
	<i>(DP)</i>	(1.66)								
6	<i>M</i>	2.26	0.20**	-0.06	0.59**	0.27**	0.66**	-	0.35**	0.69**
	<i>(DP)</i>	(1.63)								
7	<i>M</i>	2.51	0.09*	-0.08*	0.23**	0.11**	0.41**	0.30**	-	0.33**
	<i>(DP)</i>	(1.14)								
8	<i>M</i>	3.19	0.05	-0.07*	0.45**	0.16**	0.48**	0.64**	0.26**	-
	<i>(DP)</i>	(1.44)								

Note. 1: Informativeness. 2: Naturalness. 3: Discreteness. 4: Homogeneity. 5: Measure of sexual prejudice (proximal homophobic attitudes). 6: Measure of sexual prejudice (distal homophobic attitudes). 7: Measure of religiosity. 8: Measure of political conservatism (identification with political orientation). *Significant at the 0.05 level. **Significant at the 0.01 level.

Criterion validity evidence

The results of one-way ANOVAs indicated statistically significant differences between means of groups of different sexual orientations on all factors of the SOBS-F2A in both Sample A and Sample B. In general, gay and lesbian participants showed higher means on

informativeness and naturalness factors. Heterosexual individuals showed higher mean scores on the discreteness and homogeneity factors. The group formed by participants of other sexual orientations showed the lowest means in the different factors, that is, less essentialist beliefs about sexual orientation in general. Differences were observed in comparisons of means between groups with different religious beliefs. Christian participants had higher mean scores on the informativeness, discreteness, and homogeneity factors in Sample A. These same differences were observed in Sample B, and participants identified as atheists presented a higher mean naturalness scores in this other sample. Differences were also observed in comparisons of means between groups of different schooling levels. Participants with a schooling level of up to high school had higher mean scores on the discreteness and homogeneity factors in Sample A. These same differences were observed in Sample B, in which participants with a schooling level of up to high school also had a higher mean naturalness score. Table 4 shows the results of the mean comparisons between all groups in both samples. These results, which confirm the ability of the SOBS-F2A factors to differentiate groups, provide evidence for the criterion validity of this tool.

Table 4. Comparison of means in the SOBS-F2A factors between groups

Variables	Sample A (<i>N</i> = 868)			Sample B (<i>N</i> = 1038)	
	<i>M</i> (<i>DP</i>)	Differences between groups	<i>M</i> (<i>DP</i>)	Differences between groups	
Sexual Orientation					
F1	Group A	2.35 (0.80)	$F(2, 359.17)=4.85^*$	2.33 (0.94)	$F(2, 466.91)=3.98^*$
	Group B	2.48 (0.88)	$\eta^2=0.01$	2.46 (0.83)	$\eta^2=0.01$
	Group C	2.22 (0.74)	B>C; A=B; A=C	2.25 (0.71)	B>C; B=A; C=A
F2	Group A	3.25 (0.72)	$F(2, 865)=9.99^{**}$	3.25 (0.73)	$F(2, 1035)=21.94^{**}$
	Group B	3.54 (0.73)	$\eta^2=0.02$	3.67 (0.76)	$\eta^2=0.04$
	Group C	3.23 (0.75)	B>A; B>C; A=C	3.37 (0.77)	B>A; B>C; A=C
F3	Group A	2.71 (0.85)	$F(2, 376.87)=33.91^{**}$	2.79 (1.03)	$F(2, 474.24)=64.15^{**}$
	Group B	2.54 (0.81)	$\eta^2=0.06$	2.30 (0.87)	$\eta^2=0.10$
	Group C	2.23 (0.68)	A>C; B>C; A=B	2.13 (0.69)	A>B; A>C; B=C
F4	Group A	2.35 (0.70)	$F(2, 865)=3.39^*$	2.29 (0.80)	$F(2, 455.58)=7.01^{**}$
	Group B	2.34 (0.75)	$\eta^2=0.01$	2.20 (0.74)	$\eta^2=0.01$
	Group C	2.21 (0.68)	A>C; A=B; C=B	2.09 (0.68)	A>C; A=B; C=B
Religious beliefs					
F1	Group D	2.42 (0.83)	$F(2, 865)=3.28^*$	2.49 (0.96)	$F(2, 590.12)=7.01^{**}$
	Group E	2.26 (0.80)	$\eta^2=0.01$	2.25 (0.81)	$\eta^2=0.01$
	Group F	2.34 (0.76)	D>E; D=F; E=F	2.28 (0.83)	D>E; D>F; E=F
F2	Group D	3.25 (0.72)	$F(2, 865)=0.98$	3.20 (0.72)	$F(2, 1035)=16.87^{**}$
	Group E	3.31 (0.75)	$\eta^2=0.00$	3.34 (0.76)	$\eta^2=0.03$
	Group F	3.34 (0.75)	D=E=F	3.57 (0.77)	F>E>D
F3	Group D	2.81 (0.82)	$F(2, 865)=25.93^{**}$	3.00 (1.01)	$F(2, 589.62)=51.04^{**}$
	Group E	2.43 (0.79)	$\eta^2=0.06$	2.35 (0.87)	$\eta^2=0.10$
	Group F	2.35 (0.79)	D>E; D>F; E=F	2.30 (0.91)	D>E; D>F; E=F
F4	Group D	2.46 (0.71)	$F(2, 865)=11.92^{**}$	2.44 (0.82)	$F(2, 612.84)=24.64^{**}$
	Group E	2.27 (0.71)	$\eta^2=0.03$	2.19 (0.74)	$\eta^2=0.05$
	Group F	2.16 (0.68)	D>E; D>F; E=F	2.00 (0.66)	D>E>F

		Schooling level			
F1	Group G	2.33 (0.84)	$F(2, 865)=1.22$	2.36 (0.88)	$F(2, 1035)=1.59$
	Group H	2.27 (0.82)	$\eta^2=0.00$	2.40 (0.85)	$\eta^2=0.00$
	Group I	2.37 (0.78)	G=H=I	2.29 (0.87)	G=H=I
F2	Group G	3.38 (0.72)	$F(2, 865)=2.34$	3.49 (0.72)	$F(2, 1035)=5.30^{**}$
	Group H	3.23 (0.79)	$\eta^2=0.00$	3.38 (0.77)	$\eta^2=0.01$
	Group I	3.29 (0.72)	G=H=I	3.29 (0.77)	G>I; G=H; H=I
F3	Group G	2.75 (0.84)	$F(2, 865)=9.85^{**}$	2.79 (0.95)	$F(2, 1035)=10.80^{**}$
	Group H	2.41 (0.81)	$\eta^2=0.02$	2.53 (0.97)	$\eta^2=0.02$
	Group I	2.51 (0.81)	G>H; G>I; H=I	2.43 (0.96)	G>H; G>I; H=I
F4	Group G	2.42 (0.71)	$F(2, 865)=3.73^*$	2.40 (0.78)	$F(2, 1035)=11.52^{**}$
	Group H	2.33 (0.70)	$\eta^2=0.01$	2.27 (0.76)	$\eta^2=0.02$
	Group I	2.25 (0.70)	G>I; G=H; H=I	2.12 (0.74)	G>I; H>I; G=H

Note. F1: Informativeness. F2: Naturalness. F3: Discreteness. F4: Homogeneity. Sexual Orientation: A = Heterosexual; B = Homosexual; C = Participants of other sexual orientations. Religious beliefs: D = Christians; E = People of other faiths; F = Atheists. Schooling level: G = Up to high school; H = Incomplete undergraduate; I = Complete undergraduate. *Significant at the 0.05 level. **Significant at the 0.01 level.

Discussion

The results of this study confirm the replication of the factorial structure of the SOBS-F2 when it was adapted for the Brazilian context (renamed the SOBS-F2A) and reiterate that essentialist beliefs about sexual orientation can be organized into at least four dimensions. It is important to highlight that in the present context two factors loaded fewer items than the original ones and even so the set of four factors together provided a greater explanation of variance of the items than in their original structure, which may suggest a greater parsimony of the model found in this study. Item distributions in this population almost completely reproduce factors proposed in the original scale. The exceptions are the informativeness factor, which did not carry three of the eight items from the original scale, and the naturalness factor, which did not carry most of the items from the original scale.

Three of the items that constitute the informativeness factor of the original scale did not compose this factor in the version adapted in this study. Items 30 and 31 showed lower factor loadings than expected, which indicates that they were not explanatory for the factor; thus, they are weakly related to the construct in question. It was observed that the content of item 27 overlapped with that of item 24, which also had a significant factorial load slightly lower than expected; consequently, the model presented a better fit after its exclusion. Regarding the naturalness factor, 6 of the 11 items of the original scale were not considered explanatory. Item 16 showed low correlations with the overall item set. Items 13, 14 and 20 loaded in more than one factor, which indicated ambiguity about which factor could explain them. Items 21 and 23 showed factor loadings lower than expected, being little related to this construct. It is important to emphasize that exclusion of these items and consequent reduction of the scale length can be considered positive for this version of the instrument, given its greater parsimony and ease of application in future studies (Cendón et al., 2014; Freitas et al., 2000).

Naturalness factor loaded items directly related to the idea that biological factors constitute the basis of sexual orientation, which characterizes it as innate, fixed early in life, and immutable (the only item that attributes it to social and environmental factors showed an inverted load). This factor loaded the item "Social and environmental factors are the main bases of a person's sexual orientation", which can assess how much people believe that sexual orientation (and its categories) varies according to context. But it did not carry the item "The numbers of people in different sexual orientation groups are roughly the same everywhere in the world", which more explicitly reflects the belief of universality of sexual orientation and its categories. Therefore, this factor may not cover so well this type of belief contemplated by the construct in the original scale, which is in line with previous findings in the literature. As noted in Haslam and Levy's (2006) study, specific beliefs about the universality of sexual orientation may be more subtle and less elucidative among people. Beliefs about this topic were not part

of specific factors, nor did they integrate factors related to the biological nature of sexual orientation in other studies (Hegarty, 2002; Hegarty & Pratto, 2001). This difference in the beliefs that constitute the naturalness factor is an aspect that may also help explain the borderline reliability value of this factor in this version of the SOBS-F2A. Items that explicitly translated universality beliefs did not load sufficiently on this factor in the present study, and even in the original scale, which they loaded on and this factor was the one with more items (11 items), the internal consistency value was not so high ($\alpha = 0.79$), being below those of two other factors with only six items each. Future studies should analyse the reliability/precision of this factor and, if possible, include more items that might better capture the variability in this type of universality beliefs among people.

In its original structure, the dimensions of SOBS-F2 were correlated with each other, although the naturalness factor was only correlated with the homogeneity factor. In this study, the same pattern of correlations was replicated in the model resulting from the EFA with Sample A, but in the model resulting from the CFA with Sample B, this did not occur. In the final version of the SOBS-F2A, the informativeness, discreteness and homogeneity factors remained correlated with each other. The naturalness factor was not correlated with any of the other three factors, which suggests that the beliefs that make up this subscale may be related more to other dimensions of psychological essentialism.

The associations between the informativeness, discreteness and homogeneity factors observed herein have theoretical and empirical support. Some studies show that beliefs about these three dimensions can organize into a single factor of psychological essentialism (Agadullina & Chumakova, 2017; Agadullina et al., 2018). These beliefs can be understood as being relative to social essentialism, as some authors have noted in the literature (Hoyt et al. 2018; Ryazanov & Christenfeld, 2018). However, it is worth noting that working with a model in which these beliefs are organized into distinct factors, as is the case for the SOBS-F2

and the adapted version in this study, enables a better understanding of the effect of each of them on different sexual prejudice outcomes.

More detailed analysis of the items' content that make up the naturalness factor shows that, in addition to reflecting beliefs about a specific dimension of essentialist thinking, they also denote perceptions that people have about the aetiology of sexual orientation. Studies such as those by Frias-Navarro (2009) and Smith et al. (2011) show that people's perceptions about the aetiology of homosexuality are organized into two dimensions: beliefs about the effects of biological factors and beliefs about the effects of social reactions or interactions with the environment. Thus, it makes sense that the naturalness factor of the SOBS-F2A would also consist of a subscale of essentialist beliefs about the aetiology of sexual orientation. It is suggested that future studies investigate the relationship between this factor of naturalness beliefs and other scales of beliefs about the aetiology of sexual orientation or homosexuality, such as those proposed by the studies of Frias-Navarro (2009) and Smith et al. (2011). In line with the literature, these types of beliefs about biological factors and immutability or about the aetiology of sexual orientation may be understood as related to trait essentialism (Hoyt et al., 2018; Ryazanov & Christenfeld, 2018).

Analysis that evaluated the existence of external validity evidence of the SOBS-F2A (convergent, discriminant and criterion validity) presented satisfactory results, as they confirmed the relationship of its factors with associated variables according to the literature. Positive correlations were observed between beliefs about informativeness, discreteness, and homogeneity and homophobic attitudes. Studies that used latent profile analysis point to an association between presenting higher levels of these three types of beliefs and higher levels of sexual prejudice or distancing oneself from homosexual individuals (Agadullina et al., 2018; Grzanka et al., 2016; Grzanka et al., 2020). Regarding naturalness beliefs, those studies found negative (Agadullina et al., 2018; Grzanka et al., 2016) or null (Grzanka et al., 2020)

correlations with the measures of sexual prejudice, which was also observed in the samples of the present study. These findings reinforce the more recent claim that beliefs about the naturalness of sexual orientation alone exhibit an inconsistent relationship with sexual prejudice.

Correlations between higher levels of conservatism and higher levels of beliefs about informativeness, discreteness, and homogeneity and lower levels of naturalness beliefs found in this study, in part, corroborate findings from the literature. Studies show that people with more beliefs about discreteness, homogeneity, and informativeness of sexual orientation have higher identification with conservatism (Agadullina et al., 2018; Grzanka, et al., 2020; Hoyt et al. 2018). Regarding beliefs related to the naturalness and immutability of sexual orientation, negative correlations were observed in the studies by Agadullina et al. (2018) and Hoyt et al. (2018), but no statistically significant correlations were observed in the study by Grzanka et al. (2020). This inconsistency in the pattern of correlations with the naturalness factor was also observed in the present study, as the association was null in Sample A and of weak magnitude in Sample B. Almost all correlations observed in this study occurred in directions indicated by previous studies, except in the case where the Informativeness factor did not present a significant correlation with the measure of conservatism in Sample A.

Research specifically about the relationship between essentialist beliefs about sexual orientation and religiosity is scarcer. However, some studies show that religiosity correlates positively with discreteness beliefs and negatively with naturalness/immutability beliefs (Haslam & Levy, 2006; Horvath & Ryan, 2003; Whitehead, 2010). Haslam and Levy's (2006) findings show that beliefs about immutability, universality, and discreteness of sexual orientation mediate the relationship between religiosity and attitudes towards gay men and lesbians. This suggests that higher rates of sexual prejudice among people who are more religious may be partially explained by their tendency to believe less in the immutability and

universality of homosexuality and to believe more that it is categorically distinct from heterosexuality (Haslam & Levy, 2006). In this study, these associations were found with the naturalness factor (only in Sample B) and with the discreteness factor (in both samples). The positive correlations with the informativeness (only in Sample B) and homogeneity (in both samples) factors found in this study need to be investigated in future research.

The results of the analysis of variance between groups of different sexual orientations, religious beliefs, and schooling levels indicated that all factors of the SOBS-F2A showed good capacity to discriminate groups. Furthermore, in all the categories analyzed, at least one of the groups showed some difference in the means of beliefs about discreteness and homogeneity in both samples. This is in line with previous studies, as the results show that heterosexuals tend to have higher mean scores on the discreteness and homogeneity factors, while gay men and lesbians tend to have higher mean naturalness scores (Agadullina et al., 2018; Grzanka et al., 2016), and bisexual individuals tend to have lower levels of essentialist beliefs in general (Hubbard & Visser, 2015; Morgenroth et al., 2021). The results of this study showed that participants who reported having some Christian religion have higher mean scores on the informativeness, discreteness and homogeneity factors, while participants identified as atheists have higher mean naturalness scores (only in Sample B). These findings can be interpreted in accordance with the findings of Haslam and Levy (2006), who found an association between these types of beliefs and religiosity. Regarding differences in levels of beliefs about sexual orientation among participants of different schooling levels found here, such results suggest that further education has some effect in reducing some of these essentialist beliefs. Future studies should further investigate this relationship by analysing the effect of education on beliefs about sexual orientation and its relationship with sexual prejudice.

This study has some limitations that should be considered. Although multigroup confirmatory factor analysis was performed in the validation study of the original scale, these

types of analyses were not performed here. This is because the focus in this study was to translate and adapt the scale items, to investigate how the essentialist beliefs about sexual orientation reflected by these items organize in the Brazilian context and to investigate which model would integrate these beliefs presenting better fit indices. However, future studies should investigate the psychometric properties of the SOBS-F2A through other analyses that offer additional indices, such as multigroup confirmatory factor analysis.

In addition, the measures of religiosity and conservatism used here consisted only of indicators of the level of religiosity and political conservatism, which may have affected the magnitude of the relationship of these constructs with the different SOBS-F2A factors. Therefore, future studies should use other measures of religiosity and conservatism with psychometric properties for more accurate analysis of the relationship between these constructs. Finally, these surveys were performed online and used a convenience sampling technique. This implies a greater likelihood of participation by people with internet access who use the social networks used for dissemination and who are usually interested in advertisements for surveys such as these ones. Therefore, other studies should use alternatives recruitment strategies to obtain even more diverse samples.

Despite its limitations, the purposes of this study were achieved. It presents evidence of the validity of the SOBS-F2A, which is a version of the SOBS-F2 adapted for the Brazilian context. Its results show that essentialist beliefs that participants have about sexual orientation are structured similarly to those of people in other cultural contexts. The relationships between these beliefs about sexual orientation and related variables mostly replicated results found in the literature. Moreover, this study shows that the factor structure involving essentialist beliefs about discreteness, homogeneity, naturalness, and informativeness extends to samples with different schooling levels, as shown by the diverse samples studied herein. These findings

contribute to the expansion of knowledge about such constructs in samples that are more culturally diverse and more representative of the general population.

The availability of a Brazilian version of the SOBS-F2A with adequate psychometric properties enables the investigation of the role of essentialist beliefs in Brazil in comparison to other contexts where such studies have already been conducted. Thus, the translated and adapted version of the scale enables the expansion of knowledge within this line of studies and its potential contribution to the reduction of sexual prejudice. Future studies should aim to combat prejudice in the general population and promote well-being for sexual minorities and the use of the SOBS-F2A can contribute to this because it enables the assessment of different essentialist beliefs about sexual orientation, which are commonly associated with sexual prejudice. The possibility of assessing these types of beliefs with psychometric instruments will make it possible to better understand their impacts on attitudes and to produce evidence about the directions to be followed with regard to beliefs that demand greater attention for interventions in this context. In this regard, this article enhances understanding about attitudes toward sexual orientation categories and aetiology and contributes valid evidence for the measurement of essentialist beliefs about these issues. This work broadens knowledge in this field, and it has implications for practical work, such as counseling psychology and psychotherapy, educational interventions, advocacy work and policy-making.

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Appendix A: SOBS-F2A

Sexual Orientation Beliefs Scale - Form 2 Adapted version

As sentenças a seguir refletem ideias que as pessoas têm sobre a orientação sexual. Indique o seu grau de concordância com cada uma das sentenças assinalando uma das alternativas seguintes, que variam de 1 (Discordo fortemente) até 5 (Concordo fortemente). Pedimos que responda de acordo com sua opinião, da forma mais sincera possível e lembre-se que não existem respostas certas ou erradas.

Itens	Nível de concordância				
1 - Saber a orientação sexual de uma pessoa diz muito sobre ela. ¹	1	2	3	4	5
2 - É útil agrupar as pessoas de acordo com a orientação sexual delas. ¹	1	2	3	4	5
3 - A orientação sexual de uma pessoa é um atributo importante. ¹	1	2	3	4	5
4 - É possível conhecer muito sobre uma pessoa quando você conhece a orientação sexual dela. ¹	1	2	3	4	5
5 - Se você não conhece a orientação sexual de uma pessoa, você não pode dizer que realmente conhece essa pessoa. ¹	1	2	3	4	5
6 - A orientação sexual é uma categoria com classificações exclusivas: ou uma pessoa é gay/lésbica ou ela é heterossexual. ²	1	2	3	4	5
7 - Pessoas que se identificam como bissexuais estão confusas quanto a sua verdadeira orientação sexual. ²	1	2	3	4	5
8 - A orientação sexual é uma categoria com classificações claras: ou uma pessoa é gay/lésbica, ou ela é bissexual ou ela é heterossexual. ²	1	2	3	4	5
9 - É possível ser “parcialmente” ou “um pouco” gay/lésbica ou heterossexual. ² (R)	1	2	3	4	5
10 - Uma pessoa tem apenas uma verdadeira orientação sexual. ²	1	2	3	4	5
11 - Faz sentido que as pessoas possam se identificar com duas orientações sexuais ao mesmo tempo. ² (R)	1	2	3	4	5
12 - Pessoas que compartilham a mesma orientação sexual têm objetivos em comum. ³	1	2	3	4	5
13 - Pessoas com a mesma orientação sexual têm um mesmo destino. ³	1	2	3	4	5
14 - Pessoas com a mesma orientação sexual parecem estar ligadas entre si por	1	2	3	4	5

algum tipo de conexão invisível. ³					
15 - Pessoas que têm a mesma orientação sexual são muito parecidas entre si. ³	1	2	3	4	5
16 - Existem mais semelhanças do que diferenças entre pessoas que têm a mesma orientação sexual. ³	1	2	3	4	5
17 - Pessoas que têm a mesma orientação sexual interagem frequentemente entre si. ³	1	2	3	4	5
18 - Se alguém “sai do armário” (se declara como gay ou lésbica), provavelmente essa pessoa sempre se sentiu atraída pelo mesmo sexo. ⁴	1	2	3	4	5
19 - A orientação sexual é definida cedo na vida. ⁴	1	2	3	4	5
20 - A orientação sexual é inata (a pessoa já nasce com ela definida). ⁴	1	2	3	4	5
21 - Fatores sociais e ambientais são a causa principal da orientação sexual de uma pessoa. ⁴ (R)	1	2	3	4	5
22 - Fatores biológicos são a causa principal da orientação sexual de uma pessoa. ⁴	1	2	3	4	5

Nota. ¹: Item correspondente ao fator “Informatividade”. ²: Item correspondente ao fator “Discretividade”. ³: Item correspondente ao fator “Homogeneidade”. ⁴: Item correspondente ao fator “Naturalidade”. (R): Itens de pontuação invertida (as respostas marcadas com 1 devem ser recodificadas como 5 e vice-versa, e as respostas marcadas com 2 devem ser recodificadas como 4 e vice-versa). Feita a recodificação, os escores dos fatores são calculados por meio da média aritmética dos escores dos itens que compõem cada fator.

CHAPTER III - STUDY 3

Dimensions of psychological essentialism and attitudes towards sexual diversity⁵

Abstract: Essentialist thinking is commonly associated with prejudice; however, how these interrelate is not fully understood. We investigated a multidimensional model of psychological essentialism, and how these different dimensions (naturalness, discreteness, homogeneity, and informativeness) might be associated with attitudes towards sexual diversity. This study used a cross-sectional design; participants ($N=868$) completed measures of essentialist beliefs and attitudes towards sexual diversity, and data were analyzed through structural equation modeling. Results showed that the discreteness dimension was directly associated with more negative attitudes towards sexual diversity, across all participants. In contrast, naturalness beliefs were directly associated with less negative attitudes towards sexual diversity, but only among cisgender and heterosexual participants. However, naturalness was also indirectly associated (via discreteness) with more negative attitudes towards sexual diversity, across all participants. Our findings show how different essentialist beliefs relate to each other and attitudes towards sexual diversity, and help to explain their associations with sexual prejudice.

Keywords: sexual prejudice, attitudes, essentialist beliefs, essentialism, sexual orientation.

Public Significance Statement

This study highlights that one kind of essentialist belief about sexual orientation – naturalness – can be associated with both lower and higher sexual prejudice in relation to sexual diversity. The nature of the association depends on factors such as sexual orientation/identity, the type of negative attitude towards sexual diversity assessed, and its simultaneous occurrence with other essentialist beliefs.

⁵This study has been submitted and is under review for possible publication in the American Psychological Association's journal *Psychology of Sexual Orientation and Gender Diversity*. The paper was written in collaboration with and co-authored by Dr. Sari van Anders from Queen's University in Kingston, ON, Canada.

Introduction

Essentialist thinking holds that social groups have an essence, and it has been seen as one of the central aspects of prejudice since Allport published his classic theory in 1954. Since then, scholars and scientists have studied the role of essentialist thinking as a key psychological component associated with prejudice (e.g., Haslam et al., 2002; Leyens et al., 2000; Rothbart & Taylor, 1992; Yzerbyt et al., 1997). And prejudice itself has been defined as a predisposition towards negative attitudes against either a group or a person because they belong to a certain group. Research on prejudice against sexual minority⁶ groups, including gay and lesbian people, encompasses this focus (e.g., Falomir-Pichastor et al., 2017; Figueiredo & Pereira, 2021; Fry et al., 2020; Grzanka et al., 2016; Hegarty, 2010). In addition, models of sexual prejudice also consider other kinds of beliefs (e.g., pejorative and mistaken conceptions), and that these might be important to understanding prejudice against sexual minorities (Herek, 2004; Morrison & Morrison, 2003). In the present study, we aimed to investigate how various kinds of essentialist beliefs about sexual orientation can interact within a multidimensional model of psychological essentialism, and what their effects might be on different attitudes towards sexual diversity. This study was carried out mainly to help understand the direct and indirect relationships between belief in the biological basis of sexual orientation and sexual prejudice, since the implications of this dimension of psychological essentialism are not yet fully understood.

Sexual diversity can encompass a broad array of phenomena. This includes sexual identity, sexual status (e.g., behaviors, actions), and sexual orientation, which refers to interests, approaches, attractions, and fantasies, like sexual identity and sexual status. Sexual identity, status, and orientation can be configured dynamically, and relate to each other dimensions in

⁶We use the terms "minority/minorities" to refer to people and groups who are minoritized and marginalized in a power hierarchy because of resistance to their sexuality (sexual orientation, sex/gender, and other aspects); therefore, their use does not refer to statistical infrequency (van Anders, 2015; 2024). These terms can be problematic, but better encompass the range of identities, experiences, and existences arising from sexual diversity and marginalization towards it that we address in this text.

branched or co-incident ways (van Anders, 2015). Sexual orientation is one of the main aspects of sexuality linked to sexual prejudice (Herek, 2004; Morrison & Morrison, 2003), and we focus on it throughout this article.

Current models of sexual prejudice focus mainly on negative attitudes towards gays and lesbians, which have been investigated as manifestations of modern prejudice, characterized by more subtle and less explicit attitudes (Morrison & Morrison, 2003). A recent study involving a sample of heterosexual and non-heterosexual participants, which aimed to investigate validity evidence for a proposed measure of modern sexual prejudice, found evidence for a model consisting of two factors of attitudes towards homosexuality⁷ (Ramos & Cerqueira-Santos, 2021). One of these factors refers to proximal attitudes, which relate to negative attitudes towards sexual relationships and feelings towards homosexuality in one's intimate or family life. The other factor refers to distal attitudes, which relate to negative social attitudes towards laws and the integration of homosexual people into society, considering homosexual people as a social group (Ramos & Cerqueira-Santos, 2021). These dimensions of sexual prejudice assessed on the basis of proximal attitudes and distal attitudes may be very useful for investigating prejudice on an interpersonal and intergroup level.

Sexual prejudice can also be constituted by aversion towards gender diversity (Costa et al., 2013; Gordon & Meyer, 2008) and there are models that integrate factors of prejudice against sexual diversity and against gender diversity (e.g., Costa et al., 2016). As it has been found that beliefs about sex education are strongly associated with the prejudice against sexual and gender diversity ($r = 0.60$, $p < 0.001$; Santos et al., 2023). Furthermore, some people (mainly parents and caregivers) believe that talking about sexuality in schools (and sexual and

⁷Throughout this article we use the terms "homosexuality/homosexual" only when referring to references that use them (e.g., Haslam & Levy, 2006; Overby, 2014). This is also the case when we refer to the Scale of Attitudes towards Homosexuality results, which we used to measure sexual prejudice (Ramos & Cerqueira-Santos, 2021). Otherwise, we avoid using these terms, since they are associated with negative stereotypes, pathologization, and reductionism of people's identity to their sexual behavior (e.g., APA, 2020; 2023).

gender diversity) can lead children and young people to feel same-sex attraction or become lesbian, gay, bisexual or transgender (LGBT); therefore, sexual prejudice can contribute to opposition to sex education in schools for fear that it will have such an impact on sexual development (Ferfolja et al., 2023; Gegenfurtner & Gebhardt, 2017). It may be possible, then, that opposition to sex education in schools to some extent also represents subtle, covert attitudes of prejudice against sexual and gender diversity. However, more studies are required to test this assumption.

We mainly use the terms ‘sexual prejudice’ and ‘sexual stigma’ to refer to negative attitudes, inferiorization, and rejection directed to sexual minorities and everything that refers to non-heterosexuality (Herek, 2004). However, there are other dimensions of related phenomena. One is internalized homonegativity (sometimes referred to as internalized homophobia), which relates to the process of internalization of societal sexual stigma by gay, lesbian and bisexual people and directing it towards the self (Meyer, 1995). Another is heteronormativity, which, subsumed under the definition of heterosexism, refers to cultural ideologies that perpetuate sexual stigmas denying and denigrating everything that relates to non-heterosexuality (Herek, 2004).

Essentialist beliefs and sexual prejudice

Initially, studies investigating the relationship between beliefs about sexual orientation (mainly about “homosexuality”) and sexual prejudice (mainly among heterosexual people) found that people with higher beliefs about the naturalness (e.g., biologically based and immutable) of sexual orientation tend to express lower sexual prejudice (Aguero et al., 1984; Ernulf et al., 1989; Haider-Markel & Joslyn, 2008; Haslam & Levy, 2006; Haslam et al., 2002; Hegarty & Pratto, 2001; Herek & Capitanio, 1995; Horn & Heinze, 2011; Jayaratne et al., 2006; Mitchell & Deza, 2014; Overby, 2014; Sakalli, 2002; Whitley, 1990). Since the early 2000s, research has also found that other types of essentialist beliefs are also associated with higher

sexual prejudice (Haslam & Levy, 2006; Haslam et al., 2002; Hegarty, 2002; Hegarty & Pratto, 2001). This includes essentialist beliefs about discreteness (that sexual orientation has discrete and non-overlapping categories; Haslam & Levy, 2006; Haslam et al., 2002) and fundamentality (that there are profound differences between binary categories; Hegarty, 2002; Hegarty & Pratto, 2001). Thus, essentialist beliefs can have varying connections with sexual prejudice, with naturalness linked to less prejudice and discreteness and fundamentality linked to more prejudice.

Essentialist beliefs do seem to be multidimensional. In their study, Arseneau et al. (2013) present evidence of this, with four factors of essentialism: naturalness, discreteness, homogeneity and informativeness. That sample, however, was majority heterosexual and cisgender though it included some LGBT participants. But sexual orientation and gender identity seems to matter for the construction of essentialism: in a sample of LGBT participants only, Arseneau et al. found some overlapping and some of the same factors: naturalness, discreteness, entitativity, and personal and social importance. Findings from Arseneau et al.'s work suggests that some components of essentialism - naturalness and discreteness – seem to be consistent across sexual orientation and gender identity. And, to the extent that the homogeneity and informativeness factors on one hand, and entitativity and personal and social importance factors on the other, seem to be specific to sexual orientation and gender identity groups, although they can be considered parallel, respectively.

Research shows that people with higher levels of some essentialist subcomponents (discreteness, homogeneity and informativeness beliefs), or all four dimensions of essentialism simultaneously, have more negative attitudes towards sexual minorities compared to those with higher levels of naturalness alone (Agadullina et al., 2018; Grzanka et al., 2016). Moreover, these studies show that endorsement of discreteness, homogeneity and informativeness together is better predictor of negative attitudes towards sexual minorities than beliefs of naturalness

alone (Agadullina et al., 2018; Grzanka et al., 2016). Then, it may be that interactions among essentialist beliefs predict higher prejudice towards sexual minorities than any of the beliefs do themselves. As such, it may also be that the association between essentialist beliefs and attitudes towards sexual minorities is more complex than would be clear from earlier studies.

Essentialist beliefs and internalized sexual stigma among sexual minorities

The bulk of research about essentialist beliefs and prejudice against sexual minorities has been conducted with sexual majorities; this makes sense given a focus on understanding prejudice to address it. However, some research has focused on sexual minority individuals as well, to investigate the different manifestations of prejudice among LGB people, assessed through measures of internalization of sexual stigma or internalized homonegativity. And research shows some differences on the associations between beliefs about sexual orientation and prejudice by sexual orientation group.

Individuals from sexual minority groups who perceive homosexuality as biological and natural variation of sexuality may evaluate their sexual orientation more positively, in contrast to those who perceive it as an abnormality or acquired characteristic (Dar-Nimrod & Heine, 2011). However, this relationship can also be influenced by other variables and result in different outcomes (Dar-Nimrod & Heine, 2011). For example, a study by Herek et al. (2009) showed that reporting a higher perception of sexual orientation choice was associated with lower levels of internalized sexual stigma among lesbian and gay participants, but not among bisexual ones. Other studies, focusing on essentialism as multidimensional, showed that naturalness beliefs are directly associated with lower internalized homonegativity among lesbian and bisexual women (Morandini et al., 2017), but not among gay men (Morandini et al., 2015). Yet, discreteness beliefs are associated with internalized homonegativity among lesbian and bisexual women (Morandini et al., 2017) and gay men (Morandini et al., 2015), and

entitativity beliefs are associated with internalized homonegativity among lesbian and bisexual women (Morandini et al., 2017).

In a newer study, Tierney et al. (2021) investigated the co-occurrence of the four types of essentialist beliefs about sexual orientation (Arseneau et al., 2013) and explored associations with various attitudes towards sexual orientation among sexual minority individuals. Participants with higher levels of naturalness only showed lower internalized homonegativity, while participants with higher levels of discreteness, entitativity and importance of sexual orientation showed higher internalized homonegativity (Tierney et al., 2021). As such, essentialist beliefs can be related to more or less internalized homonegativity depending on the kind of essentialism endorsed, with naturalness differing from the others. It may be that these different types of beliefs have positive or negative impacts depending on the group and context (Tierney et al., 2021).

Explanations for the relationship between essentialist beliefs and sexual prejudice

There have been arguments in favor of the idea that theories about the biological basis of sexual orientation could benefit sexual minorities by dint of their association with less sexual prejudice (LeVay, 1996; Whitley, 1990) yet there are concerns about their possible pathologizing effects (Hegarty, 2002; Stein, 2001). For example, the association between naturalness beliefs and greater tolerance of sexual minorities like gays and lesbians is commonly explained by the attribution theory in relation to stigma (Weiner et al., 1988): when the cause of the stigma (in this case homosexuality) is attributed to something beyond the control of the person who has it, less guilt and fewer negative attitudes are directed towards that individual (Weiner et al., 1988). However, there are arguments to the contrary and evidence that the effects presumed by this explanation lack robust empirical support (Hegarty, 2020; Hegarty & Golden, 2008). Alternative explanations include findings that the causal effect of decreased intolerance occurs only in specific contexts, such as in the U.S., and among people

who are already more likely to believe in biological explanations of sexual orientation (Hegarty, 2001; Mitchell & Dezarn, 2014). There is also evidence that other types of beliefs have a greater effect on reducing this type of prejudice (Hegarty, 2010; Fry et al., 2020; Mitchell & Dezarn, 2014), which might make the potential costs of biological explanations less worth bearing.

Essentialist beliefs about sexual orientation may have negative impacts on attitudes towards sexual minorities, as they can accentuate stereotypes and differences between groups (Dar-Nimrod & Lisandrelli, 2012; Haslam et al., 2002; Rothbart & Taylor, 1992). They can also increase the salience of anti-sexual minority messages and their sense of marginalization (Morandini et al., 2015; Morandini et al., 2017). Interactions involving these kinds of beliefs may also constitute processes of social categorization and distinctiveness that generate prejudice, as proposed from social identity theory (Tajfel & Turner, 1986).

There is evidence that distinctiveness-seeking processes increase sexual prejudice. Recent experimental studies show increased negative attitudes towards sexual minorities in heterosexual men who are assigned to scenarios that activate processes that threaten distinctiveness between social groups (involving content related to beliefs of discreteness mainly, as well as homogeneity and informativeness) (Falomir-Pichastor & Hegarty, 2014; Falomir-Pichastor et al., 2017; Figueiredo & Pereira, 2021). Further supporting this link, studies show that experimentally decreasing endorsement of discreteness, homogeneity, and informativeness (Fry et al., 2020) and increasing the perception of similarity to homosexual people (Fritzlen et al., 2020), tends to decrease sexual prejudice among heterosexual people. Although research on the effects of distinctiveness and essentialist beliefs on reducing sexual prejudice is still scarce, findings are consistent with the prediction that distinctiveness-seeking processes can result in more prejudice, based on social identity theory (Tajfel & Turner, 1986). Notably, this process seems more consistent among individuals who perceive their group as the

majority, i.e. among men compared to women (Falomir-Pichastor & Hegarty, 2014; Falomir-Pichastor et al., 2017; Figueiredo & Pereira, 2021).

Engaging in the different dimensions of essentialist thinking simultaneously seems to be associated with higher rates of sexual prejudice (Agadullina et al., 2018; Grzanka et al., 2016; Tierney et al., 2021). Studies on the effects of threat to distinctiveness have found that participants endorse biological theories about sexual orientation as a way of justifying differences between groups (Falomir-Pichastor & Hegarty, 2014; Falomir-Pichastor et al., 2015; Falomir-Pichastor et al., 2017; Figueiredo & Pereira, 2021) or their recategorization in relation to sexual orientation (Fritzlen et al., 2020). This may reflect different aspects of biologism, the belief that biology is the best and/or only way of knowing about the life phenomena, which is linked to other ideologies such as heteronormativity (van Anders, 2024).

Biologism is itself be multifaceted, and can include biological determinism and reductionism (beliefs that all life phenomena are biologically determined and explained, respectively), and these are linked to biological essentialism (the belief that social groups are biologically defined) (van Anders, 2024). Indeed, psychological essentialism holds that social categories are "natural" and have a foundational, underlying, and deep essence that generally relies on biological factors as the root explanation (e.g., Arseneau et al., 2013; Dar-Nimrod & Heine, 2011; Fry et al., 2020; Grzanka et al., 2016).

Biological determinism and reductionism may lead to biological essentialism, since explanations of sexual orientation might be used to explain sexual orientation groups and categories. As such, psychological essentialism may reflect a host of biologicistic ideologies. Moreover, regressive ideologies like heteronormativity also are predicated on notions of a biologicistic sex binary, the superiority of manhood/masculinity/maleness, and sexual/relational complementarity, which can contribute to the marginalization of lesbian, gay, queer and other

minority sexualities (van Anders, 2024). As such, biologism and heteronormativity may inform links between essentialism and sexual prejudice.

Variables associated with beliefs about sexual orientation and sexual prejudice

As beliefs about sexual orientation are constructs associated with attitudes towards sexual diversity, other variables that are also related to sexual prejudice may come into play. Studies have investigated the relationship between essentialist beliefs and sexual prejudice by evaluating (or controlling for) the effect of variables such as political ideology or conservatism and religiosity, which are considered predictors of these type of prejudice (Crawford et al., 2016; Pearte et al., 2013; Vilanova et al., 2021; Whitley, 2009). Literature shows that conservative positions or conservatism (Haider-Markel & Joslyn, 2008; Overby, 2014; Whitehead, 2010) and religiosity (Haider-Markel & Joslyn, 2008; Mitchell & Dezarn, 2014; Overby, 2014; Whitehead, 2010) are associated with lower beliefs about sexual orientation related to the naturalness dimension. These beliefs (i.e., tied to naturalness) were the main predictors of attitudes towards sexual minorities even in models that included political ideology (Haider-Markel & Joslyn, 2008; Overby, 2014) and religiosity (Haider-Markel & Joslyn, 2008).

Studies also show that different dimensions of essentialist beliefs are associated with sexual prejudice even when controlling for the effects of individual differences in right-wing authoritarianism (Haslam & Levy, 2006; Haslam et al., 2002), social dominance orientation, political conservatism, and religiosity (Haslam & Levy, 2006). For example, beliefs about the discreteness and immutability of sexual orientation and right-wing authoritarianism independently predict sexual prejudice (Haslam & Levy, 2006; Haslam et al., 2002), with beliefs about discreteness having a greater predictive contribution (Haslam & Levy, 2006). More recent studies also show that essentialist beliefs about discreteness, homogeneity and informativeness are associated with more conservative positions and fewer LGBT friendships (Grzanka et al., 2020), and are associated with higher right-wing authoritarianism and social

distance from gay men/lesbian women (Agadullina et al., 2018). In addition, people with conservative political ideologies strategically endorse some types of beliefs that play a role in justifying prejudice. For example, they tend to more strongly endorse the belief that gay and heterosexual people are fundamentally different and less strongly endorse the belief that sexual orientation is a fixed attribute that cannot be changed, which predicts sexual prejudice (Hoyt et al., 2018). This suggests the potential for both independence and interactions between essentialist beliefs and other variables in terms of impacting sexual prejudice.

Research has found associations between sociodemographic variables, beliefs about sexual orientation, and sexual prejudice, but these are inconsistent across studies and do not yet have clear theoretical explanations. The literature shows, for example, that age (Haider-Markel & Joslyn, 2008; Morandini et al., 2017; Overby, 2014), race/ethnicity (Mitchell & Dezarn, 2014; Overby, 2014; Tierney et al., 2021), education (Haider-Markel & Joslyn, 2008), and relationship status and family income (Overby, 2014) are associated with endorsement of beliefs in general about the bases of homosexuality or naturalness and discreteness beliefs about sexual orientation. Moreover, though education in the context of undergraduate courses has the potential to reduce essentialist beliefs and, consequently, sexual prejudice (Hegarty, 2010), few studies have found an association between level of education and these types of beliefs (e.g., Haider-Markel & Joslyn, 2008). As such, how these variables interact with essentialist beliefs to impact sexual prejudice remains an important question.

The present study: Proposing a mediation model between dimensions of essentialism and attitudes towards sexual diversity

Research has investigated associations between different essentialist beliefs and sexual prejudice. However, to our knowledge, no research has so far tested the structural relationship between: (a) the different dimensions of essentialism and negative attitudes towards sexual diversity, (b) whether such relationships differ according to participants' sexual

orientation/identity, (c) whether the association between naturalness and such attitudes is mediated by other types of essentialist beliefs; and (d) whether naturalness beliefs are directly associated with lower, and indirectly associated with higher, negative attitudes towards sexual diversity among majority groups and sexual minorities. Accordingly, we aimed in this study to investigate whether: 1) naturalness beliefs predict other types of essentialist beliefs about sexual orientation; and whether naturalness beliefs directly predict lower negative attitudes, and other essentialist beliefs predict higher negative attitudes, towards sexual diversity; 2) the associations between essentialist beliefs and attitudes towards sexual diversity differ according to participants' sexual orientation/identity (cis-heterosexual and LGBT+ identity); 3) other types of essentialist beliefs mediate the association between naturalness beliefs and attitudes towards sexual diversity; and 4) naturalness beliefs indirectly predict more of these attitudes among majority groups and sexual minorities. In addition, we aimed to explore how individual difference variables may be related to the above research questions.

To address the above questions, we tested the following hypotheses:

H1a: Naturalness beliefs will positively predict stronger endorsement of the other types of essentialist beliefs: discreteness, homogeneity, and informativeness.

H1b: Naturalness will predict lower negative attitudes, whereas discreteness, homogeneity, and informativeness will predict higher negative attitudes, towards sexual diversity.

H2: The structural relationship between the different essentialist beliefs and negative attitudes towards sexual diversity will differ depending on participants' sexual orientation/identity (cis-heterosexual and LGBT+ identity).

H3a: The relationship between naturalness beliefs and attitudes towards sexual diversity will be mediated by other essentialist beliefs (discreteness, homogeneity, and informativeness).

H3b: Naturalness beliefs will indirectly predict higher negative attitudes towards sexual diversity, when mediated by other essentialist beliefs (discreteness, homogeneity, and informativeness beliefs).

Method

This study had a cross-sectional design, and was carried out through a national survey in Brazil and used a non-probabilistic convenience sampling technique to recruit participants.

Participants

A total of 868 Brazilian individuals took part in this study, whose mean age was 31.81 years ($SD = 12.27$) and who ranged in age from 18 to 70 years. Participants who identified as women (trans and cisgender; 50.8%), having a heterosexual orientation (54.7%), white (57.5%) and having no religion (50.3%) were more prevalent. People from all Brazilian states took part in this study and most (70.7%) were residents of the Southeast (38.9%) and Northeast (31.8%) regions. The sample was diverse in relation to these and other sociodemographic characteristics, such as: level of urbanization of the place of residence, marital and relationship status, parental status, schooling level, and individual monthly income. Table 1 shows in detail the distribution of participants by sociodemographic characteristics.

Table 1. Distribution of participants by sociodemographic characteristics

Sociodemographic characteristics and categories	<i>N</i> = 868	
	<i>n</i>	%
Gender		
Cisgender woman	433	49.9
Cisgender man	369	42.5
Transgender woman	8	0.9
Transgender man	8	0.9
Non-binary	29	3.3
Queer	9	1.0
Transvestite	2	0.2
Other	10	1.2
Sexual orientation		
Heterosexual	475	54.7
Bisexual	151	17.4
Homosexual	146	16.8
Pansexual	44	5.1
Asexual	28	3.2
Queer	9	1.0
Other	15	1.7
Sexual orientation/identity¹		
Cis-heterosexual	458	52.8
LGBT+	420	47.2
Race/ethnicity self-identification		
White	499	57.5
Brown ²	282	32.5
Black	67	7.7
Other	20	2.3
Religious beliefs and affiliation		
No religion, but believes in God	230	26.5

No religion and no belief in God	207	23.8
Follow some kind of religion	431	49.7
Catholic religion	228	26.3
Evangelical religion	56	6.5
Spiritist ³	47	5.4
African matrix religion	38	4.41
Protestant	19	2.2
Other	43	5.0
Level of urbanization of place of residence		
Large city or state capital - municipality with more than 100,000 inhabitants	529	61.0
Medium-sized city - municipality with 50 to 100 thousand inhabitants	126	14.5
Small city - municipality with up to 50 thousand inhabitants	148	17.0
Rural area	65	7.5
Marital and relationship status		
Single	407	46.9
Dating someone	200	23.1
Married	163	18.8
In a stable union	97	11.2
Parental status - whether you have a child or none		
With no children	659	76.0
With children under 18 years of age	133	15.3
With children over 18 years of age	76	8.7
Schooling level		
1 - Up to incomplete high school	35	4.0
2 - Completed high school	175	20.2
3 - Undergraduate degree incomplete	222	25.6
4 - Undergraduate degree completed	328	37.8
5 - Master's Degree	72	8.3
6 - Doctoral Degree	36	4.1
Individual monthly income level ⁴		

1 - Up to R\$ 100.00 or no income at all per month	117	13.5
2 – Between R\$ 100.00 and one minimum wage	211	24.3
3 – Between 1 and 2 minimum wages	202	23.3
4 – Between 2 and 4 minimum wages	166	19.1
5 - Entre 4 e 4 salários mínimos	114	13.1
6 – Above 8 minimum wages	58	6.7

¹The answers given in relation to sexual orientation (sexual attraction) were combined with the labels the participants indicated they use to identify themselves in terms of sexual orientation (e.g. straight, gay, lesbian, etc.) and gender (e.g. man, trans man, non-binary, etc.). This resulted in the two categories of cis-heterosexual participants and LGBT+ participants. ²Mixed race - mostly Black and white. ³A philosophical and scientific religious doctrine whose main assumption is the belief in the constant spiritual evolution of human beings through reincarnation. ⁴Participants who reported that they were unemployed and/or had no individual income were included in category number 1. Some participants (n = 18) who gave non-specific answers such as: "low", "I don't know", "I have no fixed income", among others, were also classified in this category. A minimum wage in Brazil was equivalent to R\$1212.00 per month (about US\$255.73 per month) at the time of data collection.

Procedures

Participants were recruited in March 2022, through ads shared on social networks (Facebook, Instagram, and WhatsApp). Potential participants were able to click on a link that directed them to read the informed consent form (ICF) and complete a questionnaire with the measures for the survey. Inclusion criteria were being over 18 years old and living in Brazil. After becoming aware of the ICF and indicating consent to take part in the research, participants were directed to answer the measures online. All participants were informed that they could stop their participation in the surveys at any time, which would indicate their withdrawal from participating in this study; therefore, only responses of participants who answered all items were considered for analysis.

No specific check questions were used to validate the quality of the data. But instruments were presented online in separate blocks with the items of each measure. Between each block there were instructions on what to do to progress through the questions and

reminders about the importance of continuing to give truthful answers in the following questions. This procedure was used to increase the chances that only participants who were reading the instructions thoroughly and who were committed to completing the entire questionnaire would complete the surveys. The participants in this research did not receive any financial compensation. This study was approved by the Research Ethics Committee of the universities to which the authors are affiliated.

Measures

Sociodemographic Questionnaire. The study used a sociodemographic questionnaire developed for this study to collect information about age, gender, sexual orientation (attraction), sexual orientation identity label categories, racial/ethnic self-identification, religious beliefs and affiliation, level of urbanization of place of residence, marital and relationship status, parental status (whether participants had a child/ren or none), schooling level and individual income (these last two variables were treated as continuous variables in the analyses, according to the organization presented in Table 1), and state of residence in Brazil.

