Psychology of Sexual Orientation and Gender Diversity

Sexual Satisfaction Across Cultures, Genders, Languages, and Sexual Orientations: Validation of the Global Measure of Sexual Satisfaction

Marie-Michèle Paquette, Sophie Bergeron, Noémie Bigras, Mónika Koós, Léna Nagy, Shane W. Kraus, Zsolt Demetrovics, Marc N. Potenza, Rafael Ballester-Arnal, Dominik Batthyány, Joël Billieux, Peer Briken, Julius Burkauskas, Georgina Cárdenas-López, Joana Carvalho, Jesús Castro-Calvo, Lijun Chen, Giacomo Ciocca, Ornella Corazza, Rita I. Csako, David P. Fernandez, Elaine F. Fernandez, Hironobu Fujiwara, Johannes Fuss, Roman Gabrhelík, Ateret Gewirtz-Meydan, Biljana Gjoneska, Mateusz Gola, Joshua B. Grubbs, Hashim T. Hashim, Md. Saiful Islam, Mustafa Ismail, Martha C. Jiménez-Martínez, Tanja Jurin, Ondrej Kalina, Verena Klein, András Költő, Sang-Kyu Lee, Karol Lewczuk, Chung-Ying Lin, Christine Lochner, Silvia López-Alvarado, Kateřina Lukavská, Percy Mayta-Tristán, Dan J. Miller, Oľga Orosová, Gábor Orosz, Hyein Chang, Kyeongwoo Park, Fernando P. Ponce, Gonzalo R. Quintana, Gabriel C. Quintero Garzola, Jano Ramos-Diaz, Kévin Rigaud, Ann Rousseau, Marco De Tubino Scanavino, Marion K. Schulmeyer, Pratap Sharan, Mami Shibata, Sheikh Shoib, Vera Sigre-Leirós, Luke Sniewski, Ognen Spasovski, Vesta Steibliene, Dan J. Stein, Carol Strong, Berk C. Ünsal, Marie-Pier Vaillancourt-Morel, Marie Claire Van Hout, and Beáta Bőthe

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Sexual satisfaction can be important for overall well-being and has been described as a sexual right. Individual and cultural factors, such as gender identity and sexual orientation, may influence the ways in which individuals describe, share, or experience their sexuality. The aims of the present study were to examine the factor structure of the five-item Global Measure of Sexual Satisfaction (GMSEX) in a large sample of adults in relationships, to conduct measurement invariance tests to examine whether the GMSEX functions similarly across language-, country-, gender- and sexual orientation-based subgroups, and to evaluate its validity with sexuality and relationship-related outcomes. Results of a confirmatory analysis among 51,778 participants from 42 different countries across five continents ($M_{age} = 32.39$ years, $SD = 12.52$, 56.9% cisgender women) corroborated the proposed one-dimensional factor structure of the scale. Measurement invariance tests also indicated that the scale was fully invariant across gender- and sexual orientation-based subgroups, and partially invariant across language- and country-based subgroups. The GMSEX correlated negatively with masturbation frequency and relationship length and positively with the frequency of sexual activity. Our findings support the validity of the GMSEX as a short and reliable scale to measure sexual satisfaction across diverse samples.

Public Significance Statement
The Global Measure of Sexual Satisfaction is a valid and reliable measure in diverse cultural-, gender-, and sexual orientation-based groups. Findings suggest no significant differences across language-, country-, gender-, and sexual orientation-based subgroups' sexual satisfaction. Results provide crucial information on sexual satisfaction among individuals in romantic relationships. The Global Measure of Sexual Satisfaction appears to be an appropriate assessment tool for sex and couple therapists working in clinical settings.

Keywords: sexual satisfaction, Global Measure of Sexual Satisfaction, gender and sexual diversity, validation cross-cultural

Sexual satisfaction is an important dimension of human sexuality and is regarded as a sexual right by the World Health Organization (2010). For individuals who engage in sexual activity, sexual satisfaction is associated with various individual, interpersonal, social, and cultural factors, such as gender and sexual orientation, which may influence how people describe, share, or experience this aspect of their sexuality (Calvillo et al., 2018; Del Mar Sánchez-Fuentes et al., 2014). The Global Measure of Sexual Satisfaction (GMSEX) is a well-validated, widely used measure of sexual satisfaction among adults (e.g., Santos-Iglesias & Byers, 2021). However, the GMSEX has not yet been psychometrically validated across culturally diverse samples nor among sexual and gender minority individuals. Therefore, the aims of the present study were: (a) to examine the factor structure of the GMSEX (Lawrance & Byers, 1992) in a large, diverse sample of adults in a relationship spanning 42 countries and 26 languages; (b) to test whether the GMSEX functions the same way in language-, country-, gender- and sexual orientation-based subgroups; and (c) to evaluate its validity with sexual and relationship-related outcomes.

Assessment of Sexual Satisfaction

The Interpersonal Exchange Model of Sexual Satisfaction (Lawrance & Byers, 1992) offers a conceptual framework to explain the mechanisms leading to higher sexual satisfaction, which can be defined as the subjective assessment of the positive and negative elements related to one's sexual life (Lawrance & Byers, 1995). The GMSEX is based on the Interpersonal Exchange Model of Sexual Satisfaction and was initially developed to assess individuals' global evaluations of their sexual life. The scale, which consists of five items, uses a semantic differential approach (i.e., very bad/very good; very unpleasant/very pleasant; very negative/very positive; very unsatisfying/very satisfying; and worthless/very valuable). This approach involves presenting pairs of opposite adjectives at either end of a series of items (Albert & Tullis, 2023).

The GMSEX showed a unidimensional factor structure, as assessed by confirmatory factor analyses (CFA; e.g., Bigras et al., 2023; Mark et al., 2014). Moreover, several studies investigating the GMSEX have shown that the scale has adequate internal consistency ($\alpha = .90$–$.98$; e.g., Bigras et al., 2023; Calvillo et al., 2020; Del Mar Sánchez-Fuentes et al., 2015; Lawrance & Byers, 1992, 1995; Mark et al., 2014; Renaud et al., 1997; Santos-Iglesias & Byers, 2021). A study comparing three scales and a single-item measure of sexual satisfaction in adults showed that the GMSEX was the most psychometrically robust measure of sexual satisfaction (Mark et al., 2014). Sexual satisfaction was positively associated with body appreciation, psychological well-being, relationship satisfaction and longevity, sexual behaviors, and sexual function (Byers, 2005; Del Mar Sánchez-Fuentes et al., 2014, 2015; Grower & Ward, 2018; Renaud et al., 1997).

The GMSEX has been validated among adolescents and adults from various populations and countries. For example, it has been evaluated using several samples including sexually active Canadian adolescents (Bigras et al., 2023), Canadian college men and women in dating relationships (Byers et al., 1998), Canadians in long-term relationships (Lawrance & Byers, 1995), married individuals living in China (Renaud et al., 1997), Spanish adults with a same-sex/-gender partner (Calvillo et al., 2020), and in mixed-sex relationships (Del Mar Sánchez-Fuentes & Sierra, 2015), as well as Canadian and American older adults aged 65–75 (Santos-Iglesias & Byers, 2021). However, the GMSEX's psychometric properties have not been examined in large samples of adults including those from diverse cultures and sexual and gender minority groups.

Sexual Satisfaction and Culture-, Gender-, and Sexual Orientation-Related Differences

Sexual satisfaction is influenced by multiple factors, including culture, gender, and sexual orientation, among others (e.g., Björkenstam et al., 2020; Rausch & Rettenberger, 2021; Rehman et al., 2011). Although several studies have examined cross-cultural differences in sexual satisfaction (e.g., Gremigni et al., 2018; Træen et al., 2019), no study has directly compared the GMSEX between different countries. Furthermore, it is possible to expect cultural differences depending on several factors, such as the level of egalitarianism in each country. For example, gender inequality may be more predominant if people endorse traditional sexual scripts and sexist attitudes that discount the importance of sexual pleasure (Santos-Iglesias et al., 2014). Indeed, sexual script theory suggests that sexual activity is driven by socially constructed rules, which would influence sexual behavior between partners (Simon & Gagnon, 1986). For instance, cultural scripts include the expectations that men are the primary sexual initiators and should always be ready for sexual activity in heterosexual relationships (Gonzalez-Rivas & Peterson, 2020). Conversely, gender inequality may be less dominant in cultures where men and women are similar in their sociosexual orientation, their sexual well-being, and the prevalence of diverse sexual experiences (Laumann et al., 2006; Petersen & Hyde, 2010; Schmitt, 2005; Schwartz & Rubel, 2005), which can result in greater sexual satisfaction.

In terms of gender comparisons in adults, research has yielded mixed results. While some studies have demonstrated that men are

more satisfied sexually than women (e.g., Carpenter et al., 2009; Petersen & Hyde, 2010), other studies have found that women are more satisfied (e.g., Ojanlatva et al., 2003; Rehman et al., 2011). However, most studies have found no gender differences in sexual satisfaction (e.g., Del Mar Sánchez-Fuentes & Sierra, 2015; Mark et al., 2014; Neto, 2012). An explanation for this finding is that men and women may not differ in levels of overall sexual satisfaction. Rather, they may differ in physical aspects of sexual interactions (e.g., frequency of sexual activities or types of sexual behaviors), which in turn could lead men to report increased sexual satisfaction or women to report increased emotional connection (Del Mar Sánchez-Fuentes & Sierra, 2015; Lawrance & Byers, 1995). This is in line with traditional, heteronormative sexual scripts, which position men as sexual initiators and women as the gatekeepers who seek sex to foster emotional intimacy and not necessarily pleasure (Cormier & O'Sullivan, 2018; Gagnon, 1990; Masters et al., 2013; Merwin et al., 2022). It is also possible that there are differences in how individuals approach sexual satisfaction. A mixed methods study, which paired interviews with close-ended measures of sexual satisfaction, revealed that individuals who reported lower levels of sexual satisfaction used a variety of criteria to anchor their satisfaction. For example, women and sexual minority men often reported that they were satisfied just by being with their partner or needed to satisfy their partner in order to feel satisfied themselves (McClelland, 2011). Finally, another potential reason for discrepancies between reported findings may be that measurement invariance tests were not conducted for the psychometric scales used in most studies before examining gender-related differences. Therefore, it is not possible to conclude whether the reported differences derived from true differences between gender-based groups or from measurement biases (Millsap, 2011).

