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Article

Predicting Condom Use among Undergraduate Students Based on the Theory of Planned Behaviour, Coquimbo, Chile, 2016

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Abstract: Background: Sexually transmitted infections and pregnancy in adolescents are acknowledged public health problems in many countries. Although it is known that the proper use of condoms allows avoiding these health problems, their use in Chile is still limited, for unknown reasons. Objective: Based on planned behavioural theory, the aim was to validate a behaviour model regarding condom use by measuring the influence of the variables that predict this use among Chilean university students. Methods: A cross-sectional descriptive study was carried out in October 2016 among 151 Chilean university students belonging to the health and engineering areas. The information was collected through a self-administered survey. The sample was divided into two groups: stable and not stable relationships. Partial least squares (PLS) regression was used for the analysis. Results: It was possible to explain the condom use of the students by 57%. The attitude was the main variable related to the intention of using condoms, together with the perceived behavioural control. Additionally, there are statistically significant differences in the variables that predict condom use among students with stable relations compared to those without a stable relationship. Conclusions: The planned behavioural theory is useful for predicting condom use behaviour when students have a stable partner.

Keywords: condoms; behaviour; Latin America; students

Introduction

Sexually transmitted infections (STIs) are varied and of high frequency among young people. The World Health Organization (WHO) estimates that over 357 million of STIs occur annually in the world, equivalent to one million infections per day [1]. These infections not only have an acute effect, but many have later repercussions in life, with chronic conditions, including AIDS and cancers like cervix and liver, caused by viral infections such as human papilloma virus and hepatitis B and C , respectively. Also infections like syphilis have serious long-term consequences (without treatment) and for children's health, as is the case of congenital syphilis.

In Chile, STIs in young people and teenage pregnancy are important public health problems. Chilean epidemiological surveillance systems show rising incidence rates of syphilis, gonorrhoea and HIV in recent years; the incidence is higher in populations between 20 and 34 years [2–5]. In fact, the latest study on the burden of disease in the country shows that STIs (excluding HIV / AIDS) are the seventh cause of loss of Healthy Life Years (DALYs) within the group of infectious diseases

among men; HIV / AIDS being the first cause among men; the seventh cause among women and third cause in the population in general [6]. Regarding HIV infection, in the last ten years HIV infections in Chile have increased by 67.8%, with the adolescent and young population by far leading the numbers. "Due to the lack of prevention campaigns and the difficulties to carry out the test - an option that WHO considers key to dealing with the epidemic - there is also a relaxation in the protection measures for the new generations born in an era where HIV is not a deadly disease" [7]. According to UNAIDS, in the year 2016, Chile had 5000 new HIV infections and there were 61000 people living with HIV [8]. On the other hand, 5% of new-borns are from mothers between 15 and 19 years; situation that creates risky conditions for both, mothers and new-borns [9].

The condom is considered a method with proven effectiveness for preventing pregnancy and transmission of diseases, and the promotion of its use as a prevention strategy in programs of good effectiveness must be incorporated [10]. According to WHO, when used correctly and consistently, condoms are one of the most effective methods of protection against STIs, including HIV. In fact, its proper use helps to reduce the risk of HIV infection by up to 96%. However, in Chile its low acceptance averts having an effect on the reduction of STIs and unwanted pregnancies at the population level. According to the National Health Survey (NHS 2010), only 53.7% of respondents have ever used condoms in their lives; having women less use than men (50% versus 57%) [11]. And recently, the NHS 2016, showed that only 12% men and 7% women reported to have used condoms in the past year [12].

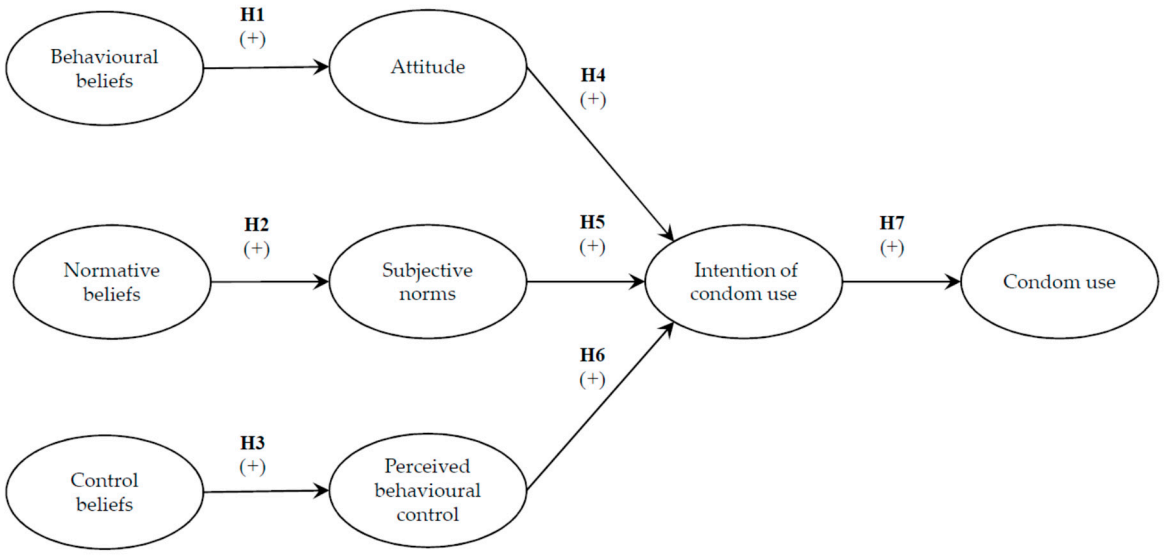
In addition to access to the condom, there are several factors that influence its use is accepted (or not) by young people. Several authors point out that these factors are related to educational level, gender, information, type of relationship, beliefs, benefits, and positive / negative effects of use / non-use [13–16]. In this sense, preventive campaigns of unwanted pregnancy and STI should be directed towards promoting healthy sexuality habits in the young population, including the appropriate use of condoms, with messages based on knowledge of the factors that could effectively influence their use. What are the causes of these low levels of condom acceptance in Chile? What variables determine the behaviour of condom use?

Framed within the study of human behaviour, the Theory of Planned Behaviour (TPB) constitutes a widely accepted conceptual framework to understand a varied set of behaviours, and in particular, the use of condoms [13]. The TPB was developed by Icek Ajzen in 1985 as an extension of the theory of reasoned action proposed five years earlier by himself and Martin Fishbein [17]. According to the TPB, the act of an individual is determined by the intention to perform such behaviour; this intention is a function of the attitude towards the procedure, the subjective norms, and the perceived social control. The attitude represents the positive or negative feelings of the individual about the performance of certain performance, while the intention describes the strength of the purpose of performing a certain procedure. Subjective norms represent the individual's perception of social pressures to perform or not perform a conduct. And finally, perceived behavioural control refers to the individual's perception of their ability to act in a certain way. Considering the antecedents, this research wishes to advance in the explanation of the use of the condom at an individual level in Chile. In particular, and based on the TPB, this study aims to measure the influence of the variables that predict the use of condoms in university students, in Coquimbo, Chile, 2016.

For the purposes of the study, and in relation to the individual behaviour of Chilean university students, the research model shown in Figure 1 was constructed. In the model and based on the previous literature [14, 19] the following hypotheses: H1: Behavioural beliefs are positively associated with attitude in relation to condom use. H2: Normative beliefs are positively associated with subjective norms in relation to the use of condoms. H3: Control beliefs are positively associated with perceived behavioural control in relation to condom use. H4: The attitude is positively associated with the intention of condom use. H5: Subjective norms are positively associated with the

intention of condom use. H6: Perceived social control is positively associated with the intention to use a condom. H7: The intention of condom use is positively associated with the condom use.

Figure 1: Model of investigation



2. Materials and Methods

A descriptive cross-sectional study was conducted in October 2016. A self-administered survey through the Internet was the technique of collecting information. The universe was 1450 university students, older than 18 years, of the careers of the Faculty of Medicine and the School of Engineering of the Guayacán Campus of the Universidad Católica del Norte (Chile). Sampling was for convenience: individuals corresponding to the needs of the study, being university students of health careers and engineering of the institution in which the researchers work, with the willingness to participate and answer the survey. The sample of the study was constituted by 151 students. The respondents expressed their explicit consent on the survey website before completing it. The survey asked the student his age, sex (two options, male or female), sexual orientation (two options, heterosexual or non-heterosexual), if he had been sexually active in the last month (two options, yes or no), if he had history of STIs (two options, yes or no), if you had been tested HIV (two options, yes or no), the use of alcohol or drugs when you have sex (three options, never, sometimes or always), and the type of relationship (three options, stable partner for more than 3 months, open relationship or casual partners, or no partner in the last 3 months). Additionally, the survey was based on measurement scales validated in the literature [13, 18]. Table 1 shows the definitions of operationalization of the variables of interest, its response format was Likert type of 7 points, where the answers range from "*strongly disagree*" to "*strongly agree*".

Table 1: Variable's operational definitions

Variable	Definition
Behavioural beliefs	Subjective probability that a behaviour produces a particular result
Attitude	Represents the positive or negative feelings of the individual about the performance of a certain behaviour
Normative beliefs	Beliefs about the extent to which other people who are important to an individual think that they should or should not perform a particular behaviour,
Subjective norms	Individual perception of social pressures to perform or not perform a

	behaviour
Control beliefs	Represents the perceived presence of factors that can facilitate or impede the performance of a behaviour,
Perceived behavioural control	The perception of the individual about his ability to act in a certain way
Intention to use a condom	Describes the strength of the purpose of using the condom
Condom use	Describes the use of a condom during the last month

Table 2 shows the items of the measurement scales and the validation carried out for each of the scales, indicating the validity of the measurement scales and the validity values of each item within them. In general there was a good degree of validity of all the constructs, with values of average variance extracted over 0.5 and values of discriminant validity, composite reliability and Cronbach's Alpha over 0.7. The values were maintained when the population is divided according to the type of relationship in two groups, a group called "*With stable couple*", which includes students with a stable partner for more than 3 months and a second group called "*No stable couple*", which integrates students with open relationship or casual partners. The descriptive analysis was carried out through relative frequencies (sex, sexual orientation, sexually active, condom use, history of STIs, HIV test, type of relationship, use of alcohol or drugs when they have sex). As a statistical technique for the analysis of the variables of interest, the modelling of structural equations *Structural Equations Modelling* (SEM) was used. In particular, the research model and the proposed relationships that were analysed with partial square regression technique *Partial Least Squares*, (PLS) [19], using the software *SmartPLS 3.0* [17]. PLS is the appropriate option for studies with a small sample, given that it has no restrictions in relation to the normality of the data to examine. The data collected was analysed in general and separating the sample, depending on whether they had or not a stable partner. This separation of groups has already been previously proposed in the literature [19]. To prove the existence of medians differences between these two groups, the nonparametric Mann-Whitney U test was used.

Ethical considerations: All subjects gave their informed consent for inclusion before they participated in the study. The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Ethics Committee of the Faculty of Medicine of the Catholic University of the North (Resolution No. 47 of September 28, 2016), guaranteeing the protection of the ethical principles in the research declared by said Committee. The field phase was carried out during the month of October 2016. The application of surveys was configured so that the anonymity of the respondent was preserved at all times. In the introduction of the instrument, the objective was explained and informed consent was included; which should be read by the student and accepted before entering the questions of the questionnaire. The configuration of the instrument gave the option to withdraw from responding at any time, without sending it to the database of the investigation.

Table 2: Cronbach´s Alfa, Average Variance Extracted (AVE), Composite Reliability and weighs.

Variables/Items		Sexually actives	With stable couple	No stable couple
Behavioural beliefs	AVE	0,69	0,64	0,70
	Composite Reliability	0,87	0,84	0,88
	Cronbach´s Alpha	0,78	0,73	0,80
	• The use of a condom every time I have sex next month	0,85	0,84	0,87

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Variables/Items		Sexually actives	With stable couple	No stable couple
	can physically distance me from my sexual partner			
	• The use of a condom every time you have sex next month can emotionally distance me from my sexual partner	0,86	0,87	0,78
	• The use of a condom every time you have sex next month can affect body pleasure (the sensation)	0,78	0,80	0,74
Attitude	AVE	0,69	0,55	0,73
	Composite Reliability	0,87	0,79	0,89
	Cronbach´s Alpha	0,77	0,58	0,81
	• For me, the use of a condom every time I have sex in the next month will be ... Pleasant-unpleasant	0,90	0,92	0,88
	• For me, the use of a condom every time I have sex in the next month will be ... Pleasant-unpleasant	0,87	0,93	0,65
	• For me, the use of a condom every time I have sex in the next month will be ... Good-bad	0,70	0,70	0,69
Normative beliefs	AVE	0,74	0,71	0,78
	Composite Reliability	0,85	0,83	0,88
	Cronbach´s Alpha	0,68	0,60	0,72
	• My parents (or equivalent to me) think I should use a condom every time I have sex next month	0,94	0,92	0,79
	• • My closest friends think I should use a condom every time I have sex next month	0,78	0,84	0,89
Subjetives norms	• People whose opinions I value would approve / disapprove my condom use every time I have sex next month.	N.C.	N.C.	N.C.
Control beliefs	AVE	0,63	0,53	0,63
	Composite Reliability	0,84	0,77	0,84
	Cro nbach´s Alpha	0,73	0,55	0,74
	• • I think that my main sexual partner will oppose us using a condom every time we have sex in the next two months	0,82	0,85	0,57
	• • Condoms will be easily accessible to me, if I decide to have sex in the next two months	0,79	0,77	0,84
	• For me, the use of a condom every time I have sex in the next two months is expensive	0,77	0,76	0,75
Perceived behavioural control	AVE	0,61	0,67	0,60
	• Composite Reliability	0,82	0,86	0,82

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Variables/Items		Sexually actives	With stable couple	No stable couple
	• Cronbach´s Alpha	0,69	0,76	0,67
	• For me, the use of a condom every time I have sex next month is possible	0,85	0,84	0,85
	• I am confident that if I wanted to, I could use a condom every time I have sex next month	0,71	0,69	0,84
	• It's easy for me to use a condom every time I have sex next month	0,77	0,78	0,76
Intention of use	AVE	0,96	0,88	0,95
	Composite Reliability	0,99	0,96	0,98
	Cronbach´s Alpha	0,98	0,96	0,98
	• I intend to use a condom every time I have sex next month	0,97	0,97	0,99
	• I will use a condom every time I have sex next month	0,98	0,98	0,96
	• I will try to use a condom every time I have sex next month	0,98	0,98	0,85

N.C. not possible to calculate

3. Results

Of the total of completed surveys, the majority were women (63%) and with an average age of 22 years. Near 95% with heterosexual orientation and 80% sexually active in the last month (n = 121). The latter are the sample from which the results of the analysis with PLS are presented. Among them, 31% never used a condom in the last month; 21% used it always and about half, sometimes. A low proportion of the respondents reported to have history of episodes of sexually transmitted infections (STIs 6%) and 13% reported having been screened for HIV infection. A relative majority of respondents (63.5%) stated that they were in a stable relationship (last 3 months); 18.5% have not had a partner in the last 3 months and another 18% mentioned having an open relationship. The consumption of alcohol or drugs when having sex was rare (6%). Of those who reported consuming, 38% mentioned sometimes and 56% never. See Table 3 for more detail.

Table 3: Distribution of the variables of interest in university students. Coquimbo, Chile, 2016´.

.Variable	N	%
Sex		
Masculine	56	37,1
Feminine	95	62,9
Total	151	100
Sexual orientation		
Heterosexual	143	94,7
No heterosexual	8	5,3
Total	151	100
Sexually actives (last month)	121	80,1
Condom use (in sexually actives)		
Never	38	31,4
Sometimes	58	47,9
Always	25	20,7

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Total	121	80,1
History of STIs (n=151)	13	8,6
HIV test (some time)	20	13,2
Type of relationship (n=151)		
Stable couple > 3 months	96	63,5
Open relationship, occasional couples	27	17,9
No couple (last 3 months)	28	18,5
Total	151	100
Use of alcohol or drugs when having sex		
Never	85	56,3
Always	9	6
Sometimes	57	37,8
Total	151	100
Age	Mean 21,9 ± 2,96 Range 18-34 years	

Figure 2 and Table 4 indicate results with respect to the research model and the relationships proposed. In Figure 2, the R^2 indicate the amount of the variance of the dependent variables that is explained by the variables that predict it (R^2 close to 1 indicates a high predictive power). In Figure A2 and Table 4, the β coefficients (standardized regression weights) indicate the extent to which the independent variables contribute to the explained variance of the dependent variables. The significance of the coefficients β was calculated using Bootstrap (procedure that creates K sets of samples in order to obtain K estimates of each parameter in the PLS model). The results obtained with Bootstrap are compared with the value of the Student's t distribution with K-1 degrees of freedom.

Figure 2: Model for sexually active individuals

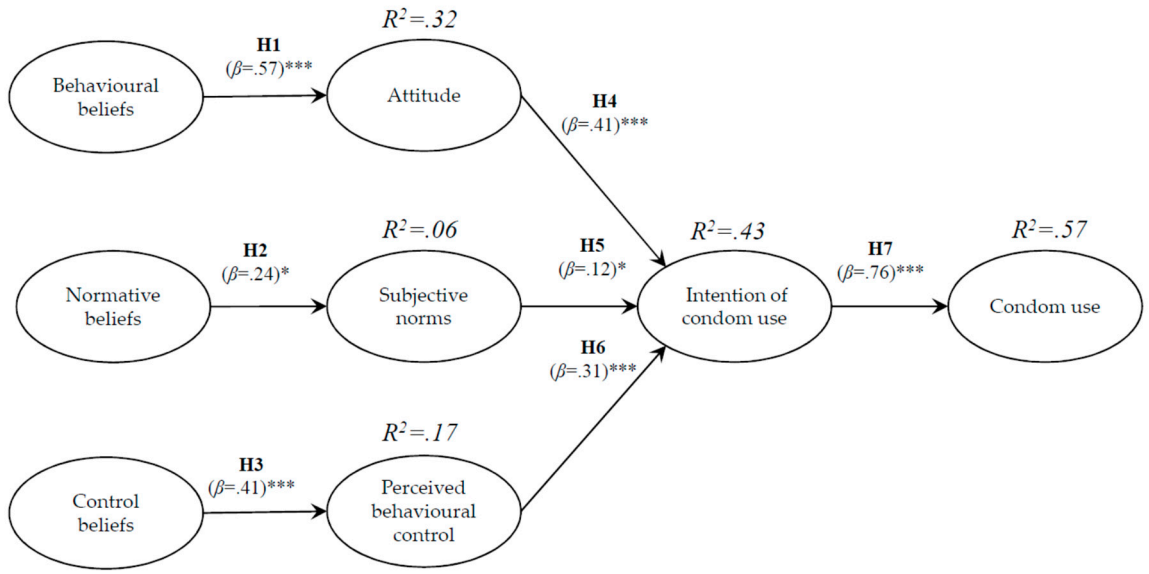

Table 4: Relationship by β coefficients

Relationship	Sexually actives (Sig.)	With stable couple (Sig.)	No stable couple (Sig.)	Test of differencies (p value)
Behavioural biliefs -> Attitude	0,57(***)	0,58 (***)	0,55 (***)	n.s.
Normative biliefs - > Subjetive norms	0,24 (*)	0,33 (***)	-0,13 (n.s.)	*
Control biliefs -> Percieved behavioural control	0,41 (***)	0,43 (***)	0,62 (***)	n.s.
Attitude -> Intention of use	0,41 (***)	0,60 (***)	0,17 (n.s.)	*
Subjective norms -> Intentionof use	0,12 (*)	0,12 (*)	-0,13 (n.s.)	+
Percieved behavioural control -> Intention of use	0,31 (***)	0,18 (*)	0,00 (n.s.)	n.s.
Intention of use -> Condom use	0,76 (***)	0,80 (***)	0,31 (n.s.)	**

Statistical significance: + p<0.1;* p<0.05; **p<0.01; ***p<0.001; n.s. no significant

In relation to sexually active individuals, the results of the PLS analysis supported the existence of all the relationships proposed in the research model. The strongest relationship found was between the intention to use and the use of a condom. 57% of the use is explained by having the intention to do so. Then, behavioural beliefs explain 32% of the attitude. The control beliefs explain 17% of the perceived behavioural control, and likewise, the attitude, the subjective norms and the perceived behavioural control explain, together, the intention of use in 43%. The relationship between normative beliefs and subjective norms, as well as the connection between the latter and the intention to use are supported with less statistical significance.

When the population was separated according to the type of relationship, the results change. Firstly, the Mann-Whitney U test indicates significant differences in both the median intention of use of the group without a stable partner of 6.3 versus the median of the group with a stable partner of 4.0 (U = 494.5 and p=0.000); and in the variable use of a condom, where the median of the group without a stable partner is 4.0 versus the median in the group with a stable partner of 2.0 (U = 555.0 and p=0.001). Secondly, and in relation to the model, there is a significant difference in the β coefficients associated with three model relationships: the relationship between normative beliefs and subjective norms, the relationship between attitude and intention to use, and the relationship between the intention to use and use a condom. In those individuals without a stable partner, only β coefficients associated with two model relationships have significant value: the relationship between behavioural beliefs and attitude, and the relationship between control beliefs and perceived behavioural control. Meanwhile, in those who have a stable partner the model maintains its significance for all β coefficients.

4. Discussion

This study is a contribution to fill the lack of research on the subject in Latin America. In effect, the last meta-analysis of the phenomenon contains only 2% of samples belonging to this geographical area [13]. In relation to the sample, it is highlighted that the percentage of condom users is similar to that reported in previous studies in the third world [21-23]. This stationary state contrasts with the increase in social freedoms in recent decades in these nations. In relation to the variables that predict the use of condoms, the study was able to verify that the proposed model is valid for the sample. While all hypotheses are supported, the variable that has the greatest predictive force is the attitude towards use, followed by the variable of perceived behavioural control. The variable with the lowest incidence in this prediction are the subjective norms. The previous order relation is consistent with previous studies [13, 16]. In particular, given that the attitude towards use is the most important

variable to explain the intention of use / use of condom, it should be noted the association between that variable and the way in which the use of condom affects pleasure or not. In particular, it does not only matter if it is considered good or bad; but also, whether or not it is nice to use a condom. In addition, as behavioural beliefs affect that attitude, increase the beliefs associated with pleasure and the physical and emotional closeness of the couple, improves the attitude toward use. So, an adequate message to promote the use of condoms among students would be that the condom does not affect the pleasure and that it maintains the closeness and the affective bond with the couple.

On the other hand, and according to the results, normative behaviours, that is, what friends and parents think, affect the intention of condom use very little. Additionally, religion does not affect anything; and neither is the knowledge that its use prevents STIs or pregnancy. More important than normative conducts is the perceived control over the behaviour, that is, access to the condom. This result coincides with that reported by Bolaños [24] and Reineke et al. (cited by [13]). Therefore, if access to the condom is perceived close, there is a greater intention to use it. Then, preventive campaigns for young people should aim to improve effective access to condoms, rather than just to inform. The findings of this study indicate that promoting the timely availability of condoms among young people implies not only improving physical access (dispensing machines in pubs, discos, lyceums, and delivery times in health centres), but also the monetary one (under cost or gratuity): having a condom *"on hand"* at the time of need influences the intention to use.

Another result of interest is the verification of statistically significant differences in relation to the predictors of condom use between the behaviour of students with a stable partner and that of those without a stable partner. These differences are consistent with previous studies [14, 15, 24]. In particular, the model best predicts condom use behaviour when students have a stable partner, however, in those who do not have a stable partner, neither attitude nor social norms nor social control explain the intention to use of condom Although the number of students in the sporadic sample is small, given that this group presents a higher risk of infection, the lack of predictors of condom use is worrisome. However, in this group the predictors of social beliefs and control beliefs remain significant. Therefore, considering that marketing strategies are increasingly accepted by the healthcare world [24], preventive messages should emphasize that the use of condoms does not affect pleasure; while improving access to condoms, they would also serve for this group. Considering the above, and that the use of condoms as a means of prevention is an effective strategy in the reduction of HIV and other STIs, and that communication strategies must be appropriate to the context and type of target population [25, 26].

5. Conclusions

The results show that the variables that best predict the use of condoms in university students were the attitude (associated with the perception of pleasure and the approach with the partner) and the perceived control (associated with access to the condom) . The results suggest that in the case of Chilean university students, on the one hand, greater accessibility would motivate the use of condoms, and on the other hand, the communicational message should emphasize that the use of condoms does not affect the pleasure in sexual intercourse nor does it influence in the couple's affective relationship. Finally, two important limitations of this study are highlighted. First, the sample was taken in a single moment of time. Second, the study population is university students. Therefore, its results cannot be projected to the general population. It is expected in the future to overcome these limitations with a population-based study.

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Conflicts of Interest: The authors declare no conflict of interest.

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