Factors Associated with Condom Use Behaviour Among Young University Students

André Teixeira Stephanou[1]
Isabella Kahl de Freitas[1]
Ana Cristina Garcia Dias[1]

[1]*Universidade Federal do Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brasil*

Abstract
As the rates of sexually transmitted infections among Brazilian youth rise, college students present with low rates of condom use. Understanding which factors affect preventive behaviours may assist in promoting them. This study aimed to test the Theory of Planned Behaviour (TPB) as a model of condom use behaviour among young university students. Data on sexual behaviour, TPB, and personality variables were collected online with 343 sexually active students aged between 18 and 29. Seventy participants also provided follow-up data after 30 days. Structural equation models and ordinal regressions were used to analyse the effects of TPB variables on condom use behaviour. Attitude was the main predictor of behavioural intention in the cross-sectional and longitudinal models. Being in a relationship and lower age at sexual debut were also associated with less frequent condom use behaviour in the cross-sectional analysis. Behavioural intention and perceived control were associated with condom use behaviour.
Keywords: condoms; theory of planned behaviour; sexual health youth; sexual behaviour.

Fatores Associados ao Uso de Camisinha Entre Jovens Universitários

Resumo
Enquanto a incidência de infecções sexualmente transmissíveis cresce entre jovens brasileiros, universitários apresentam pouco uso de preservativos. Compreender quais fatores afetam a adoção de comportamentos preventivos pode auxiliar na sua promoção. Esse estudo testou a Teoria do Comportamento Planejado (TCP) como modelo de uso de camisinha entre jovens universitários. Foram coletados dados sobre comportamento sexual, TCP, e personalidade em questionário online com 343 estudantes sexualmente ativos entre 18 e 29 anos de idade. Setenta participantes também responderam ao *follow-up* após 30 dias. Modelos de equações estruturais e regressões ordinais foram usados para analisar os efeitos das variáveis da TCP no uso de preservativo. Atitude foi o principal preditor da intenção comportamental nos modelos transversal e longitudinal. Estar em um relacionamento e menor idade na primeira relação sexual também foram associados a uso menos frequente de preservativo na análise transversal. Intenção comportamental e controle percebido foram associados com uso de preservativo.
Palavras-chave: camisinha; teoria do comportamento planejado; saúde sexual; juventude; comportamento sexual.

Factores Asociados con el Uso del Condom Entre Jóvenes Universitarios

Resumen
Mientras la incidencia de infecciones de transmisión sexual aumenta entre los jóvenes brasileños, los estudiantes universitarios reportan poco uso de preservativos. Comprender qué factores inciden en la adopción de conductas preventivas puede ayudar en su promoción. Este estudio probó la Teoría del Comportamiento Planeado (TCP) como modelo de uso de preservativos entre jóvenes universitarios. Los datos sobre comportamiento sexual, TCP y personalidad fueron recopilados en un cuestionario en línea con 343 estudiantes sexualmente activos entre 18 y 29 años. Setenta participantes también respondieron al seguimiento después de 30 días. Se utilizaron modelos de ecuaciones estructurales y regresiones ordinales para analizar los efectos de las variables de TCP sobre la utilización del condón. La actitud fue el principal predictor de la intención en los modelos transversal y longitudinal. Estar en una relación y una edad más temprana en la primera relación sexual se asociaron con el uso menos frecuente de preservativo en el análisis transversal. La intención conductual y el control percibido se asociaron con el uso de condones.
Palabras clave: condón; teoría del comportamiento planeado; salud sexual; juventud; comportamiento sexual.

Introduction

The incidence of sexually transmitted infections (STIs) is growing among young people in Brazil. Those aged between 13 and 35 show the greatest increase in detection rates of HIV and syphilis, according to national health surveillance reports (Ministério da Saúde, 2019a, 2019b). The current strategy for HIV prevention in Brazil, Combination Prevention, focuses on implementing actions targeting the structural, biomedical and behavioural domains of HIV prevention (Ministério da Saúde, 2017; UNAIDS, 2015). The rationale of Combination Prevention posits that no isolated effort can be successful in addressing HIV prevention. Despite its focus on HIV, most of Combination Prevention strategies also apply to the prevention of other

http://dx.doi.org/10.1590/1413/82712032270311

STIs. Among the behavioural strategies used to prevent STIs, the promotion of frequent condom use behaviour is notably versatile, as condom use is also effective as a contraceptive method (Ministério da Saúde, 2017; UNAIDS, 2015).

Survey data show that only about a third of young Brazilians used condoms in their latest sexual intercourse (Ministério da Saúde, 2016). University students also present low rates of condom use when compared to the general population (Borges et al., 2015; Gräf et al., 2020; Moreira et al., 2018; Nascimento et al., 2018; Sales et al., 2016; Stephanou et al., 2020), despite having access to more education – which has been associated with better knowledge about STI prevention (Ministério da Saúde, 2016; Miranda et al., 2013). Campos et al. (2017) show that, in a sample of students from health-related programs, condom use was less frequent among seniors. One possible explanation for this occurrence is that stable relationships become more common as students age and progress in their study. It is usual for young people to forego condom use as a sign of love and trust in relationships assumed to be monogamous (Alves et al., 2017; Moore et al., 2017; Stephanou et al., 2020), especially if other contraceptive measures are supposedly in place (S. Brown, 2015; Fennell, 2011). This practice should ideally be coupled with frequent STI testing, which is not as commonplace in university students (Nascimento et al., 2018; Sales et al., 2016; Wagner et al., 2010). Other factors, such as difficulty acquiring condoms and trouble convincing partners to use them (Alves et al., 2017; S. Brown, 2015), may also hinder young people's ability to use condoms consistently.

The performance of risk behaviours such as drug and alcohol abuse is typical of late adolescence and early adulthood (Campos et al., 2017). These behaviours are often associated with inconsistent condom use (Dir et al., 2018; Gräf et al., 2020; Quintana et al., 2016). Gomes and Nunes (2015) suggest that this association may occur due to the existence of shared causes for these risk behaviours, such as personality traits. A recent meta-analysis on the links between personality traits and sexual health outcomes found that extraversion was positively associated with sexual risk behaviour, including inconsistent condom use. On the other hand, higher levels of agreeableness were associated with lower sexual risk-taking (Allen & Walter, 2018). While personality traits provide useful insight into the associations between different risk behaviours, they are not as often used as the basis for interventions aimed at preventing risk behaviours or promoting healthy behaviours, perhaps because personality traits are relatively stable over time.

The Theory of Planned Behaviour (TPB; Fishbein & Ajzen, 2010) provides a useful framework for understanding health behaviour performance. It has been used to study condom use behaviour (Albarracín et al., 2001; Andrew et al., 2016; Asare, 2015; Gomes & Nunes, 2017) and as a theoretical basis for sexual health interventions (Steinmetz et al., 2016; Tyson et al., 2014). The main proposition of the TPB is that behaviour is mostly determined by one's intention to perform it and one's control over that performance (Fishbein & Ajzen, 2010). Intention is determined by the attitude towards the performance of the behaviour, the subjective norm, and the perceived behavioural control. Other relevant variables (e.g., gender, age, personality, or emotional arousal) should influence behaviour indirectly, via the TPB components (Fishbein & Ajzen, 2010). Critics of the TPB claim that the addition of variables external to the model as predictors of intention or behavioural provide evidence of the failure and limitation of the theory (Sniehotta et al., 2014). The proponents of the TPB (Fishbein & Ajzen, 2010) recognize the possibility of adding more variables to the model, but they stress that such additions should be conducted parsimoniously.

Studies investigating sexual behaviour and the TPB have shown that attitude (Chinazzo et al., 2014; Rich et al., 2014), subjective norm (Choi et al., 2019; Gomes & Nunes, 2017) and perceived control (Andrew et al., 2016; Matos et al., 2009) all have affected condom use intentions in different samples. A meta-analysis of TPB studies about condom use found that the association between intention and behaviour was stronger when the behaviour was measured retrospectively, suggesting past experiences influence the TPB components (Albarracín et al., 2001). This meta-analysis also points to the importance of longitudinal designs for TPB studies, as cross-sectional data cannot be used for causal inference and is likely to overestimate the association between psychological and behavioural measures (Sniehotta et al., 2014). Another meta-analysis (Steinmetz et al., 2016) showed that TPB-based interventions focused on sexual health behaviour had moderate effects on subjective norm, perceived control and intention to perform safe sex and contraceptive behaviours.

Despite the evidence for the usefulness of TPB in understanding and promoting sexual health behaviours, there are few reports of its application in Brazil.

Current research has focused on adolescents, used cross-sectional designs, and described attitude and perceived control as the main correlates of condom use intentions (Chinazzo et al., 2014; Matos et al., 2009). Focusing on young adults should allow for more frequent rates of sexual intercourse, which is necessary to assess condom use behaviour. As stated, while university students have more access to information, they frequently engage in unprotected sex. The accessibility of this population then makes it an ideal target for the study of condom use correlates.

This study aimed to investigate the condom use behaviour of Brazilian university students using the TPB. An extended model with personality and situational factors will also be tested to check if additional variables improve the model's ability to explain condom use behaviour in this sample. In order to assess the association of intention with future behaviour, data were collected twice over 30 days.

The following hypotheses were tested: H1 – intention will be associated with condom used behaviour prospectively as well as retrospectively; H2 – the association between intention and future behaviour will be smaller than the association of intention and past behaviour; H3 – all TPB components will be associated with intention to use condoms; H4 – variables outside the TPB framework (i.e. personality, sexual history, substance use) will only have indirect effects on condom use, via the TPB components.

Methods

This was a survey study with cross-sectional and longitudinal data collection assessing the ability of the TPB to explain the condom use behaviour of young Brazilian university students.

Participants

The inclusion criteria for this study were to be a university student between the ages of 18 and 29, studying in a Brazilian institution. Seven hundred and eighty-three people accessed the online survey. After data screening for invalid responses, 28 participants were excluded due to not being university students, providing fictional answers, or not agreeing to the informed consent form. Of the remaining 755 participants, 461 (61%) completed the entire survey. Of those, 343 were sexually active in the previous 30 days. Participation lasted an average of one and a half hour, although this value is inflated by participants that completed the survey in more than one sitting, as SurveyMonkey records start and end time. Filtering out participants with over 6 hours between start and end time, the average goes down to 22 minutes.

For the longitudinal sample, 110 participants that provided consent to be contacted 30 days after the first survey received an invitation to complete a follow-up survey. Eighty-two (74%) participants accessed the survey, with 74 (90%) providing complete answers. After the removal of forms with conflicting information, 70 (95% of complete answers; 64% of participants eligible for follow-up contact) participants remained.

Mean age of participants was 23 years in both samples. Women made up 62% of the cross-sectional and 69% of the longitudinal sample. Sixty-seven per cent of both samples reported being heterosexual. Table 1 provides summary data on other demographic characteristics of the samples.

Of the 343 participants that comprised the cross-sectional sample, 44.6% reported always using condoms in the past 30 days during anal or vaginal intercourse. For the longitudinal sample, condom use frequency was slightly lower, with 40% having reported always using condoms in the 30 days before the first instance of data collection, and 29.1% reporting always using condoms in the 30 days between data collection times. Descriptive statistics for the TPB, personality, sexual behaviour, and other behavioural variables are available in Table 2.

Instruments

The online platform SurveyMonkey was used to administer the survey. Participants were instructed to consider only "male" condoms whenever "condoms" were referenced, and anal or vaginal intercourse whenever "sexual intercourse" was mentioned. The measures are presented in the same order they were presented to the participants.

Demographic Data

Data on participants' age, sex, gender identity, race, sexual orientation, and other demographic data were collected to describe the sample and match within-subject data.

Direct Measures of the TPB Components

The behaviour of "using condoms in all instances of sexual intercourse in the next 30 days" was specified according to TPB questionnaire development guidelines (Fishbein and Ajzen 2010). Intention to use condoms was measured with four items ($\lambda 2 = .94$).

Table 1.
Sample characterization - cross-sectional (n = 343) and longitudinal (n = 70)

Variables	Cross-sectional sample	Longitudinal sample
Age (*M; SD*)	23.64 (3.19)	23.43 (3.02)
Sex (n; %)		
Female	214 (62.4)	48 (68.6)
Male	129 (37.6)	22 (31.4)
Race (n; %)		
White	190 (55.4)	37 (52.9)
Mixed	108 (31.5)	21 (30)
Black	34 (9.9)	7 (10)
Other	11 (3.2)	5 (7.1)
Sexual orientation (n; %)		
Heterosexual	233 (67.9)	47 (67.1)
Bisexual	65 (19)	12 (17.1)
Gay	36 (10.5)	11 (15.7)
Lesbian	3 (0.9)	-
Other	6 (1.7)	-
Relationship status (n; %)		
Steady relationship / Married	230 (67.6)	35 (50)
Single / Casual relationship	108 (22.4)	33 (47.1)
Other	5 (1.5)	2 (2.9)
Study level (n; %)		
Undergraduate	228 (66.5)	48 (68.6)
Graduate	115 (33.5)	22 (31.4)
Region of residence (n; %)		
North	40 (11.7)	8 (11.4)
Northeast	75 (21.9)	17 (24.3)
Midwest	40 (11.7)	8 (11.4)
Southeast	108 (31.5)	21 (30)
South	80 (23.3)	16 (22.9)
Living with (n; %)		
Family	226 (53.3)	40 (57.1)
Spouse/Partner	56 (16.3)	8 (11.4)
Friends	42 (12.2)	9 (12.8)
Alone	39 (11.4)	8 (11.4)
Other	23 (6.7)	5 (7.1)
Religiosity		
No affiliation/ Agnostic/ Atheist	177 (51.6)	40 (57.1)
Religious	166 (48.4)	30 (42.9)

Five semantic-differential items measured attitude (λ2 = .83). Four items measured injunctive subjective norm (λ2 = .81). Four items with the same general referents were also used to measure descriptive subjective norm (λ2 = .81). Perceived control was measured by four items (λ2 = .87). All items were scored on a scale from 1 to 5. The 21 item model presented a good fit to the data: χ^2 (178) = 348.758, $p < .001$, RMSEA(90% CI) = .053 (.045-.061), SRMR = .061, CFI = .99, GFI = .99). Item translations are available at https://osf.io/y9hvb/.

Sexual Behaviour and Risk Behaviours

Items from the National College Health Risk Behaviour Survey (NCHRBS), as adapted by Franca and Colares (2010), were used to measure sexual behaviour and drug use behaviour. Participants were asked about the age at sexual debut, number of lifetime sexual partners, condom-carrying behaviour, and STI testing history. Condom use frequency in the last 30 days was measured in five levels ranging from "never" to "always".

Drug use in the past month was computed into a three-level ordinal variable based on the sum of reported use of alcohol, cannabis, cocaine, and other drugs. Participants with fewer than three instances of drug use were considered "Low drug usage" (42.9%), "Intermediate drug usage" was set between three and seven instances (27.7%), and eight or more instances were considered "High drug usage" (29.4%). Drug use around sexual intercourse was measured in the last month and in the last instance of sexual intercourse.

Personality. The Reduced Inventory of Big Five Personality Factors (IGFP-5R; Laros et al., 2018, based on Benet-Martínez & John, 1998) was used to measure personality traits. The 16-item version was used as it presented better fit to the data: χ^2 (94) = 203.121, $p < .001$, CFI = .96, GFI = .99, RMSEA (90% CI) = .058 (.047-.069), SRMR = .059. Agreeableness was measured by three items with Guttman's λ2 = .72, Conscientiousness was measured by four items (λ2 = .73), Extraversion was measured by three items (λ2 = .85), Neuroticism was measured by three items (λ2 = .75), and Openness to experience was measured by three items (λ2 = .66). Items were scored from 1 ("Disagree completely") to 5 ("Agree completely").

Belief Measures of the TPB Components

Salient belief data was collected during the pilot study of the direct measures, using an open-ended questionnaire based on Fishbein and Ajzen's (2010) guidelines. Six behavioural belief items were created with the modal salient beliefs about using condoms. Behavioural belief items were the product of belief strength and outcome evaluation. Six injunctive belief items were created based on the modal referents for condom use behaviour. Participants were allowed to choose "does not apply" for referents that were not relevant for them (e.g., steady partner for single people). Injunctive belief items were the product of perceived referent approval and motivation to comply with each referent's expectations. Descriptive normative beliefs were measured by four items about the perceived behaviour of modal referents: single people, people in relationships, friends, and people concerned about their sexual health. Control belief items were constructed based on the modal beliefs about barriers and facilitating factors to condom use. Belief indices were composed by summing the items for each component.

Procedures

A pilot study to assess the adequacy of the direct measures of TPB components was conducted with 35 university students (17 online, 19 in-person). The in-person data collection was conducted by the first two authors in three different university campi. This sample was evenly split regarding gender (53% women), with participants from the five regions of Brazil. The mean age was 22.5 years old (*SD* = 3.1).

For the main study, participants were recruited via posts on 112 Facebook groups for university students. Video and images were used to advertise the study, with a maximum of two posts per group, submitted two weeks apart.

The study was reviewed and approved by the Research Ethics Committee of the researchers' institution (Certificate n. 05402818.4.0000.5334). Participants were presented with the informed consent form at every instance of data collection. Written consent was obtained during the in-person segment of the pilot study, while online consent was obtained by checking the appropriate option after reading the informed consent form. The pilot study occurred from April to May 2019. Data collection for the main study occurred from July to October 2019. Participants did not receive any sort of compensation for their participation at any phase of the study.

As the consent form did not anticipate open data, support data is not available for this study. To

Table 2.
Psychosocial and behavioural measures

Cross-sectional sample (n = 343)							
Variables	*M*	*SD*	Min	Max	Skew	Kurtosis	*S.E.*
Condom use frequency	3.52	1.66	1.00	5.00	-0.60	-1.36	0.09
Condom carrying behaviour	3.55	1.81	1.00	6.00	0.28	-1.55	0.10
Age at sexual debut	16.74	2.91	6.00	27.00	-002	1.19	0.16
Number of lifetime partners	12.44	19.25	1.00	100.00	3.12	10.50	1.04
Behavioural Intention	3.73	1.46	1.00	5.00	-0.85	-0.82	0.08
Attitude	3.83	0.94	1.40	5.00	-0.66	-0.42	0.05
Injunctive Norm	3.78	1.03	1.00	5.00	-.072	-0.11	0.06
Descriptive Norm	2.53	0.95	1.00	5.00	0.23	-0.17	0.05
Perceived Control	4.17	1.09	1.00	5.00	-1.40	0.93	0.06
Behavioural Belief	116.19	24.97	18.00	150.00	-0.79	0.54	1.35
Injunctive Belief	54.77	31.10	0.00	150.00	0.72	0.18	1.68
Descriptive Belief	11.32	3.09	4.00	20.00	0.03	-0.14	0.17
Control Belief	18.81	3.82	5.00	25.00	-0.42	-0.11	0.21
Openness to Experience	3.79	0.74	1.33	5.00	-0.54	-0.09	0.04
Conscientiousness	2.75	0.93	1.00	5.00	0.27	-0.69	0.05
Extraversion	2.57	1.10	1.00	5.00	0.46	-0.76	0.06
Agreeableness	4.41	0.59	2.00	5.00	-1.10	1.16	0.03
Neuroticism	3.25	1.06	1.00	5.00	-0.17	-0.81	0.06
Longitudinal sample (n = 70)							
Variables	*M*	*SD*	Min	Max	Skew	Kurtosis	*S.E.*
Condom use frequency[a]	3.20	1.63	1.00	5.00	-0.32	-1.56	0.22
Condom carrying behaviour[b]	3.57	1.85	1.00	6.00	0.13	-.1.56	0.23
Age at sexual debut[b]	16.92	3.18	8.00	25.00	0.33	0.47	0.39
Number of lifetime partners[b]	13.09	21.15	1.00	100.00	3.21	10.27	2.62
Behavioural Intention	3.94	1.32	1.00	5.00	-1.16	0.01	0.16
Attitude	4.11	0.79	1.80	5.00.	-0.92	0.17	0.13
Injunctive Norm	3.77	0.93	1.50	5.00	-0.39	-0.62	0.10
Descriptive Norm	2.54	0.91	1.00	4.50	-0.16	-0.83	0.11
Perceived Control	4.21	0.96	1.25	5.00	-1.43	1.14	0.13
Behavioural Belief	121.36	22.79	54.00	150.00	-0.52	-0.39	2.72
Injunctive Belief	49.61	30.82	0.00	130.00	0.66	0.01	3.16
Descriptive Belief	10.96	2.82	18.00	14.00	-0.17	-0.21	0.34
Control Belief	18.87	3.59	9.00	25.00	-0.36	-0.44	0.43
Openness to Experience	3.81	0.69	2.00	5.00	-0.40	-0.48	0.08
Conscientiousness	2.67	0.81	1.00	4.25	0.02	-0.73	0.10
Extraversion	2.30	1.04	1.00	5.00	0.63	-0.48	0.12
Agreeableness	4.43	0.59	2.67	5.00	-0.84	0.05	0.07
Neuroticism	3.22	0.97	1.00	5.00	-0.16	-0.56	0.12

Note: a. only participants that reported sexual intercourse in the past 30 days (n = 55); b. only participants that reported ever having sex (n = 65)

remedy this, synthetic datasets were created with the synthpop package v. 1.5-1 and are available at https://osf.io/y9hvb/.

Data Analysis

All analyses were conducted on RStudio v. 1.2.5033 with R v. 3.6.2. Correlations were analysed between TPB, personality, sexual behaviour, and contextual variables to explore unanticipated associations. Pearson correlation coefficient (r) was used for scale and interval data while Spearman's rho was used for ordinal and categorical data, using the psych package v. 1.8.12.

Confirmatory factor analyses were run with the lavaan package v. 0.6-5 to examine the psychometric properties of the TPB measures and the personality inventory. Structural equation models of the association of TPB variables and condom use frequency in the past 30 days were estimated with Weighted Least Squares with Mean and Variance adjustment (WLSMV) due to the ordinal measurement level of psychological and behavioural variables. Factor loadings and other effects are estimated between the factors and a latent variable y* (T. A. Brown, 2006)

Ordinal regression models were used to analyse the association of intention and perceived control with self-reported behaviour in the longitudinal sample, due to the small n of sexually active participants and the ordinal outcome measure. These models were analysed using the rms package v. 5.1-4.

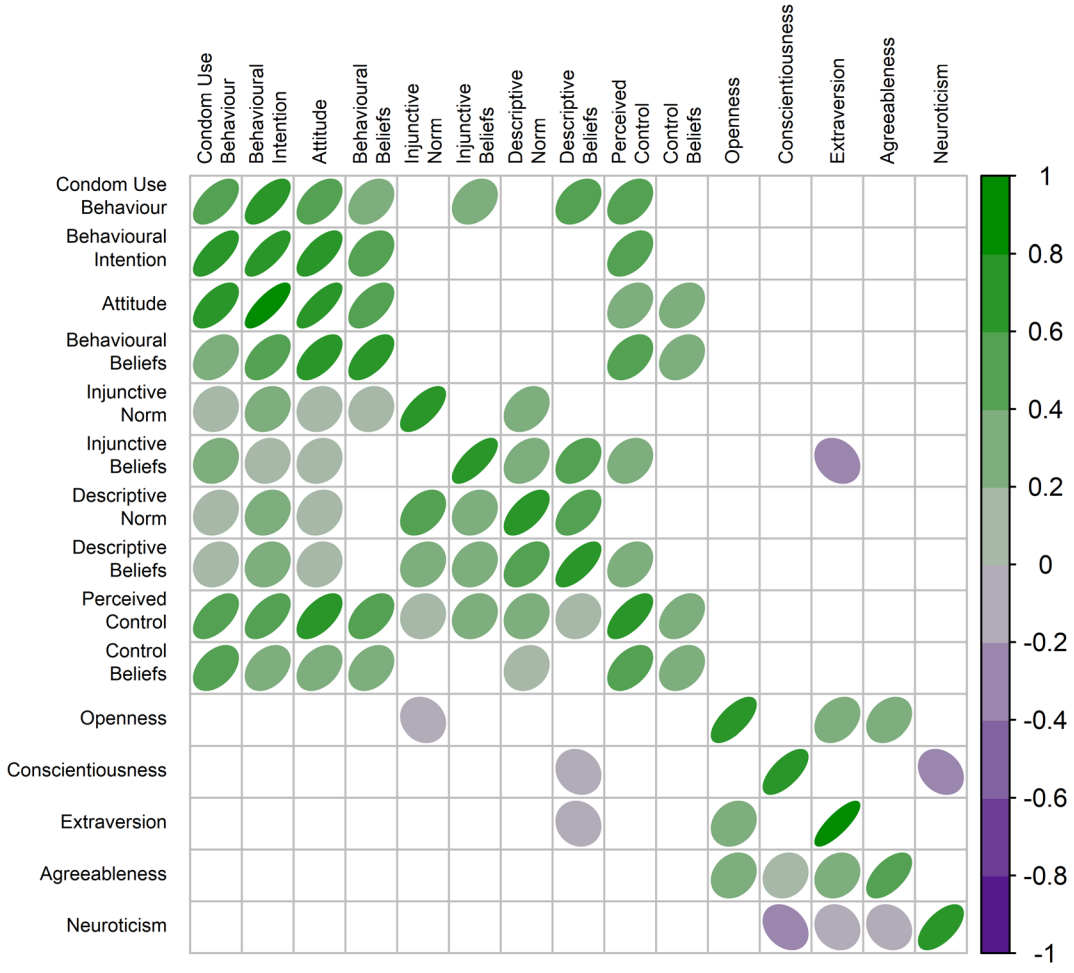

Figure 1. Spearman's rho correlations between condom use frequency in the past month, TPB, and personality variables. Lower half shows correlations in the cross-sectional sample, upper half shows correlations in the longitudinal sample. Diagonal shows correlations between measurements at baseline and follow-up.

Results

Figure 1 shows the association between condom use frequency in the previous month, TPB and personality variables. The pattern of associations of the injunctive belief index was different than what the TPB proposes. It was associated with every direct measure of TPB components, except injunctive norm. Personality variables were not associated with condom use frequency, and only had small correlations with TPB variables. Consequently, personality variables were not considered in the multivariate analyses. The association between condom use frequency and other sexual or risk behaviours are available in Figure 2.

Exploratory analysis of the data also showed that relationship status had an association with condom use frequency. People in relationships were less likely to report condom use when compared to single people or people in casual relationships, in the cross-sectional sample (r_{pb}= -.20). Given this association, relationship status was added to the extended model of condom use in the structural analyses.

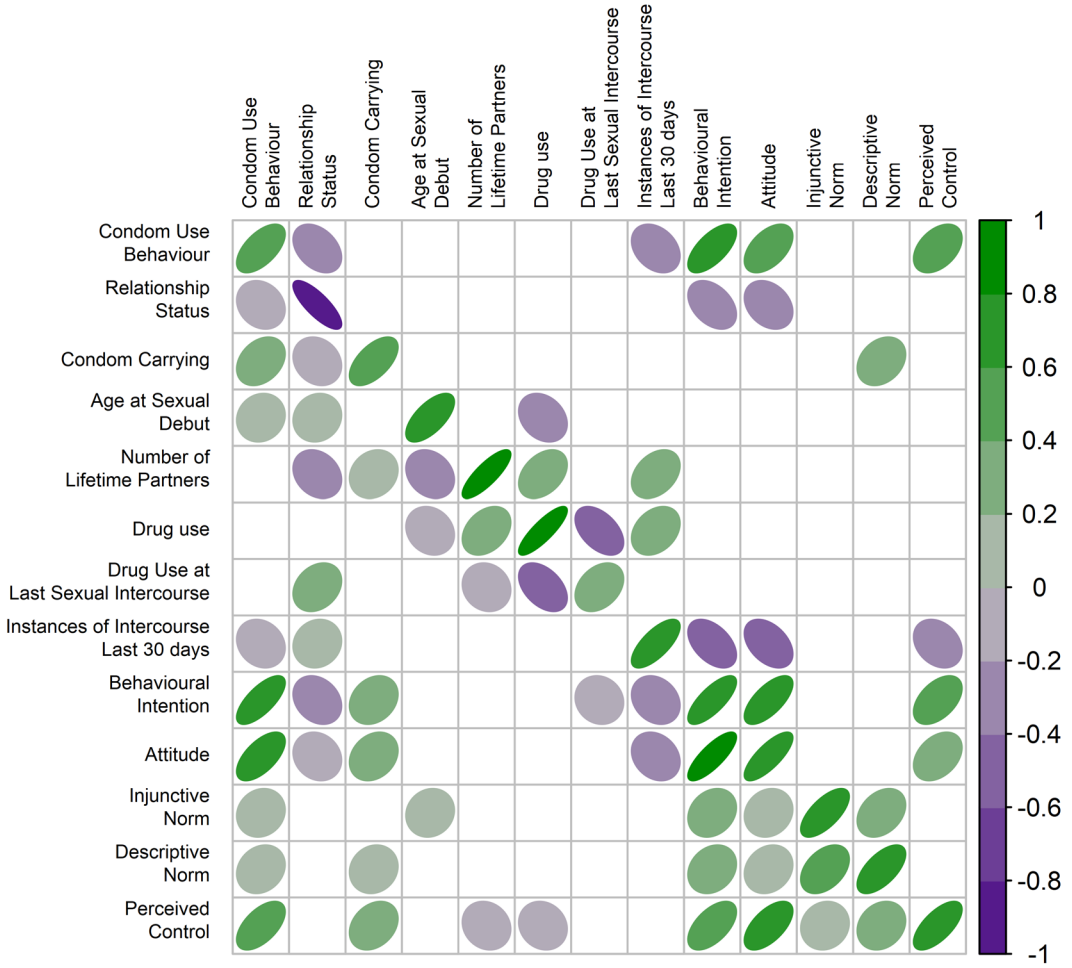

Figure 2. Spearman's rho correlations between condom use frequency in the past month, TPB, and behavioural variables. Correlations with relationship status and drug use at the last sexual intercourse are point-biserial. Relationship status coded as 1 = single/casual, 2 = married/dating. Drug use in the last sexual intercourse coded as 1 = yes, 2 = no. Correlation between number of lifetime partners and age at sexual debut are Pearson's. Lower half shows correlations in the cross-sectional sample (n = 343), upper half shows correlations in the longitudinal sample (n = 55 for correlations with condom use frequency, n = 65 for correlations with condom carrying, age at sexual debut, number of lifetime partners, drug use at last sexual intercourse and instances of intercourse in the last 30 days, and n = 70 for every other correlation). Diagonal shows correlations between measurements at baseline and follow-up.

The model testing the TPB model for self-reported condom use behaviour had a good fit to the data. As can be seen in Table 3, attitude and injunctive norm had significant effects on the intention to use condoms, and intention and control had significant effects on condom use. This provides partial support for the hypotheses as there was no effect of control and descriptive norm on the intention to use condoms.

Another model was tested including relationship status, age at sexual debut, number of lifetime sexual partners, condom-carrying behaviour, drug use in the past 30 days, and sexual intercourse under the influence of drugs in the previous 30 days as direct correlates of condom use frequency. This model also failed the goodness-of-fit test, but had adequate approximate fit statistics, χ^2 (323) = 686.864, $p < .001$, CFI = .98, GFI = .98, RMSEA(90%CI) = .057 (.051-.063), SRMR = .067. People in steady relationships were more likely to report inconsistent condom use, as well as people who had their sexual debut earlier and that did not carry condoms with them frequently. Intention and perceived control also had significant effects in the expected direction. As opposed to the previous model, control had a significant effect on intention. Full model estimates are presented in Table 3.

The hypothesis that the contribution of these added variables is mediated by the TPB variables was tested with a different specification of the extended model, with estimated effects of relationship status on attitude, age at sexual debut and number of lifetime

Table 3.
Structural equation models of condom use frequency in the last 30 days pants that reported sexual intercourse in the past 30 days (n = 55); b. only participants that reported ever having sex (n = 65)

Model 1 - TPB variables										
Path	*Est.*	*S.E.*	Z-value	*p*	Model fit					
ATT > BI	0.906	0.050	17.953	< .001	χ^2	376.432	*df*	197	*p*	< .001
IN > BI	0.200	0.073	2.746	.006	CFI	0.991				
DN > BI	-0.031	0.073	-0.419	.675	TLI	0.989				
PC > BI	0.095	0.068	1.384	.166	GFI	0.996				
BI > CUF	0.639	0.051	12.409	< .001	RMSEA	0.052	90% CI		0.044-0.059	
PC > CUF	0.360	0.077	4.677	< .001	SRMR	0.059				
Model 2 - TPB and additional correlates of condom use										
Path	*Est.*	*S.E.*	Z-value	*p*	Model fit					
ATT > BI	0.874	0.052	16.933	< .001	χ^2	686.864	*df*	323	*p*	< .001
IN > BI	0.199	0.076	2.626	.009	CFI	0.977				
DN > BI	-0.030	0.078	-0.389	.697	TLI	0.984				
PC > BI	0.142	0.070	2.033	.042	GFI	0.983				
BI > CUF	0.629	0.054	11.709	< .001	RMSEA	0.057	90% CI		0.051-0.063	
PC > CUF	0.353	0.087	4.071	< .001	SRMR	67				
RS > CUF	-0.451	0.145	-3.108	.002						
ASD > CUF	0.055	0.022	2.516	.012						
CC > CUF	0.218	0.038	5.801	< .001						
DU > CUF	-0.050	0.093	-0.537	.630						
DUS > CUF	0.024	0.081	0.292	.771						
NSP > CUF	-0.007	0.004	-1.689	.091						

CUF: Condom Use Frequency in past 30 days; BI: Behavioural Intention; ATT: Attitude, IN: Injunctive Norm; DN: Descriptive Norm; PC: Perceived Control; RS: Relationship Status; ASD: Age at Sexual Debut; CC: Condom-Carrying behaviour; DU: Drug Use past month; DUS: Drug Use during Sexual intercourse; NSP: Number of Sexual Partners; CFI: Confirmatory Fit Index; TLI: Tucker-Lewis Index; GFI: Goodness of Fit Index; RMSEA: Root Mean Square Error of Approximation; SRMR: Standardized Root Mean Square Residual.

partners on injunctive norms, and condom-carrying and drug use on perceived control. The fit statistics of this model were notably worse than previous models, χ^2 (323) = 1952.485, $p < .001$, CFI = .90, GFI = .93, RMSEA(90%CI) = .121 (.116-.127), SRMR = .180, which suggests that the model estimates should not be interpreted. Thus, the hypothesis that variables outside the TPB should not influence condom use behaviour directly was not supported in this study.

To examine the longitudinal effects of the TPB variables at the first data collection point on the intention and self-reported behaviour on the follow-up survey, an ordinal regression analysis was performed with attitude, injunctive norm, descriptive norm and perceived control as predictors of intention to use condoms (n = 70). Attitude was the only significant predictor of follow-up intention to use condoms, B = 1.549, SE = 0.289, $p < .001$. For the model of condom use frequency in the past 30 days (n = 55), both intention, B = 1.074, SE = 0.250, $p < .001$, and perceived control, B = 0.573, SE = 0.280, $p = .041$, were associated with more frequent condom use.

Discussion

The hypotheses that were tested in this study proposed that the Theory of Planned Behaviour would provide a useful explanation for the condom use behaviour of young Brazilian university students. The data provides partial support for the hypotheses. While intention was indeed the main correlate of self-reported condom use frequency, both in the cross-sectional and longitudinal analysis, the hypothesis that all components of TPB would be associated with the intention to use condoms was not supported.

The finding that attitude was the main correlate of intention to use condoms corroborates those of other studies, including meta-analyses (Albarracín et al., 2001; Chinazzo et al., 2014). This suggests that, for young Brazilian university students, the expectations they foster about the consequences of condom use may be the most important targets for interventions seeking to elevate condom use intentions.

Another important implication from this study concerns the sufficiency of TPB variables in explaining condom use behaviour. Despite the association of intention and perceived control with self-reported condom use frequency, these variables did not mediate the association of relationship status, age at sexual debut and condom-carrying behaviour with the behavioural outcome, as the theory proposes (Fishbein & Ajzen, 2010). This is a strong argument against the sufficiency of intention and perceived control as correlates of condom use frequency.

There was no association between any of the Big Five personality factors and condom use frequency in this sample. This result may be due to the short measure of personality, which means that some aspects of certain factors may not have been assessed as precisely as possible (Laros et al., 2018). One way to investigate the utility of this instrument in explaining condom use is to use it in a study that also measures a more specific personality correlate of condom use, such as impulsivity or sensation-seeking.

The lack of association between the injunctive belief index and the injunctive norm scale contradicts the TPB model, as indirect measures (belief indices) should be correlated with direct measures of the corresponding components (Fishbein & Ajzen, 2010; Montaño & Kasprzyk, 2015). This particular finding may have taken place due to two aspects of injunctive belief measurement that were not present in the direct measure: weighting the motivation to comply and allowing participants to choose "does not apply" when evaluating referents. Participants that perceived more social approval of condom use but were not motivated to abide by this approval would likely have lower injunctive belief scores when compared to their injunctive norm scores, which were not affected by motivation to comply.

Still, a gap remains in the literature concerning TPB-based interventions aimed at promoting condom use. Future studies could use media campaigns (Pedrana et al., 2014), leaflet interventions (Armitage and Talibudeen, 2010), web- or computer-based interventions (Hightow-Weidman, et al., 2018; Montanaro and Bryan, 2014) or face-to-face strategies (Goldsberry et al., 2016) as tools to change people's attitude, injunctive norm, descriptive norm, perceived control and intention towards condom use. According to the present findings, interventions aimed at young university students should emphasize the consequences of condom use/non-use in order to change attitudes toward condom use. As attitude was the main predictor of intention to use condoms, changing this component should also change subsequent behaviour. The behavioural belief measure showed that positive outcomes such as STI prevention and being more at ease after intercourse had higher means, while outcomes related to negative effects of condom use on pleasure or comfort were

evaluated closer to the scale midpoint, which suggests the sample was not as worried about condoms making intercourse less enjoyable. Taking into consideration that relationship status was the main external correlate of condom use, people in relationships may perceive preventive outcomes as less important because they assume that they are not at risk for an STI (Alves et al., 2017; Quintana et al., 2016). People in relationships are also affected by their partner's intention to use condoms, which was not taken into account in this study and may help in understanding condom use in this population (Isaacs et al. 2019). Future studies should aim to distinguish between how TPB variables relate to condom use behaviour among single people and people in relationships.

This study also provides important evidence for the applicability of the TPB to Brazilian samples, albeit in the limited population of university students. This builds upon the findings of studies that have successfully applied the TPB with Brazilian adolescents (Chinazzo et al., 2014; Matos et al., 2009). Despite the limited sample size, the present study describes a longitudinal test of the TPB model, providing support for the proposition that intention is an important predictor of future behaviour. As expected, the association of intention with future behaviour was significant and moderate, although weaker than the correlation of intention with previous behaviour.

The convenience sample used in this study is a limitation to the generalizability of the results. People that are more concerned about STIs or condom use may have been more likely to participate in the study. Such a bias may explain the large proportion of participants reporting always using condoms in the past 30 days when compared to other studies with similar populations (Alves et al., 2017; Borges et al., 2015; Gräf et al., 2020; Moreira et al., 2018; Sales et al., 2016; Stephanou et al., 2020). A replication of this study with a probability sampling approach would provide a more robust estimation of the prevalence of condom use and its association with the TPB and other psychosocial variables among young Brazilian university students.

The choice to focus on the "male" condom also limits the usefulness of this study as it pertains to the use of the "female" condom as a STI prevention strategy. In order to contribute more to prevention efforts, future studies should also investigate the utility of the TPB as a model of other preventive behaviours, such as STI testing, pre- and post-exposure prophylaxes (PrEP and PEP) among different segments of the population.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Albarracín, D., Johnson, B. T., Fishbein, M., & Muellerleile, P. A. (2001). Theories of reasoned action and planned behavior as models of condom use: A meta-analysis. *Psychological Bulletin*, *127*(1), 142–161. https://doi.org/10.1037/0033-2909.127.1.142

Allen, M. S., & Walter, E. E. (2018). Linking big five personality traits to sexuality and sexual health: A meta-analytic review. *Psychological Bulletin*, *144*(10), 1081–1110. https://doi.org/10.1037/bul0000157

Alves, B., Borges Gonçalves, M., Viviane Fontoura, L., & D'Eça Neves, G. (2017). Perfil sexual de estudantes universitários. *Revista Brasileira em Promoção da Saúde*, *30*(4), 1–8. https://doi.org/10.5020/18061230.2017.6219

Andrew, B. J., Mullan, B. A., de Wit, J. B. F., Monds, L. A., Todd, J., & Kothe, E. J. (2016). Does the Theory of Planned Behaviour Explain Condom Use Behaviour Among Men Who have Sex with Men? A Meta-analytic Review of the Literature. *AIDS and Behavior*, *20*(12), 2834–2844. https://doi.org/10.1007/s10461-016-1314-0

Armitage, C. J., & Talibudeen, L. (2010). Test of a brief theory of planned behaviour-based intervention to promote adolescent safe sex intentions. *British Journal of Psychology, 101*(1), 155–172. https://doi.org/10.1348/000712609X431728

Asare, M. (2015). Using The Theory of Planned Behavior to Determine the Condom Use Behavior Among College Students. *American Journal of Health Studies*, *30*(1), 43–50.

Benet-Martínez, V., & John, O. P. (1998). Los Cinco Grandes across cultures and ethnic groups: Multitrait-multimethod analyses of the Big Five in Spanish and English. *Journal of Personality and Social Psychology*, *75*(3), 729–750. https://doi.org/10.1037/0022-3514.75.3.729

Borges, M. R., Santos, Á. D. S., Da Silveira, R. E., & Lippi, U. G. (2015). Sexual behaviour among initial academic students. *Revista de Pesquisa: Cuidado é Fundamental Online*, *7*(2), 2505. https://doi.org/10.9789/2175-5361.2015.v7i2.2505-2515

Brown, S. (2015). 'They think it's all up to the girls': Gender, risk and responsibility for contraception. *Culture, Health & Sexuality*, *17*(3), 312–325. https://doi.org/10.1080/13691058.2014.950983

Brown, T. A. (2006). *Confirmatory factor analysis for applied research* (pp. xiii, 475). The Guilford Press.

Campos, L., Isensse, D. C., Rucker, T. C., & Bottan, E. R. (2017). Condutas de saúde de universitários ingressantes e concluintes de cursos da área da saúde. *Revista Brasileira De Pesquisa Em Saúde/Brazilian Journal of Health Research*, *18*(2), 17–25.

Chinazzo, Í. R., Câmara, S. G., & Frantz, D. G. (2014). Comportamento sexual de risco em jovens: Aspectos cognitivos e emocionais. *Psico-USF*, *19*(1), 1–12. https://doi.org/10.1590/S1413-82712014000100002

Choi, S. K., LeGrand, S., Dong, W., Muessig, K. E., & Hightow-Weidman, L. (2019). Condom use intentions mediate the relationships between psychosocial constructs and HIV sexual risk behavior in young Black men who have sex with men. *AIDS Care*, *31*(1), 53–60. https://doi.org/10.1080/09540121.2018.1492695

Dir, A. L., Gilmore, A. K., Moreland, A. D., Davidson, T. M., Borkman, A. L., Rheingold, A. A., & Danielson, C. K. (2018). What's the harm? Alcohol and marijuana use and perceived risks of unprotected sex among adolescents and young adults. *Addictive Behaviors*, *76*, 281–284. https://doi.org/10.1016/j.addbeh.2017.08.035

Fennell, J. L. (2011). Men Bring Condoms, Women Take Pills: Men's and Women's Roles in Contraceptive Decision Making. *Gender & Society*. https://doi.org/10.1177/0891243211416113

Fishbein, M., & Ajzen, I. (2010). *Predicting and Changing Behavior: The Reasoned Action Approach*. Psychology Press. https://doi.org/10.4324/9780203838020

Franca, C. da, & Colares, V. (2010). Validação do National College Health Risk Behavior Survey para utilização com universitários brasileiros. *Ciência & Saúde Coletiva*, *15*(suppl 1), 1209–1215. https://doi.org/10.1590/S1413-81232010000700030

Goldsberry, J., Moore, L., MacMillan, D., & Butler, S. (2016). Assessing the effects of a sexually transmitted disease educational intervention on fraternity and sorority members' knowledge and attitudes toward safe sex behaviors: *Journal of the American Association of Nurse Practitioners, 28*(4), 188–195. https://doi.org/10.1002/2327-6924.12353

Gomes, A., & Nunes, C. (2017). Predicting Condom Use: A Comparison of the Theory of Reasoned Action, the Theory of Planned Behavior and an Extended Model of TPB. *Psicologia: Teoria e Pesquisa*, *33*. https://doi.org/10.1590/0102.3772e33422

Gräf, D. D., Mesenburg, M. A., & Fassa, A. G. (2020). Risky sexual behavior and associated factors in undergraduate students in a city in Southern Brazil. *Revista de Saúde Pública*, *54*, 41. https://doi.org/10.11606/s1518-8787.2020054001709

Hightow-Weidman, L. B., LeGrand, S., Muessig, K. E., Simmons, R. A., Soni, K., Choi, S. K., Kirschke-Schwartz, H., & Egger, J. R. (2019). A Randomized Trial of an Online Risk Reduction Intervention for Young Black MSM. *AIDS and Behavior, 23*(5), 1166–1177. https://doi.org/10.1007/s10461-018-2289-9

Isaacs, C., Skakoon-Sparling, S., Kohut, T., & Fisher, W. A. (2019). A dyadic approach to understanding safer sex behavior in intimate heterosexual relationships. *Journal of Health Psychology,* 135910531987395. https://doi.org/10.1177/1359105319873958

Laros, J. A., Peres, A. J. de S., Andrade, J. M. de, & Passos, M. F. D. (2018). Validity evidence of two short scales measuring the Big Five personality factors. *Psicologia: Reflexão e Crítica*, *31*. https://doi.org/10.1186/s41155-018-0111-2

Matos, E. B. de, Veiga, R. T., & Reis, Z. S. N. (2009). Intenção de uso de preservativo masculino entre jovens estudantes de Belo Horizonte: Um alerta aos ginecologistas. *Revista Brasileira de Ginecologia e Obstetrícia*, *31*(11). https://doi.org/10.1590/S0100-72032009001100008

Ministério da Saúde. (2016). *Pesquisa de Conhecimentos, Atitudes e Práticas na População Brasileira—PCAP 2013*. Ministério da Saúde: Departamento de Vigilância, Prevenção e Controle das Infecções Sexualmente Transmissíveis, do HIV/Aids e das Hepatites Virais.

Ministério da Saúde. (2017). *Prevenção combinada do HIV: bases conceituais para profissionais, trabalhadores(as) e gestores(as) de saúde*. Ministério da Saúde; Departamento de Vigilância, Prevenção e Controle das Infecções Sexualmente Transmissíveis, do HIV/

Aids e das Hepatites Virais. http://www.aids.gov.br/pt-br/pub/2017/prevencao-combinada-do-hiv-bases-conceituais-para-profissionais-trabalhadoresas-e-gestores

Ministério da Saúde. (2019a). *Boletim Epidemiológico de Sífilis*. Ministério da Saúde: Departamento de Vigilância, Prevenção e Controle das Infecções Sexualmente Transmissíveis, do HIV/Aids e das Hepatites Virais. http://www.aids.gov.br/pt-br/pub/2019/boletim-epidemiologico-sifilis-2019

Ministério da Saúde. (2019b). *Boletim Epidemiológico HIV/Aids*. Ministério da Saúde: Departamento de Vigilância, Prevenção e Controle das Infecções Sexualmente Transmissíveis, do HIV/Aids e das Hepatites Virais. http://www.aids.gov.br/pt-br/pub/2019/boletim-epidemiologico-de-hivaids-2019

Miranda, A. E., Ribeiro, D., Rezende, E. F., Pereira, G. F. M., Pinto, V. M., Saraceni, V. (2013). Associação de conhecimento sobre DST e grau de escolaridade entre conscritos em alistamento ao Exército Brasileiro. Brasil, 2007. *Ciência & Saúde Coletiva, 18*(2), 489-497. https://doi.org/10.1590/S1413-81232013000200020

Montanaro, E. A., & Bryan, A. D. (2014). Comparing theory-based condom interventions: Health belief model versus theory of planned behavior. *Health Psychology, 33*(10), 1251–1260. https://doi.org/10.1037/a0033969

Montaño, D. E., & Kasprzyk, D. (2015). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. In *Health behavior: Theory, research, and practice, 5th ed* (pp. 95–124). Jossey-Bass.

Moore, A. A., Overstreet, C., Kendler, K. S., Dick, D. M., Adkins, A., & Amstadter, A. B. (2017). Potentially traumatic events, personality, and risky sexual behavior in undergraduate college students. *Psychological Trauma: Theory, Research, Practice and Policy*, *9*(1), 105–112. https://doi.org/10.1037/tra0000168

Moreira, L. R., Dumith, S. C., & Paludo, S. dos S. (2018). Uso de preservativos na última relação sexual entre universitários: Quantos usam e quem são? *Ciência & Saúde Coletiva*, *23*(4), 1255–1266. https://doi.org/10.1590/1413-81232018234.16492016

Nascimento, B. S., Spindola, T., Pimentel, M. R. A. R., Ramos, R. C. A., Costa, R. S., & Teixeira, R. S. (2018). Comportamento sexual de jovens universitários e o cuidado com a saúde sexual e reprodutiva. *Enfermería Global, 17*(49). https://doi.org/10.6018/eglobal.17.1.261411

Pedrana, A. E., Hellard, M. E., Higgs, P., Asselin, J., Batrouney, C., & Stoovè, M. (2014). No drama: Key elements to the success of an HIV/STI-prevention mass-media campaign. *Qualitative Health Research, 24*(5), 695–705. https://doi.org/10.1177/1049732314529024

Quintana, J. B., Calatayud, F. M., & Lanterna, L. P. (2016). Aspectos psicosociales de la salud sexual y reproductiva en estudiantes universitarios . *Salud & Sociedad*, *7*(2), 180–195. https://doi.org/10.22199/S07187475.2016.0002.00004

Rich, A., Mullan, B. A., Sainsbury, K., & Kuczmierczyk, A. R. (2014). The role of gender and sexual experience in predicting adolescent condom use intentions using the theory of planned behaviour. *The European Journal of Contraception and Reproductive Health Care, 19*, 295-305. https://doi.org/10.3109/13625187.2014.917624

Sales, W. B., Caveião, C., Visentin, A., Mocelin, D., Costa, P. M., & Simm, E. B. (2016). Comportamento sexual de risco e conhecimento sobre IST/SIDA em universitários da saúde. *Revista de Enfermagem Referência, IV*(10), 19-27. https://doi.org/10.12307/RIV16019

Sniehotta, F. F., Presseau, J., & Araújo-Soares, V. (2014). Time to retire the theory of planned behaviour. *Health Psychology Review*, *8*(1), 1–7. https://doi.org/10.1080/17437199.2013.869710

Steinmetz, H., Knappstein, M., Ajzen, I., Schmidt, P., & Kabst, R. (2016). How Effective are Behavior Change Interventions Based on the Theory of Planned Behavior?: A Three-Level Meta-Analysis. *Zeitschrift Für Psychologie*, *224*(3), 216–233. https://doi.org/10.1027/2151-2604/a000255

Stephanou, A. T., Delatorre, M. Z., & Dias, A. C. G. (2020). Opiniões sobre contracepção e comportamento sexual em jovens universitários do Sul brasileiro. *Psicologia: Teoria e Prática, 22*(3), 92–114.

Tyson, M., Covey, J., & Rosenthal, H. E. S. (2014). Theory of planned behavior interventions for reducing heterosexual risk behaviors: A meta-analysis. *Health Psychology: Official Journal of the Division of Health Psychology, American Psychological Association*,

33(12), 1454–1467. https://doi.org/10.1037/hea0000047

UNAIDS. (2015). *Fast-Tracking combination prevention*. Joint United Nations Programme on HIV/AIDS.

Wagner, T. M. C., Maggi, A., Souza, C. T., & Souza, R. S. (2010). Estudantes Universitários em Tempos de HIV: O contexto da testagem. *Interação em Psicologia, 14*(1), 61-71.

Recebido em: 28/09/2020
Reformulado em: 16/03/2021
Aprovado em: 20/04/2021

About the authors:

André Teixeira Stephanou is a Ph.D. student at the Núcleo de Pesquisas e Intervenções Cognitivo Comportamentais from the Graduate Program in Psychology of the Universidade Federal do Rio Grande do Sul.
ORCID: https://orcid.org/0000-0003-1135-5870
E-mail: astephanou@gmail.com

Isabella Kahl de Freitas is an undergraduate student of Psychology at the Universidade Federal do Rio Grande do Sul.
ORCID: https://orcid.org/0000-0001-6105-8773
E-mail: isabellakahlf@gmail.com

Ana Cristina Garcia Dias is a Professor at the Graduate Program in Psychology of the Universidade Federal do Rio Grande do Sul and coordinates the Núcleo de Pesquisas e Intervenções Cognitivo Comportamentais.
ORCID: https://orcid.org/0000-0003-2312-3911
E-mail: anacristinagarciadias@gmail.com

Contact:

Falta. Por favor enviar.