As for gender-diverse individuals, the few studies that have investigated sexual satisfaction have only examined some specific groups and yielded mixed results. For example, in a study involving 480 trans men, trans women, cisgender men, cisgender women, and nonbinary and genderqueer individuals, sexual satisfaction was not significantly different between the nonbinary and genderqueer, binary trans, and cisgender groups (Kennis et al., 2021). In a study involving 173 trans men who self-identified as gay or bisexual or who had sex with men regardless of how they identified (trans gay, bisexual, and/or men who have sex with men), they did not differ from other groups with regard to sexual satisfaction (Bauer et al., 2013). Research concerning sexual scripts in two-spirit, lesbian, gay, bisexual, transgender, queer or questioning and additional sexual orientations and gender identities (2SLGBTQ+) adults has shown that trans and gender-diverse individuals have scripts that reflect patterns previously observed in cisgender adults' sexual scripts (e.g., Ford, 2021; Owen & Fincham, 2011). Indeed, 2SLGBTQ+ individuals may turn to heteronormative scripts or scripts derived from pornography due to a lack of familiarity with 2SLGBTQ+ scripts, especially when their queer sexual experiences are new (Ford, 2021). However, in a study among 279 cisgender women and gender-diverse individuals, participants in same-sex/gender relationships reported higher sexual satisfaction than participants in both mixed-sex/gender and gender-diverse relationships (Dyar et al., 2020). Furthermore, studies have also reported that sexual and/or gender minority individuals may not endorse the heterosexual and cisnormative roles in their sexual scripts (Patterson et al., 2013), and may reimagine new sexual scripts by queering definitions of sex beyond heterosexual intercourse (Tarantino & Wesche, 2024). For example, a queered definition of sex may include the cocreation of pleasure with a partner by seeing sex as an opportunity to learn and engage with the other instead of just following the predetermined heteronormative script (e.g., pleasure during sex should be centered around the cisgender heterosexual man; Tarantino & Wesche, 2024). Sexual and/or gender minority individuals may also engage in more open communication about sexual preferences, desires, and boundaries (de Heer et al., 2021; Gabb, 2022), which in turn, may impact their understanding of sexual satisfaction. For instance, in a qualitative study among 169 transgender and gender-diverse undergraduates, a prevalent theme depicted in sexual scripts was open communication and more specifically, talking about consent, body parts, sexual boundaries, and preferences to sexual partners before and during the sexual experience (Dolezal et al., 2024).

In terms of sexual orientation, few studies have explored sexual satisfaction among sexual minority groups. Some have reported no significant differences across sexual orientations (e.g., Frederick et al., 2021; Holmberg & Blair, 2009; Kuyper & Vanwesenbeeck, 2011), while others have found that sexual minority individuals reported lower sexual satisfaction than their heterosexual peers (Björkenstam et al., 2020; Flynn et al., 2017; Gil, 2007). Various explanations have been offered to explain these mixed results, but some authors suggested that orgasm ability/tendencies and minority stress could have resulted in the observed differences (e.g., Björkenstam et al., 2020; Flynn et al., 2017; Kuyper & Vanwesenbeeck, 2011). Indeed, experiencing distal (i.e., stress that operates outside of an individual such as prejudicial events) and/or proximal (i.e., stress that operates within an individual such as internalized homophobia) stressors during sexual experiences is related to adverse sexual health outcomes (e.g., Grabski et al., 2019). Furthermore, experiencing these stressors during sexual activity may also shape expectancies for a typical sexual encounter, thus influencing sexual scripts (Dolezal et al., 2024). However, previous studies have mostly focused on three sexual orientation groups (i.e., gay and lesbian, bisexual, and heterosexual individuals; Björkenstam et al., 2020; Kuyper & Vanwesenbeeck, 2011), even though differences in sexual satisfaction may also vary between other sexual minority groups (e.g., pansexual, queer, and asexual).

Correlates of Sexual Satisfaction

Sexual satisfaction has been shown to have significant theoretically relevant associations with various sexuality-related variables, such as masturbation, frequency of sexual activity, and relationship length. Masturbation refers to stimulating oneself for sexual pleasure (Bowman, 2017) and has been described as providing complete autonomy and control in terms of the use of erotica or toys, type of manual stimulation, length of the experience as well as a way to meet a basic need for regulating negative physical and emotional feelings (relating to stress, negative mood, etc.; Goldey et al., 2016). Most previous studies have demonstrated that the most common reasons for engaging in masturbation are feelings of sexual desire, seeking sexual pleasure, and reaching sexual satisfaction (Burri & Carvalheira, 2019; Carvalheira & Leal, 2013; Csako et al., 2022; Rowland et al., 2020). However, some studies have also reported a negative relationship between masturbation and sexual satisfaction (e.g., Ayalon et al., 2019; Rowland et al., 2020;

Velten & Margraf, 2017), which could be explained by the sexual script theory (Gagnon & Simon, 2005). This theory suggests that all sexual practices and expressions are scripted and determined by culture, which means that individuals have sexual scripts that may define when and how sexual behaviors are "good" or "bad" (Gagnon & Simon, 2005; Wiederman, 2005). Thus, if sexual behaviors are regulated by traditional, heteronormative, religious, and/or societal norms, this might result in considering masturbation as taboo (Gagnon & Simon, 2005). At the same time, masturbation is a behavior that is commonly surrounded by societal contradictions. For example, it can be both stigmatized and promoted as a healthy sexual behavior (Kaestle & Allen, 2011; Watson & McKee, 2013), which implies that the social script for masturbation may vary across cultures, subcultures, and individuals.

Moreover, sexual satisfaction is closely linked to the frequency of sexual activity (Frederick et al., 2017; Yucel & Gassanov, 2010). Indeed, frequency of sexual activity can directly increase sexual satisfaction, and at the same time, positively impact outcomes such as desire and orgasm achievement through more physically satisfying sexual interactions (Parish et al., 2007). This can also result in more frequent sexual activity and higher sexual satisfaction (Parish et al., 2007). Furthermore, sexual activity, through variability, may increase the importance of sexual satisfaction at older ages and longer relationship durations (Gillespie, 2017).

Finally, sexual satisfaction is strongly connected to relationship characteristics, such as relationship length. Previous studies have presented mixed results concerning the direction of this association, as some studies have reported a negative effect of relationship duration on sexual satisfaction (Schmiedeberg & Schröder, 2016; Yeh et al., 2006) and others have reported a positive association (e.g., Herbenick et al., 2019; Maxwell et al., 2017). With time, individuals may shift priorities about sexuality and put more importance on sexual variety, sexual practices, understanding the sexual preferences of their partner, and communication (Gillespie, 2017; Herbenick et al., 2019; Maxwell et al., 2017), potentially resulting in higher levels of sexual satisfaction. However, with time, a decline in passion and sexual desire may also explain negative effects (Herbenick et al., 2019).

The Current Study

Addressing the discrepancies of previous studies, this study aimed to validate the GMSEX in a large, diverse sample of adults in romantic relationships. First, using confirmatory factor analysis, we examined the scale's factor structure. We expected that the GMSEX items would fit into a unidimensional factor structure, as previous studies have shown that a single-factor model fits the data well (e.g., Bigras et al., 2023; Lawrance & Byers, 1992; Mark et al., 2014). Second, we conducted measurement invariance tests to examine whether the GMSEX functioned similarly across language-, country-, gender- and sexual orientation-based groups. We examined language- and country-based group measurement invariance in an exploratory manner due to a lack of published work in this area. Due to mixed findings in previous studies and a relative lack of literature on the subject (e.g., Björkenstam et al., 2020; Del Mar Sánchez-Fuentes & Sierra, 2015; Frederick et al., 2021; Rehman et al., 2011), we did not formulate hypotheses for gender- and sexual orientation-related differences. Regarding validity, we hypothesized that the GMSEX would be positively correlated with masturbation frequency with a small-to-medium effect size and sexual activity frequency with a medium effect size. As for relationship length, given mixed results in the literature, we did not set any formal hypotheses.

Method

Participants

After data cleaning, 82,243 individuals ($M_{age} = 32.39$ years, $SD = 12.52$) participated (see detailed data cleaning procedure at https://doi.org/10.17605/OSF.IO/DK78R). However, only individuals who indicated being in a relationship responded to the GMSEX. Hence, the sample size for the present study was 51,778 participants. As for relationship status, 27,541 (33.5%) were single, 51,778 (63.0%) were in a romantic relationship, 428 (0.5%) were widowed, and 2,472 (3.0%) were divorced. Among those in a romantic relationship, 20,202 (39.0%) were cisgender men, 29,436 (56.9%) were cisgender women, and 2,051 (4.0%) were gender-diverse individuals, whereas 37,580 (72.6%) were heterosexual and 14,020 (27.4%) were sexually diverse (e.g., bisexual). Most participants ($n = 39,243$, 75.8%) completed tertiary education, worked full-time ($n = 30,723$, 59.3%), and lived in a city (i.e., in a city with a population greater than 100,000) or metropolis (i.e., the chief or capital city of a country, state, or region; $n = 34,303$, 66.3%). Detailed sociodemographic information is presented in Table 1 for the total sample and those in a relationship. More information on participants' sociodemographic characteristics by country can be found at https://osf.io/n3k2c/?view_only=838146f6027c4e6bb68371d9d14220b5.

