

## **DETERMINANTS OF CONDOM USE AMONG YOUNG ADULTS: THE ROLE OF PREPARATORY BEHAVIORAL STRATEGIES IN THE THEORY OF PLANNED BEHAVIOR**

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### **Abstract**

This study tested a modified version of the theory of planned behavior (TPB) in condom use that incorporated preparatory behavioral strategies (PBS) in a sample of French young adults ( $n= 350$ , Mean age= 22.31,  $SD= 2.49$ , Age range= 18-30 yrs.) This extended model was able to explain 42% of the variance of behavioral intention and 44% of condom use. In accordance with the TPB, condom use was predicted by intention. Perceived behavioral control (PBC), entourage norms and attitudes were significant predictors of intention, whereas socio-cultural norms had no effect on intention but had a direct effect on behavior. Intention had a direct influence on condom use and was also influenced by PBS, especially active PBS. The effect of PBC on condom use was significantly related through active PBS. The current study provides support for the importance of planning strategies to improve compliance with condom use in young adults.

**KEY WORDS:** *behavioral theories, condoms, health protective behavior, sexual attitudes, theory of planned behavior.*

### **Resumen**

Este estudio evaluó una versión modificada de la teoría del comportamiento planificado (TPB) que incorpora estrategias de preparación conductual, en el uso del condón, en una muestra de adultos jóvenes franceses ( $n= 350$ ; edad:  $M= 22,31$ ;  $DT= 2,49$ ; rango= 18-30 años). Este modelo fue capaz de explicar el 42% de la varianza de la intención conductual y el 44% del uso del condón. De acuerdo con la TPB, la intención predijo el uso del condón. El control conductual percibido (PBC), el conjunto de normas y las actitudes eran predictores significativos de la intención, mientras que las normas socioculturales no tuvieron un efecto en la intención pero sí en el comportamiento. La intención tuvo una influencia directa en el uso del condón y también fue influenciada por el PBS, especialmente el PBS activo. El efecto de la PBC en el uso del condón se relacionó de forma significativa con las PBS activas. Este estudio aporta pruebas sobre la importancia de las estrategias de planificación para mejorar el cumplimiento del uso del condón entre los adultos jóvenes.

**PALABRAS CLAVE:** *teorías conductuales, condones, comportamientos protectores de la salud, actitudes sexuales, teoría del comportamiento planificado.*

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## Introduction

The risk of contracting a sexually transmitted infection (STI) is one of the immediate and major threats to the health and well-being of young adults; according to the Centers for Disease Control and Prevention (CDC) (2013), more than half of all new STIs occur among this group. In France, while 75.1% of young adults (18-30 years old) who have had sex claim they used a condom during their first sexual encounter, only 34% of men and 22% of women declare they used one in their most recent sexual intercourse. In sexual relationships of less than 6 months, these rates reached respectively 68% and 51% (Beltzer, Lagarde, Wu-Zhou, Vongmany, & Gremy, 2005). In France, despite awareness campaigns, condom use has dropped: 34% of men under 30 say they used condoms at last sex in 2010, compared to 50% in 2004 (Beltzer, Saboni, Sauvage, & Sommen, 2011; Institut National de Prévention et d'Education pour la Santé, 2013). This tendency was confirmed by a recent survey that found that approximately one sexually active student in three does not practice safe sex (La Mutuelle des Etudiants, 2012). This lack of systematic use of condoms is a source of concern (La Ruche et al., 2013) and particularly worrying as a history of STI is known to be a strong predictor of future diagnoses of STIs (Mayer & Venkatesh, 2011).

In this context, the use of condoms is the single best way to reduce the risk of STIs, including HIV infection, in sexually active population. Thus, understanding the dynamics of decision-making with regard to condom use among young adults is crucial to develop effective STI/HIV prevention and intervention programs. It is important to be aware of the psychological determinants underpinning regular condom use and to conduct research on the social-cognitive factors that affect this behavior. The theory of planned behavior (TPB) (Ajzen, 1985, 1991, 2011; Ajzen & Madden, 1986) is one of the most widely used social-cognitive models explaining health-related behavioral intentions (e.g., B. M. Booth, Stewart, Curran, Cheney, & Borders, 2014; Kothe & Mullan, 2014; Norman, 2011). The TPB, an extension of the theory of reasoned action (TRA; Fishbein & Ajzen, 1975), suggests that behavioral intention is the most important and direct determinant of an individual's behavior (Ajzen, 1985, 1991; Madden, Scholder Ellen, & Ajzen, 1992; Yzer, 2012). According to this theoretical approach, three sets of factors influence the intention to perform/engage in health-related behaviors: Attitudes, subjective norms, and perceived behavioral control (PBC).

According to Ajzen (1991, 2011), attitudes towards a behavior assesses whether the person has a favorable or unfavorable view of the behavior in question by examining his or her beliefs about the consequences of the behavior ("not using a condom results in a risk of HIV infection") and the importance given by the individual to these consequences ("It's not serious to have HIV"). The second determinant, Subjective Norms, refers to the social pressure perceived by the person to perform the behavior or not. It is identified by the opinions of key people (family, peers; "My parents think I should use a condom when I have sex") and the desire to comply with these opinions or not ("I shall not comply with what my parents want me to do"). Thirdly, perceived behavioral control, extending the original TRA (Fishbein & Ajzen, 1975), refers to individuals' perceptions of their

ability to perform a given behavior (internal factors, skills; "I'm sufficiently sure of myself to use a condom") or the constraints (external factors; "It is difficult to buy condoms") that hinder performance behavior (Ajzen, 1991). These control beliefs can interfere (facilitating or inhibiting) with behavioral intention and performance (Notani, 1998).

Thus, based on the TPB, the Intention to perform a given behavior is influenced by positive expectations, supportive normative beliefs, and strong control beliefs (Ajzen, 1991) and is the best and most direct determinant of behavior (Ajzen, 1985; Ajzen & Madden, 1986; Armitage & Conner, 2001). Applying this model to male condom use, the predictors of effective use would thus be a positive attitude toward condoms, belief that significant others have a favorable view of them, and confidence in one's ability to control their use (e.g. self-confidence regarding the ability to use condoms and negotiate condom use).

The TPB has been successfully implemented to predict the performance of a range of health behaviors in several countries. However, Sheeran (2002), like Ajzen (2005), pointed out that the percentage of explained variance in behavioral intention differs according to the behavior. A recent meta-analysis (McEachan, Conner, Taylor, & Lawton, 2011) found that TPB predicted 43.3% (41% in an older meta-analysis, G. Godin & Kok, 1996) of the variance in Intention to carry out various health-related behaviors and that PBC, Subjective Norms and Attitudes were significant predictors of intention. In that review, the TPB explained 19.3% of the variance in subsequent health Behaviors (34% in G. Godin & Kok, 1996). The TPB was also used to identify predictors of behaviors related to sexual risk, including condom use. Recently, Booth, Norman, Harris, and Goyder (2014) found that the TPB explained 43% of the variance in STI screening Intentions. For condom use, many researchers (Abraham, Sheeran, & Orbell, 1998; Albarracín, Johnson, Fishbein, & Muellerleile, 2001; Bennett & Bozionelos, 2000; Sheeran, Abraham, & Orbell, 1999; Sheeran & Orbell, 1998) have also taken the TPB as an important theoretical basis to understand condom use. The meta-analyses by Albarracín et al. (2001) and Sheeran et al. (Sheeran et al., 1999; 1998) revealed that condom use (Behavior) was related to Intention ( $r = .44 - .45$ ), and Intention was correlated with Attitudes, Subjective Norms and PBC, with significant correlations higher than .25. The relationship between PBC and condom use was not clear, with significant and non-significant results (Bennett & Bozionelos, 2000). Nevertheless, the PBC added approximately 4 to 6% of the explained variance in Behavioral Intention (Gredig, Nideroest, & Parlan-Blaser, 2006; Nucifora, Kashima, & Gallois, 1993). Previous research (Albarracín, Fishbein, & Middlestadt, 2006; Bennett & Bozionelos, 2000; Godin & Kok, 1996; Gredig et al., 2006; Nucifora et al., 1993; Potard et al., 2012; Protogerou, Flisher, Wild, & Aaro, 2013; van Emepelen, Kok, Jansen, & Hoebbe, 2001) showed that the TPB explained between 37 and 58% of the variance in condom use Intention and between 24 and 40% in actual condom use (with lower scores for women). These results can be considered to provide a useful model to explain Intention to use condoms (with sufficient predictive validity), but at the same time, a substantial proportion of the variance in behavior remains unexplained. Moreover, Potard et al. (2012) showed that Behavioral Intention did not significantly influence consistent condom use among

French adolescents. These results provide evidence that additional post-decisional cognitions related to condom use should be considered in order to better predict intention and health behavior, as suggested by Ajzen (2011) and Sheeran (2002). It is obvious that intentions do not always translate into actions (Bagozzi, 1993; Hagger & Luszczynska, 2014).

Abraham, Sheeran, and Orbell (1998) underlined the importance of preparatory behaviors to achieve a behavioral goal. Similarly, Conner and Norman (2005) postulated that instrumental acts can be an important variable between Intention and Behavior. Barz et al. (2014), LaBrie, Lac, Kenney, and Mirza (2011), and Lewis, Logan, and Neighbors (2009) confirmed this mediating role of planning strategies between intention and behavior (e.g. physical activities, alcohol-related behaviors). In the context of condom use, Preparatory Behavioral Strategies (PBS; Lewis et al., 2009) (i.e. behaviors that reduce or limit unsafe sex, such as buying condoms, keeping them available, talking about them) have proven to be the strongest determinants of consistent condom use (Carvalho, Alavarez, Barz, & Schwarzer, 2015; Lewis, Kaysen, Rees, & Woods, 2010; Lewis et al., 2009; Sheeran et al., 1999; van Emepelen & Kok, 2006, 2008): PBS contribute to the relationship between intention and behavior among adolescents (13-19 years old). These previous results are encouraging but do not consider other TPB factors (e.g., attitudes, norms). A single study has tested the contribution of preparatory safer sex behaviors in the context of the TPB (Bryan, Fischer, & Fischer, 2002). This study reported significant correlations between Intention to use condoms and PBS ( $r = .30$  to  $.53$ ) and condom use (last and actual with  $r = .39$  to  $.43$ ) among college students. This model accounted for 71% of the variance in condom use.

Given that condom use usually requires a series of preparatory decisions and based on previous results among adolescents (Bryan et al., 2002), the purpose of this study was to test an extension of the TPB in the prediction of condom use including the PBS in a sample of young French adults. We hypothesized the PBS would had a contributing role in the relationship between intention and condom use, and improve the percentage of variance explained by the TPB model (see Figure 1). Following the TPB framework, the current study was designed to make a distinction between PBS requiring active behavior (e.g., buying a condom), communication strategies (e.g., talking with partner about using a condom), and PBS requiring mental planning (e.g., having a mental plan to avoid unsafe sex). This distinction is based on previous findings (Bagozzi, 1993; Lewis et al., 2010; Lewis et al., 2009) that preparatory behavior not only includes regulating behavior but also formulating plans, which indicates likelihood to implement a behavior. Furthermore, we hypothesized that PBS would be a volitional (or post-intentional) factor between intention and condom use in the context of the TPB. To our knowledge, this study incorporating preparatory behavioral strategies into the TPB to predict condom use is the first to be carried out among young adults in France.

## Method

### Participants

The sample for this study comprised 366 young French adults. To be eligible, participants had to be at least 18 years old. Participants completed questionnaires about their sexuality online. Excluded from the analyses were individuals who indicated that they had never had sexual intercourse ( $n= 14$ , 3.54%) and those aged over 30 ( $n= 2$ , 0.55%). The final sample for analysis consisted of 350 sexual active participants aged 18 to 30 years old. The majority were female ( $n= 232$ , 66.09%). Mean age was 22.31 years ( $SD= 2.49$ ), with no significant difference between males and females,  $t(348)= 1.12$ ,  $p= .26$ , 24.57% ( $n= 86$ ) were employed and 75.43% ( $n= 264$ ) were postgraduate students; they had an average of 11.16 years of education ( $SD= 6.49$ ). Other descriptive statistics are provided in Table 1.

**Table 1**  
Descriptive characteristics of the sample

Variables	<i>n</i>	%
Age		
18-20	101	27.74
21-25	228	62.64
26-30	35	9.62
Gender		
Male	125	34.25
Female	240	65.75
Sexual activity		
Yes	350	96.15
No	14	3.85
Sexual orientation		
Bisexual	5	1.43
Homosexual	10	2.86
Heterosexual	335	95.7
VIIH test		
Yes	103	29.42
Never	247	70.58
Actually in relationship		
Yes	191	54.57
No	159	45.73

The majority of the participants were heterosexual ( $n= 335$ , 95.7%), 2.86 % ( $n= 10$ ) were homosexual, and 1.43% ( $n= 5$ ) were bisexual. Most participants were in a relationship ( $n= 191$ , 54.57%) and had been in their current relationship for a mean of 1.02 years ( $SD= 2.02$ ). Just over 29% (29.42%,  $n= 103$ ) reported having already been screened for HIV.

### *Instruments*

The measures used in the current study were two self-report questionnaires.

- a) *The Theory of Planned Behavior Variable* (TPB, Potard et al., 2012). The TPB was largely inspired by Gagné and Godin (1999) following the guidelines of Fishbein and Ajzen (2010). This questionnaire comprised 21 items about Subjective Norms, Attitude, PBC and Intention to use condoms and actual condom use (condom for men), scored on a 5-point Likert scale. For example, one item for Subjective norms was: "It would be appropriate for a person of my gender to use a condom during every sexual encounter". Subjective Norms regarding condom use were assessed in relation to Socio-Cultural Norms (6 items) and Entourage Norms (close friends and relatives, 4 items). Questions about Attitudes (5 items) included: "Using a condom would be pleasant/unpleasant". One item measuring PBC (4 items) was: "I feel capable of using a condom every time I have sex". The item regarding Behavioral Intention was: "I intend to use a condom every time I have sex with a partner in the next three months". The answer was given on a 6-point scale, ranging from *Unlikely* (5) to *Likely* (0). The item regarding actual condom use (Behavior) was: "How many times have you used a condom in the last three months when having sex with a partner?" Answers were quantified as follows: zero (0% - 0), one out of four times (25% - 1), two out of four times (50% - 2), three out of four times (75% - 3), every time (100% - 4). Participants could tick a box if they had not had any sexual encounters during this time. Final scores were the mean of the item scores. In our study, the coefficient alphas for each of the scales were higher than .80 for all scales.
- b) *The Condom-Related Protective Behavioral Strategies Scale* (PBSS; Lewis et al., 2009). This scale assesses cognitive-behavioral strategies used to reduce unsafe sex. Students reported how often they used 14 condom-related strategies, on a Likert scale ranging from 1 (*never*) to 5 (*always*). Items included three dimensions of PBS: Active behavior (4 items; e.g., "Buy condoms"), Communication (6 items; e.g., "Told a partner I wanted to use a condom") and Mental planning (4 items; e.g., "Have a mental plan to use a condom"). Dimensions scores were the mean of the items and a global score is resulted to the sum of three dimensions' scores. Internal consistency for this sample was higher than .80 for all scales.

### *Procedure*

After obtaining the permission of the university administrators (University of Tours and University of Reims, France), the research project was explained in university courses, by the authors. Young adults who had expressed interest were e-mailed invitations to participate in a 15-min web-based survey assessing sexual behaviors and condom-related PBS. After participants had been notified of the aims of the study, they gave their informed consent and completed the online self-report questionnaire anonymously. Clear and precise instructions were given, and the importance of giving honest answers was stressed. No incentive was provided.

Informed consent was obtained from all individual participants included in the study.

### *Data analysis*

Preliminary data analyses included descriptive and Bravais-Pearson correlations across the TPB and the PBS scores. Regression analyses were conducted to analyze the impact of the determinants (Attitudes, Subjective Norms, PBC) of the Theory of Planned Behavior on Behavioral Intention and actual condom use. Next, Structural Equations Modeling with AMOS.20 (Byrne, 2010) was performed using the Maximum Likelihood estimation. In this study, selected values were greater than 0.95 for the comparative fit index (CFI), less than 0.05 for the root mean-square error of approximation (RMSEA), and less than 3 for the  $\chi^2/df$  (Hu & Bentler, 1999; Tabachnick & Fidell, 2013). Structural equation modeling (SEM) was used to estimate the TPB-based model explaining frequency of actual condom use. A model modification approach was used to estimate, evaluate, and improve the initial model.

## **Results**

### *Descriptive results for condom use*

In the current study, 12.57% of participants ( $n= 44$ ) stated that they had not had sexual intercourse during the previous three months and were excluded from the following analyses. For the remaining 87.43% ( $n= 307$ ), 27.36% ( $n= 84$ ) stated that they had never used a condom, 6.51% ( $n= 20$ ) that they had only used a condom one out of four times, 8.79% ( $n= 27$ ) one out of two times, and 12.97% ( $n= 45$ ) three out of four times, while 42.67% ( $n= 131$ ) reported that they had systematically used a condom.

With regard to the Intention to use condoms in future sexual encounters, 69.34% ( $n= 242$ ) declared that they would definitely use a condom, 13.47% ( $n= 47$ ) that it was 'fairly probable' that they would do so, 8.88% ( $n= 31$ ) that it was 'not probable or not very probable', and for 8.31% ( $n= 29$ ) there was an equal probability that they would and would not use a condom. Concerning the TPB variables, the young women scored significantly higher than the men, except for PBC. No significant differences were found for the PBS variables.

### *Correlations between the TPB variables*

To test the TPB model, we first carried out a correlational analysis of Subjective Norms (in relation to Socio-Cultural Norms and Entourage Norms), individual Attitudes, Perceived Behavioral Control, intended condom use and actual condom use (see Table 2). All correlations were significant and higher than .30 (.30 to .52). Intention to use a condom and actual condom use were also related ( $r= .41, p < .001$ ).

**Table 2**

Bravais-Pearson correlations between condom use, intention and the three predictors of the theory of planned behavior

Variables	Intention	Behavior
Subjective norms	.49 ***	.38***
Socio-cultural norms	.46***	.30***
Entourage norms	.33***	.33***
Individual attitudes	.44***	.35***
Perceived behavioral control	.52***	.34***

Note: \*\*\* $p < .001$

### *TPB model for condom use with preparatory behavioral strategies*

In the current study, the TPB model (with PBS) explained 42% of the variance for the intentional behavior, with PBC, Socio-cultural Subjective norms and Attitudes, and 44% of the variance of condom use, with Subjective Norms, Intention, Active Behavior and Mental Planning variables (see Table 3). The classic TPB model (without PBS) explained 42% of the variance for Intention and 27% for condom use.

**Table 3**

Stepwise multiple regression results predicting intention and condom use

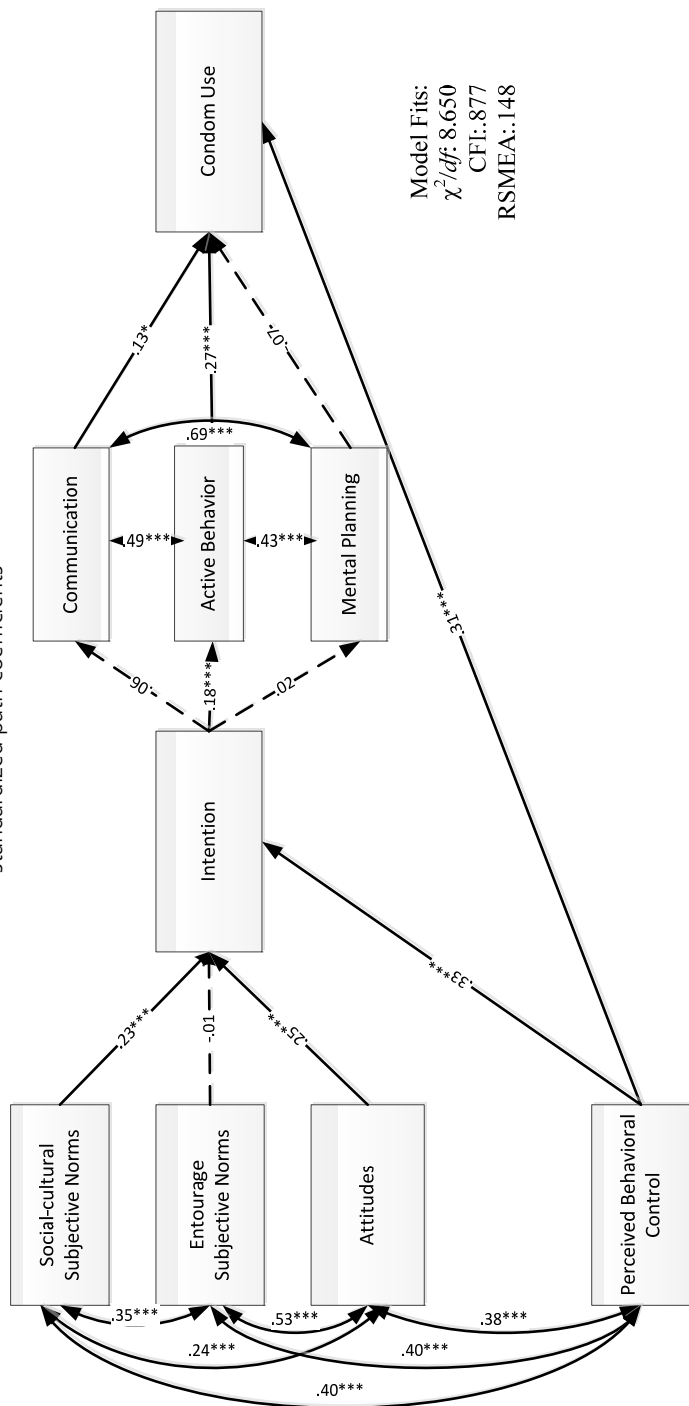
	$\Delta R^2$	Total $R^2$	$\beta$	$t$	$p$ -value
Intention					
PBC	.29	.29	.34	6.866	***
Socio-cultural norms	.10	.38	.28	5.692	***
Individual attitudes	.03	.42	.21	4.142	***
Condom use					
Entourage norms	.25	.25	.31	6.009	***
Intention	.10	.35	.19	3.557	***
Active behavior (PBS)	.06	.41	.25	4.916	***
Socio-cultural norms	.02	.43	.15	2.872	**
Mental planning (PBS)	.002	.43	-.11	-1.910	*
Communication (PBS)	.005	.44	.10	1.544	<i>ns</i>
Individual attitudes	.003	.44	.07	1.190	<i>ns</i>

Notes: PBC= Perceived behavioral control; PBS= Preparatory behavioral strategies. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ ; *ns*= non significant.

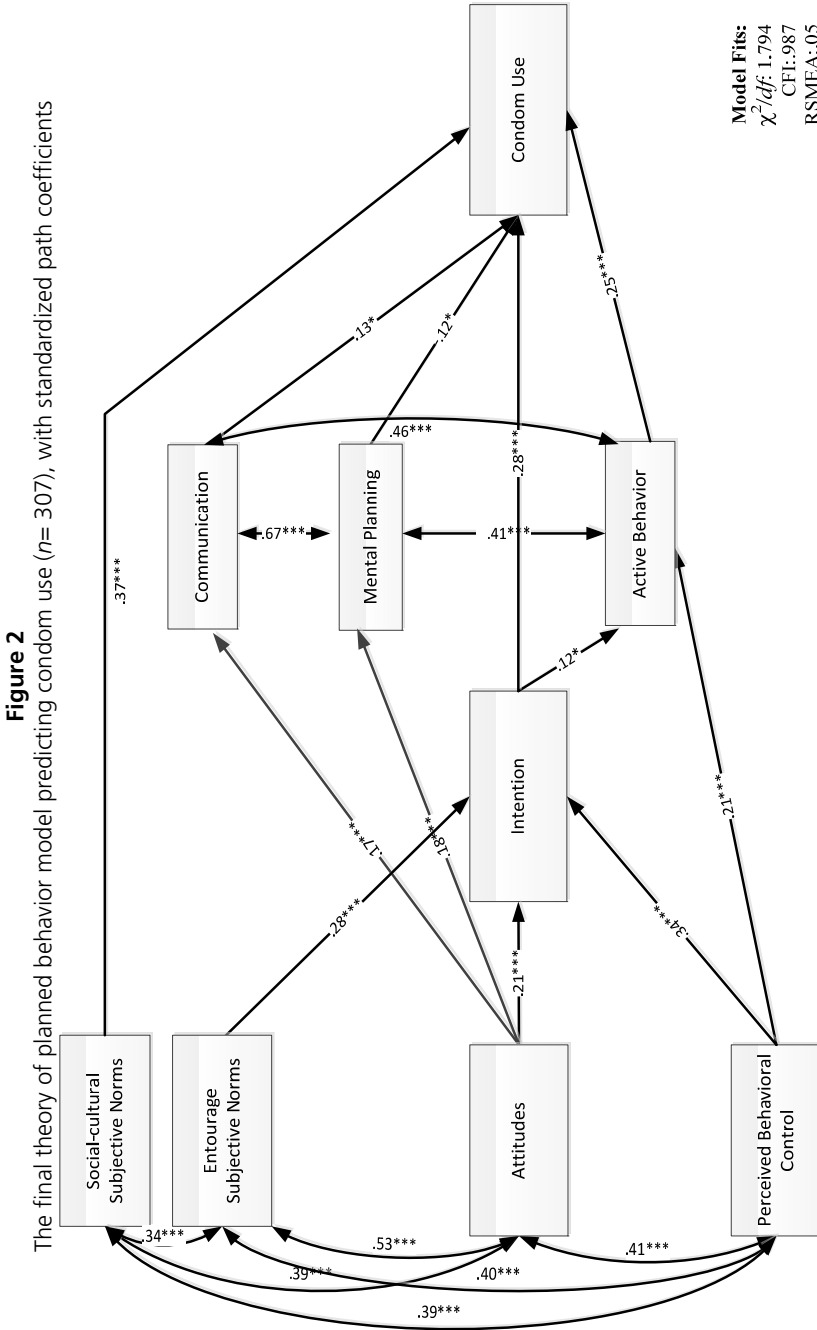
We checked the conformity of our data with the hypothesized TPB model (see Figure 1) by SEM. The model combined the four dimensions of the TPB, the three dimensions of the PBS, Intention and actual condom use. The model is shown in Figure 3. The structural model had the following fit indices:  $\chi^2 = 126.81$ ,  $df = 16$ ;  $\chi^2/df = 7.93$ ; CFI= .88, and RMSEA= .15 [.13 - .18]. The values of these indices were not acceptable. The model shows a very poor fit, with a  $\chi^2/df$  ratio higher than 5 and RMSEA higher than .05. Variants were tested on the basis of previous correlation and multiple regression results (see Tables 2 & 3).



**Figure 1** The extended theory of planned behavior model predicting condom use, including the protective behavioral strategies (n= 307), with standardized path coefficients



Notes: \*  $p < .05$ ; \*\*\*  $p < .001$ .  $df$  = degrees of freedom; CFI = Comparative fit index; RMSEA = Root mean square error of approximation. Dotted lines indicate non-significant associations ( $p > .05$ ).



Notes: \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .  $df$  = degrees of freedom; CFI = Comparative fit index; RMSEA = Root mean square error of approximation.

### *An alternative model*

SEM allows alternative models to be generated in addition to the original TPB model and was recommended as a valuable technique to explicit unique contribution of each TPB variable (Hankins, French, & Horne, 2000). Also in an exploratory approach, based on the Lagrange Multiplier Test (modification indices in Amos) suggestions for improving the model, all paths were added to the model and non-significant effects were dropped from the model (statistically non-significant paths,  $p > .05$ ), after which it was tested again. The correlated errors corresponded to Attitudes  $\rightarrow$  Communication, Attitudes  $\rightarrow$  Mental Planning and Socio-cultural norms  $\rightarrow$  Condom use. These adjustments were theoretically justified on the grounds that people's personal attitudes might facilitate or obstruct pre-volitional competences associated to condom use (e.g., Carvalho & Alvarez, 2015). Moreover, the relationships between Attitudes toward and Communication about condom use was most recently highlighted in a TPB context (e.g., Guan et al., 2016). Lastly, Socio cultural norms can should have an important influence on the performance of behaviors with a moral dimension (e.g., sexual behavior), and work in parallel with Attitudes, Subjective norms, and PBC (thus directly influencing intention; e.g., Godin, Conner, & Sheeran, 2005). Accounting for these correlated errors, fit indices for our first model indicated improved overall fit:  $\chi^2 = 26.92$ ,  $df = 15$ ;  $\chi^2/df = 1.79$ ; CFI = .99, and RMSEA = .05 [.01-.08] indicating that the model fitted the data well. Figure 2 shows the effects based on this model. The model was retested with the overall PBS score, revealing acceptable fit, but less than the previous model ( $\chi^2 = 12.27$ ,  $df = 6$ ;  $\chi^2/df = 2.05$ ; CFI = .99, and RMSEA = .05 [.00-.09]).

## **Discussion**

According to the TBP (Ajzen, 1985, 1991; Ajzen & Madden, 1986), the Intention to use condoms is the proximal predictor of behavior achievement. In turn, Behavioral Intention is influenced by Attitudes toward the behavior, Subjective Norms and Perceived Behavioral Control. In this model, the latter has a direct influence on the behavior. Moreover, as pointed out by Lewis et al. (2010), condom use requires many protective behavioral strategies (e.g., formulating a mental plan to use a condom; talking about condoms; buying or carrying condoms). The current study proposed that these PBS could have a contributing effect between behavioral intention and consistent condom use. Nevertheless, structural equation modeling analysis of the initial TPB model revealed a poor fit. An adequate model was found with PBS having a role in the relationship between intention and behavior and between PBC and behavior, especially for active preparatory behaviors. This model highlighted the direct effect of intention on behavior, itself affected by PBC and individual Attitudes. Our extended TPB explained 43% of the variance in condom use. These results are in line with meta-analyses of TPB applied to condom use (Albarracín et al., 2001; Bennett & Bozionelos, 2000; Sheeran et al., 1999). The extended TPB tested in our study explained 43% of condom use, addition of the PBS variables seeming to improve

the original TPB. Intention was predicted mainly (in descending order) by PBC, Socio-Cultural Norms (but not Entourage) and individual Attitudes. The findings of this study support Ajzen's predictions (Ajzen, 1991; Ajzen & Madden, 1986). It should be stressed that Entourage Norms did not have a significant influence on Intention in our young adult sample, in contrast to previous results with a French adolescent sample (Potard et al., 2012). This finding suggests a developmental change in the influence of and conformity to peers and parents with age: when constructing attitudes, young adults are influenced less by the expectations of major referents and more by cultural/societal norms (based on moral responsibility). On the other hand, the close entourage remains a major source of influence on behavior, as shown by the following result: Entourage Norms, Intention, Active Behavior (PBS), Socio-Cultural Norms and Mental Planning (PBS) were all predictors of condom use. Nevertheless, Attitude and PBC were not significant predictors of condom use, in contrast to Ajzen's model (Ajzen, 1985; Madden et al., 1992). Unexpectedly, our hypothesized model was not confirmed, with poor model fits (see Figures 1 and 2). This model was proposed by Bryan et al. (2002) with an adolescent sample (not only sexually active people) but the fit indices were not entirely satisfactory.

A second SEM was performed, removing the non-significant relations of the original theory. As described by Ajzen (1985, 1991; Ajzen & Madden, 1986), PBC, Entourage Norms and Attitudes were the main determinants of behavioral Intention in our extended model. Young adults with a high degree of PBC, a positive attitude towards condom use and an entourage perceived as favoring condom use were more likely to develop the behavioral Intention to use condoms. This analysis is in line with the meta-analyses mentioned above (Albarracín et al., 2001; Sheeran et al., 1999). Only the Socio-Cultural Norms did not predict Intention, but they now impacted directly on actual condom use. This result highlights the importance of the cultural and moral context in the use of condoms. From this standpoint, Jeon, Jo, Jung, and Lee (2014) indicated that societal and occupational norms were significant factors affecting condom use. These findings highlight the importance of different sources of normative influence and of subdividing Subjective Norms into more detailed dimensions (Socio-cultural Norms and Entourage Norms) for more effective prevention programs. Findings from this study largely support the TPB model. Specifically, study findings highlight that positive Attitudes, subjective Norms (Entourage) and PBC towards condom were indirectly related to greater intention to use condoms. Furthermore, the present findings support a key assumption of Ajzen model concerning the Intention-behavior relation. These findings are consistent with previous research examining socio-cognitive model regarding condom use (see for a review, Albarracín et al., 2001). All the same, the present study shows that an extension of TPB with other factors should be considered.

Because condom use is not entirely under volitional control and inevitably involves a dyadic situation, this situation can be related particularly to Perceived Behavioral Control (Abraham et al., 1999). In previous studies, PBS was conceptualized as a mediator between intention and action and between PBC and condom use (Bryan et al., 2002; Lewis et al., 2010). Our results confirm the crucial

role of PBC on behavioral Intention and on PBS as a mediator in the PBC-behavior relationship (Albarracín et al., 2001; Gredig et al., 2006; Notani, 1998; Potard et al., 2012; Protogerou et al., 2013). PBC contributed to the prediction of Intention, which in turn facilitated consistent condom use. These direct and indirect associations between intention and behavior were expected by the TPB (Ajzen, 1991; Fishbein & Ajzen, 2010; Madden et al., 1992) and have been well documented (Armitage & Conner, 2001). Our model also confirms Carvalho et al.'s conclusion (Carvalho et al., 2015) that PBC could play a major role in the performance of preparatory behaviors in the context of condom use.

Furthermore, the current study confirms and extends previous results regarding the role preparatory behavioral strategies related to safer sex with regard to condom use (Bryan et al., 2002; Carvalho et al., 2015; Lewis et al., 2010; Sheeran & Orbell, 1998; Teng & Mak, 2011; van Emepelen & Kok, 2008). The PBS related to condom use could improve the TPB prediction of consistent condom use. It was, more particularly, the active PBS that seemed to lead to effective condom use behavior: post-decisional acts could be more efficient than post-decisional cognitions or communication. In line with the above-mentioned studies, planning seemed to contribute to the link between Intention and actual condom use. Importantly, a significant relation between PBC and PBS was found, indicating that action planning is predictive when levels of PBC are high. Beliefs about the ability to control condom use could lead to planning action, which in turn could lead to effective use, in line with a previous study on dental care (Pakpour & Sniehotta, 2012).

Other PBS (Communication and Mental Planning) were minor determinants of behavior and were directly predicted by individual Attitudes. These post-decisional volitions (cognitions) reflect positive dispositions toward the behavior, fostering communication and representational strategies regarding condom use, but less efficient than post-decisional actions. This finding provides support for the distinction between the intention to try to perform a behavior and actual trying developed by Bagozzi (1993). These results also extend previous research on body weight suggesting that different planning behaviors are affected differently by Attitudes and PBC (Conner & Norman, 1996).

Understanding the role of planning and behavioral strategies that lead to condom use could suggest new directions for preventative interventions among young adults. At an individual level, interventions targeting post-decisional acts (obtaining, carrying condoms) could be developed within prevention programs. Programs should focus on converting mental plans into actions, considered as commitment decisions. These interventions should have a dual focus: 1) identification of risky situations or behaviors, and 2) generation of appropriate behaviors to cope with these situations. This study also demonstrates that self-efficacy and technical skills (regulating behaviors) seem to play a more important role than communication skills (formulating plans) in condom use. From a practical perspective, enhancing a sense of perceived control (coping with obstacles, impediments and resources) among young adults could facilitate active behavioral strategies. Interventions aimed at developing negotiation and condom use skills could improve the effectiveness of condom use among young adults. At a social

level, creating a supportive environment (e.g. by community and work-site interventions) and providing ready access to condoms could reduce the risks of unsafe sex among young adults.

Although this study made some interesting findings, a number of limitations should be noted. First, condom-related PBS and condom use behavior were measured concurrently. Longitudinal research is needed to confirm these results. Also, condom use was measured only through online self-report questionnaires, with a potential risk of social desirability bias, although studies have generally demonstrated low or no online and self-report bias on safe sex measures (Dare & Cleland, 1994; Plummer et al., 2004; Riva, Teruzzi, & Anolli, 2003). Small sample size, relationships duration, and overrepresentation of women, however, compromises the generalizability of our findings. Moreover, our findings were restricted to a young adulthood sample (18- to 30-year-old) and its generalizability to other older adolescent samples is unknown. Further research on the condom use decisions of younger male and female (less than 18-year old), a critical period in risky sexual behavior, is warranted. A common limitation to cross-sectional studies of this behavior is the participants may not be using condoms if they have been tested for STIs and are using other forms of birth control, that is, they have very rational reasons for not using condoms. The exploratory nature of the extension TPB model (by modification indices methods) may limit the ability to generalize study findings to all adulthood or French populations. It is possible that associations with other variables of interest might exist, but remain uncovered. This extended TPB model should be tested on a larger sample of young adults and on specific sexual orientation groups (homosexual, bisexual). Furthermore, a gender specific formulation of the model may be needed to take into consideration male/female differences in the TPB predictors. With regard to condom use, it is clear that the individualistic/rational approach of the TPB requires a predictor concerning affective dimensions (e.g. affective beliefs, impulsivity).

In sum, this extension of the TPB model predicts condom use better than the original TPB model, with more variance explained in both Intention and Behavior. The results suggest that specific active strategies of condom use, or "coping planning" (Hagger & Luszczynska, 2014; Sniehotta, Schwarzer, Scholz, & Schüz, 2005), should be taken into account. This study highlights the importance of examining cognitions in relation to condom use behavior. Moreover, it posits that socio-cultural beliefs could be a major and direct determinant of condom use among young adults. However, our study was restricted to emerging adulthood, and implication of findings must be considered in this light. Nevertheless, this extended model leaves a substantial proportion of the variance in condom use unexplained. It has been suggested that improved behavioral prediction could be achieved by additional constructs such as past behaviors and representations of relationships and by additional contextual variables such as relationships duration.

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