This questionnaire also asked the following about political orientation: Which political orientation do you identify with more? The response options ranged from "Extreme Left" to "Extreme Right", plus one option "I do not have a defined political position". Responses to this question were treated as an indicator of political conservatism, calculated using a seven-point scale where the "Extreme Right" response option represented the maximum score. We recoded the option indicating no defined positioning as recoded as "Center" positioning, because it was equivalent to the midpoint of this measure (i.e., equally distant from that of the "Extreme Left" and "Extreme Right" participants, and corresponding to the position of the "Center" participants).

This questionnaire also included three questions related to religiosity: 1) How often do you engage in religious practices, such as services, masses or other religious activities? 2) How

important are your religious/spiritual beliefs to you? And 3) How much do your religious/spiritual assumptions influence your decisions? These questions were answered using five-point scales, and answers were summed; scores (ranging from 3 to 15 points) were used to assess levels of religiosity.

Essentialist beliefs. The Sexual Orientation Beliefs Scale – Form 2 Adapted version (SOBS-F2A; Santos & Cerqueira-Santos, 2023) was used to measure essentialist beliefs about sexual orientation. SOBS-F2A, a version of the Sexual Orientation Belief Scale – Form 2 (Arseneau et al., 2013), has recently been adapted and validated in the Brazilian context (the sample from this study was used in the wider validation study of the scale in Brazil). SOBS-F2A is made up of four factors measuring beliefs about naturalness (five items), discreteness (six items), homogeneity (six items) and informativeness (five items). It is answered through a Likert-type scale (1 - strongly disagree to 5 - strongly agree) and participants report their agreement with items that reflect essentialist beliefs. After inverted items are recoded, higher scores indicate greater endorsement of the essentialist beliefs in each factor.

Prejudice against sexual diversity. The Attitudes Towards Homosexuality Scale (ATHO; Ramos & Cerqueira-Santos, 2021) was used to measure different dimensions of prejudice against sexual diversity. ATHO is a scale validated in the Brazilian context with a sample that included both cis-heterosexual and LGBT+ participants, and measures negative attitudes towards homosexuality and sexual diversity. It consists of seven items that are organized in a bifactor model, with adequate fit for both a unifactorial solution (general attitudes towards homosexuality) as well as a structure with two factors: proximal attitudes towards homosexuality (three items representing negative attitudes towards sexual relations and feelings related to homosexuality in one's intimate or family life) and distal attitudes towards homosexuality (four items representing negative social attitudes towards laws and the integration of homosexual people into society, by considering homosexual people as a social

group). ATHO is answered through a seven-point Likert-type scale (1 - strongly disagree to 7 - strongly agree), in which participants report their agreement with items that reflect attitudes towards homosexuals and homosexuality or same-sex attraction. Higher scores indicate more negative attitudes, after inverted items are recoded. The two-factor solution was adopted in this study to measure different dimensions of sexual prejudice.

Prejudice against gender and sexual diversity. The Sex Education Beliefs Scale (SEBS; Santos et al., 2023) was used to measure opposition to sex education and as a proximal measure of prejudice against gender and sexual diversity. The SEBS is an adapted version of a scale of teachers' attitudes towards sex education, first validated in Portugal by Reis and Vilar (2006), which was validated in Brazil by Santos et al. (2023) and measures positive and negative beliefs that people may have about the existence of formal sex education in schools. It consists of 10 items structured in a unifactorial solution. The ECES is answered using a Likert-type scale (1 - strongly disagree to 5 - strongly agree), in which participants indicate their agreement with items that reflect positive (six items) and negative (four items) beliefs about the legitimacy and benefits of formal sex education actions in schools. In author's validation study, the items on negative beliefs were recoded to the overall score measuring positive beliefs. In this study we instead opted to recode the items on positive beliefs; this allowed us to create an overall score that measures negative beliefs and therefore reflects opposition to sex education in schools.

Internalized sexual stigma. The Internalized Homophobia Scale (IHS; Lira & Morais, 2019) was used to measure internalized sexual stigma, i.e., sexual prejudice against one's own sexual orientation among non-heterosexual participants. The IHS was developed by Ross and Ross (1996) and validated in Brazil by Lira and Morais (2019). In the version adapted for the Brazilian context, it consists of 19 items distributed in two factors: internal perception of stigma (15 items) and perception of social oppression (4 items). The IHS is answered using a four-point Likert-type scale (1 - strongly disagree to 4 - strongly agree), in which participants report

their agreement with the items that reflect negative attitudes and discomfort in relation to their own non-heterosexual sexual orientation. Higher scores indicate more internalized homophobia according to the respective factor, after the inverted items are recoded. Only the internal perception of stigma factor was used in this study and only for the part of the sample ($N = 302$) that declared homo- or bisexual orientation and/or identity.

Data analysis

We tested regression and mediation models using structural equation modeling (SEM) and multi-group structural equation modeling (MSEM). However, we carried out some preliminary analyses first (results in supplementary materials – Appendix A). We tested measurement models using confirmatory factor analyses (CFA) of each scale. As one of our aims was to investigate whether sexual orientation/identity was a factor that would differentiate the structural relationships hypothesized, we tested the measurement invariance of the instruments between the target groups, using multigroup confirmatory factor analyses (MCFA) before testing the multigroup structural models. We carried out descriptive analyses on the scalar variables investigated, as well as bivariate analyses (t-test, analysis of variance [ANOVA] and Pearson's correlation) to investigate the association between all scalar variables and sociodemographic variables, including cis-heterosexual and LGBT+ sexual orientation/identity. After this stage, we tested the structural models and the variables political conservatism, level of religiosity, schooling level, individual monthly income, and age were inserted as covariates to control for possible confounding effects. We tested four structural models with the following attitudinal outcomes on sexual diversity: proximal attitudes towards homosexuality, distal attitudes towards homosexuality, opposition to sex education and internal perception of stigma. The first three models were analyzed with the whole sample ($N = 868$) and with MSEM, considering the participants sexual orientation/identity cis-heterosexual and LGBT+ as the grouping factor. The last model was analyzed only with those 302 participants

declaring homo- or bisexual orientation and/or identity and who answered the internal perception of stigma subscale.

All the analyses were conducted in JASP (Version 0.18.1.0) and the SEM and MSEM were done using the lavaan package (Rosseel, 2012), implemented in the same software. Considering the ordinal nature of the data, we used a robust diagonally weighted least squares (RDWLS) extraction method (Asparouhov & Muthen, 2010). We tested the fit indices of the tested models based on the values of the Comparative Fit Index (CFI), Standardized Root Mean Square Residuals (SRMR) and Root Mean Square Error of Approximation (RMSEA). For a model fit to be considered adequate, the following values were admitted: $CFI > 0.90$, $SRMR$ and $RMSEA < 0.08$, with an upper limit of the 90% confidence interval (CI) of $RMSEA < 0.10$ (Brown, 2015; Kline, 2016). The reliability indices of the scale factors were evaluated using McDonald's omega (ω). In order to accept the hypothesis of measurement invariance of scales models, changes in the CFI and SRMR values should be less than $|0.010|$ and in the RMSEA values should be less than $|0.015|$ when analyzing differences between the indices of each model evaluated compared to the base model, i.e. the configural invariance model (Chen, 2007; Cheung & Rensvold, 2002). As literature about cut-off points for invariance indices of structural models is limited and there is no consensus on the definition of these cut-off points even to establish measurement invariance (e.g., Sass et al., 2014; Yuan & Chan, 2016). We analyzed invariance of the significance of regression coefficients to assess whether being part of the cis-heterosexual or LBGT+ group was a factor that differentiates the structural models.

Results

Main analyses - effects of essentialist beliefs on attitudes towards sexual diversity

Hypothesis 1a and 1b - Direct effects of naturalness and all essentialist beliefs

We tested four structural models with the outcomes of negative attitudes towards sexual diversity to test our first hypothesis (H1a) - naturalness beliefs will positively predict stronger

endorsement of the other types of essentialist beliefs: discreteness, homogeneity, and informativeness - and (H1b) - naturalness will predict lower negative attitudes, whereas discreteness, homogeneity, and informativeness will predict higher negative attitudes, towards sexual diversity. In each model, we tested whether naturalness significantly predicted discreteness, homogeneity and informativeness simultaneously; and whether naturalness, discreteness, homogeneity, and informativeness significantly predicted the outcomes of negative attitudes towards sexual diversity. In all these analyses, the effects of individual differences were controlled for by inserting political conservatism, level of religiosity, schooling level, individual monthly income, and age as covariates. Analyses supported Hypothesis 1a, showing that naturalness predicted all other essentialist beliefs (i.e., discreteness, homogeneity, and informativeness). However, analyses only partially supported Hypothesis 1b. Naturalness predicted lower negative attitudes towards sexual diversity, but only discreteness predicted higher negative attitudes towards sexual diversity, and informativeness only predicted more negative proximal attitudes towards homosexuality.

The results of SEM analyses with naturalness predicting other essentialist beliefs and all these essentialist beliefs predicting attitudes towards sexual diversity, controlling for the effects of covariates, showed that all the models tested had adequate fit indices and similar structures. The outcomes of each model and their respective fit indices were: proximal attitudes towards homosexuality, $\chi^2(310) = 1139.06$, $p < 0.001$, CFI = 0.93, SRMR = 0.06 and RMSEA = 0.06, 90% CI [0.05, 0.06]; distal attitudes towards homosexuality, $\chi^2(337) = 1233.29$, $p < 0.001$, CFI = 0.94, SRMR = 0.06, RMSEA = 0.05, 90% CI [0.05, 0.06]; opposition to sex education, $\chi^2(520) = 1677.58$, $p < 0.001$, CFI = 0.95, SRMR = 0.06, RMSEA: 0.05, 90% CI [0.05, 0.05]; and internal perception of stigma, $\chi^2(621) = 1062.72$, $p < 0.001$, CFI = 0.91, SRMR = 0.08, RMSEA = 0.05, 90% CI [0.04, 0.05]. In all models, naturalness positively predicted all other types of essentialist beliefs and negatively predicted all negative attitudes

towards sexual diversity. Discreteness positively predicted all the outcomes of negative attitudes towards sexual diversity and informativeness positively predicted only the outcome of proximal attitudes towards homosexuality. Homogeneity beliefs did not directly predict the outcomes of negative attitudes towards sexual diversity in any of these models. Therefore, these associations were observed in the general sample, even after controlling for the effects of individual differences measured by covariates. However, it was necessary to test Hypothesis 2 to assess whether these results were consistent across groups or whether they depended on the participants' sexual orientation/identity.

Hypothesis 2 - Differences in the structural relationship between essentialist beliefs and negative attitudes towards sexual diversity according to participants' sexual orientation/identity

To test our second hypothesis (H2) – the structural relationship between the different essentialist beliefs and negative attitudes towards sexual diversity will differ depending on participants' sexual orientation/identity (cis-heterosexual and LGBT+ identity) – we tested the models with the outcomes of proximal attitudes towards homosexuality, distal attitudes towards homosexuality, and opposition to sex education using multi-group analysis, to investigate whether the structural relationships observed in the whole sample were impacted by participants' sexual orientation/identity. Analyses supported Hypothesis 2, showing that the structural relationship between different essentialist beliefs and negative attitudes towards sexual diversity differed depending on the sexual orientation/identity of the participants (cis-heterosexual and LGBT+ identity). The results of the MSEM analysis showed that inclusion of the sexual orientation/identity variable contributed to an improvement in the fit indices of the models with the two outcome variables of attitudes towards homosexuality and opposition to sex education. The outcomes of each model and their respective fit indices were: proximal attitudes towards homosexuality, $\chi^2(620) = 1162.76, p < 0.001, CFI = 0.95, SRMR = 0.06$ and

RMSEA = 0.04, 90% CI [0.04, 0.05]; distal attitudes towards homosexuality, χ^2 (674) = 1236.26, $p < 0.001$, CFI = 0.96, SRMR = 0.06, RMSEA = 0.04, 90% CI [0.04, 0.05]; opposition to sex education, χ^2 (1040) = 1710.29, $p < 0.001$, CFI = 0.97, SRMR = 0.06, RMSEA: 0.04, 90% CI [0.03, 0.04]. A detailed analysis of these models showed that some regression coefficients were different between the groups, i.e. statistically significant for one group, but not significant for the other. As this indicated differences by participants' sexual orientation/identity on the structural relationships found in the models with the general sample, the multi-group models would be considered more appropriate and differences between the two sexual orientation/identity groups needed to be accounted for in investigating the relationships of interest.

Analysis of the statistical significance of the regression coefficients showed that only discreteness was predicted by naturalness, and discreteness predicted both types of attitudes towards homosexuality and opposition to sex education in all models in both groups. Naturalness predicted opposition to sex education in both groups and predicted both types of attitudes towards homosexuality only among cis-heterosexual participants. On the other hand, naturalness did not show a consistent association with attitudes towards homosexuality among LGBT+ participants, as it showed only a marginally significant relationship with proximal attitudes ($p = 0.052$) and a non-significant relationship with distal attitudes ($p = 0.086$). Homogeneity predicted proximal attitudes and distal attitudes towards homosexuality among cis-heterosexual participants, but these relationships were only marginally significant ($p = 0.045$ and $p = 0.051$, respectively). Naturalness predicted homogeneity and informativeness in the three models tested, but only among LGBT+ participants. Therefore, only the impact of naturalness on discreteness and of discreteness on attitudes towards sexual diversity did not significantly differ regardless on the participants' sexual orientation/identity, with significant coefficients in both groups. And the impact of naturalness on opposition to education did not

significantly differ regardless on the participants' sexual orientation/identity, with significant coefficients in both groups.

Hypothesis 3a and 3b – Mediations and indirect effects of naturalness across groups

To test our last hypothesis (H3a) - the relationship between naturalness beliefs and attitudes towards sexual diversity will be mediated by these three essentialist beliefs: discreteness, homogeneity, and informativeness - and (H3b) - naturalness beliefs will indirectly predict higher negative attitudes towards sexual diversity, when mediated by other essentialist beliefs (discreteness, homogeneity, and informativeness beliefs) - we tested mediation models to investigate the possible mediation effect only of essentialist beliefs that were predicted by naturalness and were predictors of negative attitudes towards sexual diversity, simultaneously, in the previous analyses. We tested models with all outcomes of negative attitudes towards sexual diversity: proximal attitudes towards homosexuality, distal attitudes towards homosexuality, opposition to sex education and internal perception of stigma. The analyses only partially supported Hypothesis 3a, showing that the relationship between naturalness and negative attitudes towards sexual diversity was mediated by discreteness but not homogeneity and informativeness. And analyses only partially supported Hypothesis 3b, showing that naturalness indirectly predicted higher negative attitudes towards sexual diversity when the mediation effect of discreteness was taken into account, but not when the effects of homogeneity and informativeness were taken into account. Considering that discreteness was the only type of essentialist belief predicted by naturalness and that it predicted negative attitudes towards sexual diversity simultaneously in all models and groups, this was the only variable used to test the mediation effects hypothesized in this study. As the relationship between naturalness and opposition to sex education does not significantly differ regardless on the participants' sexual orientation/identity, the mediation effect of discreteness beliefs on this relationship was tested in the whole sample, through the multi-group model, with the two nested

subgroups. Mediation analyses were also conducted in the models with outcomes of proximal attitudes and distal attitudes towards homosexuality (separated by groups of cis-heterosexual and LGBT+ participants) and internal perception of stigma.

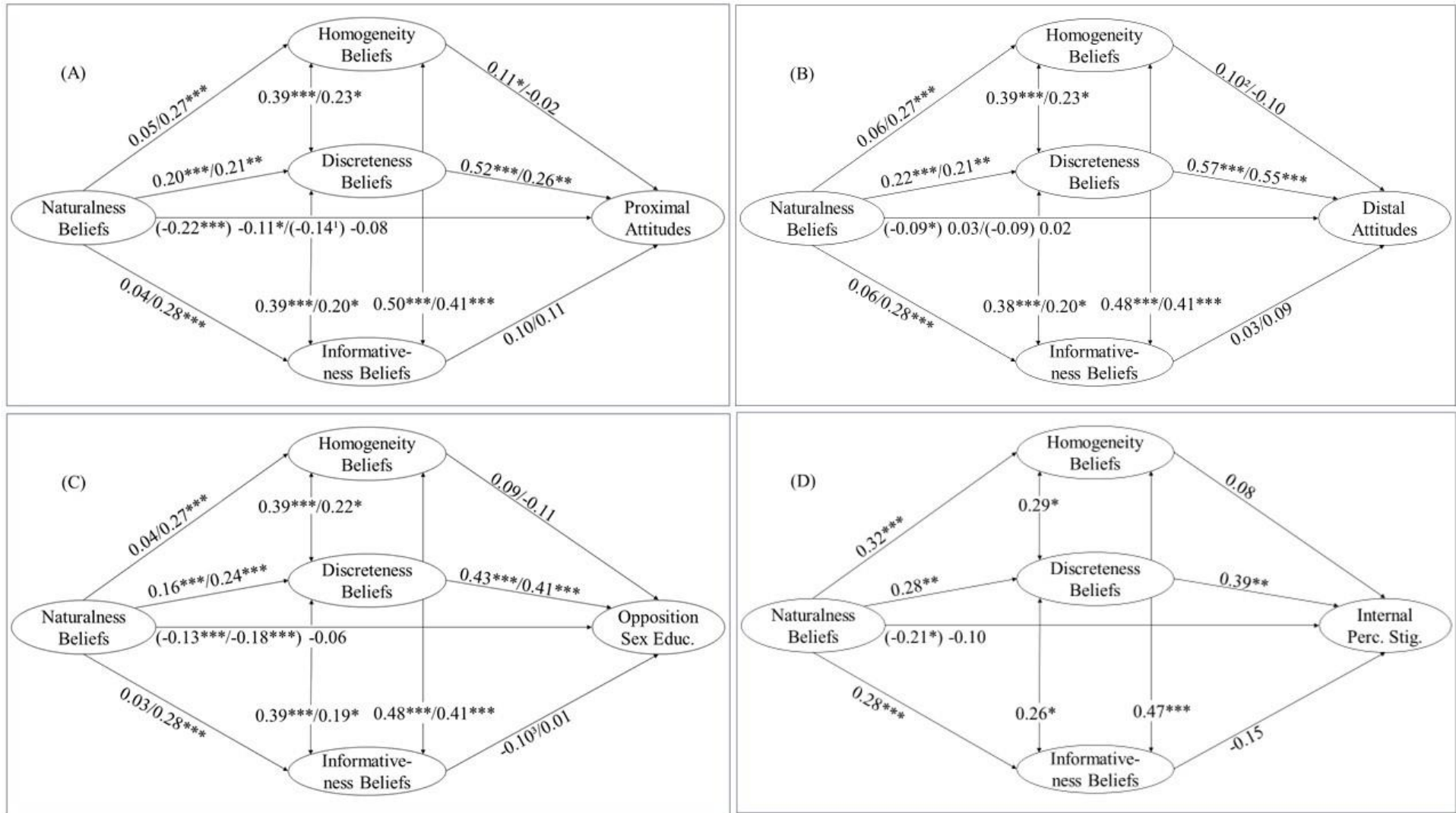
All the models showed good fit indices (all CFI > 0.90, SRMR < 0.08 and RMSEA < 0.05). Discreteness mediated all the relationships between naturalness and the outcomes in all models, as follows: distal attitudes towards homosexuality among cis-heterosexual ($\beta = 0.12, p < 0.001$) and LGBT+ participants ($\beta = 0.12, p = 0.016$); proximal attitudes towards homosexuality among cis-heterosexual ($\beta = 0.11, p = 0.002$) and LGBT+ participants ($\beta = 0.06, p = 0.034$); opposition to sex education in the multi-group model ($\beta = 0.07, p < 0.001$); and internal perception of stigma ($\beta = 0.11, p = 0.043$). Interactions resulting from the mediation effects showed that naturalness indirectly predicted higher negative attitudes towards sexual diversity (in the opposite direction of its direct effects).

When mediations were taken into account in the models, naturalness had non-significant total effects on proximal attitudes towards homosexuality in the group of LGBT+ participants ($\beta = -0.08, p = 0.236$), distal attitudes towards homosexuality in both groups (cis-heterosexual participants: $\beta = 0.03, p = 0.530$; LGBT+ participants: $\beta = 0.02, p = 0.665$), opposition to sex education in the multi-group model ($\beta = -0.06, p = 0.073$) and internal perception of stigma ($\beta = -0.10, p = 0.250$). Naturalness showed a significant total effect only in the model predicting proximal attitudes towards homosexuality, in the group of cis-heterosexual participants ($\beta = -0.11, p = 0.032$), but with a slightly lower regression coefficient value compared to the regression coefficient value of direct effect ($\beta = -0.22, p < 0.001$). Figure 1 shows the representation of these tested models, with the direct effects of all variables (except the covariates) and the total effects of naturalness on the outcomes of negative attitudes towards sexual diversity after the mediation effects were accounted. Results showed that discreteness fully mediated the relationship between naturalness and negative attitudes towards sexual

diversity in almost all models and groups, having a suppressive effect, which resulted in non-significant total effects of naturalness. The only exception was for the model predicting proximal attitudes towards homosexuality among cis-heterosexual participants, which the mediation was partial, but still suppressed the direct effect.

Figure 1

Representations of structural models of the relationship between essentialist beliefs and attitudes towards sexual diversity



Note. Models show standardized coefficients controlling for political conservatism, religiosity, schooling level, individual income and age. Values in parentheses are direct effects and values outside parentheses are total effects (sum of the direct and indirect effects) of naturalness when the mediation effect of discreteness was estimated. Values on the left refer to the cis-heterosexual group; values on the right refer to the LGBT+ group, where applicable.

* $p < .05$. ** $p < .01$. *** $p < .001$. ¹ $p = 0.052$. ² $p = 0.051$. ³ $p = 0.058$.

(A): Mediation model integrating estimates for cis-heterosexual participants (fit: $\chi^2(310) = 656.81$, $p < 0.001$, CFI = 0.96, SRMR = 0.06, RMSEA = 0.05, 90% CI [0.04, 0.05]) and LGBT+ participants (fit: $\chi^2(310) = 505.95$, $p < 0.001$, CFI = 0.94, SRMR = 0.06, RMSEA = 0.04, 90% CI [0.03, 0.04]), analyzed separately.

(B): Mediation model integrating estimates for cis-heterosexual participants (fit: $\chi^2(337) = 704.06$, $p < 0.001$, CFI = 0.96, SRMR = 0.06, RMSEA = 0.05, 90% CI [0.04, 0.05]) and LGBT+ participants (fit: $\chi^2(337) = 532.21$, $p < 0.001$, CFI = 0.95, SRMR = 0.06, RMSEA = 0.04, 90% CI [0.03, 0.04]), analyzed separately.

(C): Multigroup mediation model for cis-heterosexual and LGBT+ participants (fit: $\chi^2(1043) = 1713.24$, $p < 0.001$, CFI = 0.97, SRMR = 0.06, RMSEA = 0.04, 90% CI [0.03, 0.04]). Model with a single total effect estimated for naturalness on opposition to sex education for the two nested groups.

(D): Mediation model for the subgroup ($N = 302$) of sexual minorities (fit: $\chi^2(621) = 1062.72$, $p < 0.001$, CFI = 0.91, SRMR = 0.08, RMSEA = 0.05, 90% CI [0.04, 0.05]).

The final mediation models showed some similarities and particularities in terms of their estimates. Tables 2, 3, 4 and 5 show the standardized and unstandardized regression coefficients of all the variables entered in the models, including the covariates, in all groups investigated. As can be seen in these tables, the models tested among cis-heterosexual participants tended to explain more of the variance in the negative attitudes towards sexual diversity. Discreteness was the variable with the greatest predictive power among all those included in the models. The covariates had more significant effects in the group of cis-heterosexual participants than in the group of LGBT+ participants. Only three covariates had significant effects in the model predicting the internal perception of stigma: political conservatism and age predicting higher discreteness; and individual monthly income predicting less internal perception of stigma.

Table 2. Structural regression coefficients for predicting proximal attitudes towards homosexuality

Independent Variable	Dependent Variable	Cis-heterosexual (<i>N</i> = 458)			LGBT+ (<i>N</i> = 410)		
		β	Mean Effect (SE)	<i>p</i>	β	Mean Effect (SE)	<i>p</i>
Naturalness	Discreteness	0.20	0.32 (0.09)	<0.001	0.21	0.23 (0.09)	0.006
Naturalness	Homogeneity	0.05	0.06 (0.08)	0.443	0.27	0.25 (0.07)	<0.001
Naturalness	Informativeness	0.04	0.07 (0.10)	0.477	0.28	0.31 (0.08)	<0.001
Naturalness	Prox. Att. Homos.	-0.22	-0.38 (0.09)	<0.001	-0.14	-0.16 (0.08)	0.052
Discreteness	Prox. Att. Homos.	0.52	0.58 (0.08)	<0.001	0.26	0.26 (0.09)	0.003
Homogeneity	Prox. Att. Homos.	0.11	0.15 (0.08)	0.045	-0.02	-0.03 (0.10)	0.778
Informativeness	Prox. Att. Homos.	0.10	0.11 (0.06)	0.062	0.11	0.11 (0.08)	0.143
Politic. Conserv.	Naturalness	-0.15	-0.08 (0.03)	0.014	0.01	0.01 (0.05)	0.833
Politic. Conserv.	Discreteness	0.46	0.37 (0.04)	<0.001	0.42	0.33 (0.05)	<0.001
Politic. Conserv.	Homogeneity	0.16	0.10 (0.04)	0.005	0.08	0.05 (0.04)	0.202
Politic. Conserv.	Informativeness	0.17	0.13 (0.04)	0.002	-0.03	-0.03 (0.05)	0.568
Politic. Conserv.	Prox. Att. Homos.	0.08	0.07 (0.04)	0.113	0.21	0.17 (0.05)	<0.001
Religiosity	Naturalness	-0.06	-0.03 (0.03)	0.312	-0.07	-0.05 (0.05)	0.289
Religiosity	Discreteness	0.21	0.17 (0.04)	<0.001	0.07	0.05 (0.04)	0.206
Religiosity	Homogeneity	0.18	0.12 (0.03)	<0.001	0.03	0.02 (0.04)	0.662
Religiosity	Informativeness	0.11	0.08 (0.04)	0.033	0.04	0.03 (0.05)	0.502
Religiosity	Prox. Att. Homos.	0.20	0.18 (0.03)	<0.001	0.16	0.13 (0.04)	0.004
Schooling	Naturalness	-0.16	-0.08 (0.03)	0.019	-0.02	-0.02 (0.05)	0.732
Schooling	Discreteness	-0.10	-0.08 (0.04)	0.034	-0.05	-0.04 (0.05)	0.488
Schooling	Homogeneity	-0.10	-0.07 (0.03)	0.059	-0.12	-0.08 (0.05)	0.091
Schooling	Informativeness	0.05	0.04 (0.05)	0.369	0.04	0.03 (0.05)	0.574
Schooling	Prox. Att. Homos.	-0.02	-0.01 (0.04)	0.732	-0.01	-0.01 (0.05)	0.940
Individual Income	Naturalness	0.06	0.03 (0.04)	0.410	-0.04	-0.03 (0.05)	0.492
Individual Income	Discreteness	0.01	0.01 (0.04)	0.958	0.06	0.05 (0.04)	0.262
Individual Income	Homogeneity	-0.14	-0.09 (0.04)	0.016	-0.01	-0.01 (0.04)	0.948
Individual Income	Informativeness	-0.14	-0.11 (0.05)	0.015	0.04	0.03 (0.05)	0.501
Individual Income	Prox. Att. Homos.	0.03	0.03 (0.05)	0.573	-0.13	-0.10 (0.04)	0.003

Age	Naturalness	0.09	0.04 (0.03)	0.166	0.01	0.01 (0.05)	0.821
Age	Discreteness	0.15	0.12 (0.04)	0.003	0.19	0.15 (0.06)	0.006
Age	Homogeneity	0.12	0.08 (0.04)	0.034	0.10	0.07 (0.05)	0.150
Age	Informativeness	0.07	0.06 (0.05)	0.205	0.11	0.09 (0.06)	0.116
Age	Prox. Att. Homos.	0.02	0.03 (0.04)	0.466	0.22	0.17 (0.06)	0.002
R ² for Proximal Attitudes towards Homosexuality			Cis-heterosexual: 0.63		LGBT+: 0.32		

Note. For cis-heterosexual participants => Model fit: $\chi^2 (310) = 656.81, p < 0.001, CFI = 0.96, SRMR = 0.06$ and $RMSEA = 0.05, 90\% CI [0.04, 0.05]$. For LGBT+ participants => Model fit: $\chi^2 (310) = 505.95, p < 0.001, CFI = 0.94, SRMR = 0.06$ e $RMSEA = 0.04, 90\% CI [0.03, 0.04]$. Politic. Conserv.: Political Conservatism. Prox. Att. Homos.: Proximal Attitudes towards Homosexuality. β : Standardized regression coefficients. Mean Effects (unstandardized regression coefficients) are presented with standard errors (SE). Bolded p-values significant at the 0.05 level.

Table 3. Structural regression coefficients for predicting distal attitudes towards homosexuality

Independent Variable	Dependent Variable	Cis-heterosexual (<i>N</i> = 458)			LGBT+ (<i>N</i> = 410)		
		β	Mean Effect (SE)	<i>p</i>	β	Mean Effect (SE)	<i>p</i>
Naturalness	Discreteness	0.22	0.35 (0.09)	<0.001	0.21	0.24 (0.09)	0.006
Naturalness	Homogeneity	0.06	0.08 (0.08)	0.350	0.27	0.25 (0.07)	<0.001
Naturalness	Informativeness	0.05	0.10 (0.10)	0.335	0.28	0.32 (0.09)	<0.001
Naturalness	Distal Att. Homos.	-0.09	-0.15 (0.06)	0.013	-0.09	-0.11 (0.06)	0.086
Discreteness	Distal Att. Homos.	0.57	0.54 (0.06)	<0.001	0.55	0.58 (0.11)	<0.001
Homogeneity	Distal Att. Homos.	0.10	0.12 (0.06)	0.051	-0.10	-0.13 (0.08)	0.112
Informativeness	Distal Att. Homos.	0.03	0.03 (0.05)	0.521	0.09	0.09 (0.06)	0.150
Politic. Conserv.	Naturalness	-0.14	-0.07 (0.03)	0.024	0.01	0.01 (0.05)	0.822
Politic. Conserv.	Discreteness	0.46	0.38 (0.04)	<0.001	0.42	0.33 (0.05)	<0.001
Politic. Conserv.	Homogeneity	0.16	0.11 (0.04)	0.004	0.08	0.05 (0.04)	0.203
Politic. Conserv.	Informativeness	0.17	0.14 (0.04)	0.002	-0.03	-0.03 (0.05)	0.574
Politic. Conserv.	Distal Att. Homos.	0.32	0.25 (0.03)	<0.001	0.31	0.26 (0.05)	<0.001
Religiosity	Naturalness	-0.05	-0.03 (0.03)	0.326	-0.07	-0.05 (0.05)	0.282
Religiosity	Discreteness	0.21	0.17 (0.04)	0.001	0.07	0.05 (0.04)	0.211
Religiosity	Homogeneity	0.18	0.12 (0.03)	<0.001	0.03	0.02 (0.04)	0.658
Religiosity	Informativeness	0.11	0.08 (0.04)	0.032	0.04	0.03 (0.05)	0.497
Religiosity	Distal Att. Homos.	-0.03	-0.02 (0.03)	0.386	0.09	0.07 (0.03)	0.027
Schooling	Naturalness	-0.16	-0.08 (0.03)	0.022	-0.02	-0.02 (0.05)	0.748
Schooling	Discreteness	-0.10	-0.08 (0.04)	0.037	-0.05	-0.04 (0.05)	0.483
Schooling	Homogeneity	-0.10	-0.07 (0.04)	0.064	-0.12	-0.08 (0.05)	0.090
Schooling	Informativeness	0.05	0.04 (0.05)	0.354	0.04	0.03 (0.05)	0.578
Schooling	Distal Att. Homos.	0.01	0.01 (0.03)	0.843	0.01	0.01 (0.04)	0.993
Individual Income	Naturalness	0.06	0.03 (0.04)	0.400	-0.04	-0.03 (0.05)	0.491
Individual Income	Discreteness	0.01	0.01 (0.05)	0.981	0.06	0.05 (0.04)	0.257
Individual Income	Homogeneity	-0.14	-0.09 (0.04)	0.015	-0.01	-0.01 (0.04)	0.948
Individual Income	Informativeness	-0.14	-0.11 (0.05)	0.014	0.04	0.03 (0.05)	0.504
Individual Income	Distal Att. Homos.	-0.04	-0.03 (0.03)	0.373	-0.04	-0.03 (0.03)	0.310

Age	Naturalness	0.08	0.04 (0.03)	0.221	0.01	0.01 (0.05)	0.896
Age	Discreteness	0.14	0.12 (0.04)	0.003	0.19	0.15 (0.05)	0.006
Age	Homogeneity	0.12	0.08 (0.04)	0.034	0.10	0.07 (0.05)	0.151
Age	Informativeness	0.07	0.06 (0.04)	0.209	0.11	0.09 (0.06)	0.116
Age	Distal Att. Homos.	0.07	0.06 (0.03)	0.090	0.04	0.03 (0.04)	0.418
R ² for Distal Attitudes towards Homosexuality			Cis-heterosexual: 0.74		LGBT+: 0.59		

Note. For cis-heterosexual participants => Model fit: $\chi^2(337) = 704.06, p < 0.001, CFI = 0.96, SRMR = 0.06$ and $RMSEA = 0.05$, 90% CI [0.04, 0.05]. For LGBT+ participants => Model fit: $\chi^2(337) = 532.21, p < 0.001, CFI = 0.95, SRMR = 0.06$ and $RMSEA = 0.04$, 90% CI [0.03, 0.04]. Politic. Conserv.: Political Conservatism. Distal Att. Homos.: Distal Attitudes towards Homosexuality. β : Standardized regression coefficients. Mean Effects (unstandardized regression coefficients) are presented with standard errors (SE). Bolded p-values significant at the 0.05 level.

Table 4. Multigroup structural regression coefficients for predicting opposition to sex education

Independent Variable	Dependent Variable	Cis-heterosexual (<i>N</i> = 458)			LGBT+ (<i>N</i> = 410)		
		β	Mean Effect (SE)	<i>p</i>	β	Mean Effect (SE)	<i>p</i>
Naturalness	Discreteness	0.16	0.26 (0.06)	<0.001	0.24	0.26 (0.06)	<0.001
Naturalness	Homogeneity	0.04	0.05 (0.08)	0.528	0.27	0.26 (0.07)	<0.001
Naturalness	Informativeness	0.03	0.05 (0.10)	0.594	0.28	0.33 (0.09)	<0.001
Naturalness	Opp. Sex Educ.	-0.13	-0.21 (0.05)	<0.001	-0.18	-0.21 (0.05)	<0.001
Discreteness	Opp. Sex Educ.	0.43	0.44 (0.06)	<0.001	0.41	0.44 (0.06)	<0.001
Homogeneity	Opp. Sex Educ.	0.09	0.11 (0.07)	0.103	-0.11	-0.14 (0.08)	0.077
Informativeness	Opp. Sex Educ.	-0.10	-0.11 (0.06)	0.058	0.01	0.01 (0.06)	0.975
Politic. Conserv.	Naturalness	-0.16	-0.08 (0.04)	0.024	0.02	0.01 (0.05)	0.820
Politic. Conserv.	Discreteness	0.45	0.37 (0.05)	<0.001	0.43	0.32 (0.05)	<0.001
Politic. Conserv.	Homogeneity	0.16	0.11 (0.03)	0.004	0.07	0.05 (0.04)	0.222
Politic. Conserv.	Informativeness	0.17	0.14 (0.04)	0.002	-0.04	-0.03 (0.05)	0.509
Politic. Conserv.	Opp. Sex Educ.	0.38	0.32 (0.04)	<0.001	0.38	0.30 (0.07)	<0.001
Religiosity	Naturalness	-0.05	-0.02 (0.03)	0.407	-0.07	-0.04 (0.04)	0.312
Religiosity	Discreteness	0.21	0.17 (0.04)	<0.001	0.07	0.05 (0.04)	0.183
Religiosity	Homogeneity	0.18	0.12 (0.03)	<0.001	0.02	0.02 (0.04)	0.680
Religiosity	Informativeness	0.10	0.08 (0.04)	0.036	0.04	0.03 (0.05)	0.508
Religiosity	Opp. Sex Educ.	-0.01	-0.01 (0.03)	0.848	0.09	0.07 (0.03)	0.036
Schooling	Naturalness	-0.16	-0.08 (0.03)	0.017	-0.02	-0.01 (0.05)	0.771
Schooling	Discreteness	-0.12	-0.10 (0.04)	0.022	-0.05	-0.03 (0.05)	0.498
Schooling	Homogeneity	-0.10	-0.07 (0.04)	0.055	-0.12	-0.08 (0.05)	0.092
Schooling	Informativeness	0.05	0.04 (0.05)	0.386	0.04	0.03 (0.05)	0.578
Schooling	Opp. Sex Educ.	-0.04	-0.03 (0.04)	0.373	-0.06	-0.05 (0.04)	0.271
Individual Income	Naturalness	0.07	0.03 (0.04)	0.351	-0.05	-0.03 (0.04)	0.458
Individual Income	Discreteness	0.01	0.01 (0.05)	0.864	0.07	0.05 (0.04)	0.226
Individual Income	Homogeneity	-0.14	-0.10 (0.04)	0.017	-0.01	-0.01 (0.04)	0.974
Individual Income	Informativeness	-0.14	-0.11 (0.05)	0.015	0.05	0.04 (0.05)	0.481
Individual Income	Opp. Sex Educ.	-0.11	-0.09 (0.04)	0.020	-0.01	-0.01 (0.04)	0.903

Age	Naturalness	0.09	0.04 (0.03)	0.170	0.02	0.01 (0.04)	0.796
Age	Discreteness	0.15	0.13 (0.04)	0.002	0.19	0.14 (0.05)	0.006
Age	Homogeneity	0.13	0.09 (0.04)	0.027	0.10	0.07 (0.05)	0.164
Age	Informativeness	0.07	0.06 (0.04)	0.194	0.11	0.08 (0.05)	0.126
Age	Opp. Sex Educ.	0.13	0.11 (0.03)	0.002	0.07	0.06 (0.05)	0.221
R ² for Opposition to Sex Education			Cis-heterosexual: 0.59		LGBT+: 0.51		

Note. Model fit: $\chi^2(1043) = 1713.24$, $p < 0.001$, CFI = 0.97, SRMR = 0.06 and RMSEA: 0.04, 90% CI [0.03, 0.04]. Politic.

Conserv.: Political Conservatism. Opp. Sex Educ.: Opposition to Sex Education. β : Standardized regression coefficients.

Mean Effects (unstandardized regression coefficients) are presented with standard errors (SE). Bolded p-values significant at the 0.05 level.

Table 5. Structural regression coefficients for predicting internal perception of stigma

Independent Variable	Dependent Variable	β	Mean Effect (SE)	<i>p</i>
Naturalness	Discreteness	0.28	0.26(0.09)	0.004
Naturalness	Homogeneity	0.32	0.29 (0.08)	<0.001
Naturalness	Informativeness	0.28	0.29 (0.09)	<0.001
Naturalness	Int. Perc. Stigma	-0.21	-0.11 (0.05)	0.031
Discreteness	Int. Perc. Stigma	0.39	0.22 (0.07)	0.003
Homogeneity	Int. Perc. Stigma	0.08	0.05 (0.06)	0.419
Informativeness	Int. Perc. Stigma	-0.15	-0.08 (0.04)	0.084
Politic. Conserv.	Naturalness	0.08	0.06 (0.07)	0.294
Politic. Conserv.	Discreteness	0.37	0.26 (0.05)	<0.001
Politic. Conserv.	Homogeneity	0.11	0.08 (0.04)	0.078
Politic. Conserv.	Informativeness	-0.09	-0.07 (0.05)	0.153
Politic. Conserv.	Int. Perc. Stigma	0.13	0.05 (0.03)	0.140
Religiosity	Naturalness	-0.06	-0.06 (0.05)	0.389
Religiosity	Discreteness	0.05	0.04 (0.04)	0.401
Religiosity	Homogeneity	0.10	0.06 (0.04)	0.139
Religiosity	Informativeness	0.02	0.02 (0.05)	0.762
Religiosity	Int. Perc. Stigma	0.06	0.02 (0.03)	0.394
Schooling	Naturalness	0.02	0.02 (0.06)	0.783
Schooling	Discreteness	-0.08	-0.06 (0.06)	0.319
Schooling	Homogeneity	-0.14	-0.10 (0.06)	0.082
Schooling	Informativeness	0.04	0.03 (0.06)	0.656
Schooling	Int. Perc. Stigma	0.03	0.01 (0.03)	0.686
Individual Income	Naturalness	-0.12	-0.09 (0.06)	0.133
Individual Income	Discreteness	0.07	0.05 (0.04)	0.291
Individual Income	Homogeneity	0.03	0.02 (0.05)	0.609
Individual Income	Informativeness	0.06	0.04 (0.06)	0.468
Individual Income	Int. Perc. Stigma	-0.22	-0.09 (0.03)	0.003
Age	Naturalness	0.07	0.05 (0.06)	0.358

Age	Discreteness	0.20	0.14 (0.06)	0.018
Age	Homogeneity	0.02	0.01 (0.05)	0.776
Age	Informativeness	0.08	0.06 (0.06)	0.316
Age	Int. Perc. Stigma	0.10	0.04 (0.03)	0.190
R ² for Internal Perception of Stigma		All Sexual Minority Participants: 0.27		

Note. Model fit: $\chi^2(621) = 1062.72, p < 0.001, CFI = 0.91, SRMR = 0.08$ and RMSEA: 0.05, 90% CI [0.04, 0.05]. Politic. Conserv.: Political Conservatism. Int. Perc. Stigma: Internal Perception of Stigma. β : Standardized regression coefficients. Mean Effects (unstandardized regression coefficients) are presented with standard errors (SE). Bolded p-values significant at the 0.05 level.

Discussion

In this study, we tested theoretically grounded models of, and investigated the structural relationship among, essentialist beliefs (naturalness, discreteness, homogeneity, and informativeness) and their effect on negative attitudes towards sexual diversity (proximal attitudes towards homosexuality, distal attitudes towards homosexuality, opposition to sex education, and internal perception of stigma). We did so among individuals of different sexual orientations/identities, controlling for the effect of selected individual differences (political conservatism, level of religiosity, schooling level, individual monthly income, and age). We then investigated whether the structural relationship between essentialist beliefs and negative attitudes towards sexual diversity (proximal attitudes towards homosexuality, distal attitudes towards homosexuality, and opposition to sex education) differed across groups of different sexual orientations/identities (cis-heterosexual and LGBT+ participants). Finally, rooted in theory, we tested mediation models to investigate the indirect effect of the essentialist belief of naturalness on all negative attitudes towards sexual diversity by taking into account mediation effects of another essentialist belief, discreteness.

Our hypotheses were partially confirmed; all the hypothesized models showed good fit indices, but not all the hypothesized predictions were empirically supported. The structural relationships differed according to participants' sexual orientation/identity, as expected. This suggests that attending to sexual orientation/identity is crucial when investigating the structural

relationships between essentialist beliefs and attitudes towards sexual diversity. For example, when the effect of sexual orientation/identity was taken into account, naturalness predicted lower opposition to sex education in both groups, and lower proximal and distal attitudes towards homosexuality among cis-heterosexual participants. However, naturalness had no direct effect on proximal and distal attitudes towards homosexuality among LGBT+ participants, though it did predict lower internal perception of stigma in the subsample of sexual minority participants.

Sexual orientation/identity may matter in an additional way. It is possible that the general direct effect of naturalness beliefs on lower negative attitudes towards sexual diversity could be explained according to the attributional theory of stigma (Weiner et al., 1988). Based on this theory, it can be assumed that beliefs that sexual orientation has a biological basis, is immutable and/or is not under the control of one's choice, can be associated with greater tolerance towards sexual minorities, or less sexual prejudice, as has been found in several previous studies (e.g., Agüero et al., 1984; Ernulf et al., 1989; Haider-Markel & Joslyn, 2008; Haslam & Levy, 2006; Haslam et al., 2002; Hegarty & Pratto, 2001; Herek & Capitano, 1995; Horn & Heinze, 2011; Jayaratne et al., 2006; Mitchell & Dezarn, 2014; Overby, 2014; Sakalli, 2002; Whitley, 1990). However, this pattern was not apparent in all the models we tested in our study. This suggests the effect naturalness beliefs have on reducing sexual prejudice may depend on which attitudes are assessed and what the characteristics of the groups that hold these beliefs are, such as having a LGBT+ or cis-heterosexual sexual orientation/identity.

Despite the importance of naturalness above, discreteness was the only essentialist belief that was associated with all of the negative attitudes towards sexual diversity across sexual orientation/identity. In addition, there was evidence that naturalness indirectly predicted higher negative attitudes towards sexual diversity through the mediation of at least the discreteness dimension of the essentialist beliefs. In contrast, homogeneity and informativeness

were not predicted by naturalness, nor did they predict attitudes towards sexual diversity simultaneously in any of the models. As such, there was no foundation for investigating any potential mediating role that these two last essentialist beliefs (homogeneity; informativeness) might play in the association between naturalness and negative attitudes towards sexual diversity, though we had hypothesized that this mediation could exist.

The findings that discreteness beliefs significantly predicted higher negative attitudes towards sexual diversity in all models and in both groups of LGBT+ and cis-heterosexual participants corroborates findings from other studies. These have found that higher levels of discreteness predict higher sexual prejudice among heterosexual individuals (Haslam & Levy, 2006; Haslam et al., 2002) and internalized homonegativity among sexual minorities (Morandini et al., 2015; Morandini et al., 2017). This is also consistent with predictions from social identity theory, which proposes that processes of distinctiveness are associated with greater differentiation and prejudice or discrimination between groups (Tajfel & Turner, 1986). And, it is supported by recent studies finding evidence that these processes (activated by situations that threaten distinctiveness) also predict more sexual prejudice (Falomir-Pichastor & Hegarty, 2014; Falomir-Pichastor et al., 2017; Figueiredo & Pereira, 2021).

Based on social identity theory (Tajfel & Turner, 1986), we expected that higher homogeneity and informativeness would also predict more negative attitudes towards sexual diversity. This was because believing that people of different sexual orientations constitute homogeneous groups can influence the process of identity building and distinctiveness between groups of different sexual orientations. The same reasoning can be applied to informativeness beliefs, which refers to the thinking that sexual orientation is a characteristic that “says a lot” about a person. However, analyses did not confirm the hypothesis about the direct effects of these two dimensions of essentialist beliefs. Homogeneity beliefs had only marginally significant effects on predicting higher negative proximal and distal attitudes towards

homosexuality among cis-heterosexual participants alone. In all other models and analyses, homogeneity and informativeness showed no direct effects, and seem to have less direct impact on sexual prejudice.

It is worth noting that there was a pattern of positive correlation between essentialist beliefs of discreteness, homogeneity, and informativeness in the bivariate analyses and in all the models tested, across both groups. These associations corroborate results of previous studies that have found latent profiles of individuals who show greater endorsement of these three types of essentialist beliefs simultaneously (Agadullina et al., 2018; Grzanka et al., 2016; Grzanka et al., 2020). And research shows that individuals with higher endorsement of these beliefs together are those who have had the highest negative attitudes towards sexual minorities (Agadullina et al., 2018; Grzanka et al., 2016; Grzanka et al., 2020). This suggests that there may be some indirect effect of homogeneity and informativeness beliefs on sexual prejudice, via discreteness. Future research could therefore test hypotheses about indirect effects of homogeneity and informativeness beliefs, via discreteness, on attitudes towards sexual diversity.

Naturalness beliefs predicted discreteness when the mediating role of discreteness beliefs was considered; they also indirectly predicted higher negative attitudes towards sexual diversity in all models across both groups. This suggests that the mediating effect of discreteness suppressed the direct effect of naturalness beliefs in predicting lower negative attitudes towards sexual diversity. However, the total effects of naturalness beliefs on distal attitudes towards homosexuality, opposition to sex education, and internal perception of stigma were not significant. These relationships can be explained by the assumption that biologicistic conceptions (measured in this study by beliefs in naturalness and the other essentialist beliefs predicted by them) are associated with other regressive conceptions of sexuality, such as heteronormativity (measured in this study by negative attitudes towards sexual diversity) (van

Anders, 2024). Thus, believing in biological basis of sexual orientation predicts other essentialist beliefs, such as discreteness, which in turn explains higher sexual prejudice and leads to naturalness also indirectly predicting higher sexual prejudice.

The mediation model to explain negative proximal attitudes towards homosexuality among cis-heterosexual participants was the only one in which naturalness had a significant total effect and predicted lower of these negative attitudes towards sexual diversity; however, this was reduced to half of the direct effect. In other words, even accounting for its indirect effect via discreteness, naturalness predicted lower proximal attitudes towards homosexuality. This suggests majority groups' conceptions of sexual orientation have different impacts on their proximal attitudes towards homosexuality compared to other attitudes towards sexual diversity. It may be that cis-heterosexual people who believe that sexual orientation is based on biological factors are more tolerant of experiences of similar-gender/sex attraction in people close to them and in their own lives (and thus have lower proximal attitudes towards homosexuality), even though they also have discreteness beliefs. Applying the attributional theory of stigma (Weiner et al., 1988) to this case suggests that majorities' tolerance can be justified by the fact that they attributed the cause of homosexuality to something beyond one's control. However, it may also be that the association between higher naturalness and lower proximal attitudes towards homosexuality has no impact on reducing sexual stigma against sexual minorities or sexual prejudice in general. This is because our results showed that the total effect of naturalness was not significant for prejudice towards homosexual people when seen as a social group (measured through distal attitudes towards homosexuality) nor for prejudice towards sexual and gender diversity (measured through opposition to sex education).

Our results showed that the total effect of naturalness on the internal perception of stigma was not significant. This means that believing that sexual orientation has biological bases may, in fact, have no impact on reducing this dimension of internalized homophobia

among sexual minorities. This was because believing that sexual orientation has biological bases was also associated with more beliefs that sexual orientation has distinct and exclusive categories, which in turn predicted more internal perception of stigma. These results corroborate findings of other studies, which also show that these discreteness beliefs directly predict higher internalized homonegativity among lesbian and bisexual women (Morandini et al., 2017) and gay men (Morandini et al., 2015); and support concerns about the possible negative effects that theories about the biological basis of sexual orientation may have for sexual minorities (Hegarty, 2002; Stein, 2001). However, there is also evidence that both naturalness and discreteness beliefs indirectly predict lower internalized homonegativity, via lower identity uncertainty, among gay men (Morandini et al., 2015). Therefore, it may be that there are other variables whose interactions with psychological essentialism results in different outcomes of sexual prejudice among individuals from sexual minorities belonging to different groups (between men and women, for example), which may better explain the impacts of these essentialist beliefs on different measures of internalized homophobia.

Finally, essentialist beliefs and other individual differences seem to have a greater impact on sexual prejudice among people who belong to certain specific groups. In our study, we found that essentialist beliefs and the covariates explained a greater proportion of the variance in negative attitudes towards sexual diversity among cis-heterosexual participants than among LBTB+ participants. And internal perception of stigma (among LGB participants only) was also the attitudinal outcome with the lowest proportion of variance explained among all the models tested. This is probably because the processes of seeking distinctiveness proposed by Tajfel and Turner (1986), which also involve essentialist beliefs and produce sexual prejudice, seem to be more common in the construction/affirmation of identity among individuals who are part of groups considered to be social majorities. Previous studies present evidence that these processes happen more consistently among men than women, for example

(Falomir-Pichastor & Hegarty, 2014; Falomir-Pichastor et al., 2017; Figueiredo & Pereira, 2021). But as there is still little evidence, this requires further investigation to better understand the effect of psychological essentialism along with other individual differences on attitudes towards sexual diversity among groups that differ by social status.

Implications

Results of this study have implications for explanations of the effects of psychological essentialism on sexual prejudice. Overall, they corroborate Allport's (1954) proposition that essentialist thinking is associated with more prejudice. When it comes specifically to sexual prejudice and the impact of the different dimensions of essentialism, these effects may not be direct and are influenced by different background variables. These results also show that such explanations are supported empirically even in different cultural contexts. This is the case in Brazil, a country in the Global South, where such research is scarce.

Although some authors argue that theories about the biological basis of sexual orientation can benefit sexual minorities due to their association with less sexual prejudice (Levay, 1996; Whitley, 1990), our results suggest that naturalness beliefs do not have a significant positive impact on reducing sexual prejudice when their direct and indirect effects are considered. When naturalness' direct and indirect effects (with similar magnitudes but opposite valences) are accounted for, they cancel each other out and the total one becomes non-significant. The only exception being proximal attitudes towards homosexuality. And, although there is an association with lower proximal attitudes, it may reflect only a reduction on intolerance, without being accompanied by reductions in sexual stigma and inferiorization of non-heterosexuality. Our findings support concerns about the possible negative effects of biological theories about the bases of sexual orientation, on the other hand (Hegarty, 2002; Stein, 2001).

Endorsing essentialist beliefs that sexual orientation has biological bases (that it is defined early in life, is not under the control of the individual, and is immutable) does not in itself guarantee a reduction in sexual prejudice as might be expected according to the attributional theory of stigma (Weiner et al., 1988). This is because beliefs of naturalness are often accompanied by other essentialist conceptions about sexual orientation which, when endorsed simultaneously, result in higher sexual prejudice. The impact of this simultaneous endorsement of essentialist beliefs on sexual prejudice was observed through the effect of naturalness and discreteness beliefs together in this study (with the exception described above). Previous studies with latent profile analysis have shown this for the effect of naturalness and discreteness, homogeneity, and informativeness/discreteness, entitativity, and personal and social importance beliefs (Agadullina et al., 2018; Grzanka et al., 2016; Tierney et al., 2021). Further studies should test the hypothesis that negative proximal attitudes, as opposed to other sexual prejudice attitudes, are more likely to be influenced by naturalness beliefs, and that this only has an impact on reducing intolerance, without necessarily reducing sexual stigma towards sexual minorities and sexual diversity.

Overall, results of this study confirm that biologism contributes to the maintenance of heteronormativity based on the different deterministic, reductionist, and essentialist beliefs that people may have about sexuality (van Anders, 2024). We found evidence of the effect of different essentialist beliefs in maintaining negative attitudes towards sexual diversity. Our results also corroborate explanations from previous studies based on social identity theory, and show that the seeking of group identity distinctiveness (which involves essentialist beliefs) contributes to sexual prejudice, especially among participants from groups seen as majoritarian (Falomir-Pichastor & Hegarty, 2014; Falomir-Pichastor et al., 2017; Figueiredo & Pereira, 2021). Such findings also highlight the need for future studies and interventions to reduce sexual prejudice to take into account the role of these different dimensions of essentialist

thinking (and other individual differences) that are associated with such attitudes and the important role of foundational theories in the field of social psychology for addressing these questions.

Limitations

The limitations of this study include that participants were recruited through a convenience sampling technique, with online collection. Though this allowed us to recruit a large and diverse sample, it may have added bias to the profile of the sample studied, and generalizability is accordingly limited. Furthermore, the use of a cross-sectional design allowed us to investigate associations between the variables we studied, but prevented us from making robust inferences about directionality and causality. The effects and directional interpretations in this study should be tested in experimental and/or longitudinal studies that allow for that type of inference.

Treating all covariates as observable variables may also have limited the measurement of constructs such as political conservatism and religiosity. Other studies could measure these as latent, so that aspects such as measurement errors can be taken into account in the models. In addition, all the final latent measures that we used in the models showed good fit and invariance between LGBT+ and cis-heterosexual participants, meeting the requisites for the analyses we carried out. However, we had to make some changes to the structure of the discreteness and internal perception of stigma scales in relation to their original models in its validation studies, since both instruments were only recently adapted to the context in which the study was carried out (in Brazil) and there are still few studies to indicate the most appropriate structure of these measures in this context. Then, future research could benefit from using measures of these constructs that are more stable so that comparisons between the results of different studies may be even more accurate, though this might limit cultural diversity in research.

Conclusion

Findings from this study highlight how psychological essentialism can have a range of implications for sexual prejudice. These different essentialist beliefs that people hold about sexual orientation make contributions that are sometimes unique, direct or indirect, or interact with each other. And findings from our research inform ongoing debates about whether believing that sexual orientation has biological bases (which can be understood as essentialist beliefs of naturalness) is associated with lower sexual prejudice as originally suggested by some research versus findings from subsequent studies that have shown that this type of thinking is expressed through more beliefs, which are multidimensional, and may have several implications for predicting higher or lower sexual prejudice. The results of our study broaden knowledge in this field of research by showing that believing that sexual orientation has biological bases also has negative impact on sexual minorities by indirectly predicting higher levels of sexual prejudice. This is due to the effect that other essentialist beliefs have in mediating the relationship between naturalness beliefs and negative attitudes towards sexual diversity. In the current study, we found evidence that at least discreteness beliefs play this role of mediation, and such effects were consistent regardless of the LGBT+ or cis-heterosexual orientation/identity of the participants. As such, findings from the present study provide important insights into the impacts of diverse essentialist beliefs on varied forms of sexual prejudice, while attending to individual differences.

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Appendix A – Supplementary materials

Dimensions of psychological essentialism and attitudes towards sexual diversity

Preliminary analyses - fit and invariance of the measurement models and association with individual differences and sociodemographic variables

In this section, we present results of the fits to the measurement models, invariance models between groups by sexual orientation/identity, and associations between the scores of the measures used in this study and sociodemographic variables.

Measurement models of essentialist beliefs. The CFA of the naturalness subscale indicated a good fit for the overall sample, $\chi^2(5) = 31.08, p < 0.001$, CFI = 0.96, SRMR = 0.05, RMSEA = 0.08, 90% CI [0.05, 0.10], with all items having factor loadings > 0.30 ($ps < 0.001$) and acceptable internal consistency ($\omega = 0.67$). The CFA of the informativeness subscale indicated that the instrument had a good fit in the general sample, $\chi^2(5) = 9.19, p = 0.102$, CFI = 1.00, SRMR = 0.03, RMSEA = 0.03, 90% CI [0.00, 0.06], with all items having factor loadings > 0.30 ($ps < 0.001$) and good internal consistency ($\omega = 0.80$). And the CFA of the homogeneity subscale also indicated that the instrument had a good fit in the general sample, $\chi^2(9) = 52.75, p < 0.001$, CFI = 0.97, SRMR = 0.06, RMSEA = 0.07, 90% CI [0.06, 0.09], with all items having factor loadings > 0.30 ($ps < 0.001$) and good internal consistency ($\omega = 0.79$).

The CFA of the discreteness subscale, $\chi^2(9) = 117.83, p < 0.001$, showed that the instrument had inadequate fit, SRMR = 0.09 and RMSEA = 0.12, 90% CI [0.10, 0.14], although the CFI = 0.94 were above the cut-off point. The model modification indices indicated a high correlation between the residuals of items 5 and 6 ($r = 0.47, p < 0.001$). After excluding item 6 (which had a lower factor load), the fit of the model improved, $\chi^2(5) = 36.71, p < 0.001$, CFI = 0.97, SRMR = 0.06, but it still did not show satisfactory fit according to the RMSEA = 0.09, 90% CI [0.06, 0.11]; in addition, item 4 loaded lower than expected (standardized $\lambda = 0.24, p < 0.001$). After excluding item 4, the model showed acceptable fit indices for all indicators, χ^2

(2) = 9.76, $p = 0.008$, CFI = 0.99, SRMR = 0.04, RMSEA = 0.07, 90% CI [0.03, 0.11], and all items with factor loadings > 0.30 ($ps < 0.001$). Therefore, we adopted this 4-item model, as it proved to be more parsimonious, had a satisfactory fit, kept items (items 1, 2, 3, 5) that reflected the content of the original instrument, and showed good internal consistency ($\omega = 0.81$).

Measurement models of attitudes towards sexual diversity. The CFA of the ATHO two-factor model indicated that the instrument had a good fit in the general sample, $\chi^2(13) = 4.19$, $p = 0.989$, CFI = 1.00, SRMR = 0.02, RMSEA = 0.00, 90% CI [0.00, 0.00], with all items having factor loadings > 0.30 ($ps < 0.001$) and good internal consistency (proximal attitudes: $\omega = 0.89$; distal attitudes: $\omega = 0.90$). The CFA of the ECES indicated that the instrument had a good fit in the overall sample, $\chi^2(35) = 85.01$, $p < 0.001$, CFI = 0.99, SRMR = 0.06, RMSEA = 0.04, 90% CI [0.03, 0.05], with all items having factor loadings > 0.30 ($ps < 0.001$) and good internal consistency ($\omega = 0.94$). The CFA of the internal perception of stigma subscale also indicated that the instrument showed a good fit, $\chi^2(85) = 162.88$, $p < 0.001$, CFI = 0.95, SRMR = 0.08; RMSEA = 0.05, 90% CI [0.04, 0.07], for the original model with 15 items and 5 residual covariance specifications, as proposed in the validation study (Lira & Morais, 2019). However, two items of this instrument had factor loadings < 0.30 (Item 3 standardized $\lambda = 0.19$, $p = 0.015$ and Item 8 standardized $\lambda = 0.28$, $p < 0.001$). After excluding these two items, and keeping the four remaining residual covariance specifications, the model showed an improvement in the fit indices, $\chi^2(61) = 109.36$, $p < 0.001$, CFI = 0.97, SRMR = 0.07, RMSEA = 0.05, 90% CI [0.03, 0.07], and all items had factor loadings > 0.30 ($ps < 0.001$). Therefore, we adopted this 13-item model of the internal perception of stigma measure, as it proved to be more parsimonious, with a satisfactory fit, kept most of the items that reflect the content of the original instrument and showed good internal consistency ($\omega = 0.84$).

Invariance models between groups by sexual orientation/identity. The MCFA of the measures of essentialist beliefs and attitudes towards sexual diversity indicated that all the

measures showed configural, metric and scalar invariance between the groups of cis-heterosexual and LGBT+ participants (all changes in the CFI $< |0.010|$ and in the SRMR $< |0.010|$ or in the RMSEA $< |0.015|$). The results of the comparisons between the indices of each invariance model for the measures are shown in Table 1. MCFA was not carried out with the internal perception of stigma measure, as the structural model with this outcome that we planned to test did not include multi-group comparisons.

Table S1. Multigroup analysis results for testing measurement invariance models

	Configural Invariance ¹	Metric Invariance ²	Δ	Scalar Invariance ³	Δ
Naturalness					
CFI	0.957	0.951	-0.006	0.966	0.009
SRMR	0.058	0.064	0.006	0.055	-0.003
RMSEA	0.077	0.070	-0.007	0.045	-0.032
Discreteness					
CFI	0.994	0.993	-0.001	1.000	0.006
SRMR	0.047	0.050	0.003	0.042	-0.005
RMSEA	0.059	0.047	-0.012	0.000	-0.059
Homogeneity					
CFI	0.978	0.973	-0.005	0.979	0.001
SRMR	0.064	0.070	0.006	0.062	-0.002
RMSEA	0.067	0.067	0	0.048	-0.019
Informativeness					
CFI	1.000	1.000	0	1.000	0
SRMR	0.000	0.000	0	0.000	0
RMSEA	0.030	0.034	0.004	0.029	-0.001
Proximal Attitudes towards Homosexuality					
CFI	1.000	1.000	0	1.000	0
SRMR	0.000	0.016	0.016	0.013	0.013
RMSEA	0.000	0.000	0	0.000	0
Distal Attitudes towards Homosexuality					
CFI	1.000	1.000	0	1.000	0
SRMR	0.016	0.027	0.011	0.023	0.007
RMSEA	0.000	0.000	0	0.000	0
Opposition to Sex Education					
CFI	0.995	0.996	0.001	0.998	0.003
SRMR	0.077	0.079	0.002	0.072	-0.005
RMSEA	0.034	0.031	-0.003	0.018	-0.016

Note. ¹Baseline Model (all parameters freely estimated in the model with the two nested groups). ²Model tested with loads constrained to be equal between groups. ³Model tested with loadings and intercepts constrained to be equal between groups. Δ : Difference between the value of the fit index in the tested model compared to the baseline model. The cut-off points for differences $\leq |0.010|$ in CFI and SRMR and $\leq |0.015|$ in RMSEA were adopted to accept the hypothesis of invariance, when this criterion is met for at least two fit indices, giving greater preference to CFI, which is the most robust indicator for this analysis.

Associations between the scores of the measures. The results of the Pearson correlations showed associations between many of the observable variables and the latent variables related to essentialist beliefs and attitudes towards sexual diversity (Table 2 shows the results of the correlations, considering cis-heterosexual and LGBT+ participants separately). Each of the observable background variables correlated with at least one of the latent variables of interest in this study. This was a further justification (in addition to that found in the literature) for inserting these possible covariates in all the models to be tested in the main analyses, in order to control for confounding effects.

Table S2. Pearson correlations between the continuous variables investigated in the study

		Cis-heterosexual											
		1	2	3	4	5	6	7	8	9	10	11	12
LGBT+													
1	Naturalness	-	0.111*	0.008	0.005	-0.152**	-0.049	-0.108*	-0.090	-0.097*	-0.053	0.028	0.061
2	Discreteness	0.151**	-	0.376***	0.325***	0.593***	0.677***	0.570***	0.270***	0.485***	-0.209***	0.003	0.164***
3	Homogeneity	0.168***	0.216***	-	0.411***	0.381***	0.374***	0.299***	0.184***	0.197***	-0.179***	-0.138**	0.049
4	Informativity	0.166***	0.167***	0.342***	-	0.326***	0.285***	0.151**	0.121**	0.131**	-0.032	-0.083	0.034
5	Prox. Att. Homos.	-0.056	0.366***	0.081	0.112*	-	0.648***	0.570***	0.402***	0.444***	-0.149**	-0.010	0.141**
6	Dist. Att. Homos.	-0.028	0.569***	0.082	0.107*	0.462***	-	0.753***	0.231***	0.632***	-0.231***	-0.025	0.189***
7	Opp. Sex Educ.	-0.097*	0.452***	-0.004	-0.027	0.529***	0.741***	-	0.219***	0.630***	-0.272***	-0.074	0.182***
8	Religiosity Level	-0.040	0.162***	0.021	0.032	0.295***	0.282***	0.273***	-	0.208***	-0.041	-0.076	0.021
9	Pol. Conservatism	-0.007	0.395***	0.084	-0.043	0.355***	0.542***	0.552***	0.260***	-	-0.287***	-0.012	0.108*
10	Schooling Level	-0.023	-0.005	-0.082	0.101*	0.054	-0.003	-0.048	0.116*	-0.145**	-	0.445***	0.204***
11	Individual Income	-0.051	0.085	-0.018	0.095	0.032	0.063	0.061	0.113*	-0.013	0.461***	-	0.445***
12	Age in Years	-0.010	0.174***	0.029	0.132**	0.259***	0.172***	0.141**	0.193***	0.019	0.490***	0.441***	-
13	Int. Perc. Stigma [†]	-0.084	0.299***	0.085	-0.061	0.418***	0.413***	0.454***	0.141*	0.290***	-0.075	-0.132*	0.071

Note. Prox. Att. Homos.: Proximal Attitudes towards Homosexuality. Dist. Att. Homos.: Distal Attitudes towards Homosexuality. Int. Perc. Stigma: Internal Perception of

Stigma. [†]*N* = 302, participants who answered the Internal Perception of Stigma subscale of the IHS only. * *p* < .05, ** *p* < .01, *** *p* < .001.

Associations between the measures of essentialist beliefs and attitudes towards sexual diversity and sociodemographic variables. Here, we present results of the associations between the scores of the measures of essentialist beliefs (naturalness, discreteness, homogeneity, and informativeness) and negative attitudes towards sexual diversity (proximal attitudes towards homosexuality, distal attitudes towards homosexuality, opposition to sex education and internal perception of stigma) and sociodemographic variables. Table 3 shows the means and standard deviation by group and the statistics of the analyses whose differences were statistically significant.

The mean of naturalness beliefs in the overall sample was $M = 3.30$ ($SD = 0.74$). There were no significant differences between cis-heterosexual and LGBT+ participants, nor there were any significant differences between groups in terms of other sociodemographic characteristics researched in this study.

The mean of discreteness beliefs in the overall sample was $M = 2.18$ ($SD = 0.94$). Cis-heterosexual participants had significantly higher levels of discreteness than LGBT+ participants. Cisgender men had significantly higher levels than women, and both groups differed significantly from participants of other genders. Brown participants did not differ significantly from white participants, but had higher levels than Black participants and participants of other races/ethnicities. Those who were married and had children had significantly higher levels of the beliefs than those who were in another type of relationship or single and those who had no children, respectively.

The mean of homogeneity beliefs in the overall sample was $M = 2.31$ ($SD = 0.71$). Cis-heterosexual participants and those living in rural areas had significantly higher levels than LGBT+ participants and those living elsewhere.

The mean of informativeness beliefs in the overall sample was $M = 2.33$ ($SD = 0.80$). There were no significant differences between cis-heterosexual and LGBT participants. On the

other hand, white participants had significantly higher levels than Brown participants, but neither of these two groups differed from the group of Black and other races/ethnicities participants.

The mean of proximal attitudes towards homosexuality was $M = 2.31$ ($SD = 1.66$), and of distal attitudes towards homosexuality was $M = 2.26$ ($SD = 1.63$) in the overall sample. Cis-heterosexual participants showed significantly higher levels of proximal attitudes and distal attitudes than LGBT+ participants. Cisgender men and women showed significantly higher levels of proximal attitudes than participants of other genders. The three gender groups differed significantly in levels of distal attitudes, with cisgender men presenting the highest levels, cisgender women presenting moderate levels, and participants of other genders presenting the lowest levels of distal attitudes. Brown participants did not significantly differ in levels of proximal attitudes compared to white participants; but Brown and white participants had significantly higher levels of distal attitudes than Black and other races/ethnicities participants. Participants who were married and had children had significantly higher levels of proximal attitudes and distal attitudes than those in another type of relationship or single and those who had no children, respectively. Participants from rural areas showed significantly higher levels proximal attitudes than those from large towns.

The mean of opposition to sex education in the overall sample was $M = 2.01$ ($SD = 0.93$). Cis-heterosexual participants showed significantly higher levels of opposition to sex education than LGBT+ participants, and cisgender men had significantly higher levels than cisgender women and participants of other genders. Brown participants did not significantly differ from white participants, but had significantly higher levels than Black or other race/ethnic participants. Married participants and those who had children had significantly higher levels than those in another type of relationship or single and those who had no children, respectively.

The mean of internal perception of stigma in the group of participants declaring homo- or bisexual orientation and/or identity, who answered this measure, was $M = 1.77$ ($SD = 0.49$). Cisgender men showed significantly higher levels of internal perception of stigma than cisgender women, but participants of other genders did not differ from either group. Single participants showed significantly higher levels of internal perception of stigma than married participants, but those in a stable union or who were dating someone did not significantly differ from any of the other groups.

Table S3. Differences in levels of essentialist beliefs and attitudes towards sexual diversity by groups

Comparison variables	<i>M</i>	<i>SD</i>	<i>t / F</i>	<i>d / η²</i>	<i>p</i>	Group Differences
Naturalness						
Sexual orientation/identity						
A. Cis-heterosexual	3.254	0.720				
B. LGBT+	3.344	0.757	-1.789	-0.122	0.074	A<B
Discreteness						
Sexual orientation/identity						
A. Cis-heterosexual	2.424	0.964				
B. LGBT+	1.918	0.831	864.816	0.563	<0.001	A>B
Gender						
C. Cisgender man	2.368	1.012				
D. Cisgender woman	2.092	0.840	15.259	0.036	<0.001	C>D>E
E. Trans or others	1.769	0.908				
Race/ethnicity						
F. Brown ¹	2.300	0.921				F=G
G. White	2.165	0.932	5.543	0.013	0.004	F>H
H. Black and others	1.928	0.978				G=H
Marital and relationship status						
I. Single	2.093	0.903				I=J=L
J. Dating someone	2.098	0.868				I<K
K. Married	2.577	0.988	12.191	0.041	<0.001	J<K
L. In a stable union	2.085	0.976				L<K
Parental status - whether you have a child or none						
M. With no children	2.093	0.913				M<N
N. With children under 18 years of age	2.382	0.968	15.637	0.035	<0.001	M<O
O. With children over 18 years of age	2.641	0.924				N=O
Homogeneity						
Sexual orientation/identity						

A. Cis-heterosexual	2.362	0.699				
B. LGBT+	2.257	0.716	2.186	0.149	0.029	A>B
Level of urbanization of place of residence						
P. Large city or state capital	2.242	0.713				P=Q=R
Q. Medium-sized city	2.343	0.707				P<S
R. Small city	2.385	0.688	7.936	0.027	<0.001	Q<S
S. Rural area	2.667	0.607				R<S
Informativeness						
Sexual orientation/identity						
A. Cis-heterosexual	2.338	0.800				
B. LGBT+	2.330	0.808	0.142	0.010	0.887	A=B
Race/ethnicity						
F. Brown ¹	2.431	0.782				F>G ²
G. White	2.289	0.787	3.054	0.007	0.048	F=H
H. Black and others	2.280	0.939				G=H
Proximal Attitudes towards Homosexuality						
Sexual orientation/identity						
A. Cis-heterosexual	2.993	1.767				
B. LGBT+	1.547	1.120	14.552	0.978	<0.001	A>B
Gender						
C. Cisgender man	2.472	1.777				C=D
D. Cisgender woman	2.298	1.579	15.787	0.023	<0.001	C>E
E. Trans or others	1.485	1.231				D>E
Race/ethnicity						
F. Brown ¹	2.645	1.787				F>G
G. White	2.134	1.549	8.129	0.020	<0.001	F=H
H. Black and others	2.238	1.718				G=H
Marital and relationship status						
I. Single	2.109	1.524				I=J=L
J. Dating someone	2.028	1.537	18.276	0.081	<0.001	I<K

K. Married	3.288	1.948				J<K
L. In a stable union	2.100	1.338				L<K
Parental status - whether you have a child or none						
M. With no children	2.052	1.528				M<N
N. With children under 18 years of age	3.048	1.762	30.061	0.077	<0.001	M<O
O. With children over 18 years of age	3.259	1.872				N=O
Level of urbanization of place of residence						
P. Large city or state capital	2.144	1.607				P=Q=R
Q. Medium-sized city	2.410	1.673	6.484	0.022	<0.001	P<S
R. Small city	2.518	1.721				Q=R=S
S. Rural area	2.995	1.727				
Distal Attitudes towards Homosexuality						
Sexual orientation/identity						
A. Cis-heterosexual	2.849	1.763	12.360	0.831	<0.001	A>B
B. LGBT+	1.612	1.153				
Gender						
C. Cisgender man	2.663	1.808				
D. Cisgender woman	2.038	1.421	23.946	0.051	<0.001	C>D>E
E. Trans or others	1.530	1.264				
Race/ethnicity						
F. Brown ¹	2.489	1.645				F=G
G. White	2.217	1.643	7.733	0.015	<0.001	F>H
H. Black and others	1.807	1.349				G>H
Marital and relationship status						
I. Single	2.098	1.535				I=J=L
J. Dating someone	2.019	1.502	14.297	0.060	<0.001	I<K
K. Married	3.087	1.845				J<K
L. In a stable union	2.080	1.446				L<K
Parental status - whether you have a child or none						
M. With no children	2.022	1.465	25.494	0.071	<0.001	M<N

N. With children under 18 years of age	2.932	1.818				M<O
O. With children over 18 years of age	3.197	1.944				N=O
Opposition to Sex Education						
Sexual orientation/identity						
A. Cis-heterosexual	2.287	1.025				
B. LGBT+	1.712	0.684	9.821	0.661	<0.001	A>B
Gender						
C. Cisgender man	2.215	0.998				A>B
D. Cisgender woman	1.897	0.840	16.748	0.038	<0.001	A>C
E. Trans or others	1.680	0.812				B=C
Race/ethnicity						
F. Brown ¹	2.143	0.943				F=G ³
G. White	1.981	0.926	5.979	0.013	0.003	F>H
H. Black and others	1.799	0.813				G=H
Marital and relationship status						
I. Single	1.952	0.855				I=J=L
J. Dating someone	1.948	0.912				I<K
K. Married	2.388	1.084	9.639	0.040	<0.001	J<K
L. In a stable union	1.796	0.793				L<K
Parental status - whether you have a child or none						
M. With no children	1.904	0.851				M<N
N. With children under 18 years of age	2.294	1.016	16.963	0.048	<0.001	M<O
O. With children over 18 years of age	2.495	1.119				N=O
Level of urbanization of place of residence						
P. Large city or state capital	1.964	0.928				P=Q=R
Q. Medium-sized city	2.091	0.904				P<S
R. Small city	2.011	0.917	2.774	0.010	0.040	Q=R=S
S. Rural area	2.292	0.927				
Internal Perception of Stigma						
Gender						

C. Cisgender man	1.859	0.533				C>D
D. Cisgender woman	1.666	0.418	5.893	0.037	0.004	C=E
E. Trans or others	1.689	0.461				D=E
Marital and relationship status						
I. Single	1.850	0.524				I=J=L
J. Dating someone	1.684	0.435				I>K
K. Married	1.478	0.358	4.670	0.045	0.003	J=K=L
L. In a stable union	1.760	0.455				

Note. Differences between the groups of sexual orientation/identity, gender, ethnic/racial self-identification, marital and relationship status, parental status and level of urbanization of place of residence were investigated for all measures of essentialist beliefs and attitudes towards sexual diversity. However, only comparisons with statistically significant results are presented in the table. The only exception is for the sexual orientation/identity groups (cis-heterosexual and LGBT+ participants), where non-significant results were also presented; and no comparisons were made for the internal perception of stigma measure. ¹Mixed race - mostly Black and white participants. ²Differences between the means of the groups were marginally significant, according to the Bonferroni (p=0.052) and Games-Howell (p=0.040) post hoc tests. ³Differences between the means of the groups was marginally non-significant, according to the Bonferroni (p=0.054) and Games-Howell (p=0.053) post hoc tests.

CHAPTER IV - STUDY 4

Opposition to same-sex parenting as sexual prejudice: Validity evidence of a model and associated factors in the Brazilian context⁸

Abstract: The Beliefs about Children's Adjustment in Same-Sex Families Scale (BCASSFS) is an instrument that measures rejection of the child-rearing and educational practices of same-sex parents. This scale evaluates beliefs that are organized in a bifactorial model referring to Individual Opposition and Normative Opposition. This study aimed to adapt the BCASSFS and examine its validity in the Brazilian context with a sexually diverse sample. A national survey was carried out with a sample of 1038 participants. It was used a sociodemographic questionnaire; a version of the BCASSFS adapted for the Brazilian context; a measure of sexual prejudice; and a measure of conservatism. Confirmatory factor analysis showed good fit indices for the model suggested for the original scale. Multigroup confirmatory factor analysis showed that the BCASSFS displayed measurement invariance between subsamples of different profiles, such as heterosexual-cisgender and LGBT+ participants. Investigations of concurrent, convergent and criterion validity also showed that both scale factors were associated with theoretically related variables, in line with the literature. Together, these results show that the BCASSFS has good validity and can be used in the Brazilian context. By confirming the replication of the original model, this study contributes to broadening knowledge about these dimensions of sexual prejudice.

Keywords: Brazil; sexual prejudice; same-sex parenting; factor analysis; validity; scale.

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Introduction

In modern societies, traditional sexual prejudice has been repressed, and more veiled manifestations of these attitudes are emerging. Therefore, intolerant tendencies toward gay men and lesbian women continue to exist (Herek & McLemore, 2013; Kiebel et al., 2017). Among the studies on new forms of sexual prejudice, Morrison and Morrison (2003) propose the concept of modern homonegativity, which refers to negative considerations about gay men and lesbian women that are anchored in three types of discourses: gay men and lesbian women require nonessential social changes; prejudice and discrimination are a thing of the past; and gay men and lesbian women overemphasize their sexuality, which leads to their own marginalization. Such considerations reflect modern manifestations of prejudice through attitudes that delegitimize the struggles and rights achievements of sexual minorities, the assertion that movements supporting sexual minorities exaggerate their claims, and the denial of the need for visibility and mechanisms to combat discrimination against sexual minorities (Morrison & Morrison, 2003, 2011; Morrison et al., 2009; Whitley & Kite, 2010).

Another dimension in which the rejection of same-sex sexuality reflects manifestations of modern prejudice is the creation of children by same-sex couples. Legislation in several countries has advanced to guarantee the right of same-sex couples to establish families with children through adoption, as was the case in Spain in 2005 (Molina & Alarcón, 2015), Brazil in 2011/2013 (Santos et al., 2018) and the United States in 2015 (Gates, 2015). However, even in these countries, many people do not recognize the legitimacy of families formed by same-sex parents. The manifestation of prejudice occurs through beliefs and opinions that deny the possibility of the healthy development of children raised in these families (Cecílio & Scorsolini-Comin, 2022; Oliveira-Santos et al., 2018; Pascual-Soler et al., 2017).

Frias-Navarro and Monterde-i-Bort (2012) developed a two-factor model that organizes conceptions about the legitimacy and consequences of child rearing and education by

homosexual couples into Individual Opposition and Normative Opposition beliefs, which are assessed using the Beliefs about Children's Adjustment in Same-Sex Families Scale (BCASSFS). The Individual Opposition factor assesses beliefs that involve explicit and aggressive rejection of the effects of same-sex parenting and child-rearing practices. Thus, this factor reflects traditional manifestations of prejudice. Children's psychological difficulties and maladjustment are attributed directly to the sexual orientation of same-sex parents. The Normative Opposition factor evaluates beliefs linked to heterosexism. Since heterosexuality is normalized, naturalized, and privileged as an institution, the rejection of children for belonging to families with same-sex parents is attributed to societal norms rather than to individual beliefs. According to the authors of the model, this second factor captures covert manifestations of modern sexual prejudice that are prevalent today.

The BCASSFS does not aim to gauge the adjustment of children raised by homosexual parents but rather to assess prejudiced beliefs that people hold based on the assumption that heteronormative families are the best (or only) option for the healthy development of children. These beliefs can be considered stigmatizing because children who grow up in families with same-sex parents do not show impairments in development, adjustment, or well-being when compared to children raised in families with heterosexual parents, as research has shown evidence of this since the late 1990s and early 2000s (e.g., Anderssen et al., 2000; Patterson, 2000; Perrin, 2002; Stacey & Biblarz, 2001; Tasker, 1999; Tasker & Golombok, 1997), as well as more recently (e.g., Carone et al., 2018; Cecílio et al., 2013; De Souza Santos et al., 2013; Miller et al., 2017). This was also confirmed by a recent systematic review and meta-analysis that assessed the results of studies comparing various family outcomes (including psychological adjustment of the children) between sexual minority and heterosexual families (Zhang et al., 2023). Furthermore, literature also highlights those justifications related to fear of developmental problems, sexual and/or gender identity, social relationships or a greater risk of

sexual abuse tend to be prejudiced explanations in the social imaginary (Cecílio & Scorsolini-Comin, 2022; Cerqueira-Santos et al., 2021; Oliveira-Santos et al., 2018).

The BCASSFS is a short scale that is easy to apply and has satisfactory psychometric properties. The model maintained excellent fit indices and well-defined constructs when tested in recent studies with undergraduate students from Spain (Frias-Navarro et al., 2017; Pascual-Soler et al., 2017), Chile (Barrientos et al., 2013; Pascual-Soler et al., 2017), Italy (Badenes-Ribera et al., 2020) and with Hispanics residing in the United States (Pascual-Soler et al., 2017). It is worth noting that, although the BCASSFS also demonstrated good psychometric properties when it was used in samples made up of Italian (Badenes-Ribera et al., 2020; Baiocco et al., 2020; Ioverno et al., 2018) and Chinese (Ching & Wu, 2023; Zhao & Zheng, 2021) individuals, most of the studies validating and proving its psychometric properties have been carried out with Spanish-speaking participants (e.g., Barrientos et al., 2013; Frias-Navarro et al., 2017; Frias-Navarro & Monterde-i-Bort, 2012; Pascual-Soler et al., 2017). So, further studies should assess whether the BCASSFS provides evidence of validity in other cultural contexts and among participants who speak other languages, such as Portuguese-speaking Brazilians, for example. Research into the validity of BCASSFS in cultural contexts such as Brazil may also be worth for a better understanding of other dimensions of sexual prejudice (such as opposition to same-sex parenting and its dimensions) in that country. Given that important legal avenues for same-sex parenting were opened with the recognition of same-sex unions as family entities with rights to legal protection analogous to stable unions, by the Brazilian Federal Supreme Court in May 2011 (Filho & Rinaldi, 2018). In addition, studies should include participants with backgrounds and ages other than college students younger than 30 years old. In doing so, studies can broaden our understanding of these beliefs that underpin attitudes of sexual prejudice and their relationship with other variables.

Literature shows that there are associations between the dimensions of the BCASSFS and other measures of sexual prejudice. Studies have shown that both factors of the BCASSFS correlate positively, and with strong to moderate magnitudes, with measures that assess views on homosexual people's right to marriage and adoption (Badenes-Ribera et al., 2020; Frias-Navarro et al., 2014; Frias-Navarro et al., 2017; Frias-Navarro & Monterde-i-Bort, 2012) as well as attitudes toward homosexual people (Barrientos et al., 2013; Baiocco et al., 2020). Furthermore, positive correlations, with magnitudes from strong to weak, are observed between political conservatism and both factors of the BCASSFS (Badenes-Ribera et al., 2020; Baiocco et al., 2020; Ching & Wu, 2023) as well as between religiosity and Individual Opposition (Badenes-Ribera et al., 2020; Baiocco et al., 2020) and between religiosity and Normative Opposition (Baiocco et al., 2020).

On the other hand, literature shows that differences in the endorsement of beliefs about opposition to same-sex parenthood between groups with different sociodemographic characteristics (e.g., by sexual orientation and gender) are not so clearly defined. For instance, studies indicate that heterosexual individuals exhibit higher levels of Individual Opposition and Normative Opposition than individuals from sexual minorities groups (Ching & Wu, 2023; Zhao & Zheng, 2021). In some studies, men have higher mean scores for Individual Opposition and Normative Opposition beliefs than women (Ching & Wu, 2023; Frias-Navarro et al., 2014; Zhao & Zheng, 2020). In other studies, these differences are observed only in the Individual Opposition factor (Frias-Navarro & Monterde-i-Bort, 2012), in the Normative Opposition factor (Badenes-Ribera et al., 2020), or in neither factor (Frias-Navarro et al., 2017). Considering that the authors of some of these studies highlight the importance of assessing how well the BCASSFS factors are able to differentiate groups with different levels of endorsement of such beliefs, which reflects a better assessment of prejudice in the general population. It is

therefore of great relevance to further investigate the potential of BCASSFS (each of its factors) to capture different levels of endorsement of such beliefs between groups.

To our knowledge, regarding studies that have investigated perceptions about child adoption by same-sex couples in samples with Brazilian individuals (Cecílio & Scorsolini-Comin, 2022; Cerqueira-Santos & Santana, 2015; Cerqueira-Santos et al., 2017; Falcão, 2004; Freires, 2015; Freires et al., 2021; Oliveira-Santos et al., 2018), only three used quantitative approaches and psychometric scales (Cerqueira-Santos & Santana, 2015; Falcão, 2004; Freires, 2015). In her work, Falcão (2004) used a scale of opposition to adoption by homosexual individuals developed by the author herself in the same study. And the studies by Cerqueira-Santos and Santana (2015) and Freires (2005) used scales of opposition to adoption by homosexual individuals with items from the instrument proposed by Falcão (2004). Both studies analyzed the relationship between this construct and measures of sexual prejudice and identified statistically significant associations (Cerqueira-Santos & Santana, 2015; Falcão, 2004; Freires, 2015). Despite the importance of such findings, there is a notorious lack of instruments with recent robust validity evidence to assess perceptions about child adoption by homosexual parents in Brazil. In addition, there is no research that operationalizes beliefs about the adjustment of children raised and educated in families with same-sex parents.

It is relevant to evaluate whether the BCASSFS presents evidence of validity for use in Brazilian samples to better understand the manifestation of modern prejudice in this context. With regard to validation studies of psychometric instruments related to manifestations of modern sexual prejudice in this population, we highlight the adaptation of the Modern Homonegativity Scale (MHS; Lima et al., 2019) and the validation of the Attitudes Toward Homosexuality Scale (ATHO; Ramos & Cerqueira-Santos, 2021). The existence of validity evidence for these scales in the Brazilian context suggests that expressions of prejudice in this population also follow the trend of more subtle manifestations. Specifically, in the model

proposed by the ATHO, negative attitudes toward homosexuality are measured as social attitudes (distal attitudes) and attitudes linked to the intimate and family life (proximal attitudes). As its study (Ramos & Cerqueira-Santos, 2021) included nonheterosexual participants, the model seems explanatory for both heterosexual and nonheterosexual populations even without addressing specific measures of internalized homophobia. This is also of great relevance because providing a model and an instrument to assess such constructs in the general population helps to explain how heterosexual individuals may differ from individuals from minority groups in such perceptions.

As it is worth to conduct further investigations to assess whether the model proposed by the BCASSFS can be replicated in cultural contexts and samples different from those studied thus far. Additionally, as the introjection of stigma and the perception of social oppression against same-sex sexuality may manifest through beliefs that are organized in a similar way in the general population, regardless of the sexual orientation of individuals (Ramos & Cerqueira-Santos, 2021). This study aimed to adapt the BCASSFS and examine its validity in the Brazilian context. Specifically, we sought to cross-culturally adapt the BCASSFS for application in Brazilian samples; investigate evidence of the scale's internal validity in a sample of LGBT+ and non-university participants; assess whether the model presents factor invariance between different groups; and investigate the concurrent, convergent, and construct validity of the adapted scale.

Method

Participants

This study adopted a nonprobability type design with the use of a convenience sampling technique. The sample was made up of 1038 participants with a mean age of 33.37 years ($SD = 10.94$), ranging from 18 to 71 years, of whom 52.3% were adults aged 30 years or older. Most of the participants declared themselves as cisgender men (48.2%), heterosexual (56.1%), and

white (59.8%) with a full undergraduate degree (41.9%) and with no religion but who believed in God (25.9%). The sample included participants from all Brazilian states, with most of them from the southeast region of Brazil (40.9%). Table 1 shows a detailed distribution of the sample by sociodemographic characteristics.

Table 1. Distribution of the sample by sociodemographic characteristics

Sociodemographic characteristics	<i>n</i>	%
Age		
18-29	454	43.7
30-44	381	36.7
45-59	196	18.9
≥ 60	7	0.7
Gender		
Cisgender man	500	48.2
Cisgender woman	474	45.7
Transgender man	9	0.9
Transgender woman	8	0.8
Non-binary	33	3.2
Queer	6	0.6
Transvestite	1	0.1
Other	7	0.7
Sexual orientation		
Heterosexual	582	56.1
Bisexual	197	19.0
Homosexual	180	17.4
Pansexual	45	4.4
Asexual	23	2.2
Queer	3	0.3
Other	8	0.8
Ethnicity/race		
White	621	59.9
Parida ^a	317	30.5
Black	73	7.0
Asian ^b	11	1.1
Indigenous	4	0.4

Other	12	1.2
Educational level		
Fundamental incomplete	7	0.7
Fundamental complete	9	0.9
Incomplete high school	24	2.3
Complete high school	175	16.8
Incomplete undergraduate	263	25.3
Complete undergraduate	435	41.9
Master's degree	96	9.3
Doctoral degree	29	2.8
Religious affiliation		
No religion, but believe in God	269	26.0
No religion and don't believe in God	259	25.0
Catholic	208	20.0
Evangelical	71	6.8
Spiritist	69	6.6
African matrix religion	58	5.6
Protestant	26	2.5
Other	78	7.5
Region of residence		
Southeast	425	40.9
Northeast	271	26.1
South	214	20.6
Midwest	82	7.9
North	46	4.5
Total (N)	100	1038

^aMixed race: mostly black and white.

^bPeople who declared themselves as yellow people of Asian descent.

Instruments

A sociodemographic questionnaire was used to characterize the sample with regard to information such as age, gender, sexual orientation, ethnic/racial self-identification, educational level, religion, and state of residence. The questionnaire also included three questions about aspects related to religiosity: frequency of religious practice; importance of religious/spiritual beliefs; and influence of religious/spiritual assumptions on decisions. These items were answered using five-point agreement scales. The responses to these three items were summed, the arithmetic mean was calculated, and their scores were treated as an indicator of the participants' level of religiosity.

Additionally, the questionnaire included a question about political orientation: "Do you identify more with the ideas of which political orientation?" The answer included eight options, with seven options from "Extreme Left" to "Extreme Right" and one option, "I do not have a defined political position". Responses to this item were treated with an indicator that measured identification with political conservatism, calculated using a seven-point scale where the "Extreme Right" response option represented the maximum score. The option indicating that the participant might not have a defined positioning was recoded as "Center", which was equivalent to the midpoint of this measure.

An adapted version of the BCASSFS translated into Portuguese was used to assess beliefs about the adjustment of children in families with same-sex parents. In its original version, which was validated in Spain by Frias-Navarro and Montere-i-Bort (2012), the BCASSFS consists of 14 items organized into two factors: the Individual Opposition factor ($\alpha = 0.87$), composed of seven items that reflect explicit rejection of the effects of homosexual parenting and upbringing on children and possible psychological and adjustment difficulties of children directly related to parents' sexual orientation; and the Normative Opposition factor ($\alpha = 0.88$), consisting of seven items that reflect subtle forms of heterosexism present in society

on a daily basis, to identify sexual prejudice maintained by social and impersonal arguments. The BCASSFS is answered on a five-point Likert-type agreement scale; the higher the score obtained, the higher the levels of Individual Opposition and Normative Opposition relative to parenting by same-sex fathers or mothers. More specific information about psychometric properties of the instrument in this study is presented in the Results.

To assess sexual prejudice, the Attitudes Toward Homosexuality Scale (ATHO; Ramos & Cerqueira-Santos, 2021) was used. The ATHO consists of seven items organized in a bifactor model. It presents evidence of the measurement of attitudes toward homosexuality (homophobic attitudes) through a unifactorial structure ($\alpha = 0.88$) or a two-factor structure, with one factor referring to distal attitudes (four items; $\alpha = 0.85$) and the other to proximal attitudes (three items; $\alpha = 0.81$). The instrument is answered on a seven-point Likert-type agreement scale and the higher the level of agreement, the higher the level of prejudice against sexual diversity (to calculate the scores of each subscale, the values of some items must be inverted). The two-factor structure was adopted in this study and distal attitudes and proximal attitudes factors had Cronbach's alpha values of 0.92 and 0.92, respectively.

Conservatism was assessed using a traditionalism subscale, which is part of the Brazilian version of the right-wing authoritarianism scale (RWA), adapted for Brazil by Vilanova et al. (2018) and composed of four factors. This traditionalism subscale assesses the tendency to support traditional moral standards and values (9 items; $\alpha = 0.87$). The instrument is answered on a five-point Likert-type agreement scale and the higher the level of agreement, the greater the indication of conservatism in this dimension (to calculate the scores and obtain the indices of this subscale, the values of some items must be inverted). In this study, only the subscale referring to the traditionalism factor was used because of its consistent ability to assess conservatism and its greater association with sexual prejudice outcomes in studies conducted

in Brazil (Vilanova et al., 2018; Vilanova et al., 2019). In this study, this subscale showed a Cronbach's alpha value equal to 0.98.

Procedures

Firstly, during the planning stage of this study, one of the authors of the original BCASSFS was contacted to address questions about the proposal to adapt it to the Brazilian context and she replied encouraging the development of this work. For the translation and adaptation of the BCASSFS, the recommendations of Borsa et al. (2012) were followed: translation of the instrument into the new language by independent bilingual translators; synthesis of the translated versions; evaluation of the synthesis by expert judges; evaluation of the instrument by the target audience; reverse translation; and pilot study.

To produce validity evidence for the adapted version of the instrument, an online survey was carried out by providing a link that directed potential participants to read the Informed Consent Form (ICF) and a form with the research instruments. Participants were recruited during the months of July and August 2022 through the dissemination of the invitation with the research link on social networks. The invitation presented the following inclusion criteria: being over the age of 18 and living in Brazil. After potential participants were informed of the research objective and recommended to read and file the ICF, those who were interested indicated their consent to participate in the research and were directed to answer the online questionnaire. This article presents part of the results of a larger study that was approved by the Research Ethics Committee of the university to which the authors are affiliated (Opinion number 5.159.509 and 5.531.979), and it was performed in accordance with Resolutions 466/2012 and 510/2016 of the Brazilian National Health Council.

Data analysis

Data were tabulated in SPSS software (IBM SPSS Statistics 23.0), and analyses were conducted in JASP software (JASP-0.16.1-64bit.msi). To assess the internal validity of the

scale, confirmatory factor analysis (CFA) was conducted based on its theoretically proposed model, supported by previous validation studies of the BCASSFS. The estimation method used was robust diagonally weighted least squares (RDWLS). The fit indices of the tested models were evaluated based on the goodness-of-fit index (GFI), comparative fit index (CFI), Tucker–Lewis index (TLI) and root mean square error of approximation (RMSEA) values. For a model to be considered adequate, the following values were required: GFI, CFI and TLI ≥ 0.90 ; RMSEA ≤ 0.08 , with an upper limit of the 90% confidence interval < 0.10 (Brown, 2015; Fan & Sivo, 2005; Marsh et al., 2004). The mean values obtained for each item and each factor of the scale were analyzed (and it was checked if there were differences between the means of the Individual Opposition and Normative Opposition factors). Internal consistency values were investigated using the composite reliability (CR) and Cronbach's alpha indices. It was investigated whether the CR and Cronbach's alpha values would improve substantially if any of the items were excluded. Furthermore, homogeneity indices of each item in relation to the factor (corrected item-total correlations) were examined.

Multigroup confirmatory factor analyses were performed to test for scale invariance through four models with progressively restricted parameters (configural invariance model; metric invariance model; scalar invariance model; and strict invariance model). To evaluate the quality of fit of these models, the following fit indices values and cut-off points were considered: CFI and NNFI (non-normed fit index) ≥ 0.90 and RMSEA ≤ 0.08 (Brown, 2015; Fan & Sivo, 2005; Marsh et al., 2004). Changes in CFI and NNFI values equal to or greater than 0.01 were considered inadequate for the observed differences between the indices of each model evaluated when compared to the baseline model, i.e., the configural invariance model, as recommended by the literature (Cheung & Rensvold, 2002).

To assess the external validity of the adapted version of the BCASSFS, Pearson correlations were performed between the factors of this scale and the other scales/measures

used in this study. Correlations were analyzed with the ATHO factors, the traditionalism subscale, the religiosity index, the political conservatism index, and the age of the participants. These analyses of the association between constructs produced evidence of concurrent and convergent validity. One-way analyses of variance (ANOVAs) were conducted to investigate differences between group means on the BCASSFS factors. Participants were grouped by gender (i.e., cisgender men, cisgender women, and transgender or other gender participants), sexual orientation (i.e., heterosexual, homosexual, and participants of other sexual orientations, such as bisexual, pansexual, asexual, and others), and educational level (i.e., up to completion of high school, incomplete undergraduate degree (undergraduates), and completed undergraduate degree (graduates and postgraduates)). When statistically significant differences were identified in the comparisons, Bonferroni or Games-Howell post hoc tests were conducted to identify which groups differed from each other. These analyses of differences between groups produced evidence of criterion validity.

Results

Scale adaptation

Initially, all the BCASSFS items were translated into Portuguese by two independent Brazilian translators with full command of the English language. These translations were synthesized into a single version by the researchers responsible for the study using the translators' versions that were considered most appropriate. The two translations corresponded to each other, and the structure of the items did not change during this step. Then, the synthesis of the translations was sent to two experts in the field of psychology who were also experts in issues of sexual diversity and parenting.

After content analysis of the synthesized translations, the researchers met with the respective experts to continue the process of adapting the translated version of the scale. Some of the few the changes resulting from this step was the replacement of the expression "isolation"

with "social exclusion" in Item 3. As the expression "social isolation" became common in the context of the COVID-19 pandemic in the years just before the survey was conducted, it was believed that the expression "social exclusion" would be more appropriate to capture the content proposed by the item in the original scale. In Item 9, the term "teased" was replaced by "bullied". In Item 11, the expression "it would be wise" should mean "it would be prudent" when translated to the Brazilian context.

In the next step, the translated and adapted scale was evaluated by a group of individuals representing the target audience of this study ($N = 12$) who answered the instrument and assessed the comprehensibility of the items. In general, all items were considered clear. At this stage, a question arose about what kinds of problems Item 2 referred to (Item 2: In general, children raised by gay or lesbian parents will have more problems than those who are raised by a heterosexual father and a heterosexual mother). However, since this item was intended to refer to problems in general and the scale already had other items that referred to specific problems, we decided not to change it. We then proceeded to the reverse translation into the original language, which was performed by two new independent Brazilian translators with full command of the English language. The synthesis of the reverse translations showed that, in general, the content of the items in the adapted version of the scale remained similar to the content of the items in its original version. However, at this stage, one of the translators drew attention to the importance of specifying the reference to "homosexual parents" in Item 14. This suggestion was accepted and the change was made given its contribution to making the item more specific in the expected sense, which resulted in the following final wording: "The child usually hides the sexual orientation of his or her parents from friends when they are gay or lesbian because of fear of being socially rejected".

The back-translation of the final version of the BCASSFS adapted throughout the aforementioned steps was sent to one of the authors of the original scale so that she could

evaluate the similarity of the items with the original ones. The author considered the adapted version adequate and the conceptual ideas of the two-factor model correctly maintained and recommended the continuation of the study. Finally, a pilot study was conducted with 14 individuals from the general population, who indicated that the instrument was understandable to them and to others who would answer the scale in future research. Once this last step of the adaptation stage was completed, we proceeded to investigate the validity of the instrument through statistical analyses with data from a national sample. Appendix A presents the items translated and adapted for the Brazilian context, organized in the same format as the scale that was applied to the participants of this study.

Internal validity evidence

Confirmatory factor analysis

CFA was performed to evaluate the two-factor structure supported theoretically and empirically by previous studies (Badenes-Ribera et al., 2020; Barrientos et al., 2013; Frias-Navarro et al., 2017; Frias-Navarro & Monrde-i-Bort, 2012; Pascual-Soler et al., 2017). The results of the CFA indicated a good fit for the model according to all the indices evaluated: $\chi^2(76) = 145.933$, $p < 0.001$; GFI = 0.99; CFI = 0.99; TLI = 0.99; RMSEA = 0.03, 90% CI [0.02, 0.03]. CFA was also conducted to assess the fit of a single-factor model with all items collapsed to a possible single factor on general opposition to parenting by same-sex parents. Although the fit of the one-factor model could be considered adequate according to the GFI (0.95), CFI (0.93) and TLI (0.92) values, the model presented an RMSEA value above the maximum limit to be considered fitting (RMSEA = 0.12, 90% CI [0.11, 0.12]). Therefore, the results of the two-factor model were more suitable and adequately represented the factorial structure proposed by the authors of the original scale, as well as presenting fit indices similar to previous studies that performed validations with different samples.

More detailed analysis showed that items that loaded on Individual Opposition presented factor loadings with values between $\lambda = 0.61$ (Item 11: When a child manifests behaviors of homosexual orientation, it would be wise to take him or her to a psychologist) and $\lambda = 0.93$ (Item 7: If a child is adopted by a gay or lesbian couple, she or he will certainly have psychological issues in the future). Items that loaded on Normative Opposition showed factor loadings with values between $\lambda = 0.68$ (Item 14: The child usually hides the sexual orientation of his or her parents from friends, when they are gay or lesbian, because of fear of being socially rejected) and $\lambda = 0.85$ (Item 8: Certainly, classmates will reject a child whose father or mother is gay/lesbian). These factors had a statistically significant correlation with each other that can be considered strong ($r = 0.59$, 95% CI [0.54, 0.64]).

The following internal consistency values were observed for the BCASSFS factors: Individual Opposition CR = 0.94, $\alpha = 0.94$; and Normative Opposition CR = 0.91, $\alpha = 0.91$. It was possible to verify the importance of all items in the BCASSFS factors given the high correlation of each item with the set that constituted each subscale and the decrease in internal consistency values if any item was removed, with the exception of Item 11. However, removing Item 11 caused such a small improvement in the subscale's internal consistency indices that it was decided to keep it due to this reason and its theoretical relevance. It was also observed that mean scores were higher on the Normative Opposition subscale ($M = 2.65$, $SD = 0.90$) than on the Individual Opposition subscale ($M = 1.90$, $SD = 1.12$), and this difference was statistically significant ($t [1037] = 24.67$, $p < 0.001$, $d = 0.76$). Table 2 shows the means and standard deviations of the scores on each item and on each factor of the scale, the internal consistency values, the CR value if the item was dropped, the Cronbach's alpha value if the item was dropped, item homogeneity (corrected item-total correlations), and the standardized factor loadings of each item of the BCASSFS in this study.

Table 2. Means, standard deviations, composite reliability, composite reliability if item dropped, Cronbach's α , Cronbach's α if item dropped, item-factor correlation and standardized factor loadings for BCASSFS

	<i>M</i>	<i>SD</i>	CR	CR if item is dropped	Cronbach's α if item is dropped	Cronbach's α if item is dropped	Item-rest correlation	Standardized factor loading
IO	1.908	1.128	0.949		0.945			
Item 1	1.997	1.421		0.937		0.929	0.894	0.902
Item 2	2.094	1.379		0.940		0.936	0.816	0.877
Item 4	1.912	1.366		0.938		0.929	0.897	0.899
Item 5	1.597	1.211		0.941		0.933	0.862	0.864
Item 7	1.756	1.174		0.935		0.932	0.880	0.926
Item 11	2.346	1.408		0.958		0.958	0.582	0.609
Item 13	1.652	1.116		0.940		0.936	0.837	0.868
NO	2.657	0.903	0.916		0.915			
Item 3	3.261	1.164		0.910		0.905	0.710	0.711
Item 6	3.018	1.117		0.899		0.894	0.806	0.829
Item 8	2.322	1.081		0.897		0.895	0.807	0.848
Item 9	2.816	1.102		0.902		0.895	0.805	0.797
Item 10	2.131	1.079		0.901		0.904	0.714	0.807
Item 12	2.150	1.057		0.903		0.904	0.719	0.789
Item 14	2.899	1.169		0.913		0.914	0.623	0.678

Note. All factor loadings were statistically significant. IO: Individual Opposition. NO: Normative Opposition. CR: Composite Reliability.

Multigroup confirmatory factor analysis

Configural invariance models were tested. They were restricted to the two factors and the 14 items for subsamples divided by sexual orientation and gender identity (LGBT+ *versus* cis-heterosexual participants), by educational level (participants with up to high school *versus* undergraduates *versus* graduates), by age (young adults under 30 *versus* adults over 30 years old), and by region of residence in Brazil (participants from the northeast or north *versus*

participants from the southeast or midwest *versus* participants from the south). Results showed that the BCASSFS had good fit when the same factorial structure was tested across all groups, with good fit indices for all models (all CFI and NNFI values > 0.95 and RMSEA < 0.05). Table 3 shows fit indices of the tested models for all groups.

In addition to configural invariance, then metric invariance, scalar invariance and strict invariance models (with progressively restricted parameters) were tested. All next models showed good fit indices (all CFI and NNFI values > 0.95 and RMSEA < 0.05), and differences in the CFI and NNFI values from the baseline model (configural invariance model) were all less than 0.01. Table 3 shows fit indices of these models for all evaluated groups. Results of the second model tested indicated existence of metric invariance, i.e., the factor loadings of the items in each factor were equivalent across the compared groups. Results of the third model tested indicated existence of scalar invariance, i.e., the factorial loadings and intercept values were equivalent between the compared groups. And results of the fourth model tested indicated strict invariance, i.e., the factor loadings, intercept values, and variance and covariances of the errors were equivalent between the compared groups.

Table 3. Multigroup confirmatory factor analysis results

	Configural Invariance	Weak Invariance	Strong Invariance	Strict Invariance
<i>LGBT+ versus Cisgender-Heterosexual</i>				
CFI	1.000	0.995	0.995	0.995
NNFI	1.000	0.995	0.995	0.995
RMSEA	0.005	0.031	0.031	0.032
90% Confidence Interval	[0.000, 0.021]	[0.023, 0.039]	[0.022, 0.038]	[0.024, 0.039]
<i>Up to high school versus Undergraduate versus Graduate</i>				
CFI	1.000	1.000	1.000	1.000
NNFI	1.004	1.003	1.004	1.004
RMSEA	0.000	0.000	0.000	0.000
90% Confidence Interval	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]
<i>Young adults versus Adults over 30 years old</i>				
CFI	0.998	0.997	0.997	0.998
NNFI	0.998	0.997	0.997	0.998
RMSEA	0.019	0.023	0.022	0.021
90% Confidence Interval	[0.000, 0.029]	[0.011, 0.032]	[0.011, 0.031]	[0.009, 0.029]
<i>North + Northeast versus Southeast + Midwest versus South</i>				
CFI	1.000	1.000	1.000	1.000
NNFI	1.004	1.004	1.004	1.005
RMSEA	0.000	0.000	0.000	0.000
90% Confidence Interval	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]	[0.000, 0.000]

Note. CFI: comparative fit index; NNFI: non-normed fit index; RMSEA: root mean square error of approximation.

External validity and associated factors

Concurrent and convergent validity

The results of bivariate correlation analyses showed that both factors of the BCASSFS showed statistically significant correlations, in various magnitudes, with the other measures used in this study. Table 4 shows the correlation indices with 95% confidence intervals.

Individual Opposition factor had positive and very strong correlation with the measures of distal homophobic attitudes, proximal homophobic attitudes and traditionalism. Since these measures all assess sexual prejudice and correlated constructs, this indicates that the variables in question can be considered the same (sexual prejudice) or closely related (conservatism/traditionalism) constructs, which represents evidence of concurrent validity. Individual Opposition factor correlated positively and strongly with political conservatism and positively and moderately with the religiosity measure, suggesting that they are theoretically related but distinct constructs. These results can be considered evidence of convergent validity. The correlation with age, although was significant, had a magnitude that can be considered null. This result shows that there is almost no association between these two variables, which is theoretically and empirically supported by previous studies.

Normative Opposition factor had positive and moderate correlation with the measures of distal homophobic attitudes, proximal homophobic attitudes, traditionalism, and political conservatism. It also correlated positively with the religiosity measure, although with weak magnitude. These results indicate that the Normative Opposition factor is consistently correlated with theoretically close constructs, although to a lesser extent when compared to the Individual Opposition factor, which suggests some possible specificities for this measure of prejudice. Even so, these results provide evidence of convergent validity for the Normative Opposition factor. This factor of the BCASSFS did not correlate with age, which is also theoretically and empirically supported by literature, since previous studies found no association between these variables or identified only very weak correlations.

Table 4. Correlations between the individual opposition and normative opposition subscales and measures of sexual prejudice, traditionalism, political conservatism, religiosity and age [95% confidence intervals]

	Individual Opposition	Normative Opposition
ATHO – Proximal Attitudes	0.838** [0.819, 0.855]	0.472** [0.423, 0.518]
ATHO – Distal Attitudes	0.886** [0.873, 0.899]	0.486** [0.438, 0.531]
Traditionalism	0.791** [0.767, 0.813]	0.423** [0.372, 0.472]
Political Conservatism	0.651** [0.614, 0.685]	0.364** [0.310, 0.416]
Religiosity	0.369** [0.315, 0.420]	0.205** [0.146, 0.263]
Age	0.073* [0.012, 0.133]	-0.004 [-0.065, 0.057]

Note. ATHO: Scale of Attitudes Toward Homosexuality. * $p < 0.05$; ** $p < 0.001$.

Criterion validity

One-way ANOVAs results indicated statistically significant differences between groups for both factors of the BCASSFS, when the variables gender, sexual orientation and level of education were taken into account. In both factors, cisgender men had higher means than cisgender women, who, in turn, had higher means than transgender and other participants. Heterosexual participants had higher mean than homosexual and bisexual or others participants in both factors; however, the latter two groups did not differ. Participants with up to a high school educational level also had higher means than graduate participants in both factors; however, the means of undergraduate participants did not differ from any of the other groups in either factor of the BCASSFS. Table 5 shows the results of the mean comparisons between the groups. These results confirm the capacity of the BCASSFS factors to differentiate groups and they provide evidence of criterion validity for this instrument.

Table 5. Comparison of means between groups in the BCASSFS factors

Individual Opposition	Mean	Standard Deviation	<i>F</i>	η^2	<i>p</i>	Group Differences
Gender						
A. Cisgender man	2.178	1.298				
B. Cisgender woman	1.695	0.885	35.521	0.058	<0.001	A>B>C
C. Transgender or other	1.377	0.718				
Sexual Orientation						
D. Heterosexual	2.251	1.277				D>E
E. Homosexual	1.456	0.685	79.174	0.118	<0.001	D>F
F. Bisexual or other	1.479	0.696				E=F
Educational Level						
G. Up to high school	2.113	1.218				G>I
H. Undergraduate	1.891	1.129	4.234	0.009	0.015	G=H
I. Graduate	1.837	1.083				H=I
Normative Opposition						
Individual Opposition	Mean	Standard Deviation	<i>F</i>	η^2	<i>p</i>	Differences
Gender						
A. Cisgender man	2.797	0.940				
B. Cisgender woman	2.559	0.845	15.006	0.028	<0.001	A>B>C
C. Transgender or other	2.281	0.837				
Sexual Orientation						
D. Heterosexual	2.776	0.927				D>E
E. Homosexual	2.525	0.912	12.298	0.022	<0.001	D>F
F. Bisexual or other	2.492	0.806				E=F
Educational Level						
G. Up to high school	2.799	0.935				G>I
H. Undergraduate	2.661	0.896	3.773	0.007	0.023	G=H
I. Graduate	2.600	0.890				H=I

Discussion

The main objective of this study was to adapt the BCASSFS to the Brazilian context and investigate validity evidence of this measure for use in this population; as well as to investigate factors associated with the dimensions of prejudice that it measures. This research covered a more diverse sample than previous BCASSFS validation studies. Our results confirm the replication of the BCASSFS factorial structure, which presented good fit indices, high item saturation and high internal consistency values for each factor, corroborating findings of previous studies (Badenes-Ribera et al., 2020; Barrientos et al., 2013; Frias-Navarro et al., 2017; Pascual-Soler et al., 2017). The model exhibited factor invariance across groups of different sexual orientations and gender identities, educational levels, age range, and regions of residence in Brazil. In addition, evidence of concurrent and convergent validity as well as the construct validity of the adapted scale was found, with associations and directions in line with previous results in the literature (Badenes-Ribera et al., 2020; Baiocco et al., 2020; Barrientos et al., 2013; Ching & Wu, 2023; Frias-Navarro et al., 2017; Pascual-Soler et al., 2017). Therefore, the BCASSFS is a valid instrument to assess sexual prejudice in the Brazilian context when it manifests through opposition to the right of same-sex parents to exercise parenting and constitute families whose configuration involves child rearing.

The results of comparisons of the participants' intrapersonal mean scores on the two dimensions of the scale demonstrated higher levels of Normative Opposition than Individual Opposition, which is in line with the literature (Badenes-Ribera et al., 2020; Ching & Wu, 2023; Frias-Navarro et al., 2017; Frias-Navarro & Monterde-i-Bort, 2012; Pascual-Soler et al., 2017). This result suggests the predominance of more subtle and modern expressions of sexual prejudice that reflect the fact that heterosexism is an important social mechanism for rejecting same-sex sexuality. Thus, also in line with previous studies, these results can be analyzed in light of the modern prejudice model (Morrison & Morrison, 2003, 2011; Morrison et al., 2009;

Whitley & Kite, 2010). At the same time, this finding draws attention to the fact that, in general, the mean scores were relatively low for both dimensions of the scale, including the mean for Normative Opposition, which was below the midpoint of the instrument as well. This may be due to the characteristics of the sample, which was made up of a relatively large number of participants who identified as LGBT+, were highly educated, and had no religion. Since the BCASSFS is a self-report instrument, the social desirability of the participants taking the survey may also have contributed to the relatively low mean scores.

The results of this study confirmed the equivalence in factorial structure of the BCASSFS in subsamples of: LGBT+ and cisgender heterosexual individuals; individuals with education up to high school, undergraduates, and those with complete college education; youth under 30 and adults over 30 years old; and individuals from the north or northeast, southeast or midwest, and south regions of Brazil. Through the analyses of the subsequent progressively restricted models, it was possible to verify that regardless of the subsample, the items loaded on the same factor (configurational invariance), the magnitudes of the factorial loadings were virtually the same (factor loading invariance), and the regression intercepts relating each item to the factor were similar (intercept invariance). The scale showed good fit indices and small differences between these values even for strict invariance models, which is the most hierarchically complex model for assessing measurement invariance (Damásio, 2013). Therefore, the instrument showed good indicators of measurement invariance, and it demonstrated validity to assess the constructs in the same way in all subsamples.

The validity of the BCASSFS for samples that include LGBT+ individuals, as in this study, confirms that the process of internalizing negative beliefs and opinions related to opposition to parenting rights by families with same-sex parents also occurs in this population. Manifestations of Individual Opposition and Normative Opposition beliefs can be understood as a result of the internalization of negative evaluations about same-sex sexuality. This

introjection process relates to the notion of internalized stigma, which concerns the internalization of stigmatized social norms that LGBT+ people may experience and that may result in negative conceptions about themselves and same-sex sexuality (Antunes, 2017; Herek et al., 2015; Puckett & Levitt, 2015). Future studies should investigate the relationship between beliefs about raising children in families with same-sex parents and other measures of internalized stigma among LGBT+ individuals. Expanding knowledge about the process by which these beliefs are internalized among sexual minorities is of great importance given the potential implications for LGB individuals and their expectations, feelings, and decisions to have children, for example (Lev, 2010; Trub et al. 2017).

Analyses of the external validity of the BCASSFS showed satisfactory results and confirmed the relationship of its dimensions with theoretically associated variables. Similar to the present study, previous works found strong positive correlations between the Individual Opposition factor and measures of sexual prejudice (Badenes-Ribera et al., 2020; Barrientos et al., 2013; Frias-Navarro et al., 2017) and positive correlations, with moderate to weak magnitudes, with political conservatism and religiosity (Badenes-Ribera et al., 2020; Baiocco et al., 2020). They found that Normative Opposition factor showed moderate positive correlations with measures of sexual prejudice (Badenes-Ribera et al., 2020; Baiocco et al., 2020; Frias-Navarro et al., 2017) and moderate to weak positive correlations with political conservatism (Badenes-Ribera et al., 2020; Baiocco et al., 2020; Ching & Wu, 2023) and religiosity (Baiocco et al., 2020). In contrast to the results of this study, other works have identified correlations of smaller magnitude between measures of sexual prejudice and Individual Opposition ($r = 0.29, p < 0.010$; Baiocco et al, 2020), greater magnitude between measures of sexual prejudice and Normative Opposition ($r = 0.61, p < 0.001$ and $r = 0.51, p < 0.001$; Barrientos et al., 2013), and greater magnitude between Individual Opposition and political conservatism ($r = 0.56, p < 0.010$; Ching & Wu, 2023).

The fact that age showed a null correlation with Individual Opposition and did not correlate with Normative Opposition is also in agreement with results found in the literature. Regarding studies that evaluated this relationship, some found weak correlations between age and both BCASSFS factors (Individual Opposition: $r = 0.15$, $p = .002$ and Normative Opposition: $r = 0.11$, $p = 0.019$; Ching & Wu, 2023), weak correlations only with Normative Opposition ($r = 0.24$, $p < 0.010$; Baiocco et al, 2020; and $r = 0.12$, $p < 0.001$; Zhao & Zheng, 2021) or no statistically significant correlations between these variables (Frias-Navarro et al., 2017). It may be that cultural factors of the countries where these studies were conducted may influence the intensity with which these constructs correlated in each context. A good illustration of this is the research carried out by Baiocco et al. (2020) with Italian teachers and educators, in which the levels of Individual Opposition and Normative Opposition did not differ in the intrapersonal evaluation. This is probably because explicit homophobic attitudes seem to belong to public opinion in the same way as more subtle manifestations of sexual prejudice in that context (Baiocco et al., 2020). However, it is important to note that, in general, the relationships between these variables are in the same direction regardless of the context where they were investigated. Therefore, the results found in this study, in the Brazilian context, are in line with the findings of international research.

The fact that the Normative Opposition showed correlations of lower magnitude with the measures used here (compared to correlations of the Individual Opposition) deserves further clarification, especially in relation to the measure of sexual prejudice (ATHO). This is because, although ATHO is a more sensitive instrument for capturing explicit manifestations of sexual prejudice, its construction was based on references and studies on modern prejudice (Ramos & Cerqueira-Santos, 2021). The lower correlations between the ATHO factors and Normative Opposition (compared to correlations with Individual Opposition) suggest that this factor of the BCASSFS may be related to some even more specific dimensions of sexual prejudice expressed

nowadays. Normative Opposition involves beliefs that regard heterosexism as a social norm that reflects people's view of the world in relation to same-sex sexuality rather than individuals' own beliefs (Frias-Navarro & Monterde-i-Bort, 2012). It remains to further investigate other variables with which this dimension of sexual prejudice relates most strongly and how its effects are harmful to sexual minorities.

Regarding the criterion validity evidence of the BCASSFS, its factors showed good capacity to differentiate groups. In the present study, it was observed that cisgender men had higher mean scores than cisgender women in both dimensions of this scale. These results add to other findings indicating that men show higher mean scores than women on both factors of the BCASSFS (Ching & Wu, 2023; Frias-Navarro et al., 2014; Pascual-Soler et al., 2017; Zhao and Zheng, 2021). However, the controversy about some studies finding differences in the means between men and women only in the Individual Opposition factor (Frias-Navarro & Monterde-i-Bort, 2012; Pascual-Soler et al., 2017 [in the sample of Hispanics living in the United States]), only in the Normative Opposition factor (Badenes-Ribera et al., 2020), or in neither factor (Frias-Navarro et al., 2017) demands further explanations. Nevertheless, in general, these findings suggest that the BCASSFS subscales are sufficiently sensitive measures to capture differences in levels of prejudice between men and women in different research contexts, including Brazil. In this study, it was also observed that transgender or other-gender participants had lower mean scores than cisgender men and women. This is an unprecedented finding (although expected), since differences in the manifestations of such beliefs among transgender or other-gender individuals have not previously been investigated.

Heterosexual participants had higher mean scores on both dimensions of the BCASSFS compared to nonheterosexual participants. However, on average, homosexual participants did not differ from bisexuals or participants of other sexual orientations. To the best of our knowledge, the only studies that have carried out similar comparisons also found that

heterosexual participants had higher mean scores than homosexual participants (Zhao & Zheng, 2021) and than homosexual or bisexual participants (Ching & Wu, 2023) on both dimensions of the BCASSFS. Extending previous findings (Ching and Wu, 2023; Zhao & Zheng, 2021), our results expand the empirical findings in this field by demonstrating that individuals of various sexual minority orientations (homosexual individuals compared to individuals from other sexual minority groups) do not differ significantly in levels of opposition to same-sex parenting on both dimensions of the BCASSFS.

In this study, it was observed that participants with different educational levels showed differences in the level of beliefs on both dimensions of the BCASSFS. Participants with up to a high school education had higher mean scores, followed by those who were taking some undergraduate course and those who had completed some undergraduate and/or graduate courses. However, statistically significant differences were observed only between the means of the first and last group. These results corroborate findings in the literature that indicate that lower educational levels are associated with higher mean scores on both factors of the BCASSFS (Baiocco et al., 2020). However, they contrast with findings of Ching and Wu (2023) and Zhao and Zheng (2021), who did not find correlations between educational level and dimensions of the BCASSFS. However, it is worth noting that in Zhao and Zheng's (2021) study, most of the participants (92.6%) reported a college degree or higher, which may have influenced their results. Nevertheless, the explanation for this is still that in some contexts formal education may have little effect on these types of beliefs.

Differences found between groups by educational level indicated that having an undergraduate or graduate degree is associated with lower opposition to same-sex parenting. These results are in line with the literature indicating that people with higher levels of education have lower levels of prejudice (Dovidio et al., 2010; Herek, 2000; Herek et al., 2015). These findings, which reiterate the relationship between education and prejudice, are of great

relevance since they help in directing investments. Since formal education may contribute to the reduction of beliefs and attitudes related to sexual prejudice, including the more subtle attitudes that characterize modern prejudice.

In the present study, the effect sizes for intergroup differences in Individual Opposition levels tended to be larger than intergroup differences in Normative Opposition levels in all comparisons. This was observed in Ching and Wu's (2023) study in the comparisons between men and women. However, in other investigations that identified statistically significant differences between groups of men and women (Pascual-Soler et al., 2017; Zhao & Zheng, 2021) and between heterosexual and sexual minority groups (Ching & Wu, 2023; Zhao & Zheng, 2021), no difference trends in the magnitudes of effect sizes were observed in this direction. This may indicate that in the context of the present study, individual opposition to same-sex parenting was more evident across different groups. This suggests that interventions to reduce prejudice should consider these group specificities. On the other hand, participants had higher levels of Normative Opposition in general, and the differences between groups tended to be smaller for these types of beliefs. These findings point to the relevance of further investigation of the effects of normative opposition on same-sex parenting to better assess the urgency of interventions for the general population, with less concern for participants' gender, sexual orientation, and educational level.

The aims of this study were achieved, but it has some limitations that should be considered for the interpretation of the results. We highlight the fact that the measures of political orientation and religiosity consisted of indicators of political conservatism related to right-wing ideology level and the religiosity level, which may have affected the magnitude of the relationship between these variables and the BCASSFS factors. However, as pointed out in other studies, using a single item to operationalize political ideology seems sufficient because most people organize their ideas about political affinity in a simplistic way (Badenes-Ribera et

al., 2020; Worthen et al., 2017). Nevertheless, future studies should use other measures with psychometric properties to assess political conservatism and religiosity for more accurate analyses of the relationship between these constructs.

Still regarding the instruments, the fact that only one measure of sexual prejudice was used, namely, the ATHO, limited the investigation of the relationship between the BCASFSS dimensions and measures of other dimensions of sexual prejudice. This occurred especially with the Normative Opposition dimension, which had moderate correlations with the ATHO subscales. Further research on the relationship of this BCASSFS dimension with other measures of sexual prejudice and discrimination is encouraged to expand the validity of this construct and knowledge on its relationship with other types of sexual prejudice attitudes and related variables. Finally, the fact that an online data collection strategy and convenience sampling technique were used may have contributed to bias in the sample of this study. These techniques may have increased the likelihood of participation by individuals with internet access, those who used social media, and those who were interested in research ads like this one. Future research should consider alternative recruitment strategies.

Despite the limitations mentioned above, we present evidence that confirms that the BCASSFS is a reliable and valid measure for use in the Brazilian context. It was verified that the instrument presented satisfactory psychometric properties according to the results of the statistical analyses and according to the relationship between these results and findings in literature. In addition to confirming the validity of the theoretically proposed model, it was found that the BCASSFS is valid for assessing how individuals from different social groups organize and express beliefs about opposition to same-sex parenting and child rearing in these families. These groups include those consisting of nonheterosexual individuals, who may also express opposition to homosexual people exercising parenting. This may be because of concerns that the children may have developmental problems or because of the social rejection

they may suffer. However, in all cases, these individuals may be expressing the internalization of negative stigma about their own sexual orientation.

The findings on evidence of measurement invariance of BCASSFS found for the different groups analyzed here open possibilities for more parsimonious investigations through which intergroup differences, such as those observed in this study, can be considered more accurate. This makes it possible to expand knowledge about the dimensions of sexual prejudice assessed by the factors in this scale and to better plan interventions to reduce such beliefs and the attitudes related to them. The validation of the BCASSFS in the Brazilian context also contributes to the research in this field because it allows the development of further investigations of sexual prejudice in this country. This will enable future studies to use quantitative approaches and operationalize the constructs related to the dimensions of the BCASSFS, which have been widely investigated in the international context.

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Appendix A: BCASSFS

Beliefs About Children's Adjustment in Same-Sex Families Scale - Adapted Version for the Brazilian Context

Instruções: Indique, por favor, o seu nível de concordância com as seguintes afirmações, marcando a sua resposta na escala de 1=discordo completamente a 5=concordo completamente. Atenção para o fato de que quando aparecerem termos como pais, mães ou casais heterossexuais, estamos nos referindo a pessoas cisgêneros (com gênero correspondente ao sexo designado no nascimento). Quando aparecerem termos como casal gay ou lésbico, estamos nos referindo à casais formados por dois homens gays ou duas mulheres lésbicas.	Discordo completamente	Discordo	Nem concordo nem discordo	Concordo	Concordo completamente
1 - Em geral, o desenvolvimento social de uma criança é melhor quando ela é criada por um pai e uma mãe heterossexuais, e não por um casal gay ou lésbico. ¹	1	2	3	4	5
2 - Em geral, crianças criadas por pais gays ou mães lésbicas terão mais problemas do que aquelas que são criadas por um pai e uma mãe heterossexuais. ¹	1	2	3	4	5
3 - É mais provável que a criança terá experiências de exclusão social se seus/suas amigos/as souberem que seus pais/suas mães são gays/lésbicas. ²	1	2	3	4	5
4 - Quando crianças são criadas por um casal gay ou lésbico, elas terão mais problemas com a sua própria identidade sexual do que quando são criadas por um pai e uma mãe heterossexuais. ¹	1	2	3	4	5
5 - Se queremos defender os interesses da criança, somente casais heterossexuais deveriam poder adotar. ¹	1	2	3	4	5
6 - Uma criança adotada por um casal gay ou lésbico será alvo de piadas e rejeição por parte de seus/suas colegas. ²	1	2	3	4	5
7 - Se uma criança é adotada por um casal gay ou lésbico, ela certamente terá problemas psicológicos no futuro. ¹	1	2	3	4	5
8 - Certamente, os colegas de classe rejeitarão uma criança cujo/cuja pai ou mãe é gay/lésbica. ²	1	2	3	4	5
9 - Uma criança que é criada por um casal gay ou lésbico será importunada por seus/suas colegas de classe. ²	1	2	3	4	5
10 - A criança criada por pais gays ou mães lésbicas provavelmente não será	1	2	3	4	5

escolhida como líder por seus/suas colegas de classe ou amigos/as. ²					
11 - Quando uma criança manifesta comportamentos de orientação homossexual, seria prudente levá-la ao psicólogo. ¹	1	2	3	4	5
12 - Se os pais forem gays/lésbicas, será difícil para a criança ser convidada para festas de amigos/amigas. ²	1	2	3	4	5
13 - Um menino criado por mães lésbicas será uma criança afeminada. ¹	1	2	3	4	5
14 - A criança geralmente esconde de seus amigos a orientação sexual de seus pais, quando eles são gays ou lésbicas, por medo de ser rejeitada socialmente. ²	1	2	3	4	5

Nota. ¹: Item correspondente ao fator Oposição Individual. ²: Item correspondente ao fator Oposição Normativa.

CHAPTER V - STUDY 5

Essentialist beliefs about sexual orientation: co-occurrence, associated factors and relationship with sexual prejudice attitudes⁹

Abstract: Research has shown that different essentialist beliefs (notably naturalness, discreteness, homogeneity, and informativeness) about sexual orientation can be endorsed simultaneously and connect to sexual prejudice. However, studies have been carried out mainly in the U.S. and there are still gaps in explaining the relationship between essentialist thinking and sexual prejudice. We investigated latent profiles of essentialist beliefs about sexual orientation in the Brazilian context; whether membership in different latent profiles was associated with specific variables and sexual prejudice attitudes; and whether essentialist beliefs were directly and indirectly associated with sexual prejudice attitudes across groups by latent profiles. In a cross-sectional design, participants ($N = 1038$) completed measures of essentialist beliefs, sexual prejudice attitudes, conservatism, religiosity, and other social location variables and data were analyzed through latent profile analyses, regression analyses and path analyses. Results showed evidence for a three-latent profile solution, overlapping and diverging from previous studies. Higher conservatism and sexual prejudice attitudes were associated with a greater likelihood of membership in the high DHI (discreteness, homogeneity, informativeness) and multidimensional essentialism latent profiles than in the intermediate naturalness-only latent profile. DHI beliefs also directly predicted higher – and naturalness directly predicted lower – sexual prejudice attitudes. And the naturalness belief also indirectly predicted (via discreteness) higher sexual prejudice attitudes in the multidimensional essentialism latent profile. Our findings provide evidence for the co-occurrence of essentialist beliefs about sexual

⁹This study has been submitted and is under review for possible publication in the journal *Archives of Sexual Behavior*. The paper was written in collaboration with and co-authored by Dr. Sari van Anders from Queen's University in Kingston, ON, Canada.

orientation through different patterns, and shed light on how they can be associated with more or less sexual prejudice, depending on their simultaneous endorsement.

Keywords: beliefs, attitudes, sexual prejudice, psychological essentialism, latent profile.

Introduction

Psychological essentialism refers to the idea that members of certain categories share underlying properties or attributes (essences) that determine their observable characteristics and identity (Atran, 1987; Gelman, 2003; Haslam et al., 2006; Medin & Ortony, 1989). It can be applied to various kinds of social groups, including by sexual orientation and/or identity. Essentialist beliefs about sexual orientation can be organized in more than one dimension (Arseneau et al., 2013; Hegarty & Pratto, 2001; Haslam & Levy, 2006; Haslam et al., 2000), leading to questions about whether these multiple dimensions can co-occur and what other variables are associated with these beliefs when they are endorsed simultaneously.

Recent research that seeks to answer questions about the multiple dimensions of essentialism has mainly been conducted in the U.S. context (Grzanka et al., 2016; Grzanka et al., 2020; Tierney et al., 2021). There, it investigates the existence of different latent profiles of essentialist beliefs measured by the Sexual Orientation Beliefs Scale (SOBS) (Arseneau et al., 2013), which has four subscales. What these subscales are, however, differ, depending on whether they are validated in a sample of lesbian, gay, bisexual, and transgender [LGBT] people only (i.e., naturalness, discreteness, entitativity, and personal and social importance; noted as “Form 1”), or a sample mixed by sexual orientation/identity but predominantly heterosexual and cisgender, which we focus on in this paper (i.e., naturalness, discreteness, homogeneity, and informativeness; noted as “Form 2”). We also aimed to explore their associations with sexual prejudice and psychosocial variables that could be relevant to this context (e.g., sexual orientation/identity, conservatism, and more discussed below). And we were interested in these phenomena outside the U.S. context and within Brazil.

Existing research suggests that essentialist beliefs about sexual orientation can reflect up to three different latent profiles (Grzanka et al., 2016; Grzanka et al., 2020; Tierney et al., 2021). One of these is a multidimensional essentialism profile, which includes high levels of all essentialist beliefs (Grzanka et al., 2016; Grzanka et al., 2020; Tierney et al., 2021). Another is a naturalness-only profile: high levels of naturalness beliefs coupled with low levels of other essentialist beliefs (Grzanka et al., 2016; Grzanka et al., 2020; Tierney et al., 2021). The third latent profile is high “DHI” or “DEI”, which represents higher levels of discreteness, homogeneity, and informativeness beliefs (Grzanka et al., 2016; Grzanka et al., 2020) (or discreteness, entitativity, and personal and social importance beliefs [Tierney et al., 2021]), and lower levels of naturalness beliefs (though this was not replicated in one of the samples by Grzanka et al. [2016]).

These latent profile analyses provide important insights about essentialist beliefs about sexual orientation by focusing on the profiles that emerge from those mixture models that show the best fit among all those tested (Grzanka et al., 2016; Grzanka et al., 2020; Tierney et al., 2021). Yet they do not always show statistically significant differences between the mean scores of various essentialist beliefs like naturalness (Grzanka et al., 2020; Tierney et al., 2021) and informativeness (Grzanka et al., 2020). As such, these profiles may show less variability between some essentialist beliefs than might be inferred. This suggests that these essentialist beliefs (naturalness; informativeness) may have less influence on how we might understand groups to meaningfully differ in the types of essentialism they espouse.

Other types of essentialist beliefs may matter more for group differences. Indeed, the mean levels of endorsement of discreteness, homogeneity, entitativity, and personal and social importance beliefs differ significantly between all latent profiles across the studies (Grzanka et al., 2016; Grzanka et al., 2020; Tierney et al. 2021). This may be especially the case for discreteness beliefs, which are thought to present greater variability than other beliefs across

latent profiles. This is perhaps grounded in theory. For one, the perception of belonging to discrete categories is emphasized in social categorization processes for some people (Tajfel & Turner, 1986). And, it can also be grounded in empirical research that demonstrates the importance of the distinctiveness processes in the constitution of sexual identity, as well as its relationship with sexual prejudice (Falomir-Pichastor & Hegarty, 2014; Falomir-Pichastor et al., 2015; Falomir-Pichastor et al., 2017; Figueiredo & Pereira, 2021; Fritzlen et al., 2020).

However, there are still few studies about essentialism of sexual orientation using this mixture models approach to analyzing latent profiles, leaving important questions open. In addition, these latent profiles may be contextually and culturally-dependent, since they are rarely studied outside a U.S. context. As such, it is worth investigating which latent profiles can be found in other contexts and cultures besides the U.S. to provide a more comprehensive understanding of essentialist beliefs and their underlying constructs.

Variables associated with latent profiles of essentialist beliefs about sexual orientation

In addition to cultural and contextual variability in latent profiles of essentialist beliefs about sexual orientation, there is reason to suspect that these profiles can be meaningfully tied to important psychosocial variables. Perhaps not surprisingly, sexual orientation/identity is one of these, since essentialist beliefs may be associated differently with each other and with sexual prejudice among LGBT+ and cis-heterosexual individuals (Santos et al., under review); also, because these beliefs can have positive and negative impacts on attitudes towards sexual diversity among both cis-heterosexual individuals (Santos et al., under review) and sexual minorities (Morandini et al., 2015; Morandini et al., 2017). However, this evidence is preliminary. For example, while there is evidence that heterosexual individuals are less likely to be affiliated to the naturalness-only profile compared to the multidimensional essentialism profile (Grzanka et al., 2016), there are also findings that sexual orientation does not predict

affiliation to these latent profiles (Grzanka et al., 2020). And, among sexual minority groups¹⁰, there is evidence that non-monosexual individuals are more likely to belong to the multidimensional essentialism profile compared to the naturalness-only profile, among other differences (Tierney et al., 2021), highlighting how people's sexual identity/orientation can be meaningfully related to which profile of essentialist beliefs they fall into.

Other variables are also important to membership of different latent profiles of essentialist beliefs about sexual orientation, including political-related ones and negative attitudes towards sexual minorities (Grzanka et al., 2016; Grzanka et al., 2020). For example, higher homonegativity is associated with belonging to the high DHI or multidimensional essentialism profiles compared to the naturalness-only profile (Grzanka et al., 2016). And being part of the high DHI profile is associated with having fewer LBG friends, compared to the multidimensional essentialism and naturalness-only profiles (Grzanka et al., 2020). Importantly, this suggests that latent profile membership could predict sexual prejudice; this is supported by the findings that these profiles are associated with political-related variables (Grzanka et al., 2020) tied to political ideology and right-wing authoritarianism - variables associated with sexual prejudice (e.g., Crawford et al., 2016; Davoudpour, 2023; Hoyt et al. 2018; Hoyt & Parry, 2018; Pearte et al., 2013). And following this rationale, it is possible to hypothesize that religiosity may also be linked to different latent profiles, since there is evidence for this variable being associated with essentialist beliefs and attitudes related to sexual prejudice (e.g., Haslam & Levy, 2006; Santos et al., under review).

¹⁰As in our previous work (Santos et al., under review), we use the terms "minority/minorities" to refer to people and groups minoritized and marginalized in a power hierarchy because of resistance to their sexuality (sexual orientation, sex/gender, and other aspects); therefore, their use does not refer to statistical infrequency (van Anders, 2015; 2022). These terms can be problematic, but better encompass the range of identities, experiences, and existences arising from sexual diversity and marginalization towards it that we address in this work.

Relationship between dimensions of sexual prejudice and psychological essentialism

Psychological essentialism is tied to sexual prejudice, and this includes attention to cultural context. There are studies around the world that have developed different instruments to measure negative attitudes towards sexual minorities, internalization of sexual stigma, and related constructs (Berg et al., 2016; Costa et al., 2013). And, although most of these instruments were initially developed in the U.S., more and more have been validated in other countries, helping to address nation- and culture-specificities (Berg et al., 2016; Costa et al., 2013).

Some recently developed sexual prejudice instruments have additional advantages, beyond cultural specificity. For example, many cover different dimensions of sexual prejudice and capture more subtle expressions of modern prejudice (e.g., del Castillo et al., 2003; Frias-Navarro & Monderde-i-Bort, 2012; Morrison & Morrison, 2003; Ramos & Cerqueira-Santos, 2021). Two of them seem promising for broadening understandings of psychological essentialism, sexual prejudice, and their associations, and include the Attitudes towards Homosexuality Scale¹¹ (ATHO; Ramos & Cerqueira-Santos, 2021) and the Beliefs About Children's Adjustment in Same-Sex Families Scale (BCASSFS; Frias-Navarro & Monderde-i-Bort, 2012).

Attitudes towards Homosexuality Scale. The ATHO has evidence for a two-dimensional model of sexual prejudice, with two correlated factors: proximal attitudes and distal attitudes (Ramos

¹¹As in our previous work (Santos et al., under review), throughout this article we use the terms "homosexuality/homosexual" only when referring to references that use them (e.g., Figueiredo & Pereira, 2021; Frias-Navarro et al., 2015; Haslam & Levy, 2006). This is also the case when we refer to the Attitudes towards Homosexuality Scale results, which we used to measure sexual prejudice (Ramos & Cerqueira-Santos, 2021). Otherwise, we avoid using these terms, since they are associated with negative stereotypes, pathologization, and reduction of people's identity to their sexual behavior (e.g., APA, 2020; 2023).

& Cerqueira-Santos, 2021). Proximal attitudes refer to the negative attitudes people hold about similar-gender/sex sexuality and relationships referencing themselves and/or family members. Distal attitudes refer to negative attitudes people have towards laws and the integration of LGBQ individuals, as a social group, into society.

The distal and proximal sexual prejudice factors in the ATHO are relevant for questions of essentialist beliefs about sexual orientation. For example, there is evidence that higher proximal and distal sexual prejudice are associated with the discreteness dimension of essentialism among LGBT+ and cis-heterosexual individuals (Santos et al., under review). And higher proximal and distal sexual prejudice tend to be associated with the homogeneity dimension of essentialism, but among cis-heterosexual individuals only. In contrast, only proximal sexual prejudice seems to be negatively associated with the naturalness dimension of essentialist beliefs, and among cis-heterosexual individuals only. However, when the mediation effect of discreteness beliefs is taken into account, naturalness beliefs are also indirectly associated with higher proximal attitudes and distal attitudes among both LGBT+ and cis-heterosexual individuals.

Associations like these (Santos et al., under review), i.e., between sexual prejudice (both distal and proximal) and essentialist dimensions like discreteness and homogeneity can be explained on the basis of social identity theory (Tajfel & Turner, 1986). Social identity theory highlights that processes of distinctiveness are linked to prejudice, through discrimination of the out-group and favoring of the in-group (Tajfel & Turner, 1986). As such, this process may involve beliefs of discreteness and homogeneity, and can be the foundation for social categorization based on sexual orientation. This could also be expected for informativeness beliefs, but this association has not received empirical support from previous studies (Santos et al., under review). Other theoretical frameworks are also important; the attributional theory of stigma (Weiner et al., 1988) can explain the direct association between naturalness beliefs and

lower proximal sexual prejudice. This is because attributing uncontrollability to a stigmatized trait (in this case, similar-gender/sex sexuality) results in fewer negative responses towards the stigmatized individual or group (Weiner et al., 1988).

Finally, theoretical considerations of “biologism” – the belief that biology is the best and/or only way of knowing about the life phenomena – are useful for considering associations between essentialist beliefs and sexual prejudice (Santos et al., under review; van Anders, 2024). This is because the different essentialist beliefs may reflect different aspects of biologism, and because biologism is linked to other anti-sexual minority ideologies like heteronormativity (van Anders, 2024). Furthermore, there is evidence that high naturalness is associated with high discreteness, and that these two beliefs together are associated with distal and proximal sexual prejudice (with discreteness playing a mediating role [Santos et al., under review]). These findings may be grounded in theoretical considerations of biologism (Santos et al., under review). However, it is important to test whether these associations are replicated in other studies and in different groups. So, this can be tested across groups with different latent profiles of essentialist beliefs about sexual orientation.

Beliefs About Children's Adjustment in Same-Sex Families Scale. The BCASSFS is a second instrument that addresses sexual prejudice. It focuses specifically on opposition to same-sex parenting, with two dimensions that relate to but differ from the ATHO: individual opposition and normative opposition (Frias-Navarro & Monderde-i-Bort, 2012). Individual opposition refers to the direct rejection of parenting and child-rearing practices by same-sex parents; it reflects blatantly traditional attitudes of sexual prejudice. Normative opposition instead reflects “modern” subtle attitudes of sexual prejudice that link heterosexism and the rejection of children being raised in families with same-sex parents to social norms.

Interestingly, opposition to same-sex parenting may tap into and predict people's beliefs about the basis of similar-gender/sex sexual orientation. However, this seems to vary according

to context and the type of beliefs and opposition assessed (Frias-Navarro et al. 2015; Frias-Navarro et al., 2018). For example, evidence suggests that increasing beliefs in environmental/learned causes of similar-gender/sex sexuality increases individual opposition and normative opposition to same-sex parenting; whereas increasing beliefs in genetic causes has no significant effects (Frias-Navarro et al., 2018). Normative opposition to same-sex parenting shows a similar but also differing pattern; it increases when beliefs in both environmental/learned and genetic causes are increased (Frias-Navarro et al., 2015). Moreover, individual opposition to same-sex parenting increases when beliefs in environmental/learned relative to genetic causes increase (Frias-Navarro et al., 2015). These associations are largely explained by the attributional theory of stigma (Weiner et al., 1988). Yet, the variability and inconsistency in the associations between genetic beliefs and sexual prejudice requires further clarification.

How essentialist beliefs might be related to sexual prejudice in the form of opposition to same-sex partnering is still an open question. As per the attributional theory of stigma (Weiner et al., 1988), the attribution of (un)controllability of similar-gender/sex sexuality might explain opposition to same-sex parenting (Frias-Navarro et al. 2015; Frias-Navarro et al., 2018). Accordingly, believing in the naturalness of sexual orientation may also have implications for opposition to same-sex parenting. As such, it may be that naturalness beliefs are associated with higher or lower opposition to same-sex parenting (Santos et al., under review), alone or in concert with other essentialist beliefs.

The present study: Essentialist beliefs, predictors and outcomes, and sexual prejudice

Though there are important insights into the associations between different types of sexual prejudice attitudes and essentialist beliefs and their profiles, there is still much unknown, leaving any important questions unanswered that can help researchers and communities move towards reducing prejudice and discrimination. In addition, research that exists on these topics

have largely been conducted in the U.S., so that it is not clear if these findings are culturally-specific or not, and what we might know about essentialist profiles and sexual prejudice in other nations. Accordingly, we aimed in this study to investigate: 1) latent profiles of essentialist beliefs about sexual orientation in the Brazilian context, and how these profiles relate to those found in previous studies (in U.S. contexts); 2) whether membership in the different latent profiles can be explained by relevant psychosocial variables such as sexual orientation/identity, right-wing authoritarianism-related conservatism, political conservatism and religiosity, and other psychosocial variables previously-identified to be important (age, gender/sex, schooling, ethnic/racial identity, place of residence, relationship status, and parenthood status); 3) whether the different latent profiles reflect differing degrees and kinds of sexual prejudice (attitudes towards homosexuality; opposition to same-sex parenting); 4) whether essentialist beliefs about sexual orientation alone are directly associated with different dimensions of sexual prejudice across groups with different latent profiles; and 5) specifically whether the naturalness dimension of essentialist beliefs about sexual orientation is indirectly associated (via discreteness) with different dimensions of sexual prejudice across groups with different latent profiles.

To address the above questions, we tested the following hypotheses that were based in existing literature:

H1: Three latent profiles of essentialist beliefs about sexual orientation will be found in the Brazilian context: a profile with high levels of essentialist beliefs in all dimensions measured (multidimensional essentialism); a profile characterized by expressively high discreteness, high homogeneity and informativeness, and low naturalness (high DHI); and a profile with high naturalness and low discreteness, homogeneity, and informativeness (naturalness-only).

H2: Psychosocial variables will explain membership in different latent profiles. Specifically, heterosexual individuals and individuals with higher levels of right-wing

authoritarianism-related conservatism, political conservatism, and religiosity will be more likely to be part of the high DHI and multidimensional essentialism latent profiles, compared to the naturalness-only profile. We will also test other the predictive power of individual differences in an exploratory fashion.

H3: Membership in different latent profiles will explain variations in the levels of different dimensions of sexual prejudice. Specifically, membership in the high DHI and multidimensional essentialism profiles will be associated with higher levels of different dimensions of sexual prejudice, compared to membership in the naturalness-only profile.

H4: Discreteness, homogeneity, and informativeness beliefs will directly predict higher – and naturalness will directly predict lower – sexual prejudice, depending on the dimension of prejudice investigated and the groups with different latent profiles identified.

H5: Naturalness beliefs will indirectly predict (via discreteness) higher scores in all dimensions of sexual prejudice investigated in this study, and this will occur at least among individuals in the multidimensional essentialism latent profile.

Method

This article is one part of a multi-part report on a larger study about the relationship between conceptions of sexual orientation and beliefs and attitudes related to sexual diversity. The research method, with the exception of some measures and the data collection period (clarified below), is the same as that reported by Santos et al. (under review). It also entails the reanalysis of data from Sample B of the study by Santos and Cerqueira-Santos (2023) and the sample from the study by Santos et al. (2024). Thus, some of the method descriptions overlap with the ones of these previous reports. As this study had other objectives and focused on other relationships between the variables, we analyzed the data using different techniques than in the previous ones (Santos & Cerqueira-Santos, 2023; Santos et al., 2024). This study had a cross-

sectional design, was carried out through a national survey in Brazil, and used a non-probabilistic convenience sampling technique to recruit participants.

Participants

The final sample in this study was made up of 1038 Brazilian participants, whose mean age was 33.37 years ($SD = 10.94$), ranging from 18 to 71 years, of whom 52.3% were adults aged 30 years or older. The sample was diverse and Table 1 lays out demographics by gender/sex, sexual identity/orientation, race/ethnicity, education, religious status, marital and relationship status, and parental status. The sample included participants from all Brazilian states, with most of them from the Southeast (40.9%) and Northeast (26.1%) regions of Brazil; Table 1 additionally shows level of urbanization of the place of residence.

Table 1. Distribution of participants by sociodemographic characteristics*

Sociodemographic characteristics and categories		N = 1038	
		<i>n</i>	%
Age			
	18-29	454	43.7
	30-44	381	36.7
	45-59	196	18.9
	≥ 60	7	0.7
Gender/sex			
	Cisgender man	500	48.2
	Cisgender woman	474	45.7
	Transgender man	9	0.9
	Transgender woman	8	0.8
	Non-binary	33	3.2
	Queer	6	0.6
	Transvestite	1	0.1
	Other	7	0.7
Sexual identity/orientation			
	Heterosexual	582	56.1
	Bisexual	197	19.0
	Homosexual	180	17.4
	Pansexual	45	4.4
	Asexual	23	2.2
	Queer	3	0.3
	Other	8	0.8
Race/ethnicity self-identification			
	White	621	59.9
	Brown [†]	317	30.5
	Black	73	7.0
	Asian	11	1.1

Indigenous	4	0.4
Other	12	1.2
Schooling level		
1 - Up to incomplete high school	40	3.9
2 - Completed high school	175	16.8
3 - Undergraduate degree incomplete	263	25.3
4 - Undergraduate degree completed	435	41.9
5 - Master's Degree	96	9.3
6 - Doctoral Degree	29	2.8
Religious beliefs and affiliation		
No religion, but believes in God	269	26.0
No religion and no belief in God	259	25.0
Follow some kind of religion		
Catholic religion	208	20.0
Evangelical religion	71	6.8
Spiritist ²	69	6.6
African matrix religion	58	5.6
Protestant	26	2.5
Other	78	7.5
Marital and relationship status		
Single	442	42.6
Dating someone	210	20.2
Married	241	23.2
In a stable union	145	14.0
Parental status - whether you have a child or none		
With no children	734	70.7
With children under 18 years of age	198	19.1
With children over 18 years of age	59	5.7
Region of residence		
Southeast	425	40.9

Northeast	271	26.1
South	214	20.6
Midwest	82	7.9
North	46	4.5
Level of urbanization of place of residence		
Large city or state capital - municipality with more than 100,000 inhabitants	702	67.6
Medium-sized city - municipality with 50 to 100 thousand inhabitants	160	15.4
Small city - municipality with up to 50 thousand inhabitants	137	13.2
Rural area	39	3.8
<hr/>		
Total (N)	100	1038

Note. *In general, the questions had the items shown in the table as the response options; when participants checked the “Other” option, they could give an open-ended detailed answer. Participants answered a question about their age in years at the time of data collection and these data were recorded in the categories shown in the table. Participants answered a question about the state where they live in Brazil and so it was possible to determine the distribution of participants by region of the country. The question about schooling level included the options “Incomplete elementary school”, “Completed elementary school”, and “Incomplete high school”, but as the frequency of participants in these groups was very low ($n = 7$, $n = 9$, and $n = 24$, respectively), these answers were recorded in the “Up to incomplete high school” category for the analyses. The question about schooling level also included the option “Other” (open-ended question); ten participants who chose this option (most of them described that they were studying for some postgraduate degree) were recorded in the equivalent schooling level, according to the levels shown in the table. ¹Mixed race - mostly Black and white. ²A philosophical and scientific religious doctrine whose main assumption is the belief in the constant spiritual evolution of human beings through reincarnation.

Procedures

Participants in this study were recruited in July and August 2022, through ads shared on social networks (Facebook, Instagram, and WhatsApp). Individuals invited to take part were instructed to click on a link that directed them to read the informed consent form (ICF) and complete a questionnaire with the measures for the survey. Inclusion criteria were being over 18 years old and living in Brazil. After indicating agreement with the ICF and consent to take

part in the research, participants were directed to answer the measures online. All participants were informed in the ICF that they could stop completing the surveys at any time if they wished, which would indicate their withdrawal from participating in this study. So, only responses of participants who answered all items were considered for analysis, and participants with some missing answers to the measures were not considered in the sample.

When collecting data, the instruments were presented online in blocks with the items of each measure. Between each block there were instructions on what to do to progress through the questions and reminders highlighting the importance of continuing to give truthful answers to all questions. This strategy was used to maximize the likelihood that only participants who were reading the instructions thoroughly and who were committed to completing the entire questionnaire would be considered for the research. No other specific strategies, such as the inclusion of check questions, were used to validate the quality of the data. Participants in this research did not receive any financial compensation. This study was approved by the Research Ethics Committee/General Research Ethics Board of the universities to which the authors are affiliated and it was carried out according to standards for research with human beings.

Measures

Sociodemographic Questionnaire. Participants filled out a sociodemographic questionnaire developed for this study to collect information about age, gender/sex, sexual orientation identity label categories, racial/ethnic self-identification, religious beliefs and affiliation, level of urbanization of the place of residence, marital and relationship status, parental status (whether participants had a child/ren or none), schooling level (this variable was treated as continuous variable in the analyses, according to the organization presented in Table 1), and state of residence in Brazil. Individual monthly income was also asked in an open-ended question, but as many participants preferred not to answer this question, we decided not to use the incomplete data for this variable in the analysis.

The sociodemographic questionnaire also had the following question about political orientation: Which political orientation do you identify with more? With response options that ranged from "Extreme Left" to "Extreme Right", plus the option "I do not have a defined political position". We treated responses to this question as an indicator of political conservatism, calculated using a seven-point scale with the "Extreme Right" response option indicating the maximum score. We recoded the option indicating no defined positioning to count as "Center" positioning, because we considered it as an intermediate position (midpoint) in this measure (i.e., equally distant from the "Extreme Left" and "Extreme Right" options, and corresponding to the "Center" position option).

The sociodemographic questionnaire also included the following three questions related to religiosity: 1) How often do you engage in religious practices, such as services, masses or other religious activities? 2) How important are your religious/spiritual beliefs to you? And 3) How much do your religious/spiritual assumptions influence your decisions? These questions were answered using five-point scales, and answers were summed; we used the total scores (ranging from 3 to 15 points) to assess levels of religiosity.

Essentialist beliefs. We used the Sexual Orientation Beliefs Scale – Form 2 Adapted version (SOBS-F2A; Santos & Cerqueira-Santos, 2023) to measure individuals' essentialist beliefs about sexual orientation. SOBS-F2A is a version of the Sexual Orientation Belief Scale – Form 2 (Arseneau et al., 2013) that has recently been adapted and validated in the Brazilian context (the sample from this study was used in the wider validation study of the scale in this context). SOBS-F2A is made up of four factors measuring beliefs about naturalness (five items), discreteness (six items), homogeneity (six items) and informativeness (five items). It is answered through a five-point Likert-type scale (1 - strongly disagree to 5 - strongly agree) and participants report their agreement with items that reflect essentialist beliefs. After inverted items are recoded, higher scores indicate greater endorsement of the essentialist beliefs in each

factor. The factors of the SOBS-F2A had good (discreteness $\omega = 0.85$; homogeneity $\omega = 0.81$; informativeness $\omega = 0.82$) or acceptable (naturalness $\omega = 0.64$) internal consistency in this study (more details on the psychometric properties of the SOBS-F2A in this sample can be found in the Santos and Cerqueira-Santos' [2023] study).

Prejudice against sexual diversity. We used the Attitudes Towards Homosexuality Scale (ATHO; Ramos & Cerqueira-Santos, 2021) to measure dimensions of negative attitudes towards sexual diversity related to sexual prejudice. ATHO is a scale validated in the Brazilian context with a sample that included both cis-heterosexual and LGBT+ participants, and measures negative attitudes towards homosexuality and sexual diversity. It consists of seven items that are organized in a bifactor model, with adequate fit for both a unifactorial solution (general attitudes towards homosexuality) as well as a structure with two factors: proximal attitudes towards homosexuality (three items representing negative attitudes towards sexual relations and feelings related to homosexuality in one's intimate or family life) and distal attitudes towards homosexuality (four items representing negative social attitudes towards laws and the integration of homosexual people into society, by considering homosexual people as a social group). This measure is answered through a seven-point Likert-type scale (1 - strongly disagree to 7 - strongly agree), in which participants report their agreement with items that reflect attitudes towards homosexuals and homosexuality or same-sex attraction. Higher scores indicate more negative attitudes, after inverted items are recoded. We adopted the two-factor solution in this study, which had good fit (CFI = 1.00; TLI = 1.00; SRMR = 0.01; RMSEA = 0.00, 95% CI [0.00, 0.00) and factors with good internal consistency (proximal attitudes $\omega = 0.93$; distal attitudes $\omega = 0.93$).

Attitudes related to modern sexual prejudice. We used the Beliefs about Children's Adjustment in Same-Sex Families Scale (BCASSFS; Santos et al., 2024) to measure individuals' blatant and subtle attitudes related to modern sexual prejudice. BCASSFS was

originally developed by Frias-Navarro and Monterde-i-Bort (2012) and has recently been translated into Portuguese and validated in the Brazilian context with a sample that included both cis-heterosexual and LGBT+ participants (the sample from this study was used in the wider validation study of the scale in this context). BCASSFS is made up of 14 items organized into two factors measuring individual opposition (blatant traditional attitudes; seven items) and normative opposition (modern subtle attitudes; seven items). It is answered through a five-point Likert-type scale (1 - completely disagree to 5 - completely agree) and participants report their agreement with items that reflect beliefs of opposition to same-sex fathers or mothers. After inverted items are recoded, higher scores indicate greater opposition to same-sex parenting in each factor. The factors of the BCASSFS had good internal consistency in this study (individual opposition $\omega = 0.95$; normative opposition $\omega = 0.92$; more details on the psychometric properties of the BCASSFS in this sample can be found in Santos et al.'s [2024] study).

Right-wing authoritarianism-related conservatism. We used the traditionalism subscale, which is a factor of the Brazilian version of the right-wing authoritarianism scale (RWA; Vilanova et al., 2018) - originally developed by Duckitt et al. (2010) - to measure right-wing authoritarianism-related conservatism. The traditionalism subscale measures the tendency to support traditional moral standards and values. This measure is answered through a five-point Likert-type scale (1 - strongly disagree to 7 - strongly agree), in which participants report their agreement with items that reflect right-wing authoritarianism-related conservatism. Higher scores indicate more conservatism, after inverted items are recoded. We opted to use only the traditionalism subscale of the RWA due to its ability to assess conservatism and its consistent association with prejudice against sexual diversity in studies carried out in Brazil (Vilanova et al., 2018; Vilanova et al., 2021). That's why we also decided to include this measure of conservatism in this study, in addition to the other one of political conservatism. The

traditionalism subscale had good fit indices (CFI = 0.99; TLI = 0.98; SRMR = 0.07; RMSEA = 0.05, 95% CI [0.04, 0.06) and good internal consistency ($\omega = 0.89$) in this study.

Data analysis

Data analyses in this study were carried out using a person-centered statistical approach in the Jamovi statistical software (version 2.6.13). First, the data on essentialist beliefs of naturalness, discreteness, homogeneity, and informativeness were analyzed through latent profile analysis (LPA), to define which latent profiles of such beliefs could be identified in the sample. LPA were carried out using the snowRMM package, which integrates the R package tidyLPA into Jamovi. The four mixture models (with different patterns of variance and covariance of profiles) available in the tidyLPA R package were tested with the number of classes (which represent the latent profiles) varying from 2 to 6. Therefore, 20 mixture models of latent profiles of beliefs about sexual orientation were tested. In order to define the model with the best fit and which most adequately indicates the number of latent profiles and the classification of the participants in the sample, the values of some fit indices and additional estimates were used. In line with the literature (Nylund et al., 2007; Spurk et al., 2020; Tein et al., 2013), considering our model configurations and sample size, we considered the values of the Bayesian Information Criteria (BIC) and the Bootstrap Likelihood Ratio Test (BLRT): lower BIC and higher BLRT indicated the best fit. As significant BLRT values indicate the most adequate estimates for this test, we periodized the models with p-values <0.05 in the analysis of this fit indicator.

Complementary to the above, we analyzed the entropy estimates (to verify the accuracy of the models in classifying participants into different latent profiles) and the proportion of participants probabilistically assigned to each class (latent profile) in the model with the best fit. We considered the entropy cut-off > 0.80 to be adequate, although values > 0.60 would be acceptable (Jung & Wickrama, 2008; Muthén, 2004). We also expected profiles with more than

5% of the sample size (Nagin, 2005; Shanahan et al., 2013) and not such small samples (<50 cases) within the smallest class (Lubke & Neale, 2006; Muthén & Muthén, 2000). These criteria were also employed to help choose the model that would be most parsimonious and with a strong theoretical framework, as recommended in the literature (Spurk et al., 2020; Weller et al., 2020). In our analysis, we chose the solutions with the best fit according to the number of classes (among the four types of models), and then we compared those selected to identify the final model with the best fit among all of them. After choosing the model with the best fit and a solid theoretical framework, we estimated (by creating a new categorical variable) the participants' membership to their respective latent profile, based on the model's probabilistic function. This new categorical variable indicating the latent profile (or group) of the participants was used in the subsequent analyses.

After determining the group of participants according to their estimated latent profile of essentialist beliefs, these data plus data involving the other variables investigated in this study were analyzed using other inferential techniques. We conducted one-way ANOVA to compare whether the means of naturalness, discreteness, homogeneity, and informativeness beliefs were statistically different between the latent profile groups. We conducted multinomial logistic regression analyses to test whether membership in the different latent profiles was explained by: right-wing authoritarianism-related conservatism, political conservatism and religiosity, and differences in sexual orientation/identity, gender/sex, age, schooling, ethnic/racial identity, place of residence, relationship status, and parental status reported. Then, we conducted linear regression analyses to test whether membership in different latent profile explains variances in negative attitudes towards homosexuality (proximal and distal) and opposition to same-sex parenting (individual and normative).

Finally, we conducted path analyses to investigate the direct effects of the naturalness, discreteness, homogeneity, and informativeness beliefs - and the indirect effect of the

naturalness belief - on negative attitudes towards homosexuality and opposition to same-sex parenting. These analyses were carried out by groups of latent profile that participants were classified into in the first step of the analysis. We used the maximum likelihood estimation method in this analysis, with bootstrap (1000 replications) to estimate the standard errors. The structural models' fit was checked based on the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Standardized Root Mean Square Residuals (SRMR) and Root Mean Square Error of Approximation (RMSEA). The following cut-off points were used to consider the adequacy of the model fits: CFI and TLI > 0.90, SRMR and RMSEA < 0.08, with an upper limit of the 95% confidence interval (CI) of RMSEA expected to be < 0.10 (Brown, 2015; Kline, 2016).

Results

Hypothesis 1 - Latent profiles of beliefs about sexual orientation

We tested the four mixture models (with different patterns of variance and covariance of profiles) available in the tidyLPA R package to investigate latent profiles of essentialist beliefs about sexual orientation and test our primary hypothesis (H1) – that three latent profiles of essentialist beliefs about sexual orientation will be found in the Brazilian context: a profile with high levels of essentialist beliefs in all dimensions measured (multidimensional essentialism); a profile characterized by expressively high discreteness, high homogeneity and informativeness, and low naturalness (high DHI); and a profile with high naturalness and low discreteness, homogeneity, and informativeness (naturalness-only). All models were tested with latent profile classes ranging from 2 to 6. The fit indices analyses suggested that Model 2 with three latent profiles was the best solution, since this model had the lowest BIC value and the BRLT test was significant ($p = 0.010$). We also we found acceptable entropy value (0.74) and a not so small sample proportion within the smallest class (16.2%). The results for all these indices and estimates in each solution are shown in Table 2. It is worth mentioning that a comparison of the solutions carried out automatically by the Jamovi software also indicated the

Model 2 with three latent profiles as the best solution, based on an analytic hierarchy process (see Akogul and Erisoglu [2017] for more details). So, we adopted this solution with the three latent profiles, displayed in Figure 1, for the next analysis. This analysis provided general support for our Hypothesis 1, as we expected to find a three latent profile solution. We then moved on with the analysis to further investigate the characteristics of each latent profile.

Figure 1

Three latent profiles of essentialist beliefs about sexual orientation solution

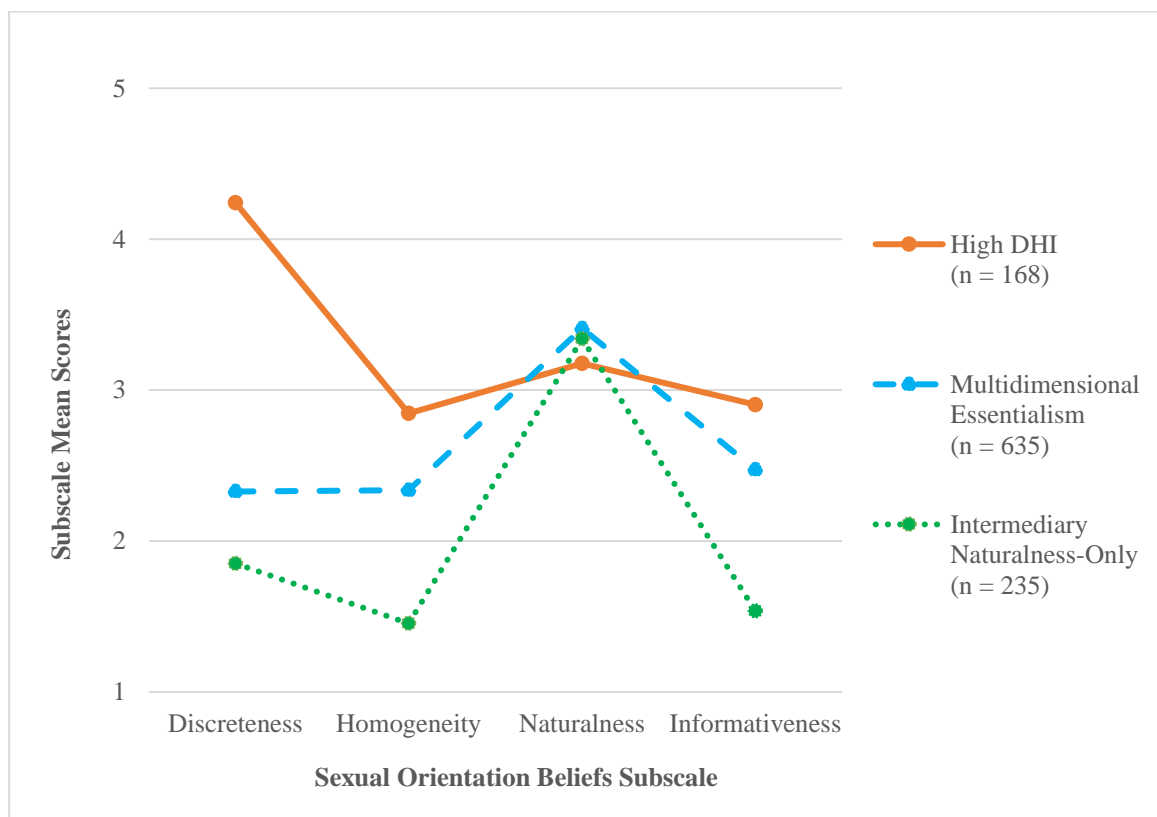


Table 2. Fit indices for LPA for sexual orientation beliefs from 2 to 6 profiles in four types of models

Models ¹	Profiles	BIC	BLRT	BLRT p-value	Entropy	Minimum within-class	Smallest class count
1	2	9949.79	435.08	0.010	0.84	0.21	220
	3	9964.33	20.19	0.020	0.52	0.20	208
	4	9803.66	195.40	0.010	0.68	0.09	89
	5	9818.65	19.74	0.010	0.66	0.09	93
	6	9842.95	10.43	0.069	0.63	0.03	26
2	2	9904.30	508.35	0.010	0.82	0.22	232
	3	9787.80	179.01	0.010	0.74	0.16	168
	4	9816.80	33.51	0.020	0.72	0.09	98
	5	9848.28	31.02	0.010	0.66	0.07	68
	6	9843.86	66.93	0.010	0.70	0.07	61
3	2	9842.33	219.21	0.010	0.84	0.23	233
	3	9876.30	0.75	0.535	0.49	0.22	229
	4	9877.82	33.21	0.010	0.50	0.15	159
	5	9912.67	-0.13	0.881	0.45	0.00	2
	6	9944.48	2.91	0.436	0.40	0.00	0
6	2	9832.72	298.28	0.010	0.82	0.23	239
	3	9869.84	67.06	0.010	0.60	0.21	215
	4	9891.83	82.18	0.010	0.71	0.12	126
	5	9954.93	41.08	0.020	0.70	0.11	116
	6	10021.09	38.01	0.059	0.71	0.09	88
Best models of each type:							
1	4	9803.66	195.40	0.010	0.68	0.09	89
2	3	9787.80	179.01	0.010	0.74	0.16	168
3	2	9842.33	219.21	0.010	0.84	0.23	233
6	2	9832.72	298.28	0.010	0.82	0.23	239
Selected model:							
2	3	9787.80	179.01	0.010	0.74	0.16	168

Note. ¹Models: 1 = equal variances, covariances fixed to zero; 2 = varying variances, covariances fixed to zero; 3 = equal variances and equal covariances; 6 = varying variances and varying covariances. Bolded values are models with the best fit at each step of analysis of the models with best fit indices and best classification estimates of participants.

We examined each of the classes in Model 2 with three latent profiles and observed that the solution was theoretically meaningful and partially confirmed our Hypothesis 1. We found a latent profile with expressively high discreteness, high homogeneity and informativeness, and low naturalness (high DHI). However, we found a latent profile we named multidimensional essentialism, with intermediary discreteness, homogeneity, and informativeness, and high naturalness (although we expected a profile with higher levels in all factors). And we found a latent profile with low discreteness, homogeneity, and informativeness and intermediary naturalness, which we named intermediary naturalness-only (although we expected a profile with high naturalness - the naturalness-only latent profile).

Comparisons of the means indicated that the profiles were significantly different from each other on all essentialist beliefs: naturalness, $F(2, 354.99) = 5.74, p = 0.004$, discreteness, $F(2, 469.99) = 1699.13, p < .0001$, homogeneity, $F(2, 384.43) = 492.19, p < .0001$, and informativeness, $F(2, 378.90) = 329.49, p < .0001$. Pairwise comparisons, via Games-Howell's post-hoc test, indicated that all means for each factor were significantly different between the latent profiles (see Table 3) except there were no significant differences in the means of naturalness between the intermediary naturalness-only profile and the high DHI ($p = 0.126$) and the multidimensional essentialism ($p = 0.504$) profiles.

Table 3. Means for naturalness, discreteness, homogeneity, and informativeness by latent profiles

Comparison variables	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	Differences
Naturalness					
A. Profile 1 – High DHI	3.18	0.82			A<B
B. Profile 2 – Multidimensional Essentialism	3.41	0.71	5.74	0.004	C~A
C. Profile 3 – Intermediary Naturalness-Only	3.34	0.84			C~B
Discreteness					
A. Profile 1 – High DHI	4.24	0.41			
B. Profile 2 – Multidimensional Essentialism	2.33	0.66	1699.13	<0.001	A>B>C
C. Profile 3 – Intermediary Naturalness-Only	1.85	0.46			
Homogeneity					
A. Profile 1 – High DHI	2.85	0.95			
B. Profile 2 – Multidimensional Essentialism	2.34	0.59	492.19	<0.001	A>B>C
C. Profile 3 – Intermediary Naturalness-Only	1.45	0.32			
Informativeness					
A. Profile 1 – High DHI	2.90	1.13			
B. Profile 2 – Multidimensional Essentialism	2.47	0.70	329.49	<0.001	A>B>C
C. Profile 3 – Intermediary Naturalness-Only	1.54	0.43			

Hypothesis 2 - Psychosocial variables that explain membership in different latent profiles

To test our second hypothesis (H2) – that heterosexual individuals and individuals with higher levels of right-wing authoritarianism-related conservatism, political conservatism, and religiosity will be more likely to be part of the high DHI and multidimensional essentialism latent profiles, compared to the (intermediary) naturalness-only profile; and to test other the predictive power of individual differences in an exploratory fashion – we tested a multinomial regression model. We entered the individual differences age and schooling as continuous variables and the others as categorical variables dichotomized: sexual orientation/identity (heterosexual participants versus other participants); gender/sex (cisgender men versus other

participants), ethnic/racial identity (white participants versus other participants), place of residence (rural areas or small cities versus other places), relationship status (married versus other status), and parental status (with children under or over 18 years old versus without any children). Analyses partially supported Hypothesis 2, showing that the model tested significantly explained membership in different latent profiles ($\chi^2[22] = 492.59, p < 0.001$, Nagelkerke's $R^2 = 0.32$), with some significant effects of the variables that we hypothesized.

Participants with higher levels of conservatism related to right-wing authoritarianism were significantly more likely to be in the high DHI, $B = 2.31$ ($SE = 0.25, p < 0.001$), or multidimensional essentialism, $B = 0.90$ ($SE = 0.18, p < 0.001$), than in the intermediary naturalness-only latent profile. Participants with higher levels of political conservatism were significantly more likely to be in the high DHI, $B = 0.46$ ($SE = 0.11, p < 0.001$) - but not in the multidimensional, $B = 0.05$ ($SE = 0.07, p = 0.525$) - than in the intermediary naturalness-only latent profile. On the other hand, heterosexual participants tended to be more likely to be in the high DHI than in the intermediary naturalness-only latent profile, but the estimated effect was only marginally significant, $B = 0.64$ ($SE = 0.34, p = 0.056$). And participants with higher levels of religiosity tended to be less likely to be in the high DHI than in the intermediary naturalness-only latent profile, but with the estimated effect only marginally significant, $B = -0.08$ ($SE = 0.04, p = 0.059$) as well.

Analysis also showed that age, gender/sex, schooling and place of residence were significantly associated with membership in the different latent profiles, among the other variables that were included in the model to test the effect in an exploratory fashion. Cisgender men were significantly more likely to be in the high DHI, $B = 1.41$ ($SE = 0.30, p < 0.001$), than the intermediary naturalness-only latent profile. Older participants and those with a higher schooling level were significantly less likely to be in the multidimensional essentialism than in the intermediary naturalness-only latent profile ($B = -0.02$ [$SE = 0.01, p = 0.013$] and $B = -0.18$

[$SE = 0.08$, $p = 0.032$], respectively). And participants who reported living in rural areas or small cities were significantly more likely to be in the multidimensional essentialism, $B = 0.51$ ($SE = 0.24$, $p = 0.030$), than in the intermediary naturalness-only latent profile. See Table 4 for more details on the estimates (including odds ratios) of all psychosocial variables included in the model tested in this analysis. Additionally, we tested the model with the multidimensional essentialism latent profile as the reference group to investigate which psychosocial variables would explain membership in the high DHI compared to the multidimensional essentialism latent profile. However, as this was not the focus of this study, we present the results of these analyses in the supplementary materials.

Table 4. Multinomial logistic regression of psychosocial variables on membership in the high DHI and multidimensional essentialist latent profiles compared to the intermediary naturalness-only latent profile

Independent variables included in the model ¹	Estimate <i>B (SE)</i>	95% CI		<i>p</i>	Odds Ratio	95% CI	
		Lower	Upper			Lower	Upper
Conservatism ²	2.31 (0.25)	1.83	2.79	<0.001	10.06	6.23	16.25
Political conservatism ²	0.46 (0.11)	0.25	0.68	<0.001	1.59	1.29	1.98
Religiosity ²	-0.08 (0.04)	-0.17	0.00	0.059	0.92	0.85	1.00
Heterosexual participants ²	0.64 (0.34)	-0.02	1.30	0.056	1.90	0.98	3.68
Cisgender men ²	1.41 (0.30)	0.83	1.20	<0.001	4.10	2.28	7.35
Age ²	-0.02 (0.02)	-0.05	0.01	0.128	0.98	0.95	1.01
Schooling ²	-0.17 (0.13)	-0.43	0.09	0.203	0.85	0.65	1.10
Rural areas or small cities ²	0.32 (0.36)	-0.38	1.02	0.373	1.38	0.68	2.78
White participants ²	0.19 (0.28)	-0.36	0.75	0.494	1.21	0.70	2.11
Married ²	-0.55 (0.36)	-1.25	0.15	0.125	0.58	0.29	1.16
Parents ²	0.23 (0.37)	-0.51	0.95	0.546	1.25	0.60	2.60
Conservatism ³	0.90 (0.18)	0.54	1.25	<0.001	2.45	1.71	3.51
Political conservatism ³	0.05 (0.07)	-0.10	0.19	0.525	1.05	0.91	1.21
Religiosity ³	0.02 (0.03)	-0.03	0.07	0.334	1.03	0.98	1.08
Heterosexual participants ³	-0.16 (0.18)	-0.51	0.20	0.390	0.86	0.60	1.22
Cisgender men ³	0.22 (0.17)	-0.12	0.55	0.202	1.24	0.89	1.74
Age ³	-0.02 (0.01)	-0.04	-0.01	0.013	0.98	0.96	1.00
Schooling ³	-0.18 (0.08)	-0.34	-0.02	0.032	0.84	0.72	0.99
Rural areas or small cities ³	0.51 (0.24)	0.05	0.97	0.030	1.66	1.10	2.64
White participants ³	-0.01 (0.17)	-0.34	0.32	0.960	0.99	0.71	1.38
Married ³	-0.27 (0.22)	-0.69	0.15	0.204	0.76	0.50	1.16
Parents ³	0.07 (0.22)	-0.36	0.50	0.757	1.07	0.70	1.64

Note. ¹Model estimates: $\chi^2(22) = 492.59, p < 0.001$, Nagelkerke's $R^2 = 0.32$. ²Probability of membership in the high DHI latent profile compared to the intermediary naturalness-only latent profile. ³Probability of membership in the multidimensional essentialism latent profile compared to the intermediary naturalness-only latent profile.

Hypothesis 3 – Association between membership in different latent profiles and variations in attitudes related to different dimensions of sexual prejudice

To test our third hypothesis (H3) – that membership in the high DHI and multidimensional essentialism profiles will be associated with higher levels of different dimensions of sexual prejudice, compared to membership in the (intermediary) naturalness-only profile – we tested four linear regression models with latent profiles as the independent variable and measures of attitudes related to sexual prejudice as the dependent variable. Analyses supported Hypothesis 3, showing the same pattern of association for all measures of negative attitudes towards homosexuality and opposition to same-sex parenting, with differences only in the magnitude of the associations and the explained variances of the models.

Membership in the high DHI ($B = 3.74$ [$SE = 0.14$, $p < 0.001$]) and multidimensional essentialism ($B = 0.47$ [$SE = 0.11$, $p < 0.001$]) was associated with higher negative proximal attitudes than membership in the intermediary naturalness-only latent profile, $F(2, 1035) = 432.34$, $p < 0.001$, $R^2 = 0.45$. Membership in the high DHI ($B = 3.93$ [$SE = 0.13$, $p < 0.001$]) and multidimensional essentialism ($B = 0.57$ [$SE = 0.10$, $p < 0.001$]) was also associated with higher negative distal attitudes than membership in the intermediary naturalness-only latent profile, $F(2, 1035) = 510.67$, $p < 0.001$, $R^2 = 0.50$. Membership in the high DHI ($B = 2.41$ [$SE = 0.08$, $p < 0.001$]) and multidimensional essentialism ($B = 0.33$ [$SE = 0.06$, $p < 0.001$]) was associated with higher individual opposition than membership in the intermediary naturalness-only latent profile, $F(2, 1035) = 556.28$, $p < 0.001$, $R^2 = 0.52$. And membership in the high DHI ($B = 1.14$ [$SE = 0.08$, $p < 0.001$]) and multidimensional essentialism ($B = 0.27$ [$SE = 0.06$, $p < 0.001$]) was associated with higher normative opposition than membership in the intermediary naturalness-only latent profile, $F(2, 1035) = 101.58$, $p < 0.001$, $R^2 = 0.16$. Additionally, we analyzed the association between membership in the high DHI profile and attitudes related to sexual prejudice, compared to membership in the multidimensional

essentialism profile. However, as this was not the focus of this study, we present these results in the supplementary materials.

Hypothesis 4 and 5 – Direct effect of discreteness, homogeneity, informativeness - and direct and indirect effect of naturalness - on attitudes related to sexual prejudice by latent profile

To test our fourth hypothesis (H4) – that discreteness, homogeneity, and informativeness beliefs will directly predict higher – and naturalness will directly predict lower – sexual prejudice, depending on the dimension of prejudice investigated and the groups with different latent profiles identified – and our fifth hypothesis (H5) – that naturalness beliefs will indirectly predict (via discreteness) higher scores in all dimensions of sexual prejudice investigated in this study, and this will occur at least among individuals in the multidimensional essentialism latent profile - we tested structural models through path analysis, with each measure of negative attitudes towards homosexuality (two factors) and opposition to same-sex parenting (two factors) as outcomes. We also tested each model in each of the three different latent profile groups. Then, we tested a total of 12 structural models.

In each model tested, the discreteness, homogeneity, informativeness, and naturalness beliefs entered as predictors of the measures of attitudes related to sexual prejudice, and naturalness also entered as a predictor of discreteness (to test naturalness' indirect effect via discreteness). Following Santos et al.'s model (under review), in these models we also set correlations between discreteness, homogeneity, and informativeness and entered age, schooling, conservatism related to right-wing authoritarianism, political conservatism, and religiosity as covariates predicting all the other variables (to control the effect of these individual differences). Analyses supported Hypothesis 4 and 5, showing that all the models had adequate fit indices and the essentialist beliefs had significant associations with the

measures of negative attitudes towards homosexuality and opposition to same-sex parenting in the expected directions. See Tables 5 to 7 for all statistics and estimates.

In models where beliefs of discreteness, homogeneity, and/or informativeness had significant direct effects, these beliefs were associated with high attitudes related to sexual prejudice. And in the models where belief of naturalness had significant direct effects, it was associated with low attitudes related to sexual prejudice. The effects were significant depending on the belief, attitude related to sexual prejudice and the latent profile group. At least two types of essentialist beliefs had significant effects on the attitudes related to sexual prejudice in almost all models. In the multidimensional essentialism latent profile group, for example, the four types of essentialist beliefs had significant direct effects on negative distal attitudes and individual opposition to same-sex parenting. However, in the intermediary naturalness-only latent profile group no essentialist belief had significant effect on negative distal attitudes and normative opposition to same-sex parenting (not even the naturalness belief). See Tables 5 to 7 for estimates of these effects in each model.

The naturalness belief had significant indirect effect (via discreteness) on negative proximal attitudes, negative distal attitudes and individual opposition to same-sex parenting in the multidimensional essentialism latent profile group. However, this indirect effect was only marginally significant on the normative opposition to same-sex parenting in this group. On the other hand, in the high DHI and intermediary naturalness-only latent profile groups the naturalness belief did not have significant indirect effect on any attitude related to sexual prejudice. See Tables 5 to 7 for estimates of these effects in each model. Direct and indirect effects of the covariates were also estimated in the models, but as they were not our focus in this study, we also present these results in the supplementary materials.

Table 5. Direct effect of essentialist beliefs – and indirect effect of naturalness – on attitudes related to sexual prejudice among participants in the high DHI latent profile

Direct and indirect pathways	Estimate <i>B (SE)</i>	95% CI		β	<i>p</i>
		Lower	Upper		
Model 1 direct and indirect effects					
Naturalness \Rightarrow Proximal attitudes	-0.52 (0.15)	-0.83	-0.21	-0.21	<0.001
Discreteness \Rightarrow Proximal attitudes	0.60 (0.29)	0.01	1.18	0.12	0.041
Homogeneity \Rightarrow Proximal attitudes	-0.03 (0.13)	-0.27	0.22	-0.01	0.814
Informativeness \Rightarrow Proximal attitudes	0.52 (0.12)	0.28	0.73	0.28	<0.001
Naturalness \Rightarrow Discreteness \Rightarrow Proximal attitudes	0.03 (0.03)	-0.01	0.12	0.01	0.311
Model 2 direct and indirect effects					
Naturalness \Rightarrow Distal attitudes	-0.31 (0.15)	-0.60	-0.02	-0.15	0.034
Discreteness \Rightarrow Distal attitudes	0.78 (0.26)	0.28	1.28	0.19	0.003
Homogeneity \Rightarrow Distal attitudes	0.09 (0.12)	-0.15	0.32	0.05	0.424
Informativeness \Rightarrow Distal attitudes	0.19 (0.11)	-0.02	0.40	0.12	0.080
Naturalness \Rightarrow Discreteness \Rightarrow Distal attitudes	0.05 (0.04)	-0.02	0.14	0.02	0.241
Model 3 direct and indirect effects					
Naturalness \Rightarrow Individual opposition	-0.21 (0.10)	-0.40	-0.02	-0.15	0.031
Discreteness \Rightarrow Individual opposition	0.44 (0.18)	0.09	0.81	0.15	0.014
Homogeneity \Rightarrow Individual opposition	0.12 (0.08)	-0.04	0.26	0.09	0.126
Informativeness \Rightarrow Individual opposition	0.16 (0.07)	0.04	0.29	0.15	0.013
Naturalness \Rightarrow Discreteness \Rightarrow Individual opposition	0.03 (0.02)	-0.01	0.08	0.02	0.253
Model 4 direct and indirect effects					
Naturalness \Rightarrow Normative opposition	-0.31 (0.09)	-0.49	-0.15	-0.27	<0.001
Discreteness \Rightarrow Normative opposition	0.30 (0.16)	-0.03	0.61	0.13	0.067
Homogeneity \Rightarrow Normative opposition	0.14 (0.07)	-0.00	0.28	0.14	0.047
Informativeness \Rightarrow Normative opposition	0.28 (0.06)	0.15	0.41	0.33	<0.001
Naturalness \Rightarrow Discreteness \Rightarrow Normative opposition	0.02 (0.02)	-0.01	0.05	0.02	0.260

Note. Model 1 fit indices: $\chi^2(35) = 196.98$, $p < 0.001$, CFI = 1.00, TLI = 1.06, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.14], R^2 for proximal attitudes: 0.49. Model 2 fit indices: $\chi^2(35) = 191.12$, $p < 0.001$, CFI = 1.00,

TLI = 1.06, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.14], R^2 for distal attitudes: 0.47. Model 3 fit indices: $\chi^2(35) = 213.05$, $p < 0.001$, CFI = 1.00, TLI = 1.06, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.14], R^2 for individual opposition: 0.54. Model 4 fit indices: $\chi^2(35) = 151.70$, $p < 0.001$, CFI = 1.00, TLI = 1.08, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.14], R^2 for normative opposition: 0.34.

Table 6. Direct effect of essentialist beliefs – and indirect effect of naturalness – on attitudes related to sexual prejudice among participants in the multidimensional essentialism latent profile

Direct and indirect pathways	Estimate	95% CI		β	p
	B (SE)	Lower	Upper		
Model 1 direct and indirect effects					
Naturalness \Rightarrow Proximal attitudes	-0.23 (0.05)	-0.33	-0.13	-0.12	<0.001
Discreteness \Rightarrow Proximal attitudes	0.28 (0.07)	0.14	0.41	0.14	<0.001
Homogeneity \Rightarrow Proximal attitudes	0.15 (0.06)	0.02	0.28	0.07	0.020
Informativeness \Rightarrow Proximal attitudes	0.10 (0.06)	-0.02	0.21	0.05	0.077
Naturalness \Rightarrow Discreteness \Rightarrow Proximal attitudes	0.04 (0.01)	0.02	0.07	0.02	0.004
Model 2 direct and indirect effects					
Naturalness \Rightarrow Distal attitudes	-0.21 (0.05)	-0.31	-0.10	-0.11	<0.001
Discreteness \Rightarrow Distal attitudes	0.32 (0.06)	0.20	0.45	0.16	<0.001
Homogeneity \Rightarrow Distal attitudes	0.20 (0.06)	0.08	0.32	0.09	0.001
Informativeness \Rightarrow Distal attitudes	0.20 (0.06)	0.07	0.32	0.11	0.002
Naturalness \Rightarrow Discreteness \Rightarrow Distal attitudes	0.05 (0.01)	0.02	0.08	0.02	0.001
Model 3 direct and indirect effects					
Naturalness \Rightarrow Individual opposition	-0.12 (0.03)	-0.17	-0.06	-0.11	<0.001
Discreteness \Rightarrow Individual opposition	0.12 (0.04)	0.04	0.20	0.10	0.004
Homogeneity \Rightarrow Individual opposition	0.13 (0.04)	0.06	0.20	0.10	<0.01
Informativeness \Rightarrow Individual opposition	0.13 (0.04)	0.06	0.20	0.12	<0.001
Naturalness \Rightarrow Discreteness \Rightarrow Individual opposition	0.02 (0.01)	0.01	0.03	0.02	0.018
Model 4 direct and indirect effects					
Naturalness \Rightarrow Normative opposition	0.03 (0.05)	-0.06	0.12	0.03	0.515
Discreteness \Rightarrow Normative opposition	0.12 (0.05)	0.01	0.22	0.10	0.029
Homogeneity \Rightarrow Normative opposition	0.15 (0.05)	0.05	0.25	0.11	0.004
Informativeness \Rightarrow Normative opposition	0.03 (0.05)	-0.07	0.11	0.02	0.597
Naturalness \Rightarrow Discreteness \Rightarrow Normative opposition	0.02 (0.01)	0.00	0.04	0.02	0.058

Note. Model 1 fit indices: $\chi^2(35) = 771.95$, $p < 0.001$, CFI = 1.00, TLI = 0.99, SRMR = 0.01 and RMSEA = 0.02, 95% CI [0.00, 0.08], R^2 for proximal attitudes: 0.57. Model 2 fit indices: $\chi^2(35) = 774.79$, $p < 0.001$, CFI = 1.00,

TLI = 0.99, SRMR = 0.01 and RMSEA = 0.02, 95% CI [0.00, 0.08], R^2 for distal attitudes: 0.57. Model 3 fit indices: $\chi^2(35) = 730.55$, $p < 0.001$, CFI = 1.00, TLI = 0.99, SRMR = 0.01 and RMSEA = 0.02, 95% CI [0.00, 0.08], R^2 for individual opposition: 0.54. Model 4 fit indices: $\chi^2(35) = 313.44$, $p < 0.001$, CFI = 1.00, TLI = 0.98, SRMR = 0.01 and RMSEA = 0.02, 95% CI [0.00, 0.08], R^2 for normative opposition: 0.11.

Table 7. Direct effect of essentialist beliefs – and indirect effect of naturalness – on attitudes related to sexual prejudice among participants in the intermediary naturalness-only latent profile

Direct and indirect pathways	Estimate	95% CI		β	p
	B (SE)	Lower	Upper		
Model 1 direct and indirect effects					
Naturalness \Rightarrow Proximal attitudes	-0.15 (0.06)	-0.26	-0.05	-0.15	0.008
Discreteness \Rightarrow Proximal attitudes	0.31 (0.11)	0.11	0.55	0.17	0.005
Homogeneity \Rightarrow Proximal attitudes	0.27 (0.16)	-0.02	0.60	0.10	0.090
Informativeness \Rightarrow Proximal attitudes	0.02 (0.10)	-0.20	0.21	0.01	0.872
Naturalness \Rightarrow Discreteness \Rightarrow Proximal attitudes	0.01 (0.01)	-0.01	0.04	0.01	0.315
Model 2 direct and indirect effects					
Naturalness \Rightarrow Distal attitudes	-0.08 (0.07)	-0.21	0.04	-0.08	0.226
Discreteness \Rightarrow Distal attitudes	0.11 (0.14)	-0.15	0.39	0.06	0.435
Homogeneity \Rightarrow Distal attitudes	0.09 (0.18)	-0.32	0.43	0.03	0.634
Informativeness \Rightarrow Distal attitudes	-0.15 (0.10)	-0.35	0.03	-0.07	0.152
Naturalness \Rightarrow Discreteness \Rightarrow Distal attitudes	0.01 (0.01)	-0.01	0.03	0.00	0.636
Model 3 direct and indirect effects					
Naturalness \Rightarrow Individual opposition	-0.12 (0.04)	-0.19	-0.05	-0.20	0.001
Discreteness \Rightarrow Individual opposition	0.13 (0.06)	0.01	0.23	0.12	0.026
Homogeneity \Rightarrow Individual opposition	0.09 (0.10)	-0.12	0.27	0.06	0.390
Informativeness \Rightarrow Individual opposition	0.03 (0.06)	-0.07	0.14	0.03	0.541
Naturalness \Rightarrow Discreteness \Rightarrow Individual opposition	0.01 (0.01)	-0.01	0.02	0.01	0.319
Model 4 direct and indirect effects					
Naturalness \Rightarrow Normative opposition	0.02 (0.08)	-0.12	0.17	0.02	0.752
Discreteness \Rightarrow Normative opposition	0.08 (0.12)	-0.18	0.32	0.04	0.528
Homogeneity \Rightarrow Normative opposition	0.24 (0.20)	-0.17	0.60	0.09	0.212
Informativeness \Rightarrow Normative opposition	-0.02 (0.14)	-0.30	0.23	-0.01	0.867
Naturalness \Rightarrow Discreteness \Rightarrow Normative opposition	0.00 (0.01)	-0.01	0.02	0.00	0.668

Note. Model 1 fit indices: $\chi^2(35) = 151.69$, $p < 0.001$, CFI = 1.00, TLI = 1.18, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.10], R^2 for proximal attitudes: 0.29. Model 2 fit indices: $\chi^2(35) = 132.07$, $p < 0.001$, CFI = 1.00,

TLI = 1.21, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.10], R^2 for distal attitudes: 0.23. Model 3 fit indices: $\chi^2(35) = 146.59$, $p < 0.001$, CFI = 1.00, TLI = 1.18, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.10], R^2 for individual opposition: 0.27. Model 4 fit indices: $\chi^2(35) = 79.68$, $p < 0.001$, CFI = 1.00, TLI = 1.46, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.10], R^2 for normative opposition: 0.04.

Discussion

In this study, we investigated latent profiles of essentialist beliefs (naturalness, discreteness, homogeneity, and informativeness) about sexual orientation in the Brazilian context. We explored whether membership in the different latent profiles was explained by specific psychosocial variables (e.g., sexual orientation/identity, right-wing authoritarianism-related conservatism, political conservatism, and religiosity), as well as social location variables (e.g., age, gender/sex, schooling, ethnic/racial identity, place of residence, relationship status, and parenthood status). And, we investigated whether membership in the different latent profiles reflected differing degrees of sexual prejudice attitudes (i.e., negative attitudes towards homosexuality and opposition to same-sex parenting). Finally, we investigated whether essentialist beliefs about sexual orientation as distinct factors were directly associated with sexual prejudice attitudes and, specifically, whether the naturalness dimension was indirectly associated (via discreteness) with the different sexual prejudice attitudes across groups by latent profiles.

Our hypotheses were partially confirmed. First, we found evidence for a three-latent profile solution. However, the characteristics of each latent profile differed subtly from what we expected. Second, some (but not all) of the psychosocial variables we hypothesized (or tested in an exploratory fashion) explained membership in different latent profiles. Third, membership in different latent profiles was associated with variations in the sexual prejudice attitudes we investigated. And finally, discreteness, homogeneity, and informativeness beliefs directly predicted higher – and naturalness directly predicted lower – sexual prejudice, depending on which attitudes measured and the latent profile of individuals. Notably, and as

predicted, among individuals in the multidimensional essentialism latent profile, the naturalness belief indirectly predicted (via discreteness) higher attitudes related to sexual prejudice (but this effect was only marginally significant for normative opposition to same-sex parenting).

Latent profiles of essentialist beliefs about sexual orientation in the Brazilian context

Our results suggest that the co-occurrence of essentialist beliefs about sexual orientation may vary by cultural context. Similar to previous investigations carried out in the U. S. (Grzanka et al., 2016; Grzanka et al., 2020; Tierney et al., 2021), we found that essentialist beliefs can reflect up to three different latent profiles. However, the latent profiles showed some context-specific characteristics. As we expected, in the Brazilian sample, we found a “high DHI” profile characterized by notably high discreteness, homogeneity, and informativeness, and low naturalness. As such, the discreteness dimension of essentialism may be much more evident among people who simultaneously endorse this belief along with the homogeneity and informativeness ones in this cultural context. Yet the literature also shows that these three beliefs can also comprise a single factor in other contexts (Agadullina & Chumakova, 2017; Agadullina et al., 2018). It may be that people in this latent profile are more concerned with the social characteristics of sexual orientation categories, whether these are discrete (mainly), homogeneous, and informative; and less concerned with their bases, whether biological and immutable.

Also, in contrast to previous studies (Grzanka et al., 2016; Grzanka et al., 2020; Tierney et al., 2021), we found that the latent profile (which we named “multidimensional essentialism”) with the highest endorsement of naturalness beliefs also showed high endorsement of the discreteness, homogeneity, and informativeness beliefs (with intermediary mean levels among the three profiles). We also found that the latent profile (which we named “intermediary naturalness-only”) with the lowest endorsement of discreteness, homogeneity, and informativeness beliefs showed intermediate endorsement of naturalness beliefs. Interestingly,

the mean for naturalness beliefs did not differ significantly between the intermediary naturalness-only profile and the other two profiles.

These subtle differences between the U.S. and Brazilian profiles suggest that the co-occurrence of essentialist beliefs about sexual orientation are co-constituted by cultural context. In the Brazilian context, higher endorsement of the naturalness belief does not occur alone, in contrast to the U.S. context (Grzanka et al., 2016; Grzanka et al., 2020; Tierney et al., 2021). This might relate to conceptions about the biological basis of sexual orientation in the U.S., which tend to be more common in the defense of rights and positive attitudes towards sexual minorities (e.g., Bartels et al., 2024; Hegarty, 2001; Diamond & Rosky, 2016; Osmundson, 2011).

Relationship between latent profiles and psychosocial variables and sexual prejudice

The relationships between the latent profiles of essentialist beliefs about sexual orientation with psychosocial variables related to political ideology were consistent with the literature (Grzanka et al., 2020). That is, we also found that having higher levels of conservatism related to right-wing authoritarianism was associated with membership in the high DHI (and multidimensional essentialism) compared to the intermediary naturalness-only latent profile. And, having higher levels of political conservatism was associated with membership in the high DHI compared to the intermediary naturalness-only latent profile.

Individual differences in the sociodemographic variables age, gender/sex, schooling and place of residence also had predictive power in explaining membership in different latent profiles. However, we used these variables in exploratory analyses, limiting interpretability. Still, findings fit with the literature, providing promising avenues (see supplementary materials by Santos et al., under review; Younas et al., 2024).

Interestingly, sexual orientation/identity was not consistently associated with membership in different latent profiles as there was only a marginally significant effect. This

actually also fits with previous research that this association sometimes exists (Grzanka et al., 2016) and sometimes does not (Grzanka et al., 2020). This also held true for religiosity. Thus, variables related to political ideology (mainly conservatism related to right-wing authoritarianism), alongside age, gender/sex, schooling and place of residence, seem to have greater power in explaining different profiles of endorsement of essentialist beliefs about sexual orientation in the Brazilian context, in contrast to people's sexual orientation/identity and religiosity, which had more contingent and context-dependent effects in general.

One possible explanation for the political ideology variables being more consistently associated with membership in different latent profiles is that they also are consistently linked to attitudes related to sexual prejudice (e.g., Crawford et al., 2016; Davoudpour, 2023; Pearte et al., 2013; Vilanova et al., 2018; Vilanova et al., 2021). These attitudes, in turn, are related to psychological essentialism, mainly discreteness, homogeneity, and informativeness beliefs as three distinct factors (e.g., Grzanka et al., 2016; Grzanka et al., 2020; Santos et al., under review) or as a single factor (Agadullina et al., 2018).

As we hypothesized, higher endorsement of the DHI profile beliefs was associated with higher sexual prejudice attitudes in all dimensions investigated, compared to endorsement to the naturalness-only profile beliefs. This association was also observed for higher endorsement of the multidimensional essentialism profile beliefs, though to a lower degree (see supplementary materials). As such, it seems that the lowest levels of sexual prejudice were held by those with the lowest mean levels of discreteness, homogeneity, and informativeness beliefs, and no difference in naturalness beliefs. These results to some extent replicate findings from previous studies (Grzanka et al., 2016; Grzanka et al., 2020) and highlight how different conceptions of sexual orientation/identity (that reflect psychological essentialism) can connect with sexual prejudice attitudes (Santos et al., under review; see also Falomir-Pichastor & Hegarty, 2014; Falomir-Pichastor et al., 2015; Falomir-Pichastor et al., 2017; Figueiredo &

Pereira, 2021). The naturalness belief reflects believing in the biological basis of sexual orientation, and our evidence suggests that this can be related to lower or higher sexual prejudice depending on the presence of other essentialist beliefs, as supported by the literature (e.g., Santos et al., under review).

This suggests that believing in the biological basis of sexual orientation may not, in itself, be an explanatory factor for decreasing sexual prejudice, further challenging the idea that believing in the biological basis of sexual orientation would benefit and improve attitudes towards sexual minorities (e.g., LeVay, 1996; Whitley, 1990). Instead, our findings support the argument that the “born this way” narrative does not, by itself, necessarily promote higher positive attitudes to and rights for sexual minorities (e.g., Bartels et al., 2024; Hegarty, 2020; Hegarty & Golden, 2008; Mitchell & Dezarn, 2014; Suhay & Garretson, 2018).

Direct and indirect effects of essentialist beliefs on sexual prejudice by latent profile

Our results indicate that discreteness (mainly), homogeneity, and informativeness beliefs are directly associated with higher sexual prejudice attitudes (Grzanka et al., 2020 [Table 2]; Haslam & Levy, 2006; Haslam et al., 2002; Santos et al., under review; see also Bartels et al. [2024]). That discreteness beliefs had more significant effects on the different attitudes and across different latent profiles confirms the greater effect of this dimension of psychological essentialism on sexual prejudice attitudes, compared to other essentialist beliefs (Haslam & Levy, 2006; Santos et al., under review). The link between discreteness beliefs and sexual prejudice can be explained according to the theory of social identity (Tajfel & Turner, 1986) and fits with findings on social categorization and distinctiveness processes (Falomir-Pichastor & Hegarty, 2014; Falomir-Pichastor et al., 2015; Falomir-Pichastor et al., 2017; Figueiredo & Pereira, 2021; Fritzlen et al., 2020; Santos et al. [under review]).

When considering the direct effects, in some cases believing in the biological basis of sexual orientation (i.e., the naturalness belief) was associated with lower sexual prejudice

attitudes (e.g., in the high DHI latent profile), consistent with the attributional theory of stigma (Weiner et al., 1988) and claims of some authors (e.g., LeVay, 1996; Whitley, 1990). However, the mixed effects of these beliefs (sometimes significant, sometimes not) require better explanations of its relationship with different dimensions of sexual prejudice depending on the context (latent profile, individual differences, and attitudes) of individuals.

Among participants in the intermediary naturalness-only latent profile, significant associations were observed between the naturalness belief and lower proximal attitudes towards homosexuality and individual opposition to same-sex parenting only. This fits with and supports the proposition by Santos et al. (under review) that in some contexts (in this case, latent profiles) believing in the biological basis of sexual orientation may only be directly associated with reduction in intolerance, but not in sexual stigma broadly. This is because that lower proximal attitudes towards homosexuality and individual opposition to same-sex parenting (this latter reflects more blatant and traditional manifestations of sexual prejudice; Frias-Navarro & Monterde-i-Bort, 2012; Santos et al., 2024) may indicate greater tolerance in interpersonal levels. While the absence of significant association between the naturalness belief and distal attitudes towards homosexuality and normative opposition to same-sex parenting (this latter reflects more subtle and modern manifestations of sexual prejudice; Frias-Navarro & Monterde-i-Bort, 2012; Santos et al., 2024) may indicate the maintenance of sexual stigma at broader levels. Accordingly, the absence of significant association between the naturalness belief and normative opposition among participants in the multidimensional essentialism latent profile can also be interpreted in this way.

Among participants in the multidimensional essentialism latent profile, most dimensions of psychological essentialism were associated positively (discreteness, homogeneity, and informativeness) or negatively (naturalness) with most sexual prejudice attitudes. However, among these participants naturalness beliefs also were indirectly associated

(via discreteness) with higher sexual prejudice attitudes. These results replicate those found in the study by Santos et al. (under review) and support the idea that biologism can lead to other essentialist conceptions about sexual orientation and foster regressive ideologies such as heteronormativity (van Anders, 2024).

Most participants in this study (61.18%, $n = 635$) were assigned to the multidimensional essentialism latent profile, a pattern not found in studies carried out in the U.S. (Grzanka et al., 2016; Grzanka et al., 2020; Tierney et al., 2021). It may be that, in the Brazilian context, simultaneous endorsement of all dimensions of psychological essentialism is the most common pattern. So, while naturalness beliefs may have direct positive implications among most of these people by being associated with lower sexual prejudice attitudes (except normative opposition to same-sex parenting), these beliefs may also have indirect negative implications by being associated (via discreteness) with higher such attitudes. On other hand, the scenario changes among individuals in the high DHI latent profile, which was associated with the highest sexual prejudice attitudes (here and in previous studies; Grzanka et al., 2016; Grzanka et al., 2020). This is because the naturalness belief seems to have solely positive implications in this latter profile, since only their direct effect was statistically significant according to the structural relationship we found in the path analysis.

Implications

Our findings have implications for deepening knowledge about the relationship between psychological essentialism and sexual prejudice. This study adds to investigations of how dimensions of essentialist thinking about sexual orientation may be expressed simultaneously through latent profiles in cultural contexts other than the U.S. Our findings show that these latent profiles may have some specific characteristics in different cultural contexts, but that they have similar relationships with sexual prejudice in both cultures.

Essentialist beliefs connect directly to sexual prejudice attitudes and both the pattern of simultaneous endorsement of these beliefs and the type of attitude assessed have implications for the connections. Furthermore, the discreteness beliefs have significant effects across most of the relationships investigated, which highlights the role of these beliefs (Haslam & Levy, 2006; Santos et al., under review) and of distinctiveness processes for prejudice (Tajfel & Turner, 1986). As believing in the biological bases of stigmatized traits (which reflects immutability or uncontrollability) leads to lower negative attitudes against individuals who hold them (Weiner et al., 1988), accordingly naturalness beliefs about sexual orientation are frequently associated with lower sexual prejudice attitudes. However, these beliefs can also be indirectly associated with *higher* sexual prejudice attitudes, and this seems to be more dependent on the context and type of attitude assessed (Santos et al., under review).

Psychological essentialism dimensions explain sexual prejudice; however, other variables also seem to be very important in contexts like Brazil, like those tied to political ideology and religiosity (Santos et al., under review; Vilanova et al., 2018; Vilanova et al., 2021). In our analyses, we took into account these variables in the models explaining the direct and indirect effects of essentialist beliefs on sexual prejudice attitudes. Interestingly, none of the essentialist beliefs explained outcomes of distal attitudes or normative opposition among participants in the intermediary naturalness-only latent profile. So, in contexts such as this latent profile, where levels of sexual prejudice are lower, other variables, such as political conservatism (the only one associated with distal attitudes), may better explain variations in sexual prejudice. Moreover, our results showed that some essentialist beliefs also mediated the relationship between political ideology variables and sexual prejudice attitudes (see Tables S2 to S13 in the supplementary materials). Thus, our findings also provide evidence about the implications of psychological essentialism for sexual prejudice taking into account effects of other factors that are also explanatory for these attitudes.

Limitations and future directions

Given the cross-sectional nature of our data, we cannot make strong causal claims regarding the direction of the relationships we tested. Both in the analyses we tested the effect of membership in the latent profiles of essentialist beliefs on sexual prejudice attitudes, and in the analyses we tested the direct and indirect effects of essentialist beliefs as distinct factors, we did it based on the hypothesis that essentialist beliefs could lead to sexual prejudice. This was mainly guided by the goal of testing the replicability of the model proposed in the study by Santos et al. (under review). However, as some authors have argued (e.g., Hegarty, 2020; Hegarty & Golden, 2008), and based on perspectives such as the justified discrimination model (Pereira & Vala, 2010; Pereira et al., 2010), it is possible that essentialist beliefs can also be outcomes of sexual prejudice and play a role in legitimizing (or contesting) discrimination and other negative attitudes towards sexual minorities. Therefore, future studies should experimentally and/or longitudinally investigate the directionality of these relationships in order to make stronger causal claims about the direction of the relationships between these variables.

Other limitations of this study are that it consisted of an online survey using a non-probabilistic convenience sampling technique. This may have generated some participation bias and interpretation of the results in terms of generalization requires caution. Even so, it is worth noting that this made it possible to recruit a large and diverse sample with participants from all Brazilian regions. Our measure of conservatism related to right-wing authoritarianism proved to be associated with many of the other variables throughout the analyses. However, including other factors of the right-wing authoritarianism (e.g., Vilanova et al., 2018) may produce even more insights on the relationship between these constructs, psychological essentialism and sexual prejudice. Accordingly, including other measures of ideologies, such as social dominance orientation, also presents in the Brazilian context (e.g., Vilanova et al., 2022), may

be equally relevant. As such, future research could benefit from other recruitment techniques and the inclusion of other ideology variables. In addition, future research could also benefit from more extensive investigations of the moderation effects of those ideological variables or the mediation effects of psychological essentialism to explain variations in sexual prejudice.

Conclusions

Findings from this study support recent evidence about the positive and negative implications of psychological essentialism for sexual prejudice (Santos et al., under review). They show that different essentialist beliefs about sexual orientation can be endorsed simultaneously and can configure different latent profiles. The profiles' levels of endorsement for each belief seem to depend to some extent on people's cultural context. The finding that people endorse all dimensions of psychological essentialism simultaneously (in the multidimensional essentialism latent profile) suggests that increasing naturalness beliefs does not have unilaterally or definitively positive implications for sexual minorities, as it can occur alongside other beliefs with negative implications. This is in line with the evidence that naturalness beliefs are also indirectly associated (via discreteness) with higher sexual prejudice attitudes, particularly among individuals in this latent profile. As such, this study provide evidence for understanding under what conditions (latent profiles and specific attitudes) psychological essentialism has implications for sexual prejudice, and what these implications are.

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Supplementary Materials

Essentialist beliefs about sexual orientation: co-occurrence, associated factors and relationship with sexual prejudice attitudes

Psychosocial variables that explain membership in in the high DHI compared to the multidimensional essentialist latent profile

Multinomial logistic regression analysis also showed that heterosexual ($B = 0.80$ [$SE = 0.30$, $p = 0.008$]) and cisgender men ($B = 1.19$ [$SE = 0.26$], $p < 0.001$) participants, as well as those with higher levels of conservatism related to right-wing authoritarianism ($B = 1.41$ [$SE = 0.18$], $p < 0.001$) and political conservatism ($B = 0.42$ [$SE = 0.09$, $p < 0.001$]), were significantly more likely to be in the high DHI than in the multidimensional essentialism latent profile ($\chi^2[22] = 492.59$, $p < 0.001$, Nagelkerke's $R^2 = 0.32$). On the other hand, in this model, participants with higher level of religiosity were significantly lower likely to be in the high DHI than in the multidimensional essentialism latent profile ($B = -0.11$ [$SE = 0.04$, $p < 0.001$]). See Table S1 for more details on the estimates (including odds ratios) of all psychosocial variables included in the model tested in this analysis.

Table S1. Multinomial logistic regression of psychosocial variables on membership in high DHI compared to the multidimensional essentialist latent profile of beliefs about sexual orientation

Independent variables included in the model ¹	Estimate <i>B</i> (<i>SE</i>)	95% CI		<i>p</i>	Odds Ratio	95% CI	
		Lower	Upper			Lower	Upper
Conservatism ²	1.41 (0.18)	1.07	1.76	<0.001	4.11	2.91	5.81
Political conservatism ²	0.42 (0.09)	0.24	0.59	<0.001	1.52	1.27	1.81
Religiosity ²	-0.11 (0.04)	-0.18	-0.03	0.005	0.90	0.83	0.97
Heterosexual participants ²	0.80 (0.30)	0.21	1.39	0.008	2.22	1.23	4.01
Cisgender men ²	1.19 (0.26)	0.68	1.70	<0.001	3.29	1.97	5.50
Age ²	0.00 (0.01)	-0.02	0.03	0.975	1.00	0.98	1.03
Schooling ²	0.01 (0.11)	-0.22	0.23	0.958	1.01	0.81	1.26
Rural areas or small cities ²	-0.19 (0.29)	-0.76	0.38	0.515	0.83	0.47	1.46
White participants ²	0.20 (0.24)	-0.28	0.68	0.409	1.22	0.76	1.98
Married ²	-0.28 (0.31)	-0.89	0.33	0.374	0.76	0.41	1.40
Parents ²	0.16 (0.33)	-0.48	0.80	0.630	1.17	0.62	2.22

Note. ¹Model estimates: $\chi^2(22) = 492.59, p < 0.001$, Nagelkerke's $R^2 = 0.32$.

Association of membership in the high DHI latent profile with attitudes related to sexual prejudice, compared to the membership in the multidimensional essentialism one

Linear regression analysis also showed that being in the high DHI profile was associated with higher attitudes related to sexual prejudice than being in the multidimensional essentialist latent profile: membership in the high DHI ($B = 3.27$ [$SE = 0.12, p < 0.001$]) was associated with higher negative proximal attitudes than membership in the multidimensional essentialism latent profile, $F(2, 1035) = 432.34, p < 0.001, R^2 = 0.45$; membership in the high DHI ($B = 3.37$ [$SE = 0.12, p < 0.001$]) was associated with higher negative distal attitudes than membership in the multidimensional essentialism latent profile, $F(2, 1035) = 510.67, p < 0.001, R^2 = 0.50$; membership in the high DHI ($B = 2.09$ [$SE = 0.07, p < 0.001$]) was associated with higher individual opposition than membership in the multidimensional essentialism latent profile, $F(2,$

1035) = 556.28, $p < 0.001$, $R^2 = 0.52$; and membership in the high DHI ($B = 0.88$ [$SE = 0.07$, $p < 0.001$]) was associated with higher normative opposition than membership in the multidimensional essentialism latent profile, $F(2, 1035) = 101.58$, $p < 0.001$, $R^2 = 0.16$.

Direct and indirect effects of the variables inserted in the models with the outcomes of attitudes related to sexual prejudice, by latent profile

Analysis showed that among the covariates (conservatism related to right-wing authoritarianism, political conservatism, religiosity, schooling and age) included in the structural models, there were some that were significantly associated with essentialist beliefs about sexual orientation and attitudes related to sexual prejudice. In general, conservatism related to right-wing authoritarianism and/or political conservatism had significant direct and/or indirect effects on higher attitudes related to sexual prejudice across almost all models. The only exception was for attitudes of normative opposition across participants in the intermediary naturalness-only latent profile. Some covariates had mixed significant indirect effects (via some essentialist beliefs), associating with both higher and lower attitudes related to sexual prejudice across the models.

Tables S2 to S5 show direct and indirect effects of psychosocial variables and essentialist beliefs on proximal and distal negative attitudes towards homosexuality and individual and normative opposition to same-sex parenting, respectively, among participants in the high DHI latent profile.

Table S2. Direct and indirect effect of the variables inserted in the model with the outcome of negative proximal attitudes towards homosexuality in the high DHI latent profile

Direct and indirect pathways	Estimate	95% CI		β	<i>p</i>
	<i>B</i> (<i>SE</i>)	Lower	Upper		
Conservatism⇒ Naturalness	-0.32 (0.08)	-0.48	-0.18	-0.40	<0.001
Pol. conserv.⇒ Naturalness	0.01 (0.05)	-0.08	0.10	0.02	0.837
Religiosity⇒ Naturalness	0.02 (0.02)	-0.02	0.06	0.10	0.337
Schooling⇒ Naturalness	-0.02 (0.06)	-0.13	0.09	-0.03	0.701
Age⇒ Naturalness	0.01 (0.01)	-0.00	0.02	0.14	0.085
Naturalness⇒ Discreteness	0.06 (0.04)	-0.02	0.13	0.11	0.142
Conservatism⇒ Discreteness	0.11 (0.04)	0.03	0.19	0.28	0.009
Pol. conserv.⇒ Discreteness	0.03 (0.03)	-0.02	0.08	0.10	0.282
Religiosity⇒ Discreteness	-0.01 (0.01)	-0.03	0.01	-0.09	0.326
Schooling⇒ Discreteness	0.05 (0.03)	-0.02	0.10	0.12	0.128
Age⇒ Discreteness	0.00 (0.00)	-0.00	0.01	0.08	0.310
Conservatism⇒ Homogeneity	0.07 (0.11)	-0.17	0.28	0.08	0.510
Pol. conserv.⇒ Homogeneity	0.06 (0.06)	-0.05	0.19	0.10	0.302
Religiosity⇒ Homogeneity	-0.01 (0.03)	-0.07	0.04	-0.04	0.722
Schooling⇒ Homogeneity	-0.15 (0.07)	-0.28	-0.02	-0.17	0.026
Age⇒ Homogeneity	0.01 (0.01)	-0.00	0.02	0.12	0.113
Conservatism⇒ Informativeness	0.06 (0.12)	-0.18	0.30	0.06	0.607
Pol. conserv.⇒ Informativeness	0.12 (0.08)	-0.03	0.29	0.16	0.143
Religiosity⇒ Informativeness	-0.03 (0.03)	-0.09	0.03	-0.10	0.331
Schooling⇒ Informativeness	-0.07 (0.09)	-0.25	0.10	-0.07	0.405
Age⇒ Informativeness	0.01 (0.01)	-0.00	0.03	0.10	0.178
Naturalness ⇒ Prox. atti.	-0.52 (0.15)	-0.83	-0.21	-0.21	<0.001
Discreteness ⇒ Prox. atti.	0.60 (0.29)	0.01	1.18	0.12	0.041
Homogeneity ⇒ Prox. atti.	-0.03 (0.13)	-0.27	0.22	-0.01	0.814
Informativeness ⇒ Prox. atti.	0.52 (0.12)	0.28	0.73	0.28	<0.001

Conservatism⇒ Prox. atti.	0.92 (0.16)	0.59	1.21	0.46	<0.001
Pol. conserv.⇒ Prox. atti.	0.10 (0.11)	-0.10	0.31	0.07	0.364
Religiosity⇒ Prox. atti.	-0.02 (0.05)	-0.11	0.07	-0.04	0.613
Schooling⇒ Prox. atti.	-0.01 (0.11)	-0.26	0.21	-0.01	0.925
Age⇒ Prox. atti.	0.02 (0.01)	-0.00	0.04	0.10	0.094
Naturalness ⇒ Discreteness ⇒ Prox. atti.	0.03 (0.03)	-0.01	0.12	0.01	0.311
Conservatism⇒ Discreteness⇒ Prox. atti.	0.07 (0.04)	-0.00	0.16	0.03	0.131
Conservatism⇒ Homogeneity⇒ Prox. atti.	-0.00 (0.02)	-0.04	0.04	-0.00	0.899
Conservatism⇒ Informativeness⇒ Prox. atti.	0.03 (0.06)	-0.09	0.17	0.02	0.619
Conservatism⇒ Naturalness⇒ Prox. atti.	0.17 (0.06)	0.06	0.30	0.08	0.007
Conservatism⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	-0.01 (0.01)	-0.04	0.00	-0.01	0.310
Pol. conserv.⇒ Discreteness ⇒ Prox. atti.	0.08 (0.02)	-0.02	0.06	0.01	0.383
Pol. conserv.⇒ Homogeneity⇒ Prox. atti.	-0.00 (0.01)	-0.03	0.02	-0.00	0.882
Pol. conserv.⇒ Informativeness⇒ Prox. atti.	0.06 (0.04)	-0.02	0.15	0.04	0.159
Pol. conserv.⇒ Naturalness⇒ Prox. atti.	-0.01 (0.03)	-0.06	0.05	-0.00	0.842
Pol. conserv.⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	0.00 (0.00)	-0.00	0.01	0.00	0.884
Religiosity⇒ Discreteness⇒ Prox. atti.	-0.01 (0.01)	-0.02	0.01	-0.01	0.407
Religiosity ⇒ Homogeneity⇒ Prox. atti.	0.00 (0.00)	-0.01	0.01	0.00	0.940
Religiosity⇒ Informativeness ⇒ Prox. atti.	-0.02 (0.02)	-0.05	0.02	-0.03	0.347
Religiosity⇒ Naturalness⇒ Prox. atti.	-0.01 (0.01)	-0.04	0.01	-0.02	0.350
Religiosity⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	0.00 (0.00)	-0.00	0.00	0.00	0.550
Schooling⇒ Discreteness⇒ Prox. atti.	0.03 (0.02)	-0.01	0.08	0.01	0.250
Schooling⇒ Homogeneity⇒ Prox. atti.	0.00 (0.02)	-0.04	0.05	0.00	0.828
Schooling⇒ Informativeness⇒ Prox. atti.	-0.04 (0.05)	-0.12	0.05	-0.02	0.416
Schooling⇒ Naturalness⇒ Prox. atti.	0.01 (0.03)	-0.05	0.07	0.01	0.705
Schooling⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	-0.00 (0.00)	-0.01	0.00	-0.00	0.791
Age⇒ Discreteness⇒ Prox. atti.	0.00 (0.00)	-0.00	0.01	0.01	0.395
Age⇒ Homogeneity⇒ Prox. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.835
Age⇒ Informativeness⇒ Prox. atti.	0.01 (0.00)	-0.00	0.01	0.03	0.210

Age⇒ Naturalness⇒ Prox. atti.	-0.01 (0.00)	-0.01	0.00	-0.03	0.138
Age⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	0.00 (0.00)	-0.00	0.00	0.00	0.410

Note. Model fit indices: $\chi^2(35) = 151.69$, $p < 0.001$, CFI = 1.00, TLI = 1.18, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.10], R^2 for proximal attitudes: 0.289. Pol. conserv.: Political conservatism. Prox. atti.: Proximal attitudes. Bolded p-values significant at the 0.05 level for the direct and indirect effects of conservatism related to right-wing authoritarianism, political conservatism, religiosity, schooling, and age on attitudes related to sexual prejudice.

Table S3. Direct and indirect effect of the variables inserted in the model with the outcome of negative distal attitudes towards homosexuality in the high DHI latent profile

Direct and indirect pathways	Estimate	95% CI		β	<i>p</i>
	<i>B</i> (<i>SE</i>)	Lower	Upper		
Conservatism⇒ Naturalness	-0.32 (0.07)	-0.46	-0.17	-0.40	<0.001
Pol. conserv.⇒ Naturalness	0.01 (0.05)	-0.08	0.10	0.02	0.841
Religiosity⇒ Naturalness	0.02 (0.02)	-0.02	0.06	0.10	0.336
Schooling⇒ Naturalness	-0.02 (0.05)	-0.13	0.08	-0.03	0.684
Age⇒ Naturalness	0.01 (0.01)	-0.00	0.02	0.14	0.066
Naturalness⇒ Discreteness	0.06 (0.04)	-0.02	0.13	0.11	0.130
Conservatism⇒ Discreteness	0.11 (0.04)	0.02	0.19	0.28	0.010
Pol. conserv.⇒ Discreteness	0.03 (0.03)	-0.02	0.08	0.10	0.268
Religiosity⇒ Discreteness	-0.01 (0.01)	-0.03	0.01	-0.09	0.325
Schooling⇒ Discreteness	0.05 (0.03)	-0.02	0.10	0.12	0.145
Age⇒ Discreteness	0.00 (0.00)	-0.00	0.01	0.08	0.312
Conservatism⇒ Homogeneity	0.07 (0.11)	-0.15	0.29	0.08	0.505
Pol. conserv.⇒ Homogeneity	0.06 (0.06)	-0.06	0.19	0.10	0.305
Religiosity⇒ Homogeneity	-0.01 (0.03)	-0.07	0.04	-0.04	0.721
Schooling⇒ Homogeneity	-0.15 (0.07)	-0.28	-0.02	-0.17	0.027
Age⇒ Homogeneity	0.01 (0.01)	-0.00	0.02	0.12	0.112
Conservatism⇒ Informativeness	0.06 (0.12)	-0.15	0.32	0.06	0.601
Pol. conserv.⇒ Informativeness	0.12 (0.08)	-0.05	0.29	0.16	0.150
Religiosity⇒ Informativeness	-0.03 (0.03)	-0.09	0.03	-0.10	0.349
Schooling⇒ Informativeness	-0.07 (0.09)	-0.25	0.09	-0.07	0.407
Age⇒ Informativeness	0.01 (0.01)	-0.01	0.03	0.10	0.190
Naturalness ⇒ Dist. atti.	-0.31 (0.15)	-0.60	-0.02	-0.15	0.034
Discreteness ⇒ Dist. atti.	0.78 (0.26)	0.28	1.28	0.19	0.003
Homogeneity ⇒ Dist. atti.	0.09 (0.12)	-0.15	0.32	0.05	0.424
Informativeness ⇒ Dist. atti.	0.19 (0.11)	-0.02	0.40	0.12	0.080

Conservatism⇒ Dist. atti.	0.67 (0.15)	0.38	0.98	0.41	<0.001
Pol. conserv.⇒ Dist. atti.	0.30 (0.10)	0.12	0.51	0.26	0.002
Religiosity⇒ Dist. atti.	-0.06 (0.04)	-0.13	0.01	-0.14	0.110
Schooling⇒ Dist. atti.	-0.07 (0.11)	-0.29	0.13	-0.05	0.492
Age⇒ Dist. atti.	0.02 (0.01)	-0.01	0.03	0.10	0.112
Naturalness ⇒ Discreteness ⇒ Dist. atti.	0.05 (0.04)	-0.02	0.14	0.02	0.241
Conservatism⇒ Discreteness⇒ Dist. atti.	0.09 (0.04)	0.01	0.18	0.05	0.055
Conservatism⇒ Homogeneity⇒ Dist. atti.	0.01 (0.02)	-0.02	0.06	0.00	0.723
Conservatism⇒ Informativeness⇒ Dist. atti.	0.01 (0.03)	-0.04	0.08	0.01	0.658
Conservatism⇒ Naturalness⇒ Dist. atti.	0.10 (0.05)	0.01	0.20	0.06	0.049
Conservatism⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	-0.01 (0.01)	-0.04	0.01	-0.01	0.236
Pol. conserv.⇒ Discreteness ⇒ Dist. atti.	0.02 (0.02)	-0.02	0.07	0.02	0.329
Pol. conserv.⇒ Homogeneity⇒ Dist. atti.	0.01 (0.01)	-0.02	0.03	0.01	0.607
Pol. conserv.⇒ Informativeness⇒ Dist. atti.	0.02 (0.02)	-0.01	0.07	0.02	0.283
Pol. conserv.⇒ Naturalness⇒ Dist. atti..	-0.00 (0.02)	-0.04	0.03	-0.00	0.854
Pol. conserv.⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	0.00 (0.00)	-0.01	0.01	0.00	0.871
Religiosity⇒ Discreteness⇒ Dist. atti.	-0.01 (0.01)	-0.03	0.01	-0.02	0.384
Religiosity ⇒ Homogeneity⇒ Dist. atti.	-0.00 (0.00)	-0.01	0.01	-0.00	0.833
Religiosity⇒ Informativeness ⇒ Dist. atti.	-0.01 (0.01)	-0.02	0.01	-0.01	0.459
Religiosity⇒ Naturalness⇒ Dist. atti.	-0.01 (0.01)	-0.02	0.01	-0.01	0.395
Religiosity⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	0.00 (0.00)	-0.00	0.00	0.00	0.496
Schooling⇒ Discreteness⇒ Dist. atti.	0.04 (0.03)	-0.02	0.09	0.02	0.207
Schooling⇒ Homogeneity⇒ Dist. atti.	-0.01 (0.02)	-0.06	0.03	-0.01	0.479
Schooling⇒ Informativeness⇒ Dist. atti.	-0.01 (0.02)	-0.06	0.02	-0.01	0.490
Schooling⇒ Naturalness⇒ Dist. atti.	0.01 (0.02)	-0.03	0.05	0.00	0.712
Schooling⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	-0.00 (0.00)	-0.01	0.01	-0.00	0.750
Age⇒ Discreteness⇒ Dist. atti.	0.00 (0.00)	-0.00	0.01	0.02	0.377
Age⇒ Homogeneity⇒ Dist. atti.	0.00 (0.00)	-0.00	0.01	0.01	0.564
Age⇒ Informativeness⇒ Dist. atti.	0.00 (0.00)	-0.00	0.01	0.01	0.311

Age⇒ Naturalness⇒ Dist. atti.	-0.00 (0.00)	-0.01	0.00	-0.02	0.203
Age⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	0.00 (0.00)	-0.00	0.00	0.00	0.330

Note. Model fit indices: $\chi^2(35) = 191.12$, $p < 0.001$, CFI = 1.00, TLI = 1.06, SRMR = 0.01 and RMSEA = 0.00,

95% CI [0.00, 0.14], R^2 for distal attitudes: 0.47. Pol. conserv.: Political conservatism. Dist. atti.: Distal attitudes.

Bolded p-values significant at the 0.05 level for the direct and indirect effects of conservatism related to right-wing authoritarianism, political conservatism, religiosity, schooling, and age on attitudes related to sexual prejudice.

Table S4. Direct and indirect effect of the variables inserted in the model with the outcome of individual opposition to same-sex parenting in the high DHI latent profile

Direct and indirect pathways	Estimate	95% CI		β	<i>p</i>
	<i>B (SE)</i>	Lower	Upper		
Conservatism⇒ Naturalness	-0.32 (0.07)	-0.46	-0.17	-0.40	<0.001
Pol. conserv.⇒ Naturalness	0.01 (0.05)	-0.08	0.10	0.02	0.841
Religiosity⇒ Naturalness	0.02 (0.02)	-0.02	0.06	0.10	0.337
Schooling⇒ Naturalness	-0.02 (0.05)	-0.13	0.08	-0.03	0.684
Age⇒ Naturalness	0.01 (0.01)	-0.00	0.02	0.14	0.066
Naturalness⇒ Discreteness	0.06 (0.04)	-0.02	0.13	0.11	0.130
Conservatism⇒ Discreteness	0.11 (0.04)	0.02	0.19	0.28	0.010
Pol. conserv.⇒ Discreteness	0.03 (0.03)	-0.02	0.08	0.10	0.268
Religiosity⇒ Discreteness	-0.01 (0.01)	-0.03	0.01	-0.09	0.325
Schooling⇒ Discreteness	0.05 (0.03)	-0.02	0.10	0.12	0.145
Age⇒ Discreteness	0.00 (0.00)	-0.00	0.01	0.08	0.312
Conservatism⇒ Homogeneity	0.07 (0.11)	-0.15	0.29	0.08	0.505
Pol. conserv.⇒ Homogeneity	0.06 (0.06)	-0.06	0.19	0.10	0.305
Religiosity⇒ Homogeneity	-0.01 (0.03)	-0.07	0.04	-0.04	0.721
Schooling⇒ Homogeneity	-0.15 (0.07)	-0.28	-0.02	-0.17	0.027
Age⇒ Homogeneity	0.01 (0.01)	-0.00	0.02	0.12	0.112
Conservatism⇒ Informativeness	0.06 (0.12)	-0.15	0.32	0.06	0.601
Pol. conserv.⇒ Informativeness	0.12 (0.08)	-0.05	0.29	0.16	0.150
Religiosity⇒ Informativeness	-0.03 (0.03)	-0.09	0.03	-0.10	0.349
Schooling⇒ Informativeness	-0.07 (0.09)	-0.25	0.09	-0.07	0.407
Age⇒ Informativeness	0.01 (0.01)	-0.01	0.03	0.10	0.190
Naturalness⇒ Ind. opp.	-0.21 (0.10)	-0.39	-0.02	-0.15	0.026
Discreteness⇒ Ind. opp.	0.44 (0.17)	0.11	0.79	0.15	0.011
Homogeneity⇒ Ind. opp.	0.12 (0.08)	-0.03	0.25	0.09	0.127
Informativeness⇒ Ind. opp.	0.16 (0.07)	0.03	0.29	0.15	0.013

Conservatism⇒ Ind. opp.	0.57 (0.10)	0.38	0.78	0.50	<0.001
Pol. conserv.⇒ Ind. opp.	0.12 (0.06)	0.01	0.23	0.15	0.048
Religiosity⇒ Ind. opp.	-0.01 (0.02)	-0.06	0.03	-0.04	0.550
Schooling⇒ Ind. opp.	0.05 (0.06)	-0.08	0.18	0.04	0.457
Age⇒ Ind. opp.	-0.00 (0.01)	-0.01	0.01	-0.00	0.999
Naturalness ⇒ Discreteness ⇒ Ind. opp.	0.03 (0.02)	-0.01	0.08	0.02	0.253
Conservatism⇒ Discreteness⇒ Ind. opp.	0.05 (0.03)	0.01	0.10	0.04	0.063
Conservatism⇒ Homogeneity⇒ Ind. opp.	0.01 (0.02)	-0.02	0.05	0.01	0.609
Conservatism⇒ Informativeness⇒ Ind. opp.	0.01 (0.02)	-0.03	0.06	0.01	0.637
Conservatism⇒ Naturalness⇒ Ind. opp.	0.07 (0.03)	0.01	0.14	0.06	0.047
Conservatism⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	-0.01 (0.01)	-0.02	0.00	-0.01	0.241
Pol. conserv.⇒ Discreteness ⇒ Ind. opp.	0.01 (0.01)	-0.01	0.04	0.02	0.329
Pol. conserv.⇒ Homogeneity⇒ Ind. opp.	0.01 (0.01)	-0.01	0.03	0.01	0.438
Pol. conserv.⇒ Informativeness⇒ Ind. opp.	0.02 (0.02)	-0.01	0.05	0.02	0.205
Pol. conserv.⇒ Naturalness⇒ Ind. opp.	-0.00 (0.01)	-0.02	0.02	-0.00	0.854
Pol. conserv.⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.868
Religiosity⇒ Discreteness⇒ Ind. opp.	-0.00 (0.01)	-0.02	0.00	-0.01	0.388
Religiosity ⇒ Homogeneity⇒ Ind. opp.	-0.00 (0.00)	-0.01	0.01	-0.00	0.772
Religiosity⇒ Informativeness ⇒ Ind. opp.	-0.01 (0.01)	-0.02	0.01	-0.02	0.417
Religiosity⇒ Naturalness⇒ Ind. opp.	-0.00 (0.01)	-0.02	0.01	-0.01	0.400
Religiosity⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.502
Schooling⇒ Discreteness⇒ Ind. opp.	0.02 (0.02)	-0.01	0.06	0.02	0.239
Schooling⇒ Homogeneity⇒ Ind. opp.	-0.02 (0.01)	-0.05	0.01	-0.02	0.216
Schooling⇒ Informativeness⇒ Ind. opp.	-0.01 (0.02)	-0.04	0.02	-0.01	0.432
Schooling⇒ Naturalness⇒ Ind. opp.	0.00 (0.01)	-0.02	0.03	0.00	0.711
Schooling⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.744
Age⇒ Discreteness⇒ Ind. opp.	0.00 (0.00)	-0.00	0.01	0.01	0.395
Age⇒ Homogeneity⇒ Ind. opp.	0.00 (0.00)	-0.00	0.00	0.01	0.347
Age⇒ Informativeness⇒ Ind. opp.	0.00 (0.00)	-0.00	0.01	0.02	0.255

Age⇒ Naturalness⇒ Ind. opp.	-0.00 (0.00)	-0.01	0.00	-0.02	0.216
Age⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.330

Note. Model fit indices: $\chi^2(35) = 213.05$, $p < 0.001$, CFI = 1.00, TLI = 1.06, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.14], R^2 for individual opposition: 0.54. Pol. conserv.: Political conservatism. Ind. opp.: Individual opposition. Bolded p-values significant at the 0.05 level for the direct and indirect effects of conservatism related to right-wing authoritarianism, political conservatism, religiosity, schooling, and age on attitudes related to sexual prejudice.

Table S5. Direct and indirect effect of the variables inserted in the model with the outcome of normative opposition to same-sex parenting in the high DHI latent profile

Direct and indirect pathways	Estimate	95% CI		β	<i>p</i>
	<i>B</i> (<i>SE</i>)	Lower	Upper		
Conservatism⇒ Naturalness	-0.32 (0.08)	-0.48	-0.17	-0.40	<0.001
Pol. conserv.⇒ Naturalness	0.01 (0.05)	-0.09	0.10	0.02	0.839
Religiosity⇒ Naturalness	0.02 (0.02)	-0.02	0.06	0.10	0.349
Schooling⇒ Naturalness	-0.02 (0.05)	-0.13	0.08	-0.03	0.687
Age⇒ Naturalness	0.01 (0.01)	-0.00	0.02	0.14	0.084
Naturalness⇒ Discreteness	0.06 (0.04)	-0.03	0.13	0.11	0.148
Conservatism⇒ Discreteness	0.11 (0.04)	0.03	0.19	0.28	0.009
Pol. conserv.⇒ Discreteness	0.03 (0.03)	-0.03	0.08	0.10	0.276
Religiosity⇒ Discreteness	-0.01 (0.01)	-0.03	0.01	-0.09	0.344
Schooling⇒ Discreteness	0.05 (0.03)	-0.02	0.10	0.12	0.135
Age⇒ Discreteness	0.00 (0.00)	-0.00	0.01	0.08	0.320
Conservatism⇒ Homogeneity	0.07 (0.11)	-0.13	0.30	0.08	0.514
Pol. conserv.⇒ Homogeneity	0.06 (0.06)	-0.05	0.19	0.10	0.327
Religiosity⇒ Homogeneity	-0.01 (0.03)	-0.07	0.04	-0.04	0.718
Schooling⇒ Homogeneity	-0.15 (0.07)	-0.29	-0.01	-0.17	0.035
Age⇒ Homogeneity	0.01 (0.01)	-0.00	0.02	0.12	0.115
Conservatism⇒ Informativeness	0.06 (0.12)	-0.17	0.32	0.06	0.605
Pol. conserv.⇒ Informativeness	0.12 (0.08)	-0.03	0.28	0.16	0.145
Religiosity⇒ Informativeness	-0.03 (0.03)	-0.09	0.03	-0.10	0.323
Schooling⇒ Informativeness	-0.07 (0.09)	-0.25	0.11	-0.07	0.420
Age⇒ Informativeness	0.01 (0.01)	-0.01	0.03	0.10	0.216
Naturalness⇒ Nor. opp.	-0.31 (0.09)	-0.50	-0.15	-0.27	<0.001
Discreteness⇒ Nor. opp.	0.30 (0.16)	-0.06	0.60	0.13	0.065
Homogeneity⇒ Nor. opp.	0.14 (0.07)	-0.00	0.27	0.14	0.053
Informativeness⇒ Nor. opp.	0.28 (0.06)	0.16	0.40	0.33	<0.001

Conservatism⇒ Nor. opp.	0.19 (0.09)	-0.00	0.38	0.21	0.039
Pol. conserv.⇒ Nor. opp.	-0.04 (0.06)	-0.15	0.08	-0.06	0.469
Religiosity⇒ Nor. opp.	-0.01 (0.02)	-0.05	0.03	-0.04	0.623
Schooling⇒ Nor. opp.	-0.02 (0.07)	-0.15	0.11	-0.02	0.778
Age⇒ Nor. opp.	0.00 (0.01)	-0.01	0.01	0.02	0.744
Naturalness ⇒ Discreteness ⇒ Nor. opp.	0.02 (0.02)	-0.01	0.06	0.02	0.292
Conservatism⇒ Discreteness⇒ Nor. opp.	0.03 (0.02)	-0.01	0.08	0.04	0.127
Conservatism⇒ Homogeneity⇒ Nor. opp.	0.01 (0.02)	-0.02	0.05	0.01	0.569
Conservatism⇒ Informativeness⇒ Nor. opp.	0.02 (0.04)	-0.05	0.10	0.02	0.622
Conservatism⇒ Naturalness⇒ Nor. opp.	0.10 (0.04)	0.04	0.19	0.11	0.012
Conservatism⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	-0.01 (0.01)	-0.02	0.00	-0.01	0.338
Pol. conserv.⇒ Discreteness ⇒ Nor. opp.	0.01 (0.01)	-0.01	0.03	0.01	0.391
Pol. conserv.⇒ Homogeneity⇒ Nor. opp.	0.01 (0.01)	-0.01	0.04	0.01	0.405
Pol. conserv.⇒ Informativeness⇒ Nor. opp.	0.03 (0.03)	-0.01	0.09	0.05	0.176
Pol. conserv.⇒ Naturalness⇒ Nor. opp.	-0.00 (0.02)	-0.03	0.03	-0.01	0.846
Pol. conserv.⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.884
Religiosity⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.01	0.00	-0.01	0.440
Religiosity ⇒ Homogeneity⇒ Nor. opp.	-0.00 (0.01)	-0.01	0.01	-0.01	0.757
Religiosity⇒ Informativeness ⇒ Nor. opp.	-0.01 (0.01)	-0.03	0.01	-0.03	0.349
Religiosity⇒ Naturalness⇒ Nor. opp.	-0.01 (0.01)	-0.02	0.01	-0.03	0.388
Religiosity⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.584
Schooling⇒ Discreteness⇒ Nor. opp.	0.01 (0.01)	-0.01	0.04	0.02	0.290
Schooling⇒ Homogeneity⇒ Nor. opp.	-0.02 (0.01)	-0.05	0.00	-0.02	0.134
Schooling⇒ Informativeness⇒ Nor. opp.	-0.02 (0.02)	-0.07	0.04	-0.02	0.413
Schooling⇒ Naturalness⇒ Nor. opp.	0.01 (0.02)	-0.03	0.04	0.01	0.701
Schooling⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.761
Age⇒ Discreteness⇒ Nor. opp.	0.00 (0.00)	-0.00	0.00	0.01	0.436
Age⇒ Homogeneity⇒ Nor. opp.	0.00 (0.00)	-0.00	0.01	0.02	0.305
Age⇒ Informativeness⇒ Nor. opp.	0.00 (0.00)	-0.00	0.01	0.03	0.244

Age⇒ Naturalness⇒ Nor. opp.	-0.00 (0.00)	-0.01	0.00	-0.04	0.139
Age⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.399

Note. Model fit indices: $\chi^2(35) = 151.70$, $p < 0.001$, CFI = 1.00, TLI = 1.08, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.14], R^2 for normative opposition: 0.34. Pol. conserv.: Political conservatism. Nor. opp.: Normative opposition. Bolded p-values significant at the 0.05 level for the direct and indirect effects of conservatism related to right-wing authoritarianism, political conservatism, religiosity, schooling, and age on attitudes related to sexual prejudice.

Tables S6 to S9 show direct and indirect effects of psychosocial variables and essentialist beliefs on proximal and distal negative attitudes towards homosexuality and individual and normative opposition to same-sex parenting, respectively, among participants in the multidimensional essentialism latent profile.

Table S6. Direct and indirect effect of the variables inserted in the model with the outcome of negative proximal attitudes towards homosexuality in the multidimensional essentialism latent profile

Direct and indirect pathways	Estimate	95% CI		β	p
	B (SE)	Lower	Upper		
Conservatism⇒ Naturalness	-0.19 (0.05)	-0.29	-0.10	-0.20	<0.001
Pol. conserv.⇒ Naturalness	-0.01 (0.02)	-0.06	0.04	-0.01	0.830
Religiosity⇒ Naturalness	-0.01 (0.01)	-0.03	0.01	-0.04	0.393
Schooling⇒ Naturalness	-0.08 (0.03)	-0.13	-0.02	-0.12	0.003
Age⇒ Naturalness	-0.00 (0.00)	-0.01	0.01	-0.00	0.939
Naturalness⇒ Discreteness	0.14 (0.04)	0.07	0.21	0.15	<0.001
Conservatism⇒ Discreteness	0.32 (0.04)	0.23	0.39	0.35	<0.001
Pol. conserv.⇒ Discreteness	0.09 (0.02)	0.05	0.13	0.18	<0.001
Religiosity⇒ Discreteness	-0.01 (0.01)	-0.02	0.01	-0.03	0.390
Schooling⇒ Discreteness	-0.05 (0.02)	-0.10	-0.01	-0.08	0.033
Age⇒ Discreteness	0.00 (0.00)	-0.00	0.01	0.070	0.070
Conservatism⇒ Homogeneity	-0.01 (0.04)	-0.10	0.06	-0.02	0.743
Pol. conserv.⇒ Homogeneity	0.01 (0.02)	-0.03	0.05	0.03	0.516
Religiosity⇒ Homogeneity	0.01 (0.01)	-0.00	0.02	0.06	0.182
Schooling⇒ Homogeneity	-0.05 (0.02)	-0.10	-0.01	-0.10	0.021
Age⇒ Homogeneity	0.00 (0.00)	-0.00	0.01	0.04	0.369
Conservatism⇒ Informativeness	0.06 (0.06)	-0.05	0.18	0.06	0.291
Pol. conserv.⇒ Informativeness	-0.05 (0.02)	-0.10	0.00	-0.09	0.035
Religiosity⇒ Informativeness	0.01 (0.01)	-0.01	0.03	0.06	0.179
Schooling⇒ Informativeness	0.03 (0.03)	-0.02	0.09	0.05	0.235
Age⇒ Informativeness	-0.01 (0.00)	-0.01	-0.00	-0.10	0.009
Naturalness ⇒ Prox. atti.	-0.23 (0.05)	-0.33	-0.14	-0.12	<0.001
Discreteness ⇒ Prox. atti.	0.28 (0.07)	0.14	0.41	0.14	<0.001
Homogeneity ⇒ Prox. atti.	0.15 (0.06)	0.03	0.28	0.07	0.016
Informativeness ⇒ Prox. atti.	0.10 (0.06)	-0.01	0.21	0.05	0.079

Conservatism⇒ Prox. atti.	1.01 (0.08)	0.85	1.17	0.55	<0.001
Pol. conserv.⇒ Prox. atti.	0.08 (0.03)	0.01	0.15	0.08	0.024
Religiosity⇒ Prox. atti.	-0.01 (0.01)	-0.03	0.01	-0.02	0.487
Schooling⇒ Prox. atti.	-0.08 (0.04)	-0.15	-0.00	-0.06	0.055
Age⇒ Prox. atti.	0.03 (0.00)	0.02	0.04	0.23	<0.001
Naturalness ⇒ Discreteness ⇒ Prox. atti.	0.04 (0.01)	0.02	0.07	0.02	0.004
Conservatism⇒ Discreteness⇒ Prox. atti.	0.09 (0.02)	0.04	0.14	0.05	<0.001
Conservatism⇒ Homogeneity⇒ Prox. atti.	-0.00 (0.01)	-0.02	0.01	-0.00	0.761
Conservatism⇒ Informativeness⇒ Prox. atti.	0.01 (0.01)	-0.01	0.03	0.00	0.431
Conservatism⇒ Naturalness⇒ Prox. atti.	0.05 (0.02)	0.02	0.08	0.02	0.004
Conservatism⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	-0.01 (0.00)	-0.02	-0.00	-0.00	0.022
Pol. conserv.⇒ Discreteness ⇒ Prox. atti.	0.03 (0.01)	0.01	0.05	0.03	0.005
Pol. conserv.⇒ Homogeneity⇒ Prox. atti.	0.00 (0.00)	-0.00	0.01	0.00	0.559
Pol. conserv.⇒ Informativeness⇒ Prox. atti.	-0.01 (0.00)	-0.01	0.00	-0.01	0.219
Pol. conserv.⇒ Naturalness⇒ Prox. atti.	0.00 (0.01)	-0.01	0.01	0.00	0.830
Pol. conserv.⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.838
Religiosity⇒ Discreteness⇒ Prox. atti.	-0.00 (0.00)	-0.01	0.00	-0.01	0.418
Religiosity ⇒ Homogeneity⇒ Prox. atti.	0.00 (0.00)	-0.00	0.01	0.00	0.266
Religiosity⇒ Informativeness ⇒ Prox. atti.	0.00 (0.00)	-0.00	0.00	0.00	0.346
Religiosity⇒ Naturalness⇒ Prox. atti.	0.00 (0.00)	-0.00	0.01	0.01	0.395
Religiosity⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.443
Schooling⇒ Discreteness⇒ Prox. atti.	-0.01 (0.01)	-0.03	-0.00	-0.01	0.064
Schooling⇒ Homogeneity⇒ Prox. atti.	-0.01 (0.01)	-0.02	0.00	-0.01	0.105
Schooling⇒ Informativeness⇒ Prox. atti.	0.00 (0.00)	-0.00	0.01	0.00	0.374
Schooling⇒ Naturalness⇒ Prox. atti.	0.02 (0.01)	0.01	0.03	0.01	0.011
Schooling⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	-0.00 (0.00)	-0.01	-0.00	-0.00	0.037
Age⇒ Discreteness⇒ Prox. atti.	0.00 (0.00)	-0.00	0.00	0.01	0.098
Age⇒ Homogeneity⇒ Prox. atti.	0.00 (0.00)	-0.00	0.00	0.00	0.417
Age⇒ Informativeness⇒ Prox. atti.	-0.00 (0.00)	-0.00	0.00	-0.01	0.181

Age⇒ Naturalness⇒ Prox. atti.	0.00 (0.00)	-0.00	0.00	0.00	0.939
Age⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.941

Note. Model fit indices: $\chi^2(35) = 771.95$, $p < 0.001$, CFI = 1.00, TLI = 0.99, SRMR = 0.01 and RMSEA = 0.02, 95% CI [0.00, 0.08], R^2 for proximal attitudes: 0.57. Pol. conserv.: Political conservatism. Prox. atti.: Proximal attitudes. Bolded p-values significant at the 0.05 level for the direct and indirect effects of conservatism related to right-wing authoritarianism, political conservatism, religiosity, schooling, and age on attitudes related to sexual prejudice.

Table S7. Direct and indirect effect of the variables inserted in the model with the outcome of negative distal attitudes towards homosexuality in the multidimensional essentialism latent profile

Direct and indirect pathways	Estimate	95% CI		β	p
	$B (SE)$	Lower	Upper		
Conservatism⇒ Naturalness	-0.19 (0.05)	-0.30	-0.10	-0.20	<0.001
Pol. conserv.⇒ Naturalness	-0.01 (0.02)	-0.05	0.04	-0.01	0.826
Religiosity⇒ Naturalness	-0.01 (0.01)	-0.02	0.01	-0.04	0.366
Schooling⇒ Naturalness	-0.08 (0.03)	-0.13	-0.02	-0.12	0.003
Age⇒ Naturalness	-0.00 (0.00)	-0.01	0.00	-0.00	0.940
Naturalness⇒ Discreteness	0.14 (0.04)	0.07	0.21	0.15	<0.001
Conservatism⇒ Discreteness	0.32 (0.04)	0.25	0.39	0.35	<0.001
Pol. conserv.⇒ Discreteness	0.09 (0.02)	0.05	0.13	0.18	<0.001
Religiosity⇒ Discreteness	-0.01 (0.02)	-0.02	0.01	-0.03	0.393
Schooling⇒ Discreteness	-0.05 (0.02)	-0.10	-0.01	-0.08	0.031
Age⇒ Discreteness	0.00 (0.00)	-0.00	0.01	0.07	0.058
Conservatism⇒ Homogeneity	-0.01 (0.04)	-0.09	0.07	-0.02	0.734
Pol. conserv.⇒ Homogeneity	0.01 (0.02)	-0.03	0.05	0.03	0.515
Religiosity⇒ Homogeneity	0.01 (0.01)	-0.00	0.02	0.06	0.175
Schooling⇒ Homogeneity	-0.05 (0.02)	-0.10	-0.01	-0.10	0.022
Age⇒ Homogeneity	0.00 (0.00)	-0.00	0.01	0.04	0.364
Conservatism⇒ Informativeness	0.06 (0.06)	-0.05	0.18	0.06	0.283
Pol. conserv.⇒ Informativeness	-0.05 (0.02)	-0.09	-0.00	-0.09	0.032
Religiosity⇒ Informativeness	0.01 (0.01)	-0.01	0.03	0.06	0.185
Schooling⇒ Informativeness	0.03 (0.03)	-0.02	0.09	0.05	0.232
Age⇒ Informativeness	-0.01 (0.00)	-0.01	-0.00	-0.10	0.009
Naturalness ⇒ Dist. atti.	-0.21 (0.05)	-0.31	-0.10	-0.11	<0.001
Discreteness ⇒ Dist. atti.	0.32 (0.07)	0.20	0.46	0.16	<0.001
Homogeneity ⇒ Dist. atti.	0.20 (0.06)	0.08	0.33	0.09	0.002
Informativeness ⇒ Dist. atti.	0.20 (0.06)	0.08	0.33	0.11	0.001

Conservatism⇒ Dist. atti.	0.73 (0.09)	0.57	0.90	0.39	<0.001
Pol. conserv.⇒ Dist. atti.	0.33 (0.04)	0.26	0.40	0.33	<0.001
Religiosity⇒ Dist. atti.	-0.02 (0.01)	-0.05	0.00	-0.05	0.102
Schooling⇒ Dist. atti.	-0.09 (0.04)	-0.16	-0.01	-0.07	0.019
Age⇒ Dist. atti.	0.02 (0.00)	0.01	0.03	0.16	<0.001
Naturalness ⇒ Discreteness ⇒ Dist. atti.	0.05 (0.01)	0.02	0.08	0.02	0.001
Conservatism⇒ Discreteness⇒ Dist. atti.	0.10 (0.03)	0.06	0.16	0.06	<0.001
Conservatism⇒ Homogeneity⇒ Dist. atti.	-0.00 (0.01)	-0.02	0.02	-0.00	0.750
Conservatism⇒ Informativeness⇒ Dist. atti.	0.01 (0.01)	-0.01	0.04	0.01	0.342
Conservatism⇒ Naturalness⇒ Dist. atti.	0.04 (0.02)	0.01	0.08	0.02	0.010
Conservatism⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	-0.01 (0.00)	-0.02	-0.00	-0.01	0.013
Pol. conserv.⇒ Discreteness ⇒ Dist. atti.	0.03 (0.01)	0.01	0.05	0.03	0.001
Pol. conserv.⇒ Homogeneity⇒ Dist. atti.	0.00 (0.00)	-0.01	0.01	0.00	0.554
Pol. conserv.⇒ Informativeness⇒ Dist. atti.	-0.01 (0.01)	-0.02	-0.00	-0.01	0.099
Pol. conserv.⇒ Naturalness⇒ Dist. atti..	0.00 (0.01)	-0.01	0.01	0.00	0.832
Pol. conserv.⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.835
Religiosity⇒ Discreteness⇒ Dist. atti.	-0.00 (0.00)	-0.01	0.00	-0.01	0.411
Religiosity ⇒ Homogeneity⇒ Dist. atti.	0.00 (0.00)	-0.00	0.01	0.01	0.231
Religiosity⇒ Informativeness ⇒ Dist. atti.	0.00 (0.00)	-0.00	0.01	0.01	0.261
Religiosity⇒ Naturalness⇒ Dist. atti.	0.00 (0.00)	-0.00	0.01	0.00	0.385
Religiosity⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.411
Schooling⇒ Discreteness⇒ Dist. atti.	-0.02 (0.01)	-0.04	-0.00	-0.01	0.058
Schooling⇒ Homogeneity⇒ Dist. atti.	-0.01 (0.01)	-0.02	-0.00	-0.01	0.064
Schooling⇒ Informativeness⇒ Dist. atti.	0.01 (0.01)	-0.01	0.02	0.01	0.285
Schooling⇒ Naturalness⇒ Dist. atti.	0.02 (0.01)	0.00	0.03	0.01	0.023
Schooling⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	-0.00 (0.00)	-0.01	-0.00	-0.00	0.029
Age⇒ Discreteness⇒ Dist. atti.	0.00 (0.00)	-0.00	0.00	0.01	0.087
Age⇒ Homogeneity⇒ Dist. atti.	0.00 (0.00)	-0.00	0.00	0.00	0.390
Age⇒ Informativeness⇒ Dist. atti.	-0.00 (0.00)	-0.00	-0.00	-0.01	0.054

Age⇒ Naturalness⇒ Dist. atti.	0.00 (0.00)	-0.00	0.00	0.00	0.942
Age⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.943

Note. Model fit indices: $\chi^2(35) = 774.79$, $p < 0.001$, CFI = 1.00, TLI = 0.99, SRMR = 0.01 and RMSEA = 0.02, 95% CI [0.00, 0.08], R^2 for distal attitudes: 0.57. Pol. conserv.: Political conservatism. Dist. atti.: Distal attitudes. Bolded p-values significant at the 0.05 level for the direct and indirect effects of conservatism related to right-wing authoritarianism, political conservatism, religiosity, schooling, and age on attitudes related to sexual prejudice.

Table S8. Direct and indirect effect of the variables inserted in the model with the outcome of individual opposition to same-sex parenting in the multidimensional essentialism latent profile

Direct and indirect pathways	Estimate	95% CI		β	<i>p</i>
	<i>B</i> (<i>SE</i>)	Lower	Upper		
Conservatism⇒ Naturalness	-0.19 (0.05)	-0.29	-0.09	-0.20	<0.001
Pol. conserv.⇒ Naturalness	-0.01 (0.03)	-0.06	0.04	-0.01	0.833
Religiosity⇒ Naturalness	-0.01 (0.01)	-0.03	0.01	-0.04	0.393
Schooling⇒ Naturalness	-0.08 (0.03)	-0.13	-0.02	-0.12	0.004
Age⇒ Naturalness	-0.00 (0.00)	-0.01	0.01	-0.00	0.939
Naturalness⇒ Discreteness	0.14 (0.04)	0.07	0.22	0.15	<0.001
Conservatism⇒ Discreteness	0.32 (0.04)	0.24	0.39	0.35	<0.001
Pol. conserv.⇒ Discreteness	0.09 (0.02)	0.05	0.14	0.18	<0.001
Religiosity⇒ Discreteness	-0.01 (0.01)	-0.02	0.01	-0.03	0.385
Schooling⇒ Discreteness	-0.05 (0.02)	-0.10	-0.01	-0.08	0.029
Age⇒ Discreteness	0.00 (0.00)	-0.00	0.01	0.07	0.050
Conservatism⇒ Homogeneity	-0.01 (0.04)	-0.09	0.07	-0.02	0.750
Pol. conserv.⇒ Homogeneity	0.01 (0.02)	-0.03	0.05	0.03	0.509
Religiosity⇒ Homogeneity	0.01 (0.01)	-0.00	0.02	0.06	0.169
Schooling⇒ Homogeneity	-0.05 (0.02)	-0.10	-0.01	-0.10	0.017
Age⇒ Homogeneity	0.00 (0.00)	-0.00	0.01	0.04	0.352
Conservatism⇒ Informativeness	0.06 (0.06)	-0.05	0.17	0.06	0.291
Pol. conserv.⇒ Informativeness	-0.05 (0.02)	-0.09	-0.00	-0.09	0.026
Religiosity⇒ Informativeness	0.01 (0.01)	-0.01	0.03	0.06	0.171
Schooling⇒ Informativeness	0.03 (0.03)	-0.02	0.09	0.05	0.222
Age⇒ Informativeness	-0.01 (0.00)	-0.01	-0.00	-0.10	0.006
Naturalness⇒ Ind. opp.	-0.12 (0.03)	-0.17	-0.06	-0.11	<0.001
Discreteness⇒ Ind. opp.	0.12 (0.04)	0.04	0.20	0.10	0.003
Homogeneity⇒ Ind. opp.	0.13 (0.04)	0.06	0.21	0.10	<0.001
Informativeness⇒ Ind. opp.	0.13 (0.03)	0.07	0.20	0.12	<0.001

Conservatism⇒ Ind. opp.	0.50 (0.05)	0.39	0.59	0.48	<0.001
Pol. conserv.⇒ Ind. opp.	0.14 (0.02)	0.11	0.18	0.25	<0.001
Religiosity⇒ Ind. opp.	-0.01 (0.01)	-0.02	0.01	-0.04	0.284
Schooling⇒ Ind. opp.	-0.01 (0.02)	-0.05	0.03	-0.01	0.697
Age⇒ Ind. opp.	0.01 (0.00)	0.00	0.01	0.07	0.016
Naturalness ⇒ Discreteness ⇒ Ind. opp.	0.02 (0.01)	0.01	0.03	0.02	0.018
Conservatism⇒ Discreteness⇒ Ind. opp.	0.04 (0.01)	0.01	0.07	0.04	0.006
Conservatism⇒ Homogeneity⇒ Ind. opp.	-0.00 (0.01)	-0.01	0.01	-0.00	0.764
Conservatism⇒ Informativeness⇒ Ind. opp.	0.01 (0.01)	-0.01	0.03	0.01	0.323
Conservatism⇒ Naturalness⇒ Ind. opp.	0.02 (0.01)	0.01	0.04	0.02	0.013
Conservatism⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	-0.00 (0.00)	-0.01	-0.00	-0.00	0.040
Pol. conserv.⇒ Discreteness ⇒ Ind. opp.	0.01 (0.01)	0.00	0.02	0.02	0.024
Pol. conserv.⇒ Homogeneity⇒ Ind. opp.	0.00 (0.00)	-0.00	0.01	0.00	0.546
Pol. conserv.⇒ Informativeness⇒ Ind. opp.	-0.01 (0.00)	-0.01	-0.00	-0.01	0.052
Pol. conserv.⇒ Naturalness⇒ Ind. opp.	0.00 (0.00)	-0.01	0.01	0.00	0.837
Pol. conserv.⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.848
Religiosity⇒ Discreteness⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.440
Religiosity ⇒ Homogeneity⇒ Ind. opp.	0.00 (0.00)	-0.00	0.00	0.01	0.216
Religiosity⇒ Informativeness ⇒ Ind. opp.	0.00 (0.00)	-0.00	0.00	0.01	0.212
Religiosity⇒ Naturalness⇒ Ind. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.409
Religiosity⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.458
Schooling⇒ Discreteness⇒ Ind. opp.	-0.01 (0.00)	-0.02	-0.00	-0.01	0.105
Schooling⇒ Homogeneity⇒ Ind. opp.	-0.01 (0.00)	-0.02	-0.00	-0.01	0.047
Schooling⇒ Informativeness⇒ Ind. opp.	0.00 (0.00)	-0.00	0.01	0.01	0.273
Schooling⇒ Naturalness⇒ Ind. opp.	0.01 (0.00)	0.00	0.02	0.01	0.022
Schooling⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	-0.00 (0.00)	-0.00	-0.00	-0.00	0.071
Age⇒ Discreteness⇒ Ind. opp.	0.00 (0.00)	-0.00	0.00	0.01	0.111
Age⇒ Homogeneity⇒ Ind. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.385
Age⇒ Informativeness⇒ Ind. opp.	-0.00 (0.00)	-0.00	-0.00	-0.01	0.029

Age⇒ Naturalness⇒ Ind. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.941
Age⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.946

Note. Model fit indices: $\chi^2(35) = 730.55$, $p < 0.001$, CFI = 1.00, TLI = 0.99, SRMR = 0.01 and RMSEA = 0.02, 95% CI [0.00, 0.08], R^2 for individual opposition: 0.54. Pol. conserv.: Political conservatism. Ind. opp.: Individual opposition. Bolded p-values significant at the 0.05 level for the direct and indirect effects of conservatism related to right-wing authoritarianism, political conservatism, religiosity, schooling, and age on attitudes related to sexual prejudice.

Table S9. Direct and indirect effect of the variables inserted in the model with the outcome of normative opposition to same-sex parenting in the multidimensional essentialism latent profile

Direct and indirect pathways	Estimate	95% CI		β	<i>p</i>
	<i>B</i> (<i>SE</i>)	Lower	Upper		
Conservatism⇒ Naturalness	-0.19 (0.05)	-0.28	-0.10	-0.20	<0.001
Pol. conserv.⇒ Naturalness	-0.01 (0.02)	-0.05	0.04	-0.01	0.826
Religiosity⇒ Naturalness	-0.01 (0.01)	-0.03	0.01	-0.04	0.401
Schooling⇒ Naturalness	-0.08 (0.03)	-0.13	-0.03	-0.12	0.002
Age⇒ Naturalness	-0.00 (0.00)	-0.01	0.00	-0.00	0.940
Naturalness⇒ Discreteness	0.14 (0.04)	0.07	0.21	0.15	<0.001
Conservatism⇒ Discreteness	0.32 (0.04)	0.25	0.39	0.35	<0.001
Pol. conserv.⇒ Discreteness	0.09 (0.02)	0.05	0.13	0.18	<0.001
Religiosity⇒ Discreteness	-0.01 (0.01)	-0.02	0.01	-0.03	0.388
Schooling⇒ Discreteness	-0.05 (0.02)	-0.10	-0.00	-0.08	0.034
Age⇒ Discreteness	0.00 (0.00)	-0.00	0.01	0.07	0.057
Conservatism⇒ Homogeneity	-0.01 (0.04)	-0.09	0.07	-0.02	0.748
Pol. conserv.⇒ Homogeneity	0.01 (0.02)	-0.03	0.05	0.03	0.520
Religiosity⇒ Homogeneity	0.01 (0.01)	-0.00	0.02	0.06	0.162
Schooling⇒ Homogeneity	-0.05 (0.02)	-0.10	-0.01	-0.10	0.015
Age⇒ Homogeneity	0.00 (0.00)	-0.00	0.01	0.04	0.351
Conservatism⇒ Informativeness	0.06 (0.06)	-0.05	0.18	0.06	0.288
Pol. conserv.⇒ Informativeness	-0.05 (0.02)	-0.09	-0.00	-0.09	0.032
Religiosity⇒ Informativeness	0.01 (0.01)	-0.01	0.03	0.06	0.178
Schooling⇒ Informativeness	0.03 (0.03)	-0.02	0.09	0.05	0.231
Age⇒ Informativeness	-0.01 (0.00)	-0.01	-0.00	-0.10	0.009
Naturalness⇒ Nor. opp.	0.03 (0.05)	-0.07	0.11	0.03	0.503
Discreteness⇒ Nor. opp.	0.12 (0.06)	0.02	0.24	0.10	0.032
Homogeneity⇒ Nor. opp.	0.15 (0.05)	0.05	0.25	0.11	0.003
Informativeness⇒ Nor. opp.	0.03 (0.05)	-0.07	0.11	0.02	0.584

Conservatism⇒ Nor. opp.	0.18 (0.05)	0.07	0.28	0.17	<0.001
Pol. conserv.⇒ Nor. opp.	0.09 (0.02)	0.04	0.13	0.15	<0.001
Religiosity⇒ Nor. opp.	-0.01 (0.01)	-0.02	0.01	-0.03	0.471
Schooling⇒ Nor. opp.	0.01 (0.03)	-0.04	0.07	0.01	0.778
Age⇒ Nor. opp.	-0.00 (0.00)	-0.01	0.00	-0.04	0.245
Naturalness ⇒ Discreteness ⇒ Nor. opp.	0.02 (0.01)	0.00	0.04	0.02	0.063
Conservatism⇒ Discreteness⇒ Nor. opp.	0.04 (0.02)	0.01	0.08	0.04	0.043
Conservatism⇒ Homogeneity⇒ Nor. opp.	-0.00 (0.01)	-0.01	0.01	-0.00	0.763
Conservatism⇒ Informativeness⇒ Nor. opp.	0.00 (0.00)	-0.01	0.01	0.00	0.719
Conservatism⇒ Naturalness⇒ Nor. opp.	-0.01 (0.01)	-0.02	0.01	-0.01	0.516
Conservatism⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.01	-0.00	-0.00	0.101
Pol. conserv.⇒ Discreteness ⇒ Nor. opp.	0.01 (0.01)	0.00	0.02	0.02	0.066
Pol. conserv.⇒ Homogeneity⇒ Nor. opp.	0.00 (0.00)	-0.00	0.01	0.00	0.561
Pol. conserv.⇒ Informativeness⇒ Nor. opp.	-0.00 (0.00)	-0.01	0.00	-0.00	0.630
Pol. conserv.⇒ Naturalness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.907
Pol. conserv.⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.846
Religiosity⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.481
Religiosity ⇒ Homogeneity⇒ Nor. opp.	0.00 (0.00)	-0.00	0.00	0.01	0.229
Religiosity⇒ Informativeness ⇒ Nor. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.662
Religiosity⇒ Naturalness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.697
Religiosity⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.511
Schooling⇒ Discreteness⇒ Nor. opp.	-0.01 (0.00)	-0.02	0.00	-0.01	0.173
Schooling⇒ Homogeneity⇒ Nor. opp.	-0.01 (0.00)	-0.02	-0.00	-0.01	0.075
Schooling⇒ Informativeness⇒ Nor. opp.	0.00 (0.00)	-0.00	0.01	0.00	0.699
Schooling⇒ Naturalness⇒ Nor. opp.	-0.00 (0.00)	-0.01	0.01	-0.00	0.526
Schooling⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.00	-0.00	-0.00	0.112
Age⇒ Discreteness⇒ Nor. opp.	0.00 (0.00)	-0.00	0.00	0.01	0.176
Age⇒ Homogeneity⇒ Nor. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.411
Age⇒ Informativeness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.613

Age⇒ Naturalness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.966
Age⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.947

Note. Model fit indices: $\chi^2(35) = 313.44$, $p < 0.001$, CFI = 1.00, TLI = 0.98, SRMR = 0.01 and RMSEA = 0.02, 95% CI [0.00, 0.08], R^2 for normative opposition: 0.11. Pol. conserv.: Political conservatism. Nor. opp.: Normative opposition. Bolded p-values significant at the 0.05 level for the direct and indirect effects of conservatism related to right-wing authoritarianism, political conservatism, religiosity, schooling, and age on attitudes related to sexual prejudice.

Tables S10 to S13 show the direct and indirect effects of psychosocial variables and essentialist beliefs on proximal and distal negative attitudes towards homosexuality and individual and normative opposition to same-sex parenting, respectively, among participants in the intermediary naturalness-only latent profile.

Table S10. Direct and indirect effect of the variables inserted in the model with the outcome of negative proximal attitudes towards homosexuality in the intermediary naturalness-only latent profile

Direct and indirect pathways	Estimate	95% CI		β	<i>p</i>
	<i>B</i> (<i>SE</i>)	Lower	Upper		
Conservatism⇒ Naturalness	-0.12 (0.14)	-0.39	0.16	-0.06	0.369
Pol. conserv.⇒ Naturalness	-0.07 (0.05)	-0.16	0.02	-0.09	0.126
Religiosity⇒ Naturalness	-0.03 (0.02)	-0.07	0.00	-0.13	0.064
Schooling⇒ Naturalness	-0.16 (0.06)	-0.28	-0.04	-0.20	0.007
Age⇒ Naturalness	0.00 (0.01)	-0.01	0.01	0.01	0.895
Naturalness⇒ Discreteness	0.04 (0.04)	-0.03	0.11	0.08	0.257
Conservatism⇒ Discreteness	0.22 (0.07)	0.06	0.36	0.20	0.002
Pol. conserv.⇒ Discreteness	-0.00 (0.03)	-0.06	0.05	-0.01	0.874
Religiosity⇒ Discreteness	-0.02 (0.01)	-0.04	-0.00	-0.16	0.021
Schooling⇒ Discreteness	-0.08 (0.03)	-0.14	-0.02	-0.18	0.018
Age⇒ Discreteness	-0.00 (0.00)	-0.01	0.01	-0.02	0.775
Conservatism⇒ Homogeneity	0.06 (0.05)	-0.05	0.17	0.08	0.286
Pol. conserv.⇒ Homogeneity	0.03 (0.02)	-0.00	0.07	0.12	0.066
Religiosity⇒ Homogeneity	0.01 (0.01)	-0.01	0.02	0.05	0.474
Schooling⇒ Homogeneity	0.00 (0.02)	-0.04	0.05	0.00	0.977
Age⇒ Homogeneity	-0.00 (0.00)	-0.00	0.00	-0.00	0.960
Conservatism⇒ Informativeness	0.05 (0.06)	-0.07	0.17	0.05	0.384
Pol. conserv.⇒ Informativeness	0.01 (0.02)	-0.04	0.06	0.03	0.581
Religiosity⇒ Informativeness	-0.02 (0.01)	-0.04	-0.00	-0.15	0.018
Schooling⇒ Informativeness	0.08 (0.03)	0.03	0.14	0.21	0.002
Age⇒ Informativeness	-0.01 (0.00)	-0.01	-0.00	-0.20	0.002
Naturalness ⇒ Prox. atti.	-0.15 (0.05)	-0.26	-0.04	-0.15	0.006
Discreteness ⇒ Prox. atti.	0.31 (0.11)	0.11	0.55	0.17	0.005
Homogeneity ⇒ Prox. atti.	0.27 (0.16)	-0.03	0.61	0.10	0.092
Informativeness ⇒ Prox. atti.	0.02 (0.10)	-0.19	0.21	0.01	0.870

Conservatism⇒ Prox. atti.	0.56 (0.13)	0.30	0.81	0.28	<0.001
Pol. conserv.⇒ Prox. atti.	0.12 (0.05)	0.02	0.21	0.16	0.011
Religiosity⇒ Prox. atti.	-0.02 (0.01)	-0.04	0.01	-0.06	0.274
Schooling⇒ Prox. atti.	-0.07 (0.05)	-0.18	0.02	-0.09	0.144
Age⇒ Prox. atti.	0.03 (0.01)	0.02	0.04	0.32	<0.001
Naturalness ⇒ Discreteness ⇒ Prox. atti.	0.01 (0.01)	-0.01	0.04	0.01	0.320
Conservatism⇒ Discreteness⇒ Prox. atti.	0.07 (0.03)	0.01	0.14	0.03	0.042
Conservatism⇒ Homogeneity⇒ Prox. atti.	0.02 (0.02)	-0.01	0.06	0.01	0.415
Conservatism⇒ Informativeness⇒ Prox. atti.	0.00 (0.01)	-0.02	0.02	0.00	0.913
Conservatism⇒ Naturalness⇒ Prox. atti.	0.02 (0.02)	-0.02	0.07	0.01	0.422
Conservatism⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	-0.00 (0.00)	-0.01	0.00	-0.00	0.570
Pol. conserv.⇒ Discreteness ⇒ Prox. atti.	-0.00 (0.01)	-0.02	0.02	-0.00	0.880
Pol. conserv.⇒ Homogeneity⇒ Prox. atti.	0.01 (0.01)	-0.00	0.03	0.01	0.264
Pol. conserv.⇒ Informativeness⇒ Prox. atti.	0.00 (0.00)	-0.01	0.01	0.00	0.934
Pol. conserv.⇒ Naturalness⇒ Prox. atti.	0.01 (0.01)	-0.00	0.03	0.01	0.185
Pol. conserv.⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.476
Religiosity⇒ Discreteness⇒ Prox. atti.	-0.01 (0.00)	-0.02	-0.00	-0.03	0.100
Religiosity ⇒ Homogeneity⇒ Prox. atti.	0.00 (0.00)	-0.00	0.01	0.01	0.572
Religiosity⇒ Informativeness ⇒ Prox. atti.	-0.00 (0.00)	-0.01	0.00	-0.00	0.876
Religiosity⇒ Naturalness⇒ Prox. atti.	0.01 (0.00)	-0.00	0.01	0.02	0.158
Religiosity⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.434
Schooling⇒ Discreteness⇒ Prox. atti.	-0.02 (0.01)	-0.06	-0.00	-0.03	0.086
Schooling⇒ Homogeneity⇒ Prox. atti.	0.00 (0.01)	-0.01	0.02	0.00	0.980
Schooling⇒ Informativeness⇒ Prox. atti.	0.00 (0.01)	-0.02	0.02	0.00	0.877
Schooling⇒ Naturalness⇒ Prox. atti.	0.02 (0.01)	0.00	0.05	0.03	0.045
Schooling⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	-0.00 (0.00)	-0.01	0.00	-0.00	0.371
Age⇒ Discreteness⇒ Prox. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.786
Age⇒ Homogeneity⇒ Prox. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.967
Age⇒ Informativeness⇒ Prox. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.877

Age⇒ Naturalness⇒ Prox. atti.	-0.00 (0.00)	-0.00	0.00	<hr/>	-0.00	0.900
Age⇒ Naturalness⇒ Discreteness⇒ Prox. atti.	0.00 (0.00)	-0.00	0.00		0.00	0.926

Note. Model fit indices: $\chi^2(35) = 151.69$, $p < 0.001$, CFI = 1.00, TLI = 1.18, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.10], R^2 for proximal attitudes: 0.29. Pol. conserv.: Political conservatism. Prox. atti.: Proximal attitudes. Bolded p-values significant at the 0.05 level for the direct and indirect effects of conservatism related to right-wing authoritarianism, political conservatism, religiosity, schooling, and age on attitudes related to sexual prejudice.

Table S11. Direct and indirect effect of the variables inserted in the model with the outcome of negative distal attitudes towards homosexuality in the intermediary naturalness-only latent profile

Direct and indirect pathways	Estimate	95% CI		β	<i>p</i>
	<i>B</i> (<i>SE</i>)	Lower	Upper		
Conservatism⇒ Naturalness	-0.12 (0.14)	-0.38	0.15	-0.06	0.363
Pol. conserv.⇒ Naturalness	-0.07 (0.05)	-0.16	0.03	-0.09	0.142
Religiosity⇒ Naturalness	-0.03 (0.02)	-0.07	0.00	-0.13	0.060
Schooling⇒ Naturalness	-0.16 (0.06)	-0.26	-0.05	-0.20	0.005
Age⇒ Naturalness	0.00 (0.01)	-0.01	0.01	0.01	0.893
Naturalness⇒ Discreteness	0.04 (0.04)	-0.03	0.12	0.08	0.265
Conservatism⇒ Discreteness	0.22 (0.07)	0.08	0.36	0.20	0.001
Pol. conserv.⇒ Discreteness	-0.00 (0.03)	-0.06	0.06	-0.01	0.881
Religiosity⇒ Discreteness	-0.02 (0.01)	-0.04	-0.01	-0.16	0.012
Schooling⇒ Discreteness	-0.08 (0.03)	-0.14	-0.01	-0.18	0.021
Age⇒ Discreteness	-0.00 (0.00)	-0.01	0.01	-0.02	0.767
Conservatism⇒ Homogeneity	0.06 (0.05)	-0.04	0.16	0.08	0.267
Pol. conserv.⇒ Homogeneity	0.03 (0.02)	-0.00	0.07	0.12	0.067
Religiosity⇒ Homogeneity	0.01 (0.01)	-0.01	0.02	0.05	0.472
Schooling⇒ Homogeneity	0.00 (0.02)	-0.04	0.04	0.00	0.977
Age⇒ Homogeneity	-0.00 (0.00)	-0.01	0.00	-0.00	0.961
Conservatism⇒ Informativeness	0.05 (0.06)	-0.07	0.18	0.05	0.382
Pol. conserv.⇒ Informativeness	0.01 (0.02)	-0.04	0.06	0.03	0.583
Religiosity⇒ Informativeness	-0.02 (0.01)	-0.04	-0.00	-0.15	0.017
Schooling⇒ Informativeness	0.08 (0.03)	0.03	0.14	0.21	0.003
Age⇒ Informativeness	-0.01 (0.00)	-0.01	-0.00	-0.20	<0.001
Naturalness ⇒ Dist. atti.	-0.08 (0.06)	-0.20	0.04	-0.08	0.211
Discreteness ⇒ Dist. atti.	0.11 (0.14)	-0.16	0.38	0.06	0.431
Homogeneity ⇒ Dist. atti.	0.09 (0.18)	-0.30	0.43	0.03	0.632
Informativeness ⇒ Dist. atti.	-0.15 (0.10)	-0.36	0.05	-0.07	0.161

Conservatism⇒ Dist. atti.	0.32 (0.23)	-0.14	0.76	0.15	0.169
Pol. conserv.⇒ Dist. atti.	0.29 (0.06)	0.17	0.42	0.36	<0.001
Religiosity⇒ Dist. atti.	0.01 (0.02)	-0.03	0.04	0.03	0.715
Schooling⇒ Dist. atti.	-0.04 (0.05)	-0.15	0.07	-0.05	0.413
Age⇒ Dist. atti.	0.01 (0.01)	-0.00	0.02	0.08	0.152
Naturalness ⇒ Discreteness ⇒ Dist. atti.	0.01 (0.01)	-0.01	0.03	0.00	0.640
Conservatism⇒ Discreteness⇒ Dist. atti.	0.02 (0.03)	-0.04	0.09	0.01	0.458
Conservatism⇒ Homogeneity⇒ Dist. atti.	0.01 (0.01)	-0.02	0.04	0.00	0.726
Conservatism⇒ Informativeness⇒ Dist. atti.	-0.01 (0.01)	-0.05	0.01	-0.00	0.553
Conservatism⇒ Naturalness⇒ Dist. atti.	0.01 (0.02)	-0.02	0.05	0.01	0.535
Conservatism⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	-0.00 (0.00)	-0.01	0.00	-0.00	0.778
Pol. conserv.⇒ Discreteness ⇒ Dist. atti.	-0.00 (0.01)	-0.01	0.01	-0.00	0.926
Pol. conserv.⇒ Homogeneity⇒ Dist. atti.	0.00 (0.01)	-0.01	0.02	0.00	0.683
Pol. conserv.⇒ Informativeness⇒ Dist. atti.	-0.00 (0.00)	-0.01	0.01	-0.00	0.660
Pol. conserv.⇒ Naturalness⇒ Dist. atti..	0.01 (0.01)	-0.00	0.02	0.01	0.387
Pol. conserv.⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.686
Religiosity⇒ Discreteness⇒ Dist. atti.	-0.00 (0.00)	-0.01	0.00	-0.01	0.489
Religiosity ⇒ Homogeneity⇒ Dist. atti.	0.00 (0.00)	-0.00	0.00	0.00	0.786
Religiosity⇒ Informativeness ⇒ Dist. atti.	0.00 (0.00)	-0.00	0.01	0.01	0.248
Religiosity⇒ Naturalness⇒ Dist. atti.	0.00 (0.00)	-0.00	0.01	0.01	0.344
Religiosity⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.666
Schooling⇒ Discreteness⇒ Dist. atti.	-0.01 (0.01)	-0.04	0.01	-0.01	0.496
Schooling⇒ Homogeneity⇒ Dist. atti.	0.00 (0.00)	-0.01	0.01	0.00	0.990
Schooling⇒ Informativeness⇒ Dist. atti.	-0.01 (0.01)	-0.04	0.01	-0.02	0.224
Schooling⇒ Naturalness⇒ Dist. atti.	0.01 (0.01)	-0.01	0.04	0.02	0.267
Schooling⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	-0.00 (0.00)	-0.01	0.00	-0.00	0.663
Age⇒ Discreteness⇒ Dist. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.858
Age⇒ Homogeneity⇒ Dist. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.984
Age⇒ Informativeness⇒ Dist. atti.	0.00 (0.00)	-0.00	0.00	0.01	0.210

Age⇒ Naturalness⇒ Dist. atti.	-0.00 (0.00)	-0.00	0.00	-0.00	0.916
Age⇒ Naturalness⇒ Discreteness⇒ Dist. atti.	0.00 (0.00)	-0.00	0.00	0.00	0.957

Note. Model fit indices: $\chi^2(35) = 132.07$, $p < 0.001$, CFI = 1.00, TLI = 1.21, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.10], R^2 for distal attitudes: 0.23. Pol. conserv.: Political conservatism. Dist. atti.: Distal attitudes. Bolded p-values significant at the 0.05 level for the direct and indirect effects of conservatism related to right-wing authoritarianism, political conservatism, religiosity, schooling, and age on attitudes related to sexual prejudice.

Table S12. Direct and indirect effect of the variables inserted in the model with the outcome of individual opposition to same-sex parenting in the intermediary naturalness-only latent profile

Direct and indirect pathways	Estimate	95% CI		β	p
	$B (SE)$	Lower	Upper		
Conservatism⇒ Naturalness	-0.12 (0.14)	-0.38	0.13	-0.06	0.369
Pol. conserv.⇒ Naturalness	-0.07 (0.05)	-0.16	0.02	-0.09	0.123
Religiosity⇒ Naturalness	-0.03 (0.02)	-0.07	0.00	-0.13	0.057
Schooling⇒ Naturalness	-0.16 (0.06)	-0.27	-0.05	-0.20	0.005
Age⇒ Naturalness	0.00 (0.01)	-0.01	0.01	0.01	0.897
Naturalness⇒ Discreteness	0.04 (0.04)	-0.03	0.11	0.08	0.243
Conservatism⇒ Discreteness	0.22 (0.07)	0.06	0.35	0.20	0.002
Pol. conserv.⇒ Discreteness	-0.00 (0.03)	-0.06	0.05	-0.01	0.878
Religiosity⇒ Discreteness	-0.02 (0.01)	-0.04	-0.01	-0.16	0.016
Schooling⇒ Discreteness	-0.08 (0.03)	-0.14	-0.01	-0.18	0.019
Age⇒ Discreteness	-0.00 (0.00)	-0.01	0.01	-0.02	0.764
Conservatism⇒ Homogeneity	0.06 (0.05)	-0.05	0.17	0.08	0.291
Pol. conserv.⇒ Homogeneity	0.03 (0.02)	-0.01	0.07	0.12	0.074
Religiosity⇒ Homogeneity	0.01 (0.01)	-0.01	0.02	0.05	0.480
Schooling⇒ Homogeneity	0.00 (0.02)	-0.04	0.05	0.00	0.977
Age⇒ Homogeneity	-0.00 (0.00)	-0.00	0.00	-0.00	0.960
Conservatism⇒ Informativeness	0.05 (0.06)	-0.06	0.17	0.05	0.374
Pol. conserv.⇒ Informativeness	0.01 (0.02)	-0.04	0.06	0.03	0.580
Religiosity⇒ Informativeness	-0.02 (0.01)	-0.04	-0.00	-0.15	0.012
Schooling⇒ Informativeness	0.08 (0.03)	0.03	0.14	0.21	0.002
Age⇒ Informativeness	-0.01 (0.00)	-0.01	-0.00	-0.20	0.001
Naturalness⇒ Ind. opp.	-0.12 (0.04)	-0.19	-0.05	-0.20	0.001
Discreteness⇒ Ind. opp.	0.13 (0.06)	0.01	0.23	0.12	0.026
Homogeneity⇒ Ind. opp.	0.09 (0.10)	-0.12	0.27	0.06	0.390
Informativeness⇒ Ind. opp.	0.03 (0.06)	-0.07	0.14	0.03	0.541

Conservatism⇒ Ind. opp.	0.40 (0.14)	0.13	0.68	0.35	0.004
Pol. conserv.⇒ Ind. opp.	0.09 (0.04)	0.02	0.17	0.20	0.024
Religiosity⇒ Ind. opp.	-0.01 (0.01)	-0.03	0.00	-0.09	0.157
Schooling⇒ Ind. opp.	-0.04 (0.03)	-0.10	0.01	-0.09	0.144
Age⇒ Ind. opp.	0.00 (0.00)	-0.00	0.01	0.04	0.522
Naturalness ⇒ Discreteness ⇒ Ind. opp.	0.01 (0.01)	-0.01	0.02	0.01	0.319
Conservatism⇒ Discreteness⇒ Ind. opp.	0.03 (0.02)	0.00	0.06	0.02	0.086
Conservatism⇒ Homogeneity⇒ Ind. opp.	0.01 (0.01)	-0.01	0.03	0.00	0.619
Conservatism⇒ Informativeness⇒ Ind. opp.	0.00 (0.01)	-0.01	0.01	0.00	0.705
Conservatism⇒ Naturalness⇒ Ind. opp.	0.01 (0.02)	-0.02	0.05	0.01	0.417
Conservatism⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.601
Pol. conserv.⇒ Discreteness ⇒ Ind. opp.	-0.00 (0.00)	-0.01	0.01	-0.00	0.891
Pol. conserv.⇒ Homogeneity⇒ Ind. opp.	0.00 (0.00)	-0.00	0.01	0.01	0.517
Pol. conserv.⇒ Informativeness⇒ Ind. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.785
Pol. conserv.⇒ Naturalness⇒ Ind. opp.	0.01 (0.01)	-0.00	0.02	0.02	0.197
Pol. conserv.⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.472
Religiosity⇒ Discreteness⇒ Ind. opp.	-0.00 (0.00)	-0.01	-0.00	-0.02	0.155
Religiosity ⇒ Homogeneity⇒ Ind. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.693
Religiosity⇒ Informativeness ⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.01	0.585
Religiosity⇒ Naturalness⇒ Ind. opp.	0.00 (0.00)	-0.00	0.01	0.03	0.093
Religiosity⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.396
Schooling⇒ Discreteness⇒ Ind. opp.	-0.01 (0.01)	-0.03	-0.00	-0.02	0.135
Schooling⇒ Homogeneity⇒ Ind. opp.	0.00 (0.00)	-0.01	0.01	0.00	0.986
Schooling⇒ Informativeness⇒ Ind. opp.	0.00 (0.01)	-0.01	0.01	0.01	0.566
Schooling⇒ Naturalness⇒ Ind. opp.	0.02 (0.01)	0.00	0.04	0.04	0.028
Schooling⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.338
Age⇒ Discreteness⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.787
Age⇒ Homogeneity⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.976
Age⇒ Informativeness⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.01	0.555

Age⇒ Naturalness⇒ Ind. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.898
Age⇒ Naturalness⇒ Discreteness⇒ Ind. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.925

Note. Model fit indices: $\chi^2(35) = 146.59$, $p < 0.001$, CFI = 1.00, TLI = 1.18, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.10], R^2 for individual opposition: 0.27. Pol. conserv.: Political conservatism. Ind. opp.: Individual opposition. Bolded p-values significant at the 0.05 level for the direct and indirect effects of conservatism related to right-wing authoritarianism, political conservatism, religiosity, schooling, and age on attitudes related to sexual prejudice.

Table S13. Direct and indirect effect of the variables inserted in the model with the outcome of normative opposition to same-sex parenting in the intermediary naturalness-only latent profile

Direct and indirect pathways	Estimate	95% CI		β	<i>p</i>
	<i>B</i> (<i>SE</i>)	Lower	Upper		
Conservatism⇒ Naturalness	-0.12 (0.14)	-0.39	0.14	-0.06	0.363
Pol. conserv.⇒ Naturalness	-0.07 (0.05)	-0.16	0.03	-0.09	0.137
Religiosity⇒ Naturalness	-0.03 (0.02)	-0.07	0.00	-0.13	0.072
Schooling⇒ Naturalness	-0.16 (0.05)	-0.26	-0.05	-0.20	0.004
Age⇒ Naturalness	0.00 (0.01)	-0.01	0.01	0.01	0.893
Naturalness⇒ Discreteness	0.04 (0.04)	-0.03	0.11	0.08	0.258
Conservatism⇒ Discreteness	0.22 (0.07)	0.07	0.35	0.20	0.002
Pol. conserv.⇒ Discreteness	-0.00 (0.03)	-0.06	0.05	-0.01	0.876
Religiosity⇒ Discreteness	-0.02 (0.01)	-0.04	-0.00	-0.16	0.017
Schooling⇒ Discreteness	-0.08 (0.03)	-0.14	-0.02	-0.18	0.019
Age⇒ Discreteness	-0.00 (0.00)	-0.01	0.01	-0.02	0.758
Conservatism⇒ Homogeneity	0.06 (0.05)	-0.03	0.16	0.08	0.255
Pol. conserv.⇒ Homogeneity	0.03 (0.02)	-0.00	0.07	0.12	0.071
Religiosity⇒ Homogeneity	0.01 (0.01)	-0.01	0.02	0.05	0.481
Schooling⇒ Homogeneity	0.00 (0.02)	-0.05	0.04	0.00	0.977
Age⇒ Homogeneity	-0.00 (0.00)	-0.00	0.00	-0.00	0.960
Conservatism⇒ Informativeness	0.05 (0.06)	-0.07	0.17	0.05	0.380
Pol. conserv.⇒ Informativeness	0.01 (0.02)	-0.04	0.06	0.03	0.568
Religiosity⇒ Informativeness	-0.02 (0.01)	-0.04	-0.00	-0.15	0.016
Schooling⇒ Informativeness	0.08 (0.03)	0.03	0.14	0.21	0.001
Age⇒ Informativeness	-0.01 (0.00)	-0.01	-0.00	-0.20	0.002
Naturalness⇒ Nor. opp.	0.02 (0.08)	-0.13	0.18	0.02	0.751
Discreteness⇒ Nor. opp.	0.08 (0.12)	-0.15	0.34	0.04	0.530
Homogeneity⇒ Nor. opp.	0.24 (0.20)	-0.16	0.65	0.09	0.230
Informativeness⇒ Nor. opp.	-0.02 (0.15)	-0.32	0.26	-0.01	0.877

Conservatism⇒ Nor. opp.	0.12 (0.16)	-0.17	0.45	0.06	0.449
Pol. conserv.⇒ Nor. opp.	0.05 (0.06)	-0.07	0.17	0.07	0.373
Religiosity⇒ Nor. opp.	0.02 (0.02)	-0.02	0.06	0.09	0.271
Schooling⇒ Nor. opp.	0.01 (0.06)	-0.13	0.13	0.01	0.932
Age⇒ Nor. opp.	-0.00 (0.01)	-0.01	0.01	-0.03	0.716
Naturalness ⇒ Discreteness ⇒ Nor. opp.	0.00 (0.01)	-0.01	0.02	0.00	0.646
Conservatism⇒ Discreteness⇒ Nor. opp.	0.02 (0.03)	-0.04	0.08	0.01	0.555
Conservatism⇒ Homogeneity⇒ Nor. opp.	0.01 (0.02)	-0.01	0.07	0.01	0.497
Conservatism⇒ Informativeness⇒ Nor. opp.	-0.00 (0.01)	-0.03	0.03	-0.00	0.919
Conservatism⇒ Naturalness⇒ Nor. opp.	-0.00 (0.01)	-0.03	0.03	-0.00	0.834
Conservatism⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.756
Pol. conserv.⇒ Discreteness ⇒ Nor. opp.	-0.00 (0.00)	-0.01	0.01	-0.00	0.934
Pol. conserv.⇒ Homogeneity⇒ Nor. opp.	0.01 (0.01)	-0.01	0.03	0.01	0.356
Pol. conserv.⇒ Informativeness⇒ Nor. opp.	-0.00 (0.00)	-0.01	0.01	-0.00	0.942
Pol. conserv.⇒ Naturalness⇒ Nor. opp.	-0.00 (0.01)	-0.02	0.01	-0.00	0.789
Pol. conserv.⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.719
Religiosity⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.01	0.00	-0.01	0.561
Religiosity ⇒ Homogeneity⇒ Nor. opp.	0.00 (0.00)	-0.00	0.01	0.00	0.585
Religiosity⇒ Informativeness ⇒ Nor. opp.	0.00 (0.00)	-0.01	0.01	0.00	0.884
Religiosity⇒ Naturalness⇒ Nor. opp.	-0.00 (0.00)	-0.01	0.01	-0.00	0.788
Religiosity⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.676
Schooling⇒ Discreteness⇒ Nor. opp.	-0.01 (0.01)	-0.03	0.01	-0.01	0.585
Schooling⇒ Homogeneity⇒ Nor. opp.	0.00 (0.01)	-0.01	0.02	0.00	0.982
Schooling⇒ Informativeness⇒ Nor. opp.	-0.00 (0.01)	-0.03	0.02	-0.00	0.885
Schooling⇒ Naturalness⇒ Nor. opp.	-0.00 (0.01)	-0.03	0.02	-0.00	0.764
Schooling⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.687
Age⇒ Discreteness⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.866
Age⇒ Homogeneity⇒ Nor. opp.	-0.00 (0.00)	-0.00	0.00	-0.00	0.967
Age⇒ Informativeness⇒ Nor. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.886

Age⇒ Naturalness⇒ Nor. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.966
Age⇒ Naturalness⇒ Discreteness⇒ Nor. opp.	0.00 (0.00)	-0.00	0.00	0.00	0.952

Note. Model fit indices: $\chi^2(35) = 79.68$, $p < 0.001$, CFI = 1.00, TLI = 1.46, SRMR = 0.01 and RMSEA = 0.00, 95% CI [0.00, 0.10], R^2 for normative opposition: 0.04. Pol. conserv.: Political conservatism. Nor. opp.: Normative opposition.

Integrating findings from studies that comprise this work

All five studies that make up this work were developed to jointly address the objective of investigating evidence about scientific (theoretical explanations) and common-sense (lay beliefs) conceptions about sexual orientation related to essentialist thinking, and the relationship between the different dimensions of psychological essentialism and sexual prejudice. They were also developed to separately address the specific objectives of this work. Study 1 was developed to address specific objective 1 - Investigate evidence on the main factors associated with the development of sexual orientation reported in studies published in recent scientific literature. Study 2 was developed to address the specific objective 2 - Investigate beliefs about sexual orientation that reflect dimensions of psychological essentialism among people with different sexual orientations/identities in the Brazilian context. Study 3 and Study 5 were developed to address specific objective 3 - Investigate implications of different essentialist beliefs about sexual orientation on different sexual prejudice attitudes, based on models that take into account the independent effects of these different dimensions of psychological essentialism and their effects, especially of the naturalness belief, when they are endorsed simultaneously. As results from Study 2 and Study 4 provide validity evidence for some psychometric instruments used in Study 3 and Study 5, then it means that Study 2 and Study 5 also address specific objective 3 of this work.

Evidence from the studies carried out along this work make it possible to expand knowledge about the different conceptions of sexual orientation and about the relationship between psychological essentialism and sexual prejudice. First, they contribute with more insightful evidence about the effects of factors associated with the development of sexual orientation (and underlying theories) in recent scientific literature, as found in Study 1. Second, they add to the evidence about the different beliefs that people may have about sexual orientation and that express dimensions of psychological essentialism (including in the

Brazilian context), as found in Study 2. Third, they provide evidence for a model of sexual prejudice and a psychometric scale to assess this construct in the Brazilian context. Finally, Study 3 and Study 5 of this work offer evidence that aids in the understanding of the relationship between essentialist beliefs about sexual orientation and between these dimensions of psychological essentialism and attitudes related to sexual prejudice.

Overall, findings from studies in this work show that evidence about the factors associated with the development of sexual orientation is diffuse, so that it may only be consistent for some theories and some categories of sexual orientation (Study 1). This applies especially to the theory proposed by LeVay (2011, 2016), which even though it is comprehensive in its attempt to consider the multifactorial aspects of the bases of sexual orientation, still has some limitations. In line with the discussion proposed in this work, concerns about the validity of these biological theories are particularly directed to those ones that emphasize the effects of biological factors or processes as the main markers (or even determinants) of the development of sexual orientation.

Accordingly, perspectives promoting the idea that these factors are decisive in defining sexual orientation, and using scientific arguments as justification for these erroneous conceptions, should be avoided. Even so, the adoption of various theories, including biological ones, to support people's conceptions about sexual orientation seems inevitable. This is because people's representations and attitudes towards aspects of human nature (which include conceptions about homosexual orientation, for example) can be influenced by scientific and common-sense theories socially endorsed (Camino, 1998; Caminho & Pereira, 2000). This may be one of the explanations for the fact that people endorse different beliefs about sexual orientation, including beliefs of naturalness. The belief of naturalness can be understood as a dimension of essentialist thinking that reflects a misreading (essentializing bias) of scientific theories about the biological basis of sexual orientation.

The multidimensional model of essentialist beliefs, with four dimensions (Arseneau et al., 2013), investigated in this work showed validity evidence for the structure with the beliefs of naturalness, discreteness, homogeneity, and informativeness when tested in samples with sexually diverse Brazilian participants (Study 2). Although some adaptations were necessary in the scale that measures these beliefs (SOBS Form 2), such as cutting down items in some factors, in the version validated in this new context (SOBS Form 2 Adapted version; SOBS-F2A). These results support the idea that people in general (regardless of their sexual orientation/identity) can endorse essentialist beliefs about sexual orientation that are organized across four distinct dimensions: naturalness, discreteness, homogeneity, and informativeness (Arseneau et al., 2013). Finding evidence for this model helps to advance in the investigation into the effects of psychological essentialism by considering the relationship between the naturalness belief and other essentialist beliefs. This is particularly important because the naturalness belief in this model expresses ideas behind the “born this way” narrative, widely used to advocate for the rights of sexual minorities in contexts such as the U.S. (Arseneau et al., 2013; Diamond & Rosky, 2016; Grzanka et al., 2016; Osmundson, 2011).

Findings on the validity of the model of opposition to same-sex parenting show that this perspective for assessing sexual prejudice, which has already been adopted in other countries and populations, is also suitable for use in the Brazilian context (Study 4). This supports the idea that sexual prejudice is multidimensional and that there are factors that can manifest across different cultural contexts. So, this applies, for example, to individual opposition and normative opposition to same-sex parenting, which research has found evidence of validity for individuals in Spain (Frias-Navarro et al., 2017; Pascual-Soler et al., 2017), Chile (Barrientos et al., 2013; Pascual-Soler et al., 2017), Italy (Badenes-Ribera et al., 2020), China (Ching & Wu, 2023), and among Hispanic individuals residing in the U. S. (Pascual-Soler et al., 2017).

Such findings also support the proposition that manifestations of sexual prejudice have changed over time and are expressed in new ways, such as through modern attitudes of prejudice (e.g., Cowan et al., 2005; Frias-Navarro & Monterde-i-Bort, 2012; Gato et al., 2012; Morrison & Morrison, 2003; Raja & Stokes, 1998; Steffens, 2005). This is in line with the wider phenomenon of prejudice, which is expressed in new ways as well when directed at other social groups, in addition to the traditional ones - such as racism, for example (e.g., Lima & Vala, 2004; McConahay, 1986; Pedersen & Walker, 1997). The availability of a version of the Beliefs about Children's Adjustment in Same-Sex Families Scale (BCASSFS) adapted for the Brazilian context will help to discuss the results of research carried out in Brazil with regard to international literature. Further, in this work, the BCASSFS and the model of opposition to same-sex parenting was employed in Study 5 to investigate the relationship between the factors of this scale/model and essentialist beliefs about sexual orientation in this cultural context.

In a complementary way, results of some studies in this work provide evidence for the assumption made in this thesis that attitudes of sexual prejudice, commonly conceptualized and operationalized among heterosexual people, can also be manifested by people from sexual minority groups. This was found in Study 3 (by analyzing the fit and invariance of the ATHO between the groups of cis-heterosexual and LGBT+ participants) and Study 4 (by analyzing the fit and invariance of the BCASSFS between the groups of cis-heterosexual and LGBT+ participants). While previous studies present validity evidence for models of attitudes related to sexual prejudice with samples that included both heterosexual-cisgender and non-heterosexual and non-cisgender people (e.g., Ching & Wu, 2023; Costa et al., 2015; Costa et al., 2016; García-Berbén et al., 2022; Guimarães et al., 2023; Ramos & Cerqueira-Santos, 2021). Study 3 and Study 4 (especially the latter) present more robust evidence that attitudes reflecting sexual prejudice can be manifested and present the same structure among both cisgender heterosexual people and LGBT+ people. These findings are taken as evidence to

support the adoption of such a perspective in this work. However, it is worth noting that research is still needed to refine this proposal for conceptualizing and operationalizing sexual prejudice.

Both Study 3 and Study 5 sought to investigate the implications of different essentialist beliefs about sexual orientation for different attitudes related to sexual prejudice. This was carried out based on models that take into account the independent (and combined) effects of essentialist beliefs, especially the naturalness belief, when they are endorsed solely and simultaneously. These studies used independent samples and different analytical approaches in order to produce more robust evidence to answer the research question investigated. In fact, their findings offer complementary support for explanations of the relationship between essentialist thinking and sexual prejudice attitudes.

Study 3 provided evidence on the structural relationship between different essentialist beliefs. It showed that the beliefs of discreteness, homogeneity, and informativeness can be dimensions of psychological essentialism that are correlated and can be analyzed at a level different from that of the naturalness belief. This reflects the fact that there are competing propositions and evidence for models of essentialist beliefs both multidimensional, with these three factors correlated with each other (e.g., Arseneau et al., 2013), and unidimensional, with these three types of beliefs collapsing into a single factor (e.g., Agadullina & Chumakova, 2017). The results supported the hypothesis that the belief of naturalness may be a distinct factor that predicts other types of essentialist beliefs (discreteness, homogeneity, and informativeness) and these beliefs together may predict higher negative attitudes towards sexual diversity.

Results from Study 3 reflect the idea that biologism, as a set of beliefs about the biological basis and nature of aspects of sexuality, can lead to or support heteronormative ideologies (van Anders, 2024). These results also provide evidence that the relationship between essentialist beliefs and their effects on attitudes towards sexual diversity depend on factors such as individual characteristics and the specific attitudes assessed. These factors have

potential to moderate the effects of the naturalness belief on the homogeneity and informativeness beliefs, and the effects of these two latter beliefs on attitudes towards sexual diversity. In addition, these factors also have potential to moderate the direct and indirect effects of the naturalness belief on attitudes towards sexual diversity.

Results from Study 5 provide support for the results found in Study 3 and they also lead to new insights into the relationship between essentialist beliefs about sexual orientation and their implications for different attitudes to sexual prejudice. Study 5 provides evidence on the relationship between essentialist beliefs, by analyzing how they can co-occur and express through latent profiles considering people's individual characteristics in the Brazilian context. It advances the investigation of the relationship between different dimensions of essentialist thinking and different sexual prejudice attitudes by including the BCASSFS factors. A brief analysis of the literature indicates that there are no studies on the relationship between the SOBS factors (naturalness, discreteness, homogeneity, and informativeness beliefs) and the BCASSFS factors (individual opposition and normative opposition to same-sex parenting). Therefore, its results contribute to covering this gap and expanding knowledge about the relationship between these constructs. In addition, this study also made it possible to test the replicability of the structural model on the relationship between psychological essentialism and attitudes related to sexual prejudice proposed in Study 3, considering some additional variables.

Using latent profile analysis in Study 5 made it possible to work with more contingently defined groups based on a person-centered approach. In this study groups were established according to the participants' latent patterns of endorsement of essentialist beliefs and were characterized according to other individual differences variables investigated. It yielded additional insights to Study 3, which revealed that the relationship between different essentialist beliefs could be moderated by people's sexual orientation/identity. This is because, on the one hand, Study 5 showed that sexual orientation did not significantly predict membership in groups

with different latent profiles of beliefs about sexual orientation. On the other hand, it was ideological variables related to conservatism that showed more consistent significant effects to explain membership in groups with different latent profiles.

Then, it may be that ideologies with which people identify may be more important than social locations, such as being cis-heterosexual or LGBT+, in explaining both how people simultaneously endorse essentialist beliefs about sexual orientation and manifest sexual prejudice attitudes. This is because the findings about the direct and indirect effects of these beliefs on sexual prejudice attitudes depended on the latent profile of individuals. That is, patterns of direct and indirect effects of the beliefs on the attitudes varied according to the groups with different latent profiles analyzed separately. And individuals with different sexual orientations were distributed among the groups independently, but the levels of endorsement of conservatism depended on the groups in which the individuals were categorized.

Conclusions and implications

When considered together, the results of the five studies carried out here contributed to achieving the objectives defined for this work and provide evidence to outline some conclusions. Therefore, the main thesis put forward here is that essentialist thinking about sexual orientation (e.g., the discreteness belief) is widely associated with sexual prejudice in the general population, although some other dimensions (e.g., the naturalness belief) have associations that are more controversial. The naturalness belief (which is not scientifically based because it manifests itself through essentialist conceptions) can be associated with both higher and lower sexual prejudice attitudes. The valence of these associations (whether they are positive or negative) depends on variables such as the type (dimension) of attitudes related to sexual prejudice investigated. Moreover, individual characteristics, such as ideological variables (e.g., political orientation and conservatism endorsement), sexual orientation/identity, among other factors, also should be taken into account in order to understand the relationship

between the naturalness beliefs and other essentialist beliefs, as well as their associations with sexual prejudice attitudes. Given that such variables are useful to help explain how people can have different patterns of simultaneous endorsement of essentialist beliefs about sexual orientation and different levels of sexual prejudice.

When simultaneous effects of essentialist beliefs about sexual orientation are considered, some dimensions of essentialist thinking are consistently associated with higher attitudes related to sexual prejudice, for example, the discreteness belief. This supports the idea that psychological essentialism is a phenomenon/process that generally occurs together with sexual prejudice (Allport, 1954). However, and particularly relevant to this work, findings on the dimension relative to the naturalness belief show that this dimension has more contingent relationships, and can be associated both with lower of these attitudes (which reflects more tolerance) and with higher of these attitudes. So, only under specific conditions, the naturalness belief is associated with a lower expression of attitudes related to this type of prejudice. This provides only partial support for the attributional theory of stigma (Weiner et al., 1988) and is only partially in line with the idea that using the “born this way” narrative could be an important strategy to promote rights and reduce negative attitudes towards sexual minorities. Actually, findings from this work suggest that using “born this way” narrative, one should take into account the specificities of how the effects of the “born this way” narrative can also be contingent, with both positive and negative implications.

Findings from the research carried out in this work are consistent with previous studies, which have indicated that dimensions of the essentialist thinking are associated with sexual prejudice (e.g., Bartels et al., 2024; Grzanka et al., 2016; Haslam & Levy, 2006). In addition, these findings broaden the understanding about the specificities of the direct and indirect effects that the naturalness belief can have on sexual prejudice. However, it is not possible to draw strong conclusions about the causal effect of these dimensions of psychological essentialism on

attitudes related to sexual prejudice (the conclusions of this work are only about associations). Since it was not possible to test empirically the direction of the relationships between any variables due to the design used in the research. The research conducted in this work was based on theoretical references and empirical studies supporting the proposition that essentialist beliefs about sexual orientation can predict sexual prejudice. However, there are also evidence and authors suggesting that essentialist beliefs, mainly those related to the naturalness dimension, may actually be outcomes (rather than predictors) of sexual prejudice (e.g., Hegarty, 2020, Hegarty & Golden, 2008). As such, further research on this issue should also empirically investigate the role of these beliefs as predictors or outcomes of prejudice.

Regardless of the causal direction between the variables, findings from this research support the argument that psychological essentialism and sexual prejudice are phenomena/processes that are interconnected and occur together. Accordingly, although the naturalness belief is commonly associated with lower sexual prejudice attitudes (negative association), the direction of this association seems to be far less consistent than the direction of the association between other essentialist beliefs and these attitudes (positive association). This is because in some contexts the naturalness belief occurs alongside the discreteness belief (which in turn occurs alongside the homogeneity and informativeness beliefs), and together they all associate with higher attitudes related to sexual prejudice. When this is the case, the naturalness belief is also indirectly associated with higher attitudes related to sexual prejudice (i.e., has a positive indirect association), contrasting with the “born this way” narrative and the attributional theory of stigma (Weiner et al., 1988) propositions.

Another issue concerning the findings from this work is that responses from people with sexual orientations/identities considered to be socially minoritized were not dealt with in more specific groups beyond the categories of cis-heterosexual and LGBT+ identities. There is evidence that, among sexual minority people, beliefs about sexual orientation vary between

groups with different sexual identities (Morandini et al., 2023). So, perhaps these different beliefs also have other indirect and more contingent implications for specific groups with sexual minority people. And there is preliminary evidence that suggests this. For example, in this research, it was found that the discreteness belief directly predicts, and the naturalness belief indirectly predicts (via discreteness), higher perceptions of internalized stigma among sexual minorities. On the other hand, as found in the study by Morandini et al. (2015), both descriptiveness and naturalness beliefs can also indirectly predict (via lower identity uncertainty) lower internalized homonegativity among gay men.

In this work, social identity theory (Tajfel & Turner, 1986) was employed as framework for the proposition that beliefs like the discreteness one can lead to sexual prejudice attitudes, as they can be involved in processes of distinctiveness, categorization and prejudice between groups. However, future studies should investigate the possible positive indirect implications that essentialist beliefs like the discreteness one can have among sexual minority groups. Further, studies should also employ other frameworks to explain these possible alternative effects of essentialist beliefs. For example, indirect effects as those found in the study by Morandini et al. (2015) can be better explained based on references such as the optimal distinctiveness theory (Brewer, 2011). According to the optimal distinctiveness theory, human beings have both the need to belong to groups and feel included, and the need to feel distinct; these needs work in opposition to each other and they depend on the situation, so a balance is sought between both needs (Brewer, 2011). Therefore, it is possible that positive implications of the discreteness belief for attitudes towards one's own sexuality among people from sexual minorities (e.g., perception of internalized stigma; internalized homonegativity) depend on the levels of the need to feel included and to feel distinct as an individual or a more specific group. Anyway, it seems that these positive indirect implications of essentialist beliefs like discreteness

may be much more context- and group-dependent. Unlike their direct negative implications, which seem to be more consistent and independent.

Regardless of the other ways in which implications of psychological essentialism on attitudes towards and among sexual minorities can be investigated, findings from this work may have important theoretical and practical implications. These findings may have implications for the theoretical explanations proposed in academia and science, since they help to expand knowledge about conceptions about sexual orientation (mainly conceptions about its biological basis) and their relationship with attitudes related to sexual prejudice. This work may also have important practical implications, since its findings and propositions can help to define interventional actions that seek to reduce sexual prejudice by taking into account people's conceptions about aspects of sexuality, such as sexual orientation. This applies mainly to actions that focus on beliefs about the biological basis of sexual orientation.

Some directions are suggested for reducing sexual prejudice based on the main conclusions of this work. That is, based on its findings about attitudes of sexual prejudice being differently influenced by people's conceptions about sexual orientation; or at least that these phenomena/processes happen together and are interconnected. A first suggestion concerns the use and appreciation of the more comprehensive theories about sexual orientation conceptualizations. One example of a theoretical-scientific framework that may bring benefits is the Sexual Configurations Theory (SCT; van Anders, 2015). This is because the SCT offers a broad foundation for positioning categories related to sexual orientation and its groups as dynamic, heterogeneous and constructed (van Anders, 2015) and therefore goes against essentialist thinking. Another suggestion is to consider the contributions of different theoretical perspectives that dialog with each other, since different theories should not be seen as mutually exclusive. In this sense, specific theories, such as biological theories, for example, do not necessarily have to be seen as sufficient to explain the basis of all sexual orientations on their

own, as noted by LeVay (2011, 2016). Nonetheless, this involves the constant exercise of analyzing, understanding and criticizing theories, their propositions, the evidence that supports them and their limitations. All this in itself also goes against essentialist perspectives.

Promoting changes in the way knowledge about conceptions of sexual orientation is constructed and disseminated among people in general could also be an important strategy for reducing sexual prejudice. So, in addition to being careful with the “born this way” narrative (not ignoring its positive effects in some contexts; e.g., Jang & Lee, 2014), boosting other messages may also have positive impacts. Focusing on the reduction of the discreteness essentialist beliefs (and homogeneity and informativeness ones, which tend to go hand in hand with the discreteness) seems to be crucial for interventions in this regard. Taking as inspiration the promotion of the “born this way” narrative through the song also named “Born this way” (Gaga, 2011), the promotion of alternative anti-essentialist messages in popular culture could have equally (or even more) positive effects. In the Brazilian context, an example of artistic production that can be used for this purpose is the song initially performed by Pepeu Gomes (in Portuguese), “Masculino e feminino” [Masculine and feminine] (Gomes, 1983). The following excerpt illustrates the anti-essentialist content of its lyrics:

Ser um homem feminino [Being a feminine man]
 Não fere o meu lado masculino [Doesn't hurt my masculine side]
 Se Deus é menina e menino [If God is a girl and a boy]
 Sou Masculino e Feminino [I'm masculine and feminine]
 Olhei tudo que aprendi [I looked at everything I learned]
 E um belo dia eu vi [And one beautiful day I saw]
 Que ser um homem feminino [That being a feminine man]
 Não fere o meu lado masculino [Doesn't hurt my masculine side]
 Se Deus é menina e menino [If God is a girl and a boy]

Sou Masculino e Feminino. [I am masculine and feminine.]

This song “Masculino e feminino [Masculine and feminine]” convey anti-essentialist messages about the possibility of overlapping gender categories and expressions. It also conveys messages that the conceptions of one's gender can be influenced by experiences throughout the life history (it is not exclusively innate and immutable). This is a song released early in the 1980s, in a context that was specific to the movements for gender rights and, more precisely, criticism of the logics of gender binarity and exclusivity. Interestingly, on the other hand, this type of artistic production (music) was already addressing issues around the naturalness of sexual orientation in other contexts early as well. For example, in the mid-1970s, a first version of the song “I was born this way” (Valentino/Harris, 1975) was already being released in English by Valentino (Charles Harris) and becoming a hit as a “pro-gay anthem”.

So, it can be said that for at least 50 years the “born this way” narrative has been pushed through music in an attempt to contribute to the promotion of rights and positive attitudes towards sexual minorities (e.g. Gaga, 2011; Valentino, 1975). On the other hand, this kind of production with messages criticizing essentialist conceptions regarding the discreteness of sexual orientation, as in the song “Masculino e feminino” (Masculine and feminine) (Gomes, 1983) regarding gender, seems to be scarcer. What is proposed, then, is that messages challenging other dimensions of essentialist thinking, especially the discreteness belief, should also be disseminated more widely, including within the popular culture. This is because, as found in this work, the belief in naturalness (which can be reinforced by the “born this way” narrative) can also predict other essentialist beliefs (or is endorsed along with such other beliefs), which results in higher attitudes related to sexual prejudice.

Similarly, as conceptions about sexual orientation can be influenced by academic-scientific institutions (e.g., Fry et al., 2020; Hegarty, 2010), the knowledge shared in (or by) academic and scientific institutions should also be taken into account to reduce essentialist

thinking and sexual prejudice. Hegarty's (2010) study, for example, shows that teaching about LGBT psychology in the context of undergraduate courses reduces sexual prejudice when the focus is on other conceptions of sexual orientation rather than biological theories. In this study, the author found that in his intervention in the academic-scientific context, the reduction of sexual prejudice was attributed to the reduction of other essentialist beliefs, such as that sexual orientation categories have clear barriers and defining features. While changes in the belief in the biological basis of sexual orientation did not seem to be related to changes in sexual prejudice itself (Hegarty, 2010). Additionally, there is evidence suggesting that reading texts reporting research findings with evidence about different conceptions of sexual orientation also influences people's conceptions about the subject (Fry et al., 2020). Furthermore, reducing multiple essentialist beliefs together seems to have potential to reduce sexual prejudice among individuals in the general population, whereas increasing the naturalness belief alone fails to have any potential effect in this direction (Fry et al., 2020).

As studies (e.g., Fry et al., 2020; Hegarty, 2010) suggest that it is the reduction of essentialist thinking in all its dimensions simultaneously (and not necessarily increasing the naturalness belief) that ultimately has potential to reduce sexual prejudice. Therefore, in the context of knowledge shared in (or by) academic and scientific institutions, interventions should take place in order to address all dimensions of essentialist thinking about sexual orientation. Since perspectives such as biological dynamism, biological expansiveness/emergence, and biological contextualism are alternatives to the biologism, which also reflects essentialist conceptions about human sexuality (van Anders, 2024). Embracing the biological dynamism, biological expansiveness/emergence, and biological contextualism perspectives can also work as anti-essentialist alternatives to essentialist thinking about sexual orientation in this context of production and sharing academic-scientific knowledge.

Interventions focusing on the various dimensions of psychological essentialism, mainly the dimension of discreteness, may have particularly important impacts in contexts where indicators related to sexual prejudice are higher, such as in Brazil (Conselho Nacional de Justiça, 2022; International Lesbian, Gay, Bisexual, Trans and Intersex Association - ILGA World, 2020), and demand urgent action for change. This is because in the investigation carried out in this work, specifically in the Brazilian context, most of the models tested explained a relatively large proportion of the variance in the attitudes towards sexual diversity and attitudes related to sexual prejudice. And even when considering the effects of various covariates in the models, essentialist beliefs remained with significant effects. Therefore, interventions on essentialist conceptions and beliefs about sexual orientation have the potential to impact on those different indicators related to sexual prejudice. This should be especially true for interventions to reduce the belief of discreteness, which was directly and consistently (and more strongly) associated with all attitudes investigated in this work.

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APPENDICES

Appendix A - Free and Informed Consent Form

(1st Data Collection - April 2022)



UNIVERSIDADE FEDERAL DE SERGIPE
PROGRAMA DE PÓS-GRADUAÇÃO EM PSICOLOGIA

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

Você está sendo convidado(a) a participar, como voluntário(a), de uma pesquisa sobre características da orientação sexual e questões sobre diversidade sexual. Caso você concorde em participar, favor indicar ao final deste documento. Sua participação não é obrigatória, a qualquer momento você poderá desistir e retirar seu consentimento e sua recusa não trará nenhum prejuízo em sua relação com os pesquisadores ou com a instituição a qual estes são vinculados. Neste termo consta o endereço de e-mail dos pesquisadores responsáveis, os quais poderão esclarecer dúvidas sobre a pesquisa e sua participação.

TÍTULO DA PESQUISA: Concepções acerca da orientação sexual e sua relação com crenças e atitudes sobre diversidade sexual.

PESQUISADOR(A) RESPONSÁVEL/INSTITUIÇÃO PROPONENTE: Esta pesquisa está sendo conduzida pelo Me. Jean Jesus Santos, no âmbito do seu doutorado, que está sendo supervisionado pelo seu orientador, o Prof. Dr. Elder Cerqueira-Santos, ambos vinculados ao Programa de Pós-graduação em Psicologia da Universidade Federal de Sergipe.

PATROCINADOR: Esta pesquisa está sendo realizada com recursos dos próprios pesquisadores, sem apoio financeiro de agências de fomento ou outros.

OBJETIVO GERAL: Esta etapa da pesquisa tem como objetivo produzir evidências de validade da versão adaptada de um instrumento para investigar diferentes tipos de crenças acerca da orientação sexual; e explorar a relação dessas com atitudes e crenças sobre diversidade sexual e educação sexual.

PROCEDIMENTOS DO ESTUDO: Ao concordar em participar desta pesquisa você responderá a seguir um questionário com perguntas sobre dados sociodemográficos e escalas com itens sobre orientação sexual, sobre diversidade sexual e sobre educação sexual. Você precisará de cerca de 10 minutos, aproximadamente, para responder as perguntas do questionário e as referidas escalas, sendo que você deverá fazer isso individualmente.

RISCOS E DESCONFORTOS: Os riscos para a participação nesta pesquisa são mínimos e estão relacionados à possibilidade de desconforto ao entrar em contato com conteúdos que podem ser percebidos como incômodos pelo(a) participante. Caso ocorra qualquer situação do tipo você poderá contactar os pesquisadores responsáveis, os quais darão o suporte necessário e poderão fazer o encaminhamento para atendimento em algum serviço psicológico.

BENEFÍCIOS: Como benefício, você terá a oportunidade de refletir sobre as temáticas abordadas e estará colaborando para a produção de conhecimento sobre o tema no Brasil.

CUSTO/REEMBOLSO PARA O PARTICIPANTE: Não há nenhuma forma de compensação financeira por participar desta pesquisa.



Universidade Federal de Sergipe

**UNIVERSIDADE FEDERAL DE SERGIPE
PROGRAMA DE PÓS-GRADUAÇÃO EM PSICOLOGIA**

EXPOSIÇÃO PESSOAL: Sua identidade estará em absoluto sigilo, todos os dados serão codificados, aqueles que possam identificar os participantes serão omitidos e, por se tratar de pesquisa online, o ID do aparelho do computador (ou similar) do respondente não ficará visível ou disponível para os pesquisadores. Nenhuma informação de identificação sobre você será incluída em possíveis publicações resultantes desta pesquisa.

Em caso de dúvidas você poderá entrar em contato com os pesquisadores responsáveis por este projeto, através do e-mail jeanjsantos@academico.ufs.br, ou do telefone (75) 99849-2423, para contato com o Me. Jean Jesus Santos; ou do e-mail eldercerqueira@gmail.com, ou do telefone (79) 99143-6110, para contato com o Prof. Dr. Elder Cerqueira-Santos. Ambos estarão à disposição para esclarecimentos.

Este documento e o projeto da presente pesquisa foram revisados e aprovados pelo Comitê de Ética em Pesquisa envolvendo Seres Humanos da Universidade Federal de Sergipe, localizado no Campus Prof. João Cardoso Nascimento, Rua Cláudio Batista, Palestina, Aracaju/SE, 49060-676, telefone para contato +55 79 2105-1700.

Caso concorde em participar, você poderá imprimir uma cópia deste Termo de Consentimento Livre e Esclarecido. Recomendamos que guarde em seus arquivos uma via deste documento.

Ao clicar no botão abaixo, o(a) senhor(a) concorda em participar da pesquisa nos termos deste TCLE. Caso não concorde em participar, apenas feche essa página no seu navegador.

() Declaro que concordo em participar da pesquisa.

Assinatura do pesquisador responsável:

Jean Jesus Santos

Appendix B - Sociodemographic Questionnaire**(1st Data Collection - April 2022)**

1 - Quantos anos você tem?

[Caixa suspensa com opções de respostas: idades a partir de 18 anos]

2 - Você mora em qual Estado do Brasil?

[Caixa suspensa com opções de respostas: todas as unidades federativas brasileiras]

3 - Você reside em:

() Zona Urbana - Capital ou Município de grande porte (acima de 100 mil habitantes)

() Zona Urbana - Município de médio porte (entre 50 mil e 100 mil habitantes)

() Zona Urbana - Município de pequeno porte (até 50 mil habitantes)

() Zona Rural

4 - Qual foi o sexo que lhe foi atribuído ao nascer?

() Feminino

() Masculino

() Intersexo

5 - Como você se declara quanto ao seu gênero?

() Mulher

() Homem

() Mulher Trans

() Homem Trans

() Não-binário

() Travesti

() Queer

() Outro _____

6 - Qual a sua orientação sexual?

- Heterossexual - sinto atração somente pelo sexo oposto
- Homossexual
- Bissexual
- Pansexual
- Assexual
- Queer
- Outra_____

7 - Em relação a sua identificação étnico-racial, você se autodeclara uma pessoa:

- Preta
- Parda
- Branca
- Indígena
- Amarela - de origem oriental
- Outra_____

8 - Qual a sua religião?

- Católica
- Evangélica
- Protestante
- Espírita
- Candomblé
- Umbanda
- Outra de matriz africana
- Sem religião, mas acredito em Deus
- Sem religião e não acredito em Deus
- Outra_____

9 - Com que frequência você se dedica a práticas religiosas, como cultos, missas ou outras atividades da sua religião?

- Nunca
- Raramente
- Ocasionalmente
- Frequentemente
- Sempre

10 - Quão importantes são para você as suas crenças religiosas/espirituais?

- Nada importantes
- Pouco importantes
- Algo importante
- Muito importantes
- Extremamente importantes

11 - O quanto seus pressupostos religiosos/espirituais influenciam suas decisões?

- Não influenciam
- Influenciam um pouco
- Influenciam moderadamente
- Influenciam fortemente
- Influenciam muito

12 - Qual o seu nível de escolaridade?

- Ensino Fundamental incompleto
- Ensino Fundamental completo
- Ensino Médio incompleto
- Ensino Médio completo
- Ensino Superior incompleto

Ensino Superior completo

Mestrado concluído

Doutorado concluído

Outro_____

13 - Qual a sua área de formação? (Informe qual a área do seu curso de graduação e/ou mestrado e doutorado, caso tenha feito)

[Espaço para escrever resposta em forma de texto]

14 - Você se identifica mais com ideias de qual orientação política?

Extrema-esquerda

Esquerda

Centro-esquerda

Centro

Centro-direita

Direita

Extrema-direita

Não tenho um posicionamento político definido

15 - Qual o seu nível de proximidade com pessoas LGBTQ+? (Caso você seja LGBTQ+, considere o seu nível de proximidade com outras pessoas LGBTQ+)

Conheço pessoas LGBTQ+ e tenho algumas como amigos(as) e próximas a mim

Conheço pessoas LGBTQ+, mas não tenho nenhuma como amigo(a) ou próximo(a) a mim

Não conheço pessoas LGBTQ+, nem tenho nenhuma como amigo(a) ou próximo(a) a mim

16 - Qual a sua renda mensal? (Digite o valor da sua renda mensal individual aproximada)

[Espaço para escrever resposta em forma de texto]

17 - Qual o seu estado de relacionamento atual?

Solteiro/a

Casado/a

Em união estável

Namorando - em um relacionamento sério com alguém

18 - Você tem filhos/as?

Sim

Não

19 - Seus filhos/as são:

Somente crianças ou adolescentes de até 18 anos

Somente adultos/as maiores de 18 anos

Menores de 18 anos e maiores de 18 anos

Não tenho filhos/as

20 - Como você se identifica quanto a sua orientação sexual?

Sou heterossexual - sinto atração somente pelo sexo oposto

Sou gay, lésbica ou bissexual

Outra orientação sexual

Appendix C - Free and Informed Consent Form

(2nd Data Collection - July to August 2022)



Universidade Federal de Sergipe

UNIVERSIDADE FEDERAL DE SERGIPE PROGRAMA DE PÓS-GRADUAÇÃO EM PSICOLOGIA

TERMO DE CONSENTIMENTO LIVRE E ESCLARECIDO

Você está sendo convidado(a) a participar, como voluntário(a), de uma pesquisa sobre características da orientação sexual e questões sobre diversidade sexual. Caso você concorde em participar, favor indicar ao final deste documento. Sua participação não é obrigatória, a qualquer momento você poderá desistir e retirar seu consentimento e sua recusa não trará nenhum prejuízo em sua relação com os pesquisadores ou com a instituição a qual estes são vinculados. Neste termo consta o endereço de e-mail dos pesquisadores responsáveis, os quais poderão esclarecer dúvidas sobre a pesquisa e sua participação.

TÍTULO DA PESQUISA: Concepções acerca da orientação sexual e sua relação com crenças e atitudes sobre diversidade sexual.

PESQUISADOR(A) RESPONSÁVEL/INSTITUIÇÃO PROPONENTE: Esta pesquisa está sendo conduzida pelo Me. Jean Jesus Santos, no âmbito do seu doutorado, que está sendo supervisionado pelo seu orientador, o Prof. Dr. Elder Cerqueira-Santos, ambos vinculados ao Programa de Pós-graduação em Psicologia da Universidade Federal de Sergipe.

PATROCINADOR: Esta pesquisa está sendo realizada com recursos dos próprios pesquisadores, apoio financeiro de agências de fomento ou outros.

OBJETIVO GERAL: Esta etapa da pesquisa tem como objetivo produzir as evidências de validade da versão adaptada de instrumentos para investigar diferentes tipos de crenças acerca da orientação sexual e do ajustamento de crianças em famílias com pais ou mães do mesmo sexo; e explorar a relação dessas com atitudes e crenças sobre diversidade sexual.

PROCEDIMENTOS DO ESTUDO: Ao concordar em participar desta pesquisa você responderá a seguir um questionário com perguntas sobre dados socioidentitários e escalas com itens sobre orientação sexual, diversidade e ajustamento de crianças em famílias com pais e mães do mesmo sexo. Você precisará de cerca de 15 minutos, aproximadamente, para responder as perguntas do questionário e as referidas escalas, sendo que você deverá fazer isso individualmente.

RISCOS E DESCONFORTOS: Os riscos para a participação nesta pesquisa são mínimos e estão relacionados à possibilidade de desconforto ao entrar em contato com conteúdos que podem ser percebidos como incômodos pelo(a) participante. Caso ocorra qualquer situação do tipo você poderá contactar os pesquisadores responsáveis, os quais darão o suporte necessário e poderão fazer o encaminhamento para atendimento em algum serviço psicológico.

BENEFÍCIOS: Como benefício, você terá a oportunidade de refletir sobre as temáticas abordadas e estará colaborando para a produção de conhecimento sobre o tema no Brasil.

CUSTO/REEMBOLSO PARA O PARTICIPANTE: Não há nenhuma forma de compensação financeira por participar desta pesquisa.

Cidade Universitária Professor José Aloísio de Campos, Av. Marechal Rondon, s/n - Jardim Rosa Elze, 49100-000, São Cristóvão, Sergipe, Brasil.



UNIVERSIDADE FEDERAL DE SERGIPE
PROGRAMA DE PÓS-GRADUAÇÃO EM PSICOLOGIA

EXPOSIÇÃO PESSOAL: Sua identidade estará em absoluto sigilo, todos os dados serão codificados, aqueles que possam identificar os participantes serão omitidos e por se tratar de pesquisa online, o ID do aparelho do computador (ou similar) do respondente não ficará visível ou disponível para os pesquisadores. Nenhuma informação de identificação sobre você será incluída em possíveis publicações resultantes desta pesquisa.

Em caso de dúvidas você poderá entrar em contato com os pesquisadores responsáveis por este projeto, através do e-mail jeanjsantos@academico.ufs.br, ou do telefone (75) 99849-2423, para contato como o Me. Jean Jesus Santos; ou do e-mail elderquerqueira@gmail.com, ou do telefone (79) 99143-6110, para contato como o Prof. Dr. Elder Cerqueira-Santos. Ambos estarão à disposição para esclarecimentos.

Este documento e o projeto da presente pesquisa foram revisados e aprovados pelo Comitê de Ética em Pesquisa envolvendo Seres Humanos da Universidade Federal de Sergipe, localizado no Campus Prof. João Cardoso Nascimento, Rua Cláudio Batista, Palestina, Aracaju/SE, 49060-676, telefone para contato +55 79 2105-1700.

Caso concorde em participar, você poderá imprimir uma cópia deste Termo de Consentimento Livre e Esclarecido na seguinte página: (<https://drive.google.com/file/d/1XfJmqUKFN1Vlv2-RjpcBXZwh-ePv9Kcg/view?usp=sharing>). Recomendamos que guarde em seus arquivos uma via deste documento.

Ao clicar no botão abaixo, o(a) Senhor(a) concorda em participar da pesquisa nos termos deste TCLE. Caso não concorde em participar, apenas feche essa página no seu navegador.

() Declaro que concordo em participar da pesquisa.

Assinatura do pesquisador responsável:

Jean Jesus Santos

Appendix D - Sociodemographic Questionnaire**(2nd Data Collection - July to August 2022)**

1 - Quantos anos você tem?

[Caixa suspensa com opções de respostas: idades a partir de 18 anos]

2 - Você mora em qual Estado do Brasil?

[Caixa suspensa com opções de respostas: todas as unidades federativas brasileiras]

3 - Você reside em:

() Zona Urbana - Capital ou Município de grande porte (acima de 100 mil habitantes)

() Zona Urbana - Município de médio porte (entre 50 mil e 100 mil habitantes)

() Zona Urbana - Município de pequeno porte (até 50 mil habitantes)

() Zona Rural

4 - Qual foi o sexo que lhe foi atribuído ao nascer?

() Feminino

() Masculino

() Intersexo

5 - Como você se declara quanto ao seu gênero?

() Mulher

() Homem

() Mulher Trans

() Homem Trans

() Não-binário

() Travesti

() Queer

() Outro _____

6 - Qual a sua orientação sexual?

- Heterossexual - sinto atração somente pelo sexo oposto
- Homossexual
- Bissexual
- Pansexual
- Assexual
- Queer
- Outra_____

7 - Em relação a sua identificação étnico-racial, você se autodeclara uma pessoa:

- Preta
- Parda
- Branca
- Indígena
- Amarela - de origem oriental
- Outra_____

8 - Qual a sua religião?

- Católica
- Evangélica
- Protestante
- Espírita
- Candomblé
- Umbanda
- Outra de matriz africana
- Sem religião, mas acredito em Deus
- Sem religião e não acredito em Deus
- Outra_____

9 - Com que frequência você se dedica a práticas religiosas, como cultos, missas ou outras atividades da sua religião?

- Nunca
- Raramente
- Ocasionalmente
- Frequentemente
- Sempre

10 - Quão importantes são para você as suas crenças religiosas/espirituais?

- Nada importantes
- Pouco importantes
- Algo importante
- Muito importantes
- Extremamente importantes

11 - O quanto seus pressupostos religiosos/espirituais influenciam suas decisões?

- Não influenciam
- Influenciam um pouco
- Influenciam moderadamente
- Influenciam fortemente
- Influenciam muito

12 - Qual o seu nível de escolaridade?

- Ensino Fundamental incompleto
- Ensino Fundamental completo
- Ensino Médio incompleto
- Ensino Médio completo
- Ensino Superior incompleto

Ensino Superior completo

Mestrado concluído

Doutorado concluído

Outro_____

13 - Qual a sua área de formação? (Informe qual a área do curso de graduação, mestrado e/ou doutorado que você fez e se dedica na sua carreira)

Engenharias

Ciências Exatas e da Terra

Ciências Agrárias

Ciências da Saúde

Ciências Biológicas

Ciências Sociais Aplicadas

Ciências Humanas

Linguística, Letras e Artes

Não fiz curso de graduação

Outra_____

14 - Você se identifica mais com ideias de qual orientação política?

Extrema-esquerda

Esquerda

Centro-esquerda

Centro

Centro-direita

Direita

Extrema-direita

Não tenho um posicionamento político definido

15 - Qual o seu nível de proximidade com pessoas LGBT+? (Caso você seja LGBT+, considere o seu nível de proximidade com outras pessoas LGBT+)

- Conheço pessoas LGBT+ e tenho algumas como amigos(as) e próximas a mim
- Conheço pessoas LGBT+, mas não tenho nenhuma como amigo(a) ou próximo(a) a mim
- Não conheço pessoas LGBT+, nem tenho nenhuma como amigo(a) ou próximo(a) a mim

16 - Qual a sua renda mensal? (Digite o valor da sua renda mensal individual aproximada)

[Espaço para escrever resposta em forma de texto]

17 - Qual o seu estado de relacionamento atual?

- Solteiro/a
- Casado/a
- Em união estável

Namorando - em um relacionamento sério com alguém

18 - Você tem filhos/as?

- Sim
- Não

19 - Seus filhos/as são:

- Somente crianças ou adolescentes de até 18 anos
- Somente adultos/as maiores de 18 anos
- Menores de 18 anos e maiores de 18 anos
- Não tenho filhos/as

ANNEXES

Annex 1 - Sexual Orientation Beliefs Scale (SOBS)

(1st Data Collection - April 2022/ 2nd Data Collection - July to August 2022)

Sexual Orientation Beliefs Scale

1 - Sexual orientation is a category with distinct boundaries: A person is either gay/lesbian or heterosexual.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

2 - People who identify as bisexual are confused about their true sexual orientation.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

3 - Sexual orientation is a category with clear boundaries: A person is either gay/lesbian, bisexual, or heterosexual.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

4 - It is possible to be “partially” or “somewhat” gay or straight.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

5 - A person has only one true sexual orientation.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

6 - People may reasonably identify as two sexual orientations at the same time.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

7 - People who share the same sexual orientation pursue common goals.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

8 - People with the same sexual orientation share a common fate.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

9 - Individuals with the same sexual orientation seem to be connected to one another by some invisible link.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

10 - People who have the same sexual orientation are very similar to one another.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

11 - There are more similarities than differences among people who have the same sexual orientation.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

24 - Sexual orientation is an important characteristic of people.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

25 - Knowing a person's sexual orientation tells you a lot about them.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

26 - It's useful to group people according to their sexual orientation.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

27 - A person's sexual orientation is an important attribute.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

28 - It is possible to know about many aspects of a person once you know her or his sexual orientation.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

29 - If you don't know a person's sexual orientation, you can't really say that you know that person.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

30 - It is usually possible to know a person's sexual orientation without being told.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

31 - Most people view their sexual orientation as important to them.

1 - () Strongly disagree 2 - () Disagree 3 - () Neither agree nor disagree
4 - () Agree 5 - () Strongly agree

Annex 2 - Scale of Attitudes towards Homosexuality

(1st Data Collection - April 2022/ 2nd Data Collection - July to August 2022)

Escala de Atitudes frente à Homossexualidade

Abaixo há uma série de frases sobre homossexuais e o que você pode pensar sobre eles. Por favor, indique o quanto você concorda ou discorda, usando a escala abaixo. Não há respostas corretas ou erradas.

1 - Existem muitos grupos de homossexuais que pressionam os políticos para conseguir mais direitos e isso pode fazer com que os direitos dos heterossexuais sejam fragilizados.

1 - () Discordo fortemente 2 - () Discordo 3 - () Discordo em parte 4 - () Não concordo nem discordo
5 - () Concordo em parte 6 - () Concordo 7 - () Concordo fortemente

2 - Não acredito que os homossexuais necessitem de medidas ou leis direcionadas para seu grupo.

1 - () Discordo fortemente 2 - () Discordo 3 - () Discordo em parte 4 - () Não concordo nem discordo
5 - () Concordo em parte 6 - () Concordo 7 - () Concordo fortemente

3 - Se eu tivesse um filho/filha eu não me importaria que ele/ela tivesse relações íntimas com alguém do mesmo gênero.

1 - () Discordo fortemente 2 - () Discordo 3 - () Discordo em parte 4 - () Não concordo nem discordo
5 - () Concordo em parte 6 - () Concordo 7 - () Concordo fortemente

4 - Se fosse o caso, eu não veria problema em sentir desejo de ter relações sexuais com alguém do mesmo gênero que eu.

1 - () Discordo fortemente 2 - () Discordo 3 - () Discordo em parte 4 - () Não concordo nem discordo
5 - () Concordo em parte 6 - () Concordo 7 - () Concordo fortemente

5 - Se acontecesse, não me importaria que alguém homossexual tivesse relações íntimas com alguém da minha família.

1 - () Discordo fortemente 2 - () Discordo 3 - () Discordo em parte 4 - () Não concordo nem discordo
5 - () Concordo em parte 6 - () Concordo 7 - () Concordo fortemente

6 - Do mesmo modo que os imigrantes adotam os costumes dos países em que chegam, creio que os homossexuais poderiam fazer o mesmo e serem mais discretos.

1 - () Discordo fortemente 2 - () Discordo 3 - () Discordo em parte 4 - () Não concordo nem discordo
5 - () Concordo em parte 6 - () Concordo 7 - () Concordo fortemente

7 - Se os homossexuais realmente se esforçassem em integrar-se à sociedade, não precisariam fazer tantas manifestações nem se esconder.

1 - () Discordo fortemente 2 - () Discordo 3 - () Discordo em parte 4 - () Não concordo nem discordo
5 - () Concordo em parte 6 - () Concordo 7 - () Concordo fortemente

11 - A homossexualidade é moralmente aceitável.

1 - () Discordo totalmente

2 - () Discordo

3 - () Concordo

4 - () Concordo totalmente

12 - Não me preocupa que descubram que sou gay/lésbica/bissexual.

1 - () Discordo totalmente

2 - () Discordo

3 - () Concordo

4 - () Concordo totalmente

13 - Mulheres lésbicas obviamente masculinas fazem-me sentir desconfortável.

1 - () Discordo totalmente

2 - () Discordo

3 - () Concordo

4 - () Concordo totalmente

14 - Mesmo que pudesse mudar a minha orientação sexual, não mudaria.

1 - () Discordo totalmente

2 - () Discordo

3 - () Concordo

4 - () Concordo totalmente

15 - A homossexualidade é tão natural quanto a heterossexualidade.

1 - () Discordo totalmente

2 - () Discordo

3 - () Concordo

4 - () Concordo totalmente