Procedure

The International Sex Survey (ISS) is a cross-sectional and self-report study in 42 countries[1] (Bőthe et al., 2022; see the preregistered study design at https://osf.io/uyfra/?view_only=6e4f96b748be42d99363d58e32d511b8) that collected data between October 2021 and May 2022. Following a preestablished translation procedure for cross-cultural studies, the survey battery, initially in English, was translated into 25 other languages (Beaton et al., 2000). Indeed, the principal investigator and coinvestigators prepared all materials (e.g., survey, guidelines for collaborators, study advertisement materials) and managed all language versions of the survey. The collaborators from each country were responsible for translating the survey battery from English to the target language following the aforementioned preestablished translation protocol (Beaton et al., 2000), if an official, validated translation was not available, and for pretesting it in the target language. Every term was verified by native-language psychology and sex researchers (e.g., Hungarian researchers translated the Hungarian version of the survey). Thus, every term, for example, related to gender and sexual orientation, was translated and adapted to each language. Also, the translations for all scales and questions in the survey are available on the study's

[1] Egypt, Iran, Pakistan, and Romania were included in the study protocol paper as collaborating countries ((Bőthe, Koós, et al., 2021); however, it was not possible to get ethical approval for the study in a timely manner in these countries. Chile was not included in the study protocol paper as a collaborating country (Bőthe, Koós, et al., 2021), as it joined the study after publishing the study protocol. Therefore, instead of the planned 45 countries (Bőthe, Koós, et al., 2021), only 42 individual countries are considered in the present study; see details at https://osf.io/n3k2c/.

Table 1
Sociodemographic Characteristics

Variable	N_{total} = 81,975–82,243	%	$N_{in\ a\ relationship}$ = 51,600–51,778	%
Country of residence				
Algeria	24	0.03	9	0.00
Australia	639	0.78	399	0.80
Austria	746	0.91	524	1.00
Bangladesh	373	0.45	101	0.20
Belgium	644	0.78	464	0.90
Bolivia	385	0.47	158	0.30
Brazil	3,579	4.35	2,310	4.50
Canada	2,541	3.09	1,687	3.30
Chile	1,173	1.43	482	0.90
China	2,428	2.95	1,226	2.40
Colombia	1,913	2.33	755	1.50
Croatia	2,390	2.91	1,466	2.80
Czech Republic	1,640	1.99	1,089	2.10
Ecuador	276	0.34	100	0.20
France	1,706	2.07	1,129	2.20
Germany	3,271	3.98	2,498	4.80
Gibraltar	64	0.08	43	0.10
Hungary	11,200	14.58	8,454	16.30
India	194	0.24	102	0.20
Iraq	99	0.12	53	0.10
Ireland	1,702	2.07	985	1.90
Israel	1,334	0.66	919	1.80
Italy	2,401	2.92	1,511	2.90
Japan	562	0.68	331	0.60
Lithuania	2,015	2.45	1,448	2.80
Malaysia	1,170	1.42	478	0.90
Mexico	2,137	2.60	984	1.90
New Zealand	2,834	3.45	1,917	3.70
North Macedonia	1,251	1.52	793	1.50
Panama	333	0.40	174	0.30
Peru	2,672	3.25	1,202	2.30
Poland	9,892	12.03	7,372	14.2
Portugal	2,262	2.75	1,327	2.60
Slovakia	1,134	1.38	724	1.40
South Africa	1,849	2.25	1,019	2.00
South Korea	1,464	1.78	786	1.50
Spain	2,327	2.83	1,134	2.20
Switzerland	1,144	1.39	744	1.40
Taiwan	2,668	3.24	1,422	2.70
Turkey	820	1.00	443	0.90
United Kingdom	1,412	1.72	924	1.80
United States	2,398	2.92	1,386	2.70
Other	1,177	1.43	699	1.10
Language				
Arabic	142	0.17	71	0.10
Bangla	332	0.40	89	0.20
Croatian	2,522	3.07	1,558	3.00
Czech	1,583	1.92	1,058	2.00
Dutch	518	0.63	366	0.70
English	13,994	17.02	8,205	15.80
French	3,941	4.79	2,590	5.00
German	3,494	4.25	2,617	5.10
Hebrew	1,315	1.60	909	1.80
Hindi	17	0.02	10	0.00
Hungarian	10,937	13.30	8,388	16.20
Italian	2,437	2.96	1,524	2.90
Japanese	466	0.57	258	0.50
Korean	1,437	1.75	780	1.50
Lithuanian	2,094	2.55	1,506	2.90
Macedonian	1,301	1.58	831	1.60
Mandarin—simplified	2,474	3.01	1,235	2.40
Mandarin—traditional	2,685	3.26	1,428	2.80
Polish	10,343	12.58	7,777	15.00
Portuguese—Brazil	3,650	4.44	2,377	4.60

(*table continues*)

Table 1 (*continued*)

Variable	N_{total} = 81,975–82,243	%	$N_{in\ a\ relationship}$ = 51,600–51,778	%
Portuguese—Portugal	2,277	2.77	1,325	2.60
Slovak	2,118	2.58	1,368	2.60
Spanish—Latin America	8,926	10.85	3,870	7.50
Spanish—Spain	2,312	2.81	1,124	2.20
Turkish	853	1.04	467	0.90
Sex assigned at birth				
Male	33,245	40.43	20,880	40.30
Female	48,987	59.57	30,892	59.70
Gender (original answer options in the survey)				
Masculine/man	32,549	39.58	20,566	39.70
Feminine/woman	46,874	56.99	29,862	57.70
Indigenous or other cultural gender minority identity (e.g., two-spirit)	166	0.20	92	0.20
Nonbinary, gender fluid, or something else (e.g., genderqueer)	2,315	2.81	1,104	2.10
Other	302	0.37	139	0.30
Gender (categories used in the analyses)				
Cisgender man	31,802	38.70	20,202	39.02
Cisgender woman	46,010	55.90	29,436	56.85
Gender-minority individual	4,245	5.20	2,051	3.96
Trans status				
No, I am not a trans person	79,280	96.43	50,369	97.30
Yes, I am a trans man	357	0.43	162	0.30
Yes, I am a trans woman	295	0.36	132	0.30
Yes, I am a nonbinary trans person	881	1.07	439	0.80
I am questioning my gender identity	1,137	1.38	507	1.00
I don't know what it means	269	0.33	155	0.30
Sexual orientation (original answer options in the survey)				
Heterosexual/straight	56,125	68.24	37,580	72.60
Gay or lesbian	4,607	5.60	2,228	4.30
Heteroflexible	6,200	7.54	4,006	7.70
Homoflexible	534	0.65	253	0.50
Bisexual	7,688	9.35	4,450	8.60
Queer	957	1.16	476	0.90
Pansexual	1,969	2.39	1,198	2.30
Asexual	1,064	1.29	304	0.60
I do not know yet or I am currently questioning my sexual orientation	1,951	2.37	680	1.30
None of the above	807	0.98	425	0.80
I don't want to answer	308	0.37	158	0.30
Sexual orientation (categories used in the analyses)				
Heterosexual	56,125	68.50	37,580	72.58
Gay/lesbian	4,607	5.60	2,228	4.30
Bi/queer/pan	10,614	13.00	6,124	11.83
Flexible	6,734	8.20	4,259	8.23
Emerging	3,822	4.60	1,409	2.72
Highest level of education				
Primary (e.g., elementary school)	1,002	1.22	592	1.10
Secondary (e.g., high school)	20,325	24.71	11,933	23.00
Tertiary (e.g., college or university)	60,896	74.04	39,243	75.80
Currently being in education				
Not being in education	49,802	60.55	35,044	67.70
Being in primary education (e.g., elementary school)	64	0.08	26	0.10
Being in secondary education (e.g., high school)	1,571	1.91	748	1.40
Being in tertiary education (e.g., college or university)	30,762	37.40	15,937	30.80
Work status				
Not working	20,853	25.36	10,337	20.00
Working full time	42,981	52.26	30,723	59.30
Working part-time	11,356	13.81	7,025	13.60
Doing odd jobs	7,029	8.55	3,684	7.10
Socioeconomic status				
My life circumstances are among the worst	227	0.28	86	0.20
My life circumstances are much worse than average	773	0.94	311	0.60
My life circumstances are worse than average	4,232	5.15	1,912	3.70
My life circumstances are average	26,742	32.52	15,497	29.90
My life circumstances are better than average	31,567	38.38	20,971	40.50

(*table continues*)

Table 1 (*continued*)

Variable	N_{total} = 81,975–82,243	%	$N_{in\ a\ relationship}$ = 51,600–51,778	%
My life circumstances are much better than average	14,736	17.92	10,214	19.70
My life circumstances are among the best	3,957	4.81	2,782	5.40
Residence				
Metropolis (population is over 1 million people)	26,441	32.15	16,162	31.20
City (population is between 100,000–999,999 people)	29,920	36.38	18,141	35.00
Town (population is between 1,000–99,999 people)	21,103	25.66	14,168	27.40
Village (population is below 1,000 people)	4,764	5.79	3,298	6.40
Relationship status				
Single	27,541	33.49	N/A	N/A
In a relationship	27,440	33.36	27,440	53.00
Married or common-law partners	24,338	29.59	24,338	47.00
Widow or widower	428	0.52	N/A	N/A
Divorced	2,472	3.01	N/A	N/A
Number of children				
None	57,909	70.41	31,214	60.30
1	8,417	10.23	6,876	13.30
2	10,353	12.59	8,934	17.30
3	3,843	4.67	3,340	6.50
4	1,014	1.23	875	1.70
5	290	0.35	258	0.50
6–9	125	0.15	105	0.20
10 or more	24	0.03	14	0.00
Mean and standard deviation	*M*	*SD*	*M*	*SD*
Age	32.39	12.52	34.21	12.64

Note. Percentages might not add up to 100% due to missing data.

additional online materials at the Open Science Framework page (Bőthe, Nagy, & François, 2024; see https://osf.io/jcz96/).

Participants completed an anonymous survey on the Qualtrics Research Suite, which took approximately 25–45 min. The list of all collaborating countries, the eligibility criteria, and the detailed description of the translation and data collection procedures are presented in the study protocol (Bőthe, Koós, et al., 2021). All published papers and conference presentations using the ISS data set can be seen on the related Open Science Framework pages (publications: https://osf.io/jb6ey/?view_only=0014d87bb2b546f7a2693543389b934d; conference presentations: https://osf.io/c695n/?view_only=7cae32e642b54d049e600ceb8971053e) for transparency of data use. The data set is not publicly available, as it includes data on sensitive topics. As the ISS follows open-science practices, the corresponding author may provide data upon justified request. The study was conducted in accordance with the Helsinki Declaration and was approved by all collaborating countries' national/institutional ethics review boards (https://osf.io/n3k2c/?view_only=838146f6027c4e6bb68371d9d14220b5).

Measures

Gender and Sexual Orientation

Participants' gender identity was assessed using one question following prior recommendations (Bauer et al., 2017): "What gender or gender identity do you identify with?" (answer options: masculine/man, feminine/woman, indigenous or other cultural gender minority identity, e.g., two-spirit, nonbinary, gender fluid or something else, e.g., genderqueer, and other). As for the other option, participants were invited to answer in their own words how they personally describe their gender. To simplify statistical analyses and increase statistical power, three groups were created based on sex assigned at birth, gender identity, and trans status: cisgender men (n = 31,802), cisgender women (n = 46,010), and gender-minority individuals (n = 4,245; see https://doi.org/10.17605/OSF.IO/DK78R). For the cisgender groups (i.e., men and women), individuals who reported the same sex assigned at birth and gender identity as well as "not identifying as a trans person" or "don't know what trans means" were categorized as cisgender men and women. Individuals who reported being "trans" (i.e., trans men, trans women, and trans nonbinary) or reported their gender being "nonbinary, gender-fluid, or other (e.g., genderqueer)," "questioning their gender identity," "indigenous cultural gender identity," or "other cultural gender identities" were merged into the same category (i.e., gender-diverse individuals). For those who were in a relationship, 20,202 identified as cisgender men, 29,436 as cisgender women, and 2,051 as gender-minority individuals. Participants' sexual orientation was assessed with the following item based on prior recommendations (Weinrich, 2014) "People describe their sexual orientation in different ways. Which expression best describes your current sexual orientation? If no expression describes you, check 'None of the above' and write the answer that describes you personally" (answer options: heterosexual/straight, gay or lesbian, heteroflexible, homoflexible, bisexual, queer, pansexual, asexual, I do not know yet or I am currently questioning my sexual orientation, none of the above, I don't want to answer). To simplify statistical analyses and increase statistical power, five groups were created: heterosexual (n = 56,125), gay/lesbian (n = 4,607), bi/queer/pan (i.e., bisexual, queer, and pansexual; n = 10,614), flexible (i.e., heteroflexible and homoflexible; n = 6,734), and emerging identities (i.e., asexual, I do not know yet or I am currently

questioning my sexual orientation, and none of the above; $n =$ 3,822). For those who were in a relationship, 37,580 described their sexual orientation as heterosexual, 2,228 as gay/lesbian, 6,124 as bi/queer/pan, 4,259 as flexible, and 1,409 as emerging. These groups deviate from the preregistered groups (linked to the preregistration document—https://doi.org/10.17605/OSF.IO/DK78R) as some of the groups needed to be changed during the review process.[2]

Masturbation Frequency

Masturbation frequency was assessed with one question as in previous studies (e.g., Bőthe, Tóth-Király, et al., 2021): "In the past year (past 12 months), how often did you masturbate?" (answer options: 0 = *never*, 1 = *once in the past year*, 2 = *2–6 times in the past year*, 3 = *7–11 times in the past year*, 4 = *monthly*, 5 = *2–3 times a month*, 6 = *weekly*, 7 = *2–3 times a week*, 8 = *4–5 times a week*, 9 = *6–7 times a week*, 10 = *more than 7 times a week*).

Frequency of Sexual Activity

Before answering the sexuality-related question, participants read the definition that sexual experiences referred to:

> Sexual experience with a partner is defined as any activity or behavior (excluding childhood sexual games or possible sexual abuse) that stimulates or arouses a person with the intent to produce an orgasm or sexual pleasure. Think about any kind of sexual experience with a partner.

Frequency of sexual activity was assessed with one question based on previous studies (Bőthe, Tóth-Király, et al., 2021): "Past year (in the past 12 months), how often did you have sex (in a relationship or out of a relationship)?" (answer options: 0 = *never*, 1 = *once in the past year*, 2 = *2–6 times in the past year*, 3 = *7–11 times in the past year*, 4 = *monthly*, 5 = *2–3 times a month*, 6 = *weekly*, 7 = *2–3 times a week*, 8 = *4–5 times a week*, 9 = *6–7 times a week*, 10 = *more than 7 times a week*).

Relationship Length

Before answering any romantic relationship-related questions, participants who indicated being in any type of romantic relationship were asked to answer each of the following questions with respect to their primary partner if they had more than one partner. Relationship length was assessed with one question based on previous studies (Bőthe, Tóth-Király, et al., 2021): "How long have you been together with your partner?." Participants indicated their relationship length in years.

Sexual Satisfaction

The GMSEX (Lawrance & Byers, 1995; Lawrance et al., 2020) assessed partnered individuals' level of sexual satisfaction: "Overall, how would you describe your sexual relationship with your partner?." This questionnaire includes five items based on a semantic differential approach, that is, *very bad* (7) versus *very good* (1), *very unpleasant* (7) versus *very pleasant* (1), *very negative* (7) versus *very positive* (1), *very unsatisfying* (7) versus *very satisfying* (1), and *worthless* (7) versus *valuable* (1). Greater scores indicate greater sexual satisfaction. This scale was initially developed and validated with adults in English (Lawrance & Byers, 1995; Lawrance et al., 2020).

Statistical Analysis

Descriptive Analyses

Descriptive statistics for all items of the GMSEX were generated, including the means with standard deviation, minimum and maximum values, and skewness and kurtosis values following the preregistered analysis plan (https://doi.org/10.17605/OSF.IO/DK78R).

Missing values on the GMSEX items, country, language, gender, and sexual orientation (ranging from 0% to 1.67%) were not missing completely at random, based on Little's missing completely at random test, $\chi^2(72) = 580.82$, $p < .001$. Yet, the amount of missing data in the study was negligible, and the full-information maximum likelihood method was used to handle missing data, following previous recommendations (Newman, 2014).

Test of Dimensionality

Since the unidimensional factor structure of the GMSEX was established in several samples (e.g., Bigras et al., 2023; Byers et al., 1998; Calvillo et al., 2020; Del Mar Sánchez-Fuentes & Sierra, 2015; Santos-Iglesias & Byers, 2021), a CFA was conducted to examine the structural validity and dimensionality of the GMSEX. The model was evaluated using common goodness-of-fit indices (Browne & Cudeck, 1993; Marsh et al., 2005; Schermelleh-Engel et al., 2003): comparative fit index (CFI; ≥.90 adequate; ≥.95 good), Tucker–Lewis index (TLI; ≥.90 adequate; ≥.95 good), and root-mean-square error of approximation (RMSEA) with its 90% confidence interval (CI; RMSEA, ≤.10 acceptable, ≤.08 adequate, and ≤.05 good; Browne & Cudeck, 1993; Kenny et al., 2015; Schermelleh-Engel et al., 2003). We conducted multivariate normality (i.e., Mardia's test in Mplus), and the findings suggested that both the multivariate skew test and the multivariate kurtosis test were significant ($ps < .001$), which indicates a nonnormal distribution. Therefore, the robust maximum likelihood estimator was used for the CFA and measurement invariance tests.

Test of Measurement Invariance

Tests of measurement invariance were conducted using participants' language, country, gender, and sexual orientation as grouping variables to ensure that comparisons were meaningful as well as to reduce the possibility of measurement biases and invalid comparisons between groups (Millsap, 2011; Vandenberg & Lance, 2000). A minimum of 485 participants was required to be included in each subgroup in the measurement invariance tests based on Monte Carlo simulations (see details: https://doi.org/10.17605/OSF.IO/DK78R).

In the first set of measurement invariance tests, as 19 out of the 26 languages had a sufficient number of participants (i.e., $n >$ 485) for these tests, participants' language was the grouping variable with 19 languages (see all languages in Table 1). In the second set of measurement invariance, as 28 out of the 42 countries had a sufficient number of participants (i.e., $n > 485$) for these tests,

[2] In the preregistered statistical analysis plan (https://doi.org/10.17605/OSF.IO/DK78R), we created merged groups of individuals with different sexual orientations. However, during the review process, reviewers asked us to change the grouping of individuals based on their sexual orientation. Therefore, we deviated from the preregistered sexual orientation-based groups in the present article.

participants' country of residence was the grouping variable with 28 countries (see all countries in Table 1). In the third set of measurement invariance tests, participants' gender identity was the grouping variable with three categories (i.e., cisgender men, cisgender women, and gender-diverse individuals) as the number of participants in different gender minority groups did not permit their use as separate groups in this particular analysis. In the fourth set of measurement invariance tests, participants' sexual orientation was the grouping variable with five sexual orientations (i.e., heterosexual, gay/lesbian, bi/queer/pan, flexible, and emerging) as the limited number of participants in different sexual orientation groups did not allow for the creation of separate groups in this particular analysis. Also, information on creating gender- and sexual orientation-based groups can be found in the preregistration document (https://doi.org/10.17605/OSF.IO/DK78R).

In each measurement invariance test, we tested and compared six levels of invariance with increasingly constrained parameters: configural (i.e., factor loadings and thresholds were freely estimated), metric (i.e., factor loadings were set to be equal), scalar (i.e., factor loadings and thresholds were set to be equal), residual (i.e., factor loadings, thresholds, and residual variances were constrained to be equal), latent variance (i.e., factor loadings, thresholds, uniqueness, and latent variances were constrained to be equal), and latent mean (i.e., factor loadings, thresholds, residual variances, latent variances, and latent means were constrained to be equal) invariance. The first four levels examine measurement invariance in a narrower sense (e.g., the presence of potential measurement differences or biases), while the last two levels examine measurement invariance in a broader sense (i.e., structural invariance, such as the presence of group-based differences on the level of variance and means; Milfont & Fischer, 2010; Vandenberg & Lance, 2000). Testing the last two steps of invariance is optional. Yet, doing so can provide information about differences in (latent) levels of sexual satisfaction between groups (Milfont & Fischer, 2010; Vandenberg & Lance, 2000). Significant decreases in CFI (ΔCFI $\leq$ .010) and increases in RMSEA (ΔRMSEA $\leq$ .015) suggested which level of measurement invariance was achieved (Chen, 2007; Cheung & Rensvold, 2002). A more liberal cutoff for the RMSEA (i.e., around .10), and more liberal ΔRMSEA (i.e., .030) and ΔCFI (i.e., .020) measures may be acceptable when evaluating metric invariance (Rutkowski & Svetina, 2014) as multiple groups were included in the present study with a large number of participants. It has also been suggested to report additional fit indices (e.g., ΔTLI). Indeed, they may incorporate control for parsimony and thus be advantageous in model comparisons (Marsh et al., 2013, 2005). Finally, we tested partial measurement invariance (i.e., models in which a subset of parameters was allowed to vary across groups) in cases when models were not fully invariant (Milfont & Fischer, 2010).

Tests of Reliability and Validity

Cronbach's alphas and McDonald's omegas were calculated to assess the reliability of the GMSEX (McDonald, 1970; McNeish, 2018; Nunnally, 1978). The GMSEX's associations with theoretically relevant correlates were assessed to examine validity. Specifically, following previous work (e.g., Rausch & Rettenberger, 2021), associations between the GMSEX and past-year masturbation frequency, past-year frequency of sexual activity with a partner, and relationship length (in years) were examined using Spearman correlations. Correlations around |.10| were considered weak, |.30| moderate, and |.50| strong (Cohen, 1992).

Results

Descriptive Statistics, Validity, and Reliability

Means, standard deviations, skewness, kurtosis, Cronbach's alphas, and McDonald's omegas were calculated and are reported in Tables 2 and 3. Likewise, descriptive statistics (i.e., means, standard deviations, skewness, and kurtosis) were calculated for each item of the GMSEX (Table 3). As presented in Table 3, all items loaded significantly on the latent factor ($p < .005$). Factor loadings were above .50, which is the minimum required factor loading for adequate contribution of items on a latent factor (Tabachnick & Fidell, 2007). Based on the results of the CFA (Table 4), the hypothesized unidimensional model fit the data well. The CFI indicated an excellent fit to the data (CFI = .99) and the TLI indicated an excellent fit (TLI = .98) as well. As for the RMSEA, it indicated an excellent fit (RMSEA = .05, 90% CI [.048, .055]). The GMSEX also demonstrated excellent reliability ($\alpha = .96$, $\omega = .96$).

Measurement Invariance Across Language, Country, Gender, and Sexual Orientation

First, measurement invariance testing was conducted to examine the factor structure of the GMSEX across 19 languages (i.e., Croatian, Czech, English, French, German, Hebrew, Hungarian, Italian, Korean, Lithuanian, Macedonian, Mandarin simplified, Mandarin traditional, Polish, Brazilian Portuguese, Portuguese, Slovak, Spanish [Latin American], and Spanish [Spain]) to ensure that any subsequent language-based comparisons were meaningful (Table 4). The change in the CFI value was slightly greater than the recommended threshold at the scalar invariance level, while the changes in the TLI and RMSEA values were acceptable. We relaxed equality constraints of items based on the examination of modification indices to test partial invariance (see Table 4). This partial scalar invariance demonstrated adequate changes in the fit indices. In addition, the changes in the fit indices showed that latent mean invariance was achieved (i.e., ΔCFI $\leq -.003$, ΔTLI $\leq -.001$, and ΔRMSEA = .000), suggesting that no latent mean differences existed between language-based groups (see Table 5).

Measurement invariance testing was conducted to examine the factor structure of the GMSEX across 28 countries (i.e., Austria, Brazil, Canada, China, Colombia, Croatia, Czech Republic, France, Germany, Hungary, Ireland, Israel, Italy, Lithuania, Mexico, New Zealand, North Macedonia, Peru, Poland, Portugal, Slovakia, South Africa, South Korea, Spain, Switzerland, Taiwan, the United Kingdom, and the United States; Table 4). The change in the CFI value was slightly greater than the recommended threshold at the scalar invariance level, while the changes in the TLI and RMSEA values were acceptable. We relaxed equality constraints of items based on the examination of modification indices. This partial scalar invariance demonstrated adequate changes in the fit indices. Furthermore, the changes in the fit indices showed that latent mean invariance was achieved (i.e., ΔCFI $\leq -.004$, ΔTLI $\leq -.001$, and ΔRMSEA $\leq .001$), suggesting no mean differences existed between country-based groups (see Table 6).

In the next step, measurement invariance testing was conducted to examine the factor structure of the GMSEX across three subgroups (i.e., cisgender men, cisgender women, and gender-minority individuals; Table 4). For each group, the baseline models were

Table 2
Descriptive Statistics and Correlations Between the Global Measure of Sexual Satisfaction and Sexuality-Related Variables

Variable	Skewness (*SE*)	Kurtosis (*SE*)	Range	*M* (*SD*)	1	2	3	4
1. GMSEX[a]	−1.39 (0.01)	1.39 (0.02)	1–7	5.55 (1.56)	—			
2. Masturbation frequency[b]	−0.42 (0.01)	−0.46 (0.02)	0–10	5.36 (2.61)	−.04**	—		
3. Frequency of sexual activity[b]	−0.24 (0.01)	−1.19 (0.02)	0–10	4.07 (2.72)	.32**	−.02**	—	
4. Relationship length (year)	1.78 (0.01)	3.37 (0.02)	<1–88	9.20 (9.95)	−.20**	−.09**	−.21**	—

Note. GMSEX = Global Measure of Sexual Satisfaction.
[a] Only participants in a relationship completed the GMSEX. [b] 0 = *never*, 1 = *once in the past year*, 2 = *2–6 times in the past year*, 3 = *7–11 times in the past year*, 4 = *monthly*, 5 = *2–3 times a month*, 6 = *weekly*, 7 = *2–3 times a week*, 8 = *4–5 times a week*, 9 = *6–7 times a week*, 10 = *more than 7 times a week*.
** $p < .001$.

estimated, and the parameters were gradually constrained. Fit indices suggested that configural, metric, scalar, residual, and latent variance and latent mean invariance were achieved (i.e., $\Delta CFI \leq -.001$, $\Delta TLI = .000$, and $\Delta RMSEA \leq .001$), suggesting no mean differences between gender-based groups (see Table 7).

Finally, measurement invariance testing was conducted to examine the factor structure of the GMSEX across five sexual orientation-based groups (i.e., heterosexual, gay/lesbian, bi/queer/pan, flexible, and emerging; Table 4). For each group, the baseline models were estimated, and the parameters were gradually constrained. Fit indices suggested that configural, metric, scalar, residual, and latent variance and latent mean invariance were achieved (i.e., $\Delta CFI \leq -.001$, $\Delta TLI = .000$, and $\Delta RMSEA = .000$), suggesting there existed no mean differences between sexual orientation-based groups (see Table 8).

Validity

Correlations between sexual satisfaction and masturbation frequency, sexual activity frequency, and relationship length were examined to assess validity (see Table 2). Contrary to the hypotheses, weak, negative correlations were observed between sexual satisfaction and masturbation frequency ($r = -.04$, $p < .001$) and relationship length ($r = -.20$, $p < .001$). A moderate, positive association was observed between sexual satisfaction and sexual activity frequency ($r = .32$, $p < .001$), which was consistent with our hypothesis.

Discussion

The current study was based on the idea that sexual satisfaction may be important to overall well-being, is widely experienced, and represents a fundamental sexual right (World Health Organization, 2010). Despite sexual satisfaction being inherent to the sexual lives of many people globally, several factors such as country of residence or gender identity may influence how people describe, share, or experience this aspect of their sexuality. Therefore, the goal of this study was to validate cross-culturally the widely used GMSEX in a large international cross-cultural sample of participants in romantic relationships and to examine whether the scale functions similarly across language-, country-, gender-, and sexual orientation-based groups.

Among a sample of over 50,000 participants from 42 different countries, results were in accordance with previous validation studies of the GMSEX (e.g., Bigras et al., 2023; Santos-Iglesias & Byers, 2021) showing strong psychometric properties including factor structure, reliability, validity, and measurement invariance across several indicators. CFAs supported the unidimensionality of the GMSEX across groups and yielded excellent reliability indices, corroborating previous findings with adolescents (Bigras et al., 2023) and adults (Calvillo et al., 2020; Del Mar Sánchez-Fuentes et al., 2015; Lawrance & Byers, 1995; Mark et al., 2014; Santos-Iglesias & Byers, 2021). Moreover, the GMSEX showed weak negative associations with relationship length and a moderate positive association with frequency of sexual activity. In sum, results support the GMSEX as a short and valid scale to assess sexual satisfaction across diverse samples.

To mitigate measurement biases, tests of invariance across language-, country-, gender-, and sexual orientation-based groups were conducted. Latent means invariance was demonstrated across all 19 studied languages including, for example, Croatian, Spanish, and Hebrew. These findings provide a basis for all subsequent steps of invariance testing and support the use of the GMSEX as a reliable measure in multiple languages, as differences in GMSEX scores may be attributed to actual differences between groups. Similarly, latent

Table 3
Standardized Factor Loadings, Reliability Indices, and Descriptive Statistics of the GMSEX

Item	Standardized factor loadings	Range	*M* (*SD*)	Skewness (*SE*)	Kurtosis (*SE*)	α	ω
Overall, how would you describe your sexual relationship with your partner?							
1. Very bad–very good	0.92	1–7	5.43 (1.67)	−1.22 (0.01)	0.88 (0.02)		
2. Very unpleasant–very pleasant	0.92	1–7	5.65 (1.61)	−1.46 (0.01)	1.62 (0.02)		
3. Very negative–very positive	0.94	1–7	5.62 (1.68)	−1.40 (0.01)	1.28 (0.02)		
4. Very unsatisfying–very satisfying	0.87	1–7	5.29 (1.74)	−1.04 (0.01)	0.26 (0.02)		
5. Worthless–valuable	0.89	1–7	5.73 (1.72)	−1.50 (0.01)	1.42 (0.02)		
GMSEX total score		1–7	5.55 (1.56)	−1.39 (0.01)	1.39 (0.02)	.96	.96

Note. All factor loadings are standardized. Loadings are statistically significant at $p < .001$. GMSEX = Global Measure of Sexual Satisfaction; α = Cronbach's alpha; ω = McDonald's omega.

Table 4

Confirmatory Factor Analysis and Tests of Measurement Invariance on the GMSEX

Model	$\chi^2(df)$	CFI	TLI	RMSEA	90% CI	Comparison	$\Delta\chi^2(df)$	ΔCFI	ΔTLI	ΔRMSEA
One-factor CFA	685.744* (5)	.992	.983	.052	[.048, .055]					
					Language-based invariance					
M1. Configural	1,192.394* (95)	.985	.971	.066	[.063, .070]					
M2. Metric	1,841.005* (167)	.978	.975	.062	[.059, .064]	M2–M1	441.58* (72)	−.007	+.004	−.004
M3. Scalar	3,546.187* (239)	.956	.965	.073	[.070, .075]	M3–M2	2,559.15* (72)	−.022	−.010	+.011
M3a. Scalar partial[a]	3,383.068* (238)	.958	.966	.071	[.069, .073]	M3a–M2	2,248.55* (71)	−.020	−.009	+.009
M3b. Scalar partial[b]	3,255.913* (237)	.960	.968	.070	[.067, .072]	M3b–M2	2,015.61* (70)	−.018	−.007	+.008
M3c. Scalar partial[c]	3,138.359* (236)	.961	.969	.068	[.066, .071]	M3c–M2	1,811.68* (69)	−.017	−.006	+.006
M3d. Scalar partial[d]	3,033.017* (235)	.963	.970	.067	[.065, .069]	M3d–M2	1,617.60* (68)	−.015	−.005	+.005
M3e. Scalar partial[e]	2,960.321* (234)	.964	.970	.067	[.064, .069]	M3e–M2	1,490.58* (67)	−.014	−.005	+.005
M3f. Scalar partial[f]	2,894.877* (233)	.964	.971	.066	[.064, .068]	M3f–M2	1,379.14* (66)	−.014	−.004	+.004
M3g. Scalar partial[g]	2,838.611* (232)	.965	.971	.065	[.063, .068]	M3g–M2	1,289.19* (65)	−.013	−.004	+.003
M3h. Scalar partial[h]	2,774.946* (231)	.966	.972	.065	[.063, .067]	M3h–M2	1,170.84* (64)	−.012	−.003	+.003
M3i. Scalar partial[i]	2,719.455* (230)	.967	.973	.064	[.062, .066]	M3i–M2	1,071.12* (63)	−.011	−.002	+.002
M3j. Scalar partial[j]	2,670.713* (229)	.967	.973	.064	[.062, .066]	M3j–M2	984.82* (62)	−.011	−.002	+.002
M3k. Scalar partial[k]	2,624.762* (228)	.968	.973	.063	[.061, .065]	M3k–M2	904.55* (61)	−.010	−.002	+.001
M4. Residual	3,353.935* (318)	.959	.976	.060	[.058, .062]	M4–M3	836.37* (90)	−.009	+.003	−.003
M5. Latent variance	3,690.285* (336)	.955	.975	.062	[.060, .063]	M5–M4	411.14* (18)	−.004	−.001	+.002
M6. Latent means	**3,919.556* (353)**	**.952**	**.974**	**.062**	**[.060, .064]**	**M6–M5**	**300.58* (17)**	**−.003**	**−.001**	**+.000**
					Country-based invariance					
M1. Configural	1,185.996* (140)	.986	.971	.067	[.063, .070]					
M2. Metric	1,834.409* (248)	.978	.976	.062	[.059, .064]	M2–M1	458.74* (108)	−.008	+.005	−.005
M3. Scalar	3,505.866* (356)	.957	.966	.072	[.070, .075]	M3–M2	2,491.98* (108)	−.021	−.010	+.010
M3a. Scalar partial[a]	3,353.368* (355)	.959	.968	.071	[.060, .073]	M3a–M2	2,198.43* (107)	−.019	−.008	+.009
M3b. Scalar partial[b]	3,238.171* (354)	.961	.969	.069	[.067, .072]	M3b–M2	1,990.64* (106)	−.017	−.007	+.007
M3c. Scalar partial[c]	3,144.694* (353)	.962	.970	.068	[.066, .071]	M3c–M2	1,815.86* (105)	−.016	−.006	+.006
M3d. Scalar partial[d]	3,072.579* (352)	.963	.970	.068	[.065, .070]	M3d–M2	1,690.57* (104)	−.015	−.006	+.006
M3e. Scalar partial[e]	3,003.535* (351)	.964	.971	.067	[.065, .069]	M3e–M2	1,565.83* (103)	−.014	−.005	+.005
M3f. Scalar partial[f]	2,944.143* (350)	.965	.972	.066	[.064, .068]	M3f–M2	1,463.95* (102)	−.013	−.004	+.004
M3g. Scalar partial[g]	2,898.414* (349)	.965	.972	.066	[.064, .068]	M3g–M2	1,382.85* (101)	−.013	−.004	+.004
M3h. Scalar partial[h]	2,855.096* (348)	.966	.972	.065	[.063, .068]	M3h–M2	1,307.64* (100)	−.012	−.004	+.003
M3i. Scalar partial[i]	2,809.676* (347)	.966	.973	.065	[.063, .067]	M3i–M2	1,224.59* (99)	−.012	−.003	+.003
M3j. Scalar partial[j]	2,769.177* (346)	.967	.973	.064	[.062, .067]	M3j–M2	1,151.32* (98)	−.011	−.003	+.002
M3k. Scalar partial[k]	2,728.666* (345)	.967	.974	.064	[.062, .066]	M3k–M2	1,076.61* (97)	−.011	−.002	.000
M3l. Scalar partial[l]	2,693.326* (344)	.968	.974	.064	[.061, .066]	M3l–M2	1,011.88* (96)	−.010	.000	.000
M4. Residual	3,511.078* (479)	.959	.976	.061	[.059, .063]	M4–M3	899.24* (135)	−.009	+.002	−.003
M5. Latent variance	3,871.831* (506)	.954	.975	.063	[.061, .065]	M5–M4	442.65* (27)	−.005	−.001	+.002
M6. Latent means	**4,166.168* (533)**	**.950**	**.974**	**.064**	**[.062, .065]**	**M6–M5**	**42,344* (27)**	**−.004**	**−.001**	**+.001**
					Gender-based invariance ($n_{\text{cismen}} = 2{,}0032$, $n_{\text{ciswomen}} = 2{,}9140$, $n_{\text{gender diverse}} = 2{,}019$)					
M1. Configural	777.677* (15)	.991	.982	.055	[.051, .058]					
M2. Metric	1,023.337* (23)	.988	.985	.050	[.048, .053]	M2–M1	292.54* (8)	−.003	+.003	−.005
M3. Scalar	1,390.087* (31)	.984	.985	.051	[.048, .053]	M3–M2	330.26* (8)	−.004	+.000	+.001
M4. Residual	1,367.364* (41)	.985	.989	.044	[.042, .046]	M4–M3	101.30* (10)	.001	+.004	−.007
M5. Latent variance	1,393.204* (43)	.984	.989	.043	[.041, .045]	M5–M4	10.28* (2)	−.001	+.000	−.001
M6. Latent means	**1,501.760* (45)**	**.983**	**.989**	**.044**	**[.042, .045]**	**M6–M5**	**171.21* (2)**	**−.001**	**+.000**	**+.001**
					Sexual orientation-based invariance ($n_{\text{heterosexual}} = 37{,}216$, $n_{\text{gay/lesbian}} = 2{,}194$, $n_{\text{biplus}} = 6075$, $n_{\text{flexible}} = 4{,}240$, $n_{\text{emerging}} = 1{,}381$)					
M1. Configural	799.946* (25)	.991	.983	.055	[.052, .058]					
M2. Metric	1,039.610* (41)	.989	.986	.049	[.046, .051]	M2–M1	41.49* (16)	−.002	+.003	−.006
M3. Scalar	1,349.891* (57)	.986	.987	.047	[.045, .049]	M3–M2	221.67* (16)	−.003	+.001	−.002
M4. Residual	1,355.070* (77)	.986	.991	.040	[.038, .042]	M4–M3	148.93* (20)	+.000	+.004	−.007
M5. Latent variance	1,403.792* (81)	.985	.991	.040	[.038, .042]	M5–M4	40.42* (4)	−.001	+.000	+.000
M6. Latent means	**1,485.712* (85)**	**.984**	**.991**	**.040**	**[.038, .042]**	**M6–M5**	**97.40* (4)**	**−.001**	**+.000**	**+.000**

Note. Bold letters indicate the final levels of invariance that were achieved. $n_{\text{Croatian}} = 1{,}545$, $n_{\text{Czech}} = 1{,}053$, $n_{\text{English}} = 8{,}103$, $n_{\text{French}} = 2{,}564$, $n_{\text{German}} = 2{,}585$, $n_{\text{Hebrew}} = 893$, $n_{\text{Hungarian}} = 8{,}342$, $n_{\text{Italian}} = 1{,}509$, $n_{\text{Korean}} = 769$, $n_{\text{Lithuanian}} = 1{,}498$, $n_{\text{Macedonian}} = 813$, $n_{\text{Mandarin simplified}} = 1{,}234$, $n_{\text{Mandarin traditional}} = 1{,}423$, $n_{\text{Polish}} = 7{,}713$, $n_{\text{Brazilian Portuguese}} = 2{,}356$, $n_{\text{Portuguese}} = 1{,}312$, $n_{\text{Slovak}} = 1{,}342$, $n_{\text{Spanish Latin American}} = 3{,}824$, $n_{\text{Spanish}} = 1{,}116$. $n_{\text{Austria}} = 519$, $n_{\text{Brazil}} = 2{,}291$, $n_{\text{Canada}} = 1{,}675$, $n_{\text{China}} = 1{,}226$, $n_{\text{Colombia}} = 740$, $n_{\text{Croatia}} = 1{,}454$, $n_{\text{Czech Republic}} = 1{,}083$, $n_{\text{France}} = 1{,}110$, $n_{\text{Germany}} = 2{,}469$, $n_{\text{Hungary}} = 8{,}392$, $n_{\text{Ireland}} = 974$, $n_{\text{Israel}} = 903$, $n_{\text{Italy}} = 1{,}497$, $n_{\text{Lithuania}} = 1{,}440$, $n_{\text{Mexico}} = 971$, $n_{\text{New Zealand}} = 1{,}893$, $n_{\text{North Macedonia}} = 775$, $n_{\text{Peru}} = 1{,}193$, $n_{\text{Poland}} = 7{,}312$, $n_{\text{Portugal}} = 1{,}315$, $n_{\text{Slovakia}} = 716$, $n_{\text{South Africa}} = 1{,}007$, $n_{\text{South Korea}} = 775$, $n_{\text{Spain}} = 1{,}124$, $n_{\text{Switzerland}} = 741$, $n_{\text{Taïwan}} = 1{,}417$, $n_{\text{United Kingdom}} = 916$, $n_{\text{United States}} = 1{,}368$. CFA = confirmatory factor analyses; GMSEX = Global Measure of Sexual Satisfaction; CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root-mean-square error of approximation; 90% CI = 90% confidence interval of the RMSEA; ΔCFI = change in CFI value compared to the preceding model; ΔTLI = change in the TLI value compared to the preceding model; ΔRMSEA = change in the RMSEA value compared to the preceding model; M1 = Model 1; M2 = Model 2; M3 = Model 3; M4 = Model 4; M5 = Model 5; M6 = Model 6; M3a = Model 3a; M3b = Model 3b; M3c = Model 3c; M3d = Model 3d; M3e = Model 3e; M3f = Model 3f; M3g = Model 3g; M3h = Model 3h; M3i = Model 3i; M3j = Model 3j; M3k = Model 3k; M3l = Model 3l.
Language [a] The intercept of Item 3 in Polish was freed. [b] The intercept of Item 1 in Spanish Latin American was freed. [c] The intercept of Item 4 in simplified Mandarin was freed. [d] The intercept of Item 1 in German was freed. [e] The intercept of Item 4 in German was freed. [f] The intercept of Item 2 in Hungarian was freed. [g] The intercept of Item 5 in Czech was freed. [h] The intercept of Item 4 in Spanish Latin American was freed. [i] The intercept of Item 2 in Spanish was freed. [j] The intercept of Item 3 in German was freed. [k] The intercept of Item 1 in simplified Mandarin was freed. Country [a] The intercept of Item 3 from Poland was freed. [b] The intercept of Item 4 from China was freed. [c] The intercept of Item 1 from Germany was freed. [d] The intercept of Item 2 from Hungary was freed. [e] The intercept of Item 4 from Germany was freed. [f] The intercept of Item 5 from the Czech Republic was freed. [g] The intercept of Item 3 from Germany was freed. [h] The intercept of Item 1 from China was freed. [i] The intercept of Item 2 from Spain was freed. [j] The intercept of Item 2 from Peru was freed. [k] The intercept of Item 1 from Poland was freed. [l] The intercept of Item 4 from Italy was freed.
* $p < .05$.

Table 5
Language-Based Descriptive Statistics on the GMSEX

Languages (included in the measurement invariance tests)	*N*	*M*	*SD*	Minimum	Maximum
Croatian	1,536	5.68	1.67	1.00	7.00
Czech	1,036	5.49	1.57	1.00	7.00
English	8,046	5.53	1.55	1.00	7.00
French	2,555	5.59	1.49	1.00	7.00
German	2,563	5.36	1.51	1.00	7.00
Hebrew	890	5.05	1.99	1.00	7.00
Hungarian	8,308	5.62	1.51	1.00	7.00
Italian	1,497	5.51	1.64	1.00	7.00
Korean	768	5.55	1.40	1.00	7.00
Lithuanian	1,483	5.50	1.49	1.00	7.00
Macedonian	786	5.71	1.71	1.00	7.00
Mandarin simplified	1,234	5.62	1.15	1.00	7.00
Mandarin traditional	1,421	5.28	1.36	1.00	7.00
Polish	7,682	5.55	1.53	1.00	7.00
Portuguese—Brazil	2,317	5.31	1.74	1.00	7.00
Portuguese—Portugal	1,309	5.84	1.40	1.00	7.00
Slovak	1,335	5.91	1.30	1.00	7.00
Spanish—Latin American	3,751	5.58	1.70	1.00	7.00
Spanish—Spain	1,106	5.77	1.59	1.00	7.00

Note. GMSEX = Global Measure of Sexual Satisfaction.

means invariance was achieved for countries. Although culture might play a role in shaping beliefs, attitudes, and values toward sexuality and relates to sexual satisfaction (Abdolmanafi et al., 2018), findings indicated that the GMSEX was valid across various countries including diverse cultures. Notably, partial measurement invariance was observed for languages and countries as well. These findings suggest that specific items of the GMSEX (e.g., very unsatisfying–very satisfying) may function slightly differently in different cultures or contexts and may contribute to biases if they are not handled carefully, such that in these instances, it is preferable to use latent variable models that can account for measurement biases (e.g., Byrne et al., 1989).

Table 6
Country-Based Descriptive Statistics on the GMSEX

Countries (included in the measurement invariance tests)	*N*	*M*	*SD*	Minimum	Maximum
Austria	516	5.71	1.29	1.00	7.00
Brazil	2,253	5.29	1.75	1.00	7.00
Canada	1,671	5.48	1.55	1.00	7.00
China	1,226	5.62	1.16	1.00	7.00
Colombia	705	5.62	1.86	1.00	7.00
Croatia	1,445	5.70	1.65	1.00	7.00
Czech Republic	1,067	5.51	1.57	1.00	7.00
France	1,105	5.49	1.59	1.00	7.00
Germany	2,449	5.32	1.55	1.00	7.00
Hungary	8,358	5.65	1.50	1.00	7.00
Ireland	966	5.71	1.51	1.00	7.00
Israel	900	5.03	2.00	1.00	7.00
Italy	1,483	5.51	1.64	1.00	7.00
Lithuania	1,426	5.49	1.49	1.00	7.00
Mexico	962	5.51	1.78	1.00	7.00
New Zealand	1,879	5.45	1.56	1.00	7.00
North Macedonia	750	5.70	1.73	1.00	7.00
Peru	1,174	5.51	1.63	1.00	7.00
Poland	7,286	5.56	1.53	1.00	7.00
Portugal	1,313	5.86	1.36	1.00	7.00
Slovakia	710	5.87	1.35	1.00	7.00
South Africa	999	5.68	1.47	1.00	7.00
South Korea	774	5.55	1.39	1.00	7.00
Spain	1,115	5.79	1.56	1.00	7.00
Switzerland	738	5.63	1.43	1.00	7.00
Taiwan	1,415	5.29	1.36	1.00	7.00
United Kingdom	907	5.47	1.58	1.00	7.00
United States	1,364	5.64	1.53	1.00	7.00

Note. GMSEX = Global Measure of Sexual Satisfaction.

Table 7
Gender-Based Descriptive Statistics on the GMSEX

Gender	*N*	*M*	*SD*	Minimum	Maximum
Gender (included in the measurement invariance tests)					
Cisgender men	20,032	5.44	1.57	1.00	7.00
Cisgender women	29,140	5.61	1.54	1.00	7.00
Gender diverse	2,019	5.63	1.47	1.00	7.00
Intersection of sex assigned at birth, gender identity, and trans status					
Cisgender men	20,032	5.44	1.57	1.00	7.00
Cisgender women	29,140	5.61	1.55	1.00	7.00
Trans men	247	5.73	1.52	1.00	7.00
Trans women	238	5.49	1.62	1.00	7.00
Trans nonbinary	396	5.87	1.30	1.00	7.00
Nonbinary, gender fluid, or something else (e.g., genderqueer)	447	5.62	1.48	1.00	7.00
Questioning	495	5.58	1.44	1.00	7.00
Indigenous cultural gender identity or other cultural gender identities	171	5.39	1.54	1.00	7.00

Note. GMSEX = Global Measure of Sexual Satisfaction.

Our results also showed that the GMSEX is fully invariant between our gender groups, suggesting that the GMSEX works similarly regardless of whether a person identifies as a cisgender woman, a cisgender man, or a gender-diverse individual. This finding is in line with previous studies that found no gender-related differences in terms of sexual satisfaction (e.g., Mark et al., 2014; Del Mar Sánchez-Fuentes & Sierra, 2015). Individuals may differ in other aspects of sexual interactions (e.g., frequency of sexual activity) and not in the level of sexual satisfaction. For example,

Table 8
Sexual Orientation-Based Descriptive Statistics on the GMSEX

Sexual orientation	*N*	*M*	*SD*	Min.	Max.
Sexual orientation (included in the measurement invariance tests)					
Heterosexual	37,216	5.54	1.57	1.00	7.00
Gay/lesbian	2,194	5.55	1.56	1.00	7.00
Bi/queer/pan	6,075	5.66	1.48	1.00	7.00
Flexible	4,240	5.54	1.49	1.00	7.00
Emerging	1,381	5.22	1.66	1.00	7.00
Sexual orientation (original answer options in the survey)					
Heterosexual	37,216	5.54	1.57	1.00	7.00
Gay/lesbian	2,194	5.55	1.56	1.00	7.00
Heteroflexible	3,973	5.54	1.49	1.00	7.00
Homoflexible	245	5.55	1.51	1.00	7.00
Bisexual	4,400	5.62	1.52	1.00	7.00
Queer	468	5.89	1.20	1.00	7.00
Pansexual	1,182	5.73	1.41	1.00	7.00
Asexual	284	4.89	1.62	1.00	7.00
I do not know yet or I am currently questioning my sexual orientation	667	5.22	1.65	1.00	7.00
None of the above	405	5.45	1.67	1.00	7.00
I don't want to answer	140	5.28	1.92	1.00	7.00

Note. GMSEX = Global Measure of Sexual Satisfaction.

increased frequency of sexual activity may lead men to report increased sexual satisfaction (Del Mar Sánchez-Fuentes & Sierra, 2015; Lawrance & Byers, 1995). However, even if the results suggest that the GMSEX can be reliably used across different gender identities, more research is needed among individuals with trans and nonbinary identities as they may define sexual satisfaction differently than cisgender adults (e.g., including themes such as partners, gender affirmation, bodily comfort, and effects of medical transition; Lindley et al., 2021).

Invariance testing across sexual orientations revealed that the GMSEX was fully invariant across the five sexual orientation-based groups, and no differences were observed in sexual satisfaction scores across individuals with different sexual orientations. This is in line with previous results among a sample of middle-aged and older adults showing that sexual orientation was not significantly associated with sexual satisfaction, using one single item (Buczak-Stec et al., 2023). Results also resonated with those from a sample of heterosexual and gay Spanish adults who completed the GMSEX (Del Mar Sánchez-Fuentes & Sierra, 2015). Yet, other results have shown that people from sexual minorities reported lower levels of sexual satisfaction in comparison to heterosexual individuals (Björkenstam et al., 2020; Flynn et al., 2017; Grabovac et al., 2019). However, those studies used a single item of sexual satisfaction that potentially prevented them from adequately capturing the subjective appraisal of one's own sexual satisfaction, as does the GMSEX (Lawrance et al., 2020). Based on the minority stress model (Meyer, 2003) and given discrimination and prejudice sexual minorities may have experienced, we may hypothesize that their sexual satisfaction would be relatively low. However, several factors that were not currently examined may operate to buffer sexual-minority factors and promote sexual satisfaction. For example, the availability of a partner or relationship satisfaction can reduce the deleterious impact on sexual satisfaction (Fleishman et al., 2020; Kuyper & Vanwesenbeeck, 2011). In addition, sexual and gender minorities often question and diverge from traditional gender and sexual norms, showing greater flexibility in terms of sexual consent attitudes, beliefs, and behaviors (e.g., Beres et al., 2004; McKenna et al., 2021). Moreover, it is only recently that sexual satisfaction was examined in sexual minority groups. While the current results suggest that the GMSEX can be reliably used across different sexual orientations with differences, more research is needed to fully understand how sexual satisfaction might differ based on whether a person identifies with a sexual minority group or not.

Regarding relationships with sexual behaviors, while sexual satisfaction was weakly and negatively associated statistically with masturbation frequency, the effect size was too small to be considered meaningful. In line with the findings of previous studies among adults, sexual satisfaction was positively associated with sexual activity frequency (Frederick et al., 2017; Yucel & Gassanov, 2010). A higher frequency of sexual activity may contribute directly to sexual satisfaction while also influencing desire and orgasm (Parish et al., 2007).

Sexual satisfaction was also negatively associated with relationship length. This result is consistent with the findings of previous studies showing a decline in sexual satisfaction in committed couples over time (Schmiedeberg & Schröder, 2016; Yeh et al., 2006). It is possible that over the course of a relationship, changes in sexual desire may lead to a mismatch between partners (Schmiedeberg & Schröder, 2016). An alternative explanation could be that passion, which is an essential element for high sexual satisfaction (Rubin & Campbell, 2012), is greater at the beginning of the relationship but decreases over time. Thus, sexual satisfaction could steadily decline with subsiding passion (Yeh et al., 2006).

Practical Implications

The findings of the present study have implications relevant to research, policy, and intervention. Having established that the GMSEX is country, language, gender identity, and sexual orientation invariant, it can be a helpful assessment tool in various settings among diverse samples of individuals. It may inform the development of evidence-based policies and interventions related to sexual health and well-being. Indeed, validating a measure across a wide range of countries should help identify (and ultimately address) potential cultural biases in the assessment of sexual satisfaction. Sexual well-being, including sexual satisfaction, has been recognized as imperative to public health (Mitchell et al., 2021), and calls were recently made about including sexuality in a comprehensive subjective well-being assessment (Hooghe, 2012), so as not to overlook key elements when trying to fully understand people's well-being. Therefore, by showing country-, language-, gender-, and sexual orientation group-based invariance, our results suggest that the GMSEX is culturally sensitive and relevant, which supports its accuracy and validity to be used broadly in diverse settings.

Strengths, Limitations, and Future Directions

Although this study has multiple strengths (e.g., large sample size, methodology, incorporation of open-science practices), some limitations should be noted (Bőthe, Nagy, Ponce, & François, 2024; see the general limitations of the ISS at https://osf.io/n3k2c/?view_only=838146f6027c4e6bb68371d9d14220b5). Within the ISS, the GMSEX specifically targeted sexual experiences within the context of a romantic relationship, limiting the understanding of sexual pleasure outside of romantic relationships. The cross-sectional study cannot provide causal insight or changes over time. Longitudinal studies are needed to examine the temporal stability of the GMSEX across diverse populations. Moreover, because the ISS as a whole was not directly supported by any funding agency, there was limited recruitment from some jurisdictions, limiting some analyses of specific countries, languages, gender, and sex groups. By merging gender identities and sexual orientations to forced group comparisons for sufficient power, some nuances were likely masked and the scope of the results was restricted. In regard to the sexual orientation-based groups, it is important to note that participants who identified as heteroflexible or homoflexible were separated from the Bi/Queer/Pan group, which means that flexibility was defined outside of bisexuality and pansexuality. Furthermore, another limitation is the grouping of queer, bisexual, and pansexual individuals into a single group, as queer individuals might be monosexual or plurisexual. Future studies should investigate between-group differences among gender and sexual minority participants, as differences may also vary between gender and sexual minority subcultures (e.g., Björkenstam et al., 2020; Dyar et al., 2020). Sexual satisfaction is influenced by a range of contextual factors (Del Mar Sánchez-Fuentes et al., 2014), which can impact an individual's perception of satisfaction and might not be accounted for in a measure. Moreover, partial scalar invariance

was achieved in the language- and country-based measurement invariance tests. These findings may suggest that some items might be "culturally sensitive" and require further investigation. Therefore, it is recommended that future studies choose statistical analyses that can account for potential measurement biases (e.g., latent variable models) when using the GMSEX (e.g., Byrne et al., 1989).

Conclusion

Bearing in mind that sexual satisfaction is a core component of sexual well-being, which is common to most human beings (World Health Organization, 2010), results showed that the GMSEX captures the concept of sexual satisfaction consistently across diverse populations, based on the country of residence, language, gender identity, and sexual orientation. Importantly, the GMSEX has been translated and is now freely available in 26 different languages for research and clinical use, including often underrepresented and underserved populations. Robust measurement invariance across language-, country-, gender-, and sexual orientation-based groups establishes consistency in the measurement of sexual satisfaction, which is crucial when examining its determinants and related outcomes. The current findings of this study may be used to identify patterns, trends, and cultural norms related to sexual satisfaction, as well as to establish benchmarks for evaluating sexual well-being within and across countries, sexual orientations, and gender identities.

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