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**Determinants of condom use among young adults: The role of preparatory  
behavioral strategies in the Theory of Planned Behavior**

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### **Abstract**

The goal of our research was to test the mediational role of Protective Behavioral Strategies (PBS) in the Theory of Planned Behavior (TPB) applied to the condom use context among French young adults sexually active ( $n = 350$ , Mean Age = 22.31, SD = 2.49). 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, entourage norms and attitudes were significant predictors of intention, whereas socio-cultural norms had no effect. The influence of intention on condom use was directly and mediated through active PBS. The effect of PBC on condom use was significantly mediated through active PBS. Socio-cultural norms had also a direct effect. The current study provided support for the potential importance of planning strategies to improve compliance with condom use in young adulthood.

*Keywords:* condom use, planned behavior, protective behavioral strategies, intention, sexual behavior, ISTs

## Introduction

The risk of contracting a sexually transmitted infection (STI) is one of the immediate and major threats that hang over the health and well-being of young adults, representing more than half of all new STIs according to the Centers for Disease Control and Prevention (CDC), (Centers for Disease Control and Prevention, 2013). World Health Organization (WHO) estimates at approximately 499 million the number of new cases of curable STIs every year in the world (Satterwhite et al., 2013; World Health Organization, 2013). The morbidity of acute illness makes a prior public health concern but also because STIs cause serious sequelae and facilitate the transmission of human immunodeficiency virus (HIV) (Mayer & Venkatesh, 2011). The population of the 15-24 years seems more at the risk to develop certain STIs (Moreau, Lydié, Warszawski, & Bajos, 2007).

In France, while 75.1% of young French adults (20-25 years old) who have had sex claim they used a condom during their first sexual encounter, only 34% of men and 22% of women said they used one during their most recent sexual experience (18-30 years old). Within sexual relationships of less than 6 months, these rates reached respectively 68% and 51% (Beltzer, Lagarde, Wu-Zhou, Vongmany, & Gremy, 2005). This lack of systematic use of condoms is preoccupant (La Ruche et al., 2013) but not specific to France. Despite prevention campaigns in France condom use dropped. National Institute of Prevention and Education for Health (Beltzer, Saboni, Sauvage, & Sommen, 2011; Institut National de Prévention et d'Education pour la Santé, 2013) published eloquent rates: 34% of the men of less than 30 years say have used condom in 2010, whereas they were 50% in 2004. A tendency still confirmed by other survey stressing that approximately one sexual active student on three does not protect itself (La Mutuelle des Etudiants, 2012). Consequently, at

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least once 10% of French young have Chlamydia or gonorrhea. This finding is particularly worrying as a history of STI is known to be a strong predictor of future diagnoses of STIs (Mayer & Venkatesh, 2011). HIV and Acquired ImmunoDeficiency Syndrome (AIDS) also do affect young adults: 25% of HIV-positive people worldwide are aged fewer than 25.

In this context, the use of condoms is the single most way to reduce the risk of STI, including HIV infection. It is important to be aware of the psychological determinants underpinning the regular condom use. Understanding the dynamics of decision-making over condom use along young adults is crucial to designing STI/HIV prevention and intervention programs. More precisely, to identify the key determinants of condom use among young adults is a public health priority. It is crucial to develop research on the social-cognitive factors that affect condom use. Within diverse social-cognitive models, the Theory of Planned Behavior (TPB) (Ajzen, 1985, 1991, 2011; Ajzen & Madden, 1986) is one of the most widely used in for understanding health 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; M Fishbein & Ajzen, 1975) (Ajzen, 1985, 1991; Madden, Scholder Ellen, & Ajzen, 1992; Yzer, 2012), suggests that behavioral intentions are the most important and direct determinant of individual's behaviors. With this theoretical approach, three set of factors influence intentions to perform/engage health-related behaviors: attitudes, subjective norms and perceived behavioral control about a given behavior. This model of behavior-specific cognitive determinants is depicted in Figure 1.

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Please Insert Figure 1 here

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According Ajzen (1991, 2011), Attitudes (A) towards a behavior is direct determinant of intention. Attitudes reflect the individual's evaluative reactions (positive/favorable or

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negative/unfavorable) of a particular behavior. Based in the TPB, another determinant of intention to perform a behavior is Subjective Norms (SN). Subjective norms refer the individual's beliefs that social referents ('the significant others' e.g. parents, peers, social or religious organizations) approve or disapprove of performing a behavior. This determinant measure different source of normative influences – i.e. individual's desire to comply with the salient referents' beliefs and behaviors. Perceived behavioral control (PBC), added to the initial TRA (M Fishbein & Ajzen, 1975), reflects individual's perceptions of capacities (internal factors, skills) or constraints (external factors) about performing a specific behavior (Ajzen, 1991). PBC describes control beliefs which may interfere (facilitating or inhibiting) with the behavioral performance. The introduction of the PBC in the TRA is found to be a stronger predictor of behavior (Notani, 1998). According Ajzen (Ajzen, 1985; Ajzen & Madden, 1986). It is assumed that PBC not only is to determine intention but on top of to directly influence individual behavior, even moderate the relationship between behavioral intention and actual behavior (Ajzen & Madden, 1986; Sheeran, Trafimow, & Armitage, 2003).

So, based on the TPB, intentions are influenced by these three constructs. Positive expectations, supportive normative beliefs, and stronger control beliefs facilitate individual's intentions toward performing a behavior. Intentions are described as the cognitive representation of an individual readiness to perform a given behavior (Ajzen, 1991). The theory assumes that behavioral intention to act in a certain way is the immediate determinant of behavior (Armitage & Conner, 2001) and the best indication of involvement or not in an action (Ajzen, 1985; Ajzen & Madden, 1986). The second factor which determines the probability of perform a behavior is the perceived behavioral control (Notani, 1998). Thus, if we apply this model to the condom use, positive attitudes toward using condoms, beliefs that

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significant others have favorable evaluation of condom use and confidence about individual's control over condom use would predicted effectiveness of condom use.

The TPB has been successfully implemented to provide good predictions of the performance of a range of health behaviors and in several countries. A recent meta-analysis (McEachan, Conner, Taylor, & Lawton, 2011) shown that TPB predicted 43.3% (41 % of the variance in a more older meta-analysis, Godin & Kok, 1996) of the variance in intention to multiple health behaviors and found PBC, subjective norms and attitudes were significant predictors of intention. In this review, TPB explained 19.3% of the variance in subsequent health behaviors (34% in Godin & Kok, 1996). However, Sheeran (2002) such as Azjen (2005) underlined that the percent of explained variance in behavioral intention differed according to behaviors. In addition, the TPB was also utilized to identify predictors of sexual risk behaviors, including condom use (for more details see: Albarracin, Johnson, Fishbein, & Muellerleile, 2001; Sheeran, Abraham, & Orbell, 1999). Recently, Booth, Norman, Harris and Goyder (2014) shown that the TPB explained between 43% of the variance in STI screening intentions. In the domain of the use of condoms, many researchers (Abraham, Sheeran, & Orbell, 1998; Albarracin, et al., 2001; Bennett & Bozionelos, 2000; Sheeran, et al., 1999; Sheeran & Orbell, 1998) also take the TPB as an important theoretical basis to understand whether condom use intend to perform a behavior. Based on meta-analyses, Albarracín et al. (2001) and Sheeran et al. (Sheeran, et al., 1999; 1998) shown that condom use (behavior) was related to intention ( $r = .44 - .45$ ), and intention was correlated with Attitudes, Subjective Norms and Perceived Behavioral Control, with correlations higher than .25. Nevertheless, they failed to find significant effect between PBC and behavior. On the other hand, Bennett and Bozionelos' meta-analysis (2000) reported significant correlation between PBC and condom use. Nucifora, Gallois, and Kashima (1993) and Gredig, Nideroest, and Parlan-Blaser

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(2006) found that the PBC added approximately 4 to 6% of the variance explained in condom use intention.

Previous researches on young adults and adults has been tested the TPB explained between 37 to 58% of the variance in condom use intentions and between 24 to 40% in condom use (with lower scores for women) (Albarracin, 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). These results can be considered to have a useful model for explaining intention to use condoms (with sufficient predictive validity) but simultaneously a substantial proportion of the variance in behavior remains unexplained. Moreover, Potard et al. (2012) shown that behavior intentions 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 intentions and health behaviors, such as suggested by Ajzen (2011) or Sheeran (2002). It is obvious that intentions to do is not always translated into actions (Bagozzi, 1993; Hagger & Luszczynska, 2014).

Abraham, