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Portuguese version of the Short-Form Condom Attitude Scale and psychometric properties among undergraduate students

Versão em português da Short-Form Condom Attitude Scale e propriedades psicométricas entre estudantes universitários

Miriane Lucindo Zucoloto (https://orcid.org/0000-0002-4745-227X) [1]
Wanderson Roberto da Silva (https://orcid.org/0000-0001-8897-8772) [2,3]
Rafaella Alves Silva (https://orcid.org/0000-0002-4179-6477) [4]
Jonathan Leonardo Gonçalves Prudencio (https://orcid.org/0000-0003-2672-929X) [1]
Vitoria de Souza Pinto Frazatto (https://orcid.org/0000-0003-2827-1972) [1]
Edson Zangiacomi Martinez (https://orcid.org/0000-0002-0949-3222) [1]

Abstract *The condom use can be influenced by psychological and sociocultural aspects, which can be modulated by individual's attitudes. The aim was to propose a Brazilian Portuguese version of the Short-Form Condom Attitude Scale (Short-Form CAS), describing all procedures of translation, transcultural adaptation, and psychometric properties evaluation when applied to undergraduate students. A cross sectional study was conducted among students enrolled at University of São Paulo (USP), Campus Ribeirão Preto (n = 491; 61.2% female; average age: 22 years; standard deviation: four years). Confirmatory factor analysis was performed. A one-factor model with seven items exhibited good factorial validity and reliability, suggesting to be a better factorial solution of the Short-Form CAS in the sample. Few studies have been carried out on the behavioral factors associated with condom use in key populations, which can be exacerbated by a lack of appropriate scales. Therefore, the main contribution of the present study was to propose a simplified and transculturally adapted version of the Short-form CAS with some psychometric properties verified. Since the use of condoms is a component of the study of sexual risk behavior, this scale might be an option to be applied in various Brazilian population segments for this purpose.*

Key words *Reliability, Validation study, Youth, Condom, Sexual behaviors*

Resumo *O uso de preservativos pode ser influenciado por aspectos psicológicos e socioculturais, que podem ser modulados por atitudes individuais. O objetivo foi propor uma versão em português brasileiro da Short-Form Condom Attitude Scale (Short-Form CAS), descrevendo os procedimentos de tradução, adaptação transcultural e avaliação das propriedades psicométricas em uma amostra de universitários. Trata-se de estudo transversal com estudantes matriculados na Universidade de São Paulo (USP), Campus Ribeirão Preto (n = 491; 61,2% feminino; média de idade: 22 anos; desvio-padrão: quatro anos). Foi realizada análise fatorial confirmatória. O modelo unifatorial com sete itens apresentou boa validade fatorial e confiabilidade, sugerindo ser a melhor solução fatorial para a Short-Form CAS. Há poucos estudos sobre os fatores comportamentais associados ao uso de preservativos em populações-chave, o que pode ser influenciado pela falta de instrumentos. A principal contribuição deste estudo foi propor uma versão simples e adaptada transculturalmente da Short-Form CAS com algumas propriedades psicométricas verificadas. Uma vez que o uso de preservativos é um componente do comportamento sexual de risco, a escala se apresenta como uma nova opção para futuros estudos na população brasileira.*

Palavras-chave *Confiabilidade, Estudo de validação, Juventude, Preservativo, Comportamentos sexuais*

[1] Faculdade de Medicina de Ribeirão Preto, Universidade de São Paulo. Av. Bandeirantes 3900, Monte Alegre. 14049-900. Ribeirão Preto SP Brasil. mirianezucoloto@gmail.com
[2] Programa de Pós-Graduação em Nutrição e Longevidade, Faculdade de Nutrição, Universidade Federal de Alfenas. Alfenas MG Brasil.
[3] Programa de Pós-Graduação em Alimentos, Nutrição e Engenharia de Alimentos, Faculdade de Ciências Farmacêuticas, Universidade Estadual Paulista. Araraquara SP Brasil.
[4] Escola de Enfermagem Ribeirão Preto, Universidade de São Paulo. Ribeirão Preto SP Brasil.

Introduction

In 1990, the Brazilian Unified Health System began to distribute male condoms widely and systematically, which played a fundamental role in the fight against Sexually Transmitted Infections (STI's)[1]. However, even with public infection prevention policies, researches have shown an increase in the rate of STIs, especially among Brazilian young people[2,3].

According to the Joint United Nations Programme on HIV/Aids (UNAIDS), several factors are associated with changes in the pattern of incidence and profile of the population diagnosed with STIs in Brazil, including a reduction in use and distribution of condoms, a lack of awareness regarding sexually transmitted infections, especially considering the reduction of prevention programs, the low investment in Brazilian health services, and low rates of STI testing among key populations in recent years[3-5].

STIs continue to be a global public health issue. In 2016, the World Health Organization (WHO) estimated that 376.4 million people aged 15 to 49 years had curable STIs, with 127.2 million cases of chlamydia, 86.9 million instances of gonorrhea, and 6.3 million cases of syphilis topping the list. These figures point to a substantial prevalence of STIs, justifying the WHO's worldwide strategy and prioritizing activities to meet STI eradication targets by 2030[6,7]. According to the Brazilian Ministry of Health, in its 2018 annual report, an increase in registered syphilis cases has been observed over the last ten years. In 2017, 119,800 cases of acquired syphilis were reported, resulting in a rate of 58.1 cases per 100,000 people, which is considered very high[8].

Despite the current availability of new technologies and scientific knowledge that effective HIV prevention requires a combination of behavioral, biomedical, and structural intervention actions[9], in Brazil, the prevention strategies are still largely focused on condom use[10]. According to the Brazilian National School Health Survey – PeNSE 30% of the interviewed students reported not using a condom during their last sexual intercourse[11]. The condom non-use was associated with lack of access to health care and sexual health education, substance use (e.g., alcohol), and poor health self-perception. Another point to consider is that advances in HIV biomedical interventions, such as Treatment as Prevention (TasP) and pre-exposure prophylaxis (PrEP), have resulted in changes in sexual behavior and STI incidences over the last decade. Some countries, primarily high-income ones, observed temporal correlations between the introduction of PrEP and a decrease in condom use and an increase in the prevalence of STIs[9,12].

Recent studies conducted by Bonfim et al.[13] and Gräf et al.[14] about factors associated with STIs/HIV diagnosis and risk behaviors among Brazilian undergraduate students found 87.4% of students have had unprotected sex in the last year[13], 45% did not use condoms in the last sexual intercourse, and 24% had two partners or more within three months before the survey[14]. Considering the general Brazilian population, the prevalence of consistent condom use was only 22.8%. Moreover, 59% of the population reported not having used a condom in the past 12 months, and the main reason was trusting their partner (73.4%)[15].

Studies regarding unsafe sexual behavior in the context of knowledge, attitude, and practice have emphasized that having good knowledge and/or attitude about condoms does not guarantee their use, i.e., people with positive perceptions about condoms can engage in unsafe sex[16]. In this sense, there is a consensus that condom use can be influenced by psychological and sociocultural aspects, which can modulate the decision-making process by determining people's attitudes and practices[17,18].

In Brazil, so far, there are no psychometric scales available to assess the attitude towards condom use that can help in the investigation of risk behaviors more comprehensively and that consider its multifactorial nature. The "Short-Form Condom Attitude Scale" (Short-Form CAS) proposed by Roy et al.[19] is a suitable scale for this purpose, as it allows the assessment of positive and negative attitudes towards condom use. The scale consists of ten items related to sexual satisfaction, gender-role, and sexual interest that measure positive and negative attitudes towards condom use. Answers are arranged on a 5-point Likert scale (strongly disagree to strongly agree).

The objective of this study was to propose a Brazilian Portuguese version of the Short-Form CAS, presenting all the steps of translation and transcultural adaptation. Furthermore, as a second purpose, we evaluated the psychometric properties of the scale when applied to a sample of Brazilian undergraduate students.

Methods

Translation and transcultural adaptation

The translation of the Short-form CAS into Brazilian Portuguese was conducted by three bilingual translators, independently. Thus, three Portuguese versions were obtained and were synthesized into the first version of the instrument in Brazilian Portuguese by the responsible researchers. The transcultural adaptation of the scale followed the methodology proposed by Ferrer et al.[20] To evaluate the objectivity and relevance of the translated instrument, six specialists (health professionals with previous experience in validation studies) assessed the content of the items independently. Firstly, the specialists' committee was asked to evaluate each item of the translated instrument individually according to semantic, idiomatic, cultural, and conceptual equivalences. The semantic equivalence is concerned with the meaning of words in terms of vocabulary and grammar; the idiomatic equivalence is concerned with the equivalence of expressions and meanings in different languages; the cultural equivalence is concerned with the adaptation of the context to the study's target audience; and the conceptual equivalence is concerned with the preservation of the original instrument's concept. The specialists were then asked to classify each item of the instrument as adequate or not adequate for usage in the target population, based on the equivalence ratings. In these circumstances, suggestions for item revisions and simplification were asked. For each item, the content validity index (CVI) was calculated, with a CVI of 0.78 indicating the necessity for a new translation (i.e., two or more specialists evaluated the item as not adequate)[21]. Following this step, the researchers responsible for the study and three undergraduate students from the study's target population suggested a final version, taking into account the specialists' ideas as well as the scale's application criteria. A back-translation was completed as the final step by a multilingual translator who had no prior knowledge of the original version of the scale. This phase ensures that all modified elements are comparable to the instrument's original proposal.

Participants and procedures

For the assessment of the psychometric properties of the Short-form CAS, the instrument was applied to a sample of undergraduate students through an open web survey. The study population was the students enrolled in the courses of the eight units of the University of São Paulo (USP), Campus Ribeirão Preto. These units include the School of Physical Education and Sport of Ribeirão Preto (EEFERP, abbreviation in Portuguese), the Ribeirão Preto School of Nursing (EERP), the School of Pharmaceutical Sciences of Ribeirão Preto (FCFRP), the Law School of Ribeirão Preto (FDRP), the School of Economics, Business Administration, and Accounting at Ribeirão Preto (FEARP), the Ribeirão Preto Medical School (FMRP), the School of Dentistry of Ribeirão Preto (FORP), and the Faculty of Philosophy, Sciences, and Letters at Ribeirão Preto (FFCLRP). The total number of undergraduate students on campus at the time of the survey was 7,181. Each of the eight units was considered a stratum when determining the minimum sample size. A proportion of 0.5 was used, which indicates the maximum variability in a population and is often used to determine a more conservative sample size 7, with a confidence coefficient of 0.95 and an absolute precision of 0.045. As a result, a minimum sample size of 449 individuals was determined. The number of respondents in each stratum was proportional to the corresponding total number of students.

An electronic version of the data collection instrument was developed on the Research electronic data capture (REDCap) platform[22]. REDCap is a secure application for creating and managing online surveys and databases (http://project-redcap.org).

The invitation to participate, which included a link to the online survey, was sent to all students by e-mail or messaging applications. The survey's aims and details on answer confidentiality were specified in the disclosure text, which was placed alongside a link to access the electronic questionnaire. The Informed Consent Form was on the first page of the online survey. The first questions of the survey, when accepting participation, were about the inclusion criteria (age ≥ 18 years and being enrolled in an undergraduate course at one of the eight units of the university). Individuals who did not match the inclusion criteria were directed for the end of the survey and received a notification of non-compliance and acknowledgement. Participants filled out the Portuguese version of the Short-form CAS, as well as sociodemographic (age, gender, and monthly income) and relationship status (first sexual experience, and sexual orientation) information. The data collection was carried out from March to May

2021, and the average response time was approximately 15 minutes.

Factorial validity and Reliability

Factorial validity of Short-Form CAS was assessed using confirmatory factor analysis (CFA). According to the original proposal, the instrument presents a one-factor structure, which was tested in the present study sample. It should be noted that those participants who answered "I do not want to answer" for any item on the scale were not considered in the analyses. Therefore, the final database for conducting the CFA considered a sample size of 413 individuals.

CFA was performed through a polychoric correlation matrix considering the method weighted least squares mean and variance adjusted (WLS-MV). The goodness-of-fit indices used were: ratio of chi-square to its degrees of freedom (χ^2/df), comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean squared residual (SRMR). The fit of the model to data was considered adequate when $\chi^2/df \leq 5$, CFI and TLI ≥ 0.9; and RMSEA e SRMR < 0.08[18]. When the factor loadings (λ) of the items were ≥ 0.4, they were deemed adequate. Reliability was evaluated using the internal consistency metrics alpha ordinal coefficient (α) and omega coefficient (ω). The values α and $\omega \geq 0.7$ were indicators of satisfactory internal consistency[23]. The analyzes were performed using the "lavaan" and "semTools" packages in the R program (http://www.r-project.org).

Ethical issues

This study was approved by the Research Ethics Committee of the Ribeirão Preto Medical School of the University of São Paulo (USP) under the registration CAAE number 31049220.4.0000.5440. The informed consent form was presented on the first page of the online form, and the survey only began when the participant agreed to participate in the study by clicking on the option "I agree with the consent form". The option "I prefer not to answer" was included in all questions of the online form, and participants have the option to stop participating at any time. In order to comply with data security and confidentiality requirements, the captured data was stored in the REDCap platform housed in an independent server of the researchers' institution. Only the principal investigator had access to the account that hosted the survey during the data collection process.

Results

After completing the procedures of translation and cross-cultural adaptation as described in the Methods section, considering the assessment of equivalences in the translation process and the CVI values (CVI ≥ 0.83 for all items – only items 2 and 5 were classified as not adequate by only one specialist), there was no need for new translations of any items in the final version of the instrument. However, the panel of specialists made some important suggestions, which were considered by the researchers in order to simplify and adapt the instrument for the target population. The final version in Portuguese of the translated and cross-culturally adapted instrument and its original version in English are shown in Chart 1.

A total of 491 undergraduate students participated in the instrument application stage (61.2% declared to be female, and according to gender identity, 0.4% declared to have a non-binary identity). The average age was 22 years (standard deviation 4 years). The distribution of students in the eight units of the university was 4.9% from the School of Physical Education and Sport; 10.0% from the Ribeirão Preto College of Nursing; 7.7% from the Faculty of Pharmaceutical Sciences of Ribeirão Preto; 6.3% from the Law School of Ribeirão Preto; 18.3% from the School of Economics, Business Administration and Accounting at Ribeirão Preto; 26.2% from the Faculty of Philosophy, Sciences and Letters at Ribeirão Preto; 19.3% from the Ribeirão Preto Medical School; and 6.9% from the School of Dentistry of Ribeirão Preto. The higher proportion of students from some units was already anticipated in the sample planning, because these are the units with the most undergraduate courses offered and, as a result, the highest number of students enrolled.

The characterization of the sample according to sociodemographic and behavioral variables is presented in Table 1.

Most of the sampled students were identified as heterosexual, followed by bisexual and homosexual (23.2% and 11.4%, respectively). The majority also stated that they were single and that they had already had their first sexual experience with someone else. More than 90% of students were financially dependent on a relative or guardian, with monthly incomes ranging from two to ten minimum wages. The distribution of students' responses to each item of the Short-Form CAS is shown in Table 2.

Chart 1. English (Original) and Brazilian Portuguese version of the Short-Form Condom Attitude Scale. Ribeirão Preto, São Paulo, 2021.

Item	Original version	Brazilian Portuguese version
	Short-Form Condom Attitude Scale (Short-Form CAS)	*Versão reduzida da Escala de Atitude em Relação ao Uso de Preservativo (Short-Form CAS - BR)*
1	Condoms are uncomfortable	*Preservativos são desconfortáveis*
2	The idea of using condoms does not appeal to me	*A ideia de usar preservativos não me agrada*
3	Using condoms make sex un-enjoyable	*Usar preservativos torna o sexo desagradável*
4	Proper use of condoms enhance sexual pleasure	*O uso adequado de preservativos aumenta o prazer sexual*
5	I would avoid using condom if possible	*Eu evitaria usar preservativos, se possível*
6	I just don't like the idea of using condoms	*Eu simplesmente não gosto da ideia de usar preservatives*
7	Men who use condoms show concern and responsibility to their partner(s)	*Homens que usam preservativo demostram preocupação e responsabilidade para com seu(s) parceiro(s)*
8	Using condoms are unmanly	*Usar preservativos não é coisa de homem*
9	Condoms are the best way to protect myself from HIV and against other STIs	*Preservativos são a melhor maneira de me proteger do HIV e de outras infecções sexualmente transmissíveis*
10	Suggestion from a partner to use a condom mean that she doesn't trust her partner	*Se uma pessoa pede que seu parceiro use preservativo, significa que ela não confia nele*
	Response categories:	**Categorias de resposta**:
	Strongly disagreed/ Disagreed / Undecided or neutral / Agreed / Strongly agreed	Discordo totalmente/Discordo/Nem concordo nem discordo/Concordo/Concordo totalmente

Source: XXX.

Table 1. Distribution of the undergraduate students (n = 491) according to some sociodemographic and behavioral variables. Ribeirão Preto, São Paulo, 2021.

Variable	Response category	n*(%)
Sexual orientation	Heterosexual	303 (61.8%)
	Homosexual	56 (11.4%)
	Pansexual	9 (1.8%)
	Bisexual	114 (23.3%)
	Asexual	3 (0.6%)
	Other	3 (0.6%)
	I do not want to answer	2 (0.4%)
Current relationship status	Single	276 (56.4%)
	Stable relationship	198 (40.5%)
	Married / Live together	15 (3.1%)
Monthly income**	Up to 1 minimum wage #	17 (3.5%)
	From 1 to 2 minimum wages	42 (8.6%)
	From 2 to 5 minimum wages	180 (37.0%)
	From 5 to 10 minimum wages	134 (27.5%)
	More than 10 minimum wages	86 (17.7%)
	I don't know/don't want to answer	28 (5.7%)
First sexual experience	Yes	434 (88.6%)
	No	48 (9.8%)
	I do not want to answer	8 (1.6%)

*The sample size can be different in some variables due to missing values ** Considering both students who depended on a financial responsible and those who were solely financially responsible for their expenses (9.6%)
Reference value for the Brazilian minimum wage at 2022 = R$ 1.212,00 (exchange rate in February 2022 was 1 USD = 5.01 BRL)

Source: Authors.

Table 2. Distribution of responses of the undergraduate students (n = 491) to the items of the Short-Form Condom Attitude Scale (Short-Form CAS). Ribeirão Preto, São Paulo, 2021.

Items of Short-Form CAS	Male	Female	Total
	n (%)	n (%)	n (%)
1. Condoms are uncomfortable			
Strongly disagreed	33 (17.5)	84 (27.8)	117 (23.8)
Disagreed	44 (23.3)	80 (26.5)	124 (25.3)
Undecided or neutral	51 (27)	55 (18.2)	106 (21.6)
Agreed	35 (18.5)	36 (11.9)	71 (14.5)
Strongly agreed	13 (6.9)	3 (1)	16 (3.3)
I do not want to answer	13 (6.9)	44 (14.6)	57 (11.6)
2. The idea of using condoms does not appeal to me			
Strongly disagreed	87 (46)	171 (56.6)	258 (52.5)
Disagreed	50 (26.5)	66 (21.9)	116 (23.6)
Undecided or neutral	33 (17.5)	31 (10.3)	64 (13)
Agreed	14 (7.4)	22 (7.3)	36 (7.3)
Strongly agreed	2 (1.1)	3 (1)	5 (1)
I do not want to answer	3 (1.6)	9 (3)	12 (2.4)
3. Using condoms make sex un-enjoyable			
Strongly disagreed	56 (29.6)	137 (45.5)	193 (39.4)
Disagreed	71 (37.6)	82 (27.2)	153 (31.2)
Undecided or neutral	31 (16.4)	37 (12.3)	68 (13.9)
Agreed	15 (7.9)	8 (2.7)	23 (4.7)
Strongly agreed	2 (1.1)	2 (0.7)	4 (0.8)
I do not want to answer	14 (7.4)	35 (11.6)	49 (10)
4. Proper use of condoms enhance sexual pleasure			
Strongly disagreed	25 (13.2)	18 (6)	43 (8.8)
Disagreed	43 (22.8)	57 (18.9)	100 (20.4)
Undecided or neutral	66 (34.9)	112 (37.2)	178 (36.3)
Agreed	27 (14.3)	43 (14.3)	70 (14.3)
Strongly agreed	6 (3.2)	18 (6)	24 (4.9)
I do not want to answer	22 (11.6)	53 (17.6)	75 (15.3)
5. I would avoid using condom if possible			
Strongly disagreed	42 (22.2)	93 (30.9)	135 (27.6)
Disagreed	44 (23.3)	73 (24.3)	117 (23.9)
Undecided or neutral	33 (17.5)	39 (13)	72 (14.7)
Agreed	44 (23.3)	62 (20.6)	106 (21.6)
Strongly agreed	22 (11.6)	15 (5)	37 (7.6)
I do not want to answer	4 (2.1)	19 (6.3)	23 (4.7)
6. I just don't like the idea of using condoms			
Strongly disagreed	87 (46)	172 (57.1)	259 (52.9)
Disagreed	71 (37.6)	77 (25.6)	148 (30.2)
Undecided or neutral	19 (10.1)	23 (7.6)	42 (8.6)
Agreed	7 (3.7)	17 (5.6)	24 (4.9)
Strongly agreed	2 (1.1)	1 (0.3)	3 (0.6)
I do not want to answer	3 (1.6)	11 (3.7)	14 (2.9)
7. Men who use condoms show concern and responsibility to their partner(s)			
Strongly disagreed	3 (1.6)	5 (1.7)	8 (1.6)
Disagreed	2 (1.1)	6 (2)	8 (1.6)
Undecided or neutral	13 (6.9)	16 (5.3)	29 (5.9)
Agreed	68 (36)	87 (28.8)	155 (31.6)
Strongly agreed	102 (54)	183 (60.6)	285 (58)
I do not want to answer	1 (0.5)	5 (1.7)	6 (1.2)

it continues

The study of psychometric properties of the scale started by testing the fitting of the one-factor model (originally proposed) of the scale to data. Table 3 presents the psychometric indicators found for each model tested. We found adequate values in the goodness of fit indices for the one-factor model (Model 1), indicating good factorial validity. However, items 7 (λ = -0.28), 8

Table 2. Distribution of responses of the undergraduate students (n = 491) to the items of the Short-Form Condom Attitude Scale (Short-Form CAS). Ribeirão Preto, São Paulo, 2021.

Items of Short-Form CAS	Male	Female	Total
	n (%)	n (%)	n (%)
8. Using condoms are unmanly			
Strongly disagreed	155 (82)	218 (72.2)	373 (76)
Disagreed	15 (7.9)	17 (5.6)	32 (6.5)
Undecided or neutral	4 (2.1)	4 (1.3)	8 (1.6)
Agreed	7 (3.7)	23 (7.6)	30 (6.1)
Strongly agreed	6 (3.2)	31 (10.3)	37 (7.5)
I do not want to answer	2 (1.1)	9 (3)	11 (2.2)
9. Condoms are the best way to protect myself from HIV and against other STIs			
Strongly disagreed	2 (1.1)	0 (0)	2 (0.4)
Disagreed	0 (0)	0 (0)	0 (0)
Undecided or neutral	3 (1.6)	2 (0.7)	5 (1)
Agreed	50 (26.5)	57 (18.9)	107 (21.8)
Strongly agreed	133 (70.4)	241 (79.8)	374 (76.2)
I do not want to answer	1 (0.5)	2 (0.7)	3 (0.6)
10. Suggestion from a partner to use a condom mean that she doesn't trust her partner			
Strongly disagreed	131 (69.3)	251 (83.1)	382 (77.8)
Disagreed	49 (25.9)	36 (11.9)	85 (17.3)
Undecided or neutral	4 (2.1)	8 (2.6)	12 (2.4)
Agreed	3 (1.6)	4 (1.3)	7 (1.4)
Strongly agreed	1 (0.5)	1 (0.3)	2 (0.4)
I do not want to answer	1 (0.5)	2 (0.7)	3 (0.6)

Source: Authors.

Table 3. Structural models tested for the Short-Form Condom Attitudes Scale applied to undergraduate students (n = 490) and results of Confirmatory Factor Analysis and internal consistence study. Ribeirão Preto, São Paulo, 2021.

Structural model	λ	x^2/df	CFI	TLI	RMSEA	SRMR	α	ω
Model 1 Original proposal – one-factor structure	0.19 to 0.91	1.83	0.99	0.99	0.05	0.06	0.55	0.67
Model 2 Two-factor structure (Factor 1: positive attitude/Factor 2: negative attitude)	Factor 1: 0.19 to 0.91 Factor 2: 0.27 to 0.68	1.76	0.99	0.99	0.04	0.06	Factor 1: 0.75 Factor 2: 0.29	Factor 1: 0.80 Factor 2: 0.41
Model 3 One-factor structure – excluding the items 7, 8 and 9	0.51 to 0.91	1.77	0.99	0.99	0.04	0.04	0.72	0.77

λ: factorial loadings, χ^2/df: Chi-square by degrees of freedom, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, RMSEA: Root Mean Square Error of Approximation, SRMR: Standardized Root Mean Squared Residual, α: ordinal alpha coefficient, ω: omega coefficient.

Source: Authors.

(λ = 0.19), and 9 (λ = -0.22) had very low factor loadings. When we excluded these items (Model 3), good fits of the one-factor model to data were maintained. Additionally, we tested an alternative model (Model 2), with two factors (positive and negative attitude). This structure also did not fit the data, as the factor loadings of the items were inadequate (item 7: λ = 0.35, item 8: λ = 0.19, and item 9: λ = 0.27).

The internal consistency for Models 1 and 2 was below adequate considering the results of α and ω. On the other hand, Model 3 presented good reliability. Therefore, Model 3, which considered the exclusion of items 7, 8, and 9, exhibited good factorial validity and reliability, suggesting that the one-factor solution of the Short-Form CAS was appropriate for the sample.

Discussion

Only a few studies have been carried out on the behavioral factors associated with condom use among the groups in which the epidemic is concentrated, which can be exacerbated by a lack of appropriate instruments. Therefore, the main contribution of the present study to the scientific literature is to propose a simplified, transculturally adapted, and easy-to-apply version of the Short-form CAS with some psychometric properties verified when applied to undergraduate students.

The Portuguese version of Short-Form CAS required no substantial adjustments or updates during the transcultural adaptation stage. Because all of the questions are made up of basic and direct language, we believe that, despite being tested on a group of undergraduate students, the Portuguese version of Short-Form CAS can also be applied in different contexts in the Brazilian population without modification.

A positive attitude towards the use of condoms can be suggested among undergraduate students by observing the distribution of responses to the items in general. However, it draws attention to the frequency of undecided students or those who refuse to respond to some questions, such as in items 1 and 4 about the comfort of using condoms and the increase in pleasure when using condoms properly. It is noteworthy that the option "I do not want to answer" was included due to a requirement of the Ethics Committee in Research with Human Beings, and was not part of the response categories of the scale in the original format. The participants who answered "I do not wan to answer" to any item of Short-Form CAS were excluded from the CFA in the present study.

Three items presented low factorial weights in the CFA for both one-factor and two-factor models, which harmed the local model fit. As a result, the model with the optimum factorial solution for the scale applied to the sample of undergraduate students was the one that considered the exclusion of items 7, 8, and 9 (Model 3). Observing the theoretical content of these items, items 7 and 8, are similar in terms of moral views and ideals about men's condom use behavior, expressing feelings and views that may not be common in the study's target population. In addition, items 7, 8 and 9 showed a certain concentration of response frequencies in the extremes of the scale (ceiling and floor effects), which may have contributed to the low factor weights found. However, we emphasize that this structure must be evaluated and confirmed in different samples before presenting a version of the instrument with seven items, which is not the objective of the present manuscript. Therefore, we recommend that future studies that consider applying the Portuguese version of Short-Form CAS use the complete version with ten items.

We can point out the convenience sample as a limitation of the current study. Although our sample included students from different areas, distributed among the eight units of the Campus and a variety of undergraduate courses, our results cannot be generalized to all Brazilian students. In addition, the online nature of the instrument does not prevent respondents from providing false information, sharing the survey link with people outside the target population, or answering the instrument more than once. However, we believe that this was not common in our case, since we did not have duplicate records or responses that appeared to be inconsistent with those observed for the sample as a whole.

Almost all health behavior models consider attitude as a relevant factor and evidence suggests that attitude toward condom use is a strong predictor of the decision to use or not[24,25]. In addition, understanding the factors that influence condom use is critical for developing effective interventions and community programs to reduce STI incidence[26]. In this regard, the proposal of the Portuguese version of the Short-Form CAS opens up new research avenues for the field, particularly by making it possible to operationalize the construct attitude toward condom use in a straightforward manner and with few items. Ad-

ditionally, this scale can be combined with others in more in-depth investigations or multifactorial models in the study of sexual risk behavior in different contexts considering the Brazilian population.

The attitude towards condom use, in general, can be considered positive in the sample when observing the frequency of responses to the items of Short-Form CAS.

Despite the high degree of knowledge and a positive attitude regarding the importance of condom use for the prevention of STIs and HIV, a recent population-based study found a low frequency of condom use among young people both in their first and last sexual intercourse, with no difference between men and women [13]. These results were similar to previous studies with representative samples [27]. Thus, due to the unconformity between attitude, knowledge, and practice, we highly recommend that further research be conducted on behavioral aspects that influence condom use decisions.

Collaborations

All authors contributed to the study's conception and design. ML Zucoloto coordinated the study, wrote the methodology, collaborated on statistical analyses, and wrote the first draft for submission. WR Silva performed statistical analyses and collaborated in writing the manuscript. RA Silva coordinated the translation and cross-cultural adaptation stage. JLG Prudencio and VP Frazatto collaborated in the development of the methodology and collected the data. EZ Martinez coordinated the study, wrote the final version of the manuscript, and was in charge of financing the study through the funding agency. The final version of the manuscript was revised and approved by all authors before publication.

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References

1. Paiva V, Pupo LR, Barboza R. The right to prevention and the challenges of reducing vulnerability to HIV in Brazil. *Rev Saude Publica* 2006; 40(Suppl.):109-119.
2. Saffier IP, Kawa H, Harling G. A scoping review of prevalence, incidence and risk factors for HIV infection amongst young people in Brazil. *BMC Infect Dis* 2017; 17(1):675.
3. UNAIDS. Confronting inequalities [Internet]. 2021. [cited 2023 jul 7]. Available from: https://www.unaids.org/sites/default/files/media_asset/2021-global-aids--update_en.pdf
4. Pascom ARP, Veras N, Pinho REG, Pereira IO, Aquino LM, Freitas MA, Pereira GFM. Impact of COVID-19 pandemic on HIV care in Brazil. *Top Antivir Med* 2021; 29(1):289
5. The Lancet Global Health. Brazil enters the Bolsonaro zone. *Lancet Glob Health* 2019; 7(2):E160.
6. Rowley J, Vander Hoorn S, Korenromp E, Low N, Unemo M, Abu-Raddad LJ, Chico RM, Smolak A, Newman L, Gottlieb S, Thwin SS, Broutet N, Taylor MM. Chlamydia, gonorrhoea, trichomoniasis and syphilis: global prevalence and incidence estimates, 2016. *Bull World Health Organ* 2019; 97(8):548-562.
7. World Health Organization (WHO). Global health sector strategy on sexually transmitted infections 2016-2021 [Internet]. [cited 2023 out 13]. Available from: http://www.who.int/reproductivehealth/publications/rtis/ghss-stis/en

8. Brasil. Mnistério da Saúde (MS). Boletim Epidemiológico de Sífilis – 2018. [acessado 2023 ago 3]. Disponível em: https://www.saude.ba.gov.br/wp-content/uploads/2018/08/2018-Boletim-Epidemiologico-Sifilis.pdf
9. Traeger M, Stoové M. Why risk matters for STI control: who are those at greatest risk and how are they identified? *Sex Health* 2022; 19(4):265-277.
10. Dourado I, MacCarthy S, Reddy M, Calazans G, Gruskin S. Revisiting the use of condoms in Brazil. *Rev Bras Epidemiol* 2015; 18(1):63-88.
11. Noll M, Noll P, Silva PRE, Gomes JM, Soares Junior JM, Silveira EA, Sorpreso ICE. Associated factors and sex differences in condom non-use among adolescents: Brazilian National School Health Survey (PeNSE). *Reprod Health* 2020; 17(1):139.
12. Traeger MW, Cornelisse VJ, Asselin J, Price B, Roth NJ, Willcox J, Tee BK, Fairley CK, Chang CC, Armishaw J, Vujovic O, Penn M, Cundill P, Forgan-Smith G, Gall J, Pickett C, Lal L, Mak A, Spelman TD, Nguyen L, Murphy DA, Ryan KE, El-Hayek C, West M, Ruth S, Batrouney C, Lockwood JT, Hoy JF, Hellard ME, Stoové MA, Wright EJ; PrEPX Study Team. Association of HIV preexposure prophylaxis with incidence of sexually transmitted infections among individuals at high risk of HIV infection. *JAMA* 2019; 321(14):1380-1390.
13. Bomfim IG, Santos SD, Ruggiero CM, Napoleão AA, SANCAHIV. Factors associated with sexually transmitted infection/HIV diagnosis among a predominantly university population in Brazil. *Int J STD AIDS* 2021; 32(9):821-829.
14. Gräf DD, Mesenburg MA, Fassa AG. Risky sexual behavior and associated factors in undergraduate students in a city in Southern Brazil. *Rev Saude Publica* 2020; 17(54):41.
15. Felisbino-Mendes MS, Araújo FG, Oliveira LVA, Vasconcelos NM, Vieira MLFP, Malta DC. Sexual behaviors and condom use in the Brazilian population: analysis of the National Health Survey, 2019. *Rev Bras Epidemiol* 2021; 24(Suppl. 2):e210018.
16. Gutierrez EB, Pinto VM, Basso CR, Spiassi AN, Lopes MEBR, Barros CRS. Factors associated with condom use in young people – a population-based survey. *Rev Bras Epidemiol* 2019; 22:e190034
17. Lima IMB, Oliveira AEC, Andrade JM, Coêlho HFC, Lima KS. Modelo De decisão sobre o uso de preservativos: uma regressão logística Multinomial. *Tempus Actas Saude Colet* 2016; 10(2):67-80.
18. Stephanou AT, Freitas IK, Dias ACG. Factors associated with condom use behaviour among young university students. *Psico-USF* 2022; 27(3):539-352.
19. Roy T, Anderson C, Evans C, Rahman MS, Rahman M. Cross-cultural adaptation of the short-form condom attitude scale: validity assessment in a sub-sample of rural-to-urban migrant workers in Bangladesh. *BMC Public Health* 2013; 13:240.
20. Ferrer M, Alonso J, Prieto L, Plaza V, Monsó E, Marrades R, Aguar MC, Khalaf A, Antó JM. Validity and reliability of the St George's Respiratory Questionnaire after adaptation to a different language and culture: the Spanish example. *Eur J Respir Dis* 1996; 9(6):1160-1166.
21. Polit DF, Beck CT. The Content Validity Index: are you sure you know what's being reported? Critique and recommendations. *Res Nurs Health* 2006; 29(5):489-497.
22. Harris PA. Research Electronic Data Capture (REDCap) – planning, collecting and managing data for clinical and translational research. *BMC Bioinform* 2012; 13(Suppl. 12):A15.
23. Maroco J. *Análise de equações estruturais*. Lisboa: Reportnumber; 2014.
24. Senn TE, Scott-Sheldon LA, Carey MP. Relationship-specific condom attitudes predict condom use among STD clinic patients with both primary and non-primary partners. *AIDS Behav* 2014; 18(8):1420-1427.
25. Elshiekh HF, Hoving C, de Vries H. Psychosocial determinants of consistent condom use among university students in Sudan: findings from a study using the Integrated Change Model. *BMC Public Health* 2023; 23(1):578.
26. Starosta AJ, Berghoff CR, Earleywine M. Factor structure and gender stability in the multidimensional condom attitudes scale. *Assessment* 2015; 22(3):374-384.
27. Berquó E, Barbosa RM, Lima LP, Grupo de estudos em população, sexualidade e AIDS. Uso de preservativo: tendências entre 1998 e 2005 na população brasileira. *Rev Saude Publica* 2008; 42(Supl. 1):34:44.

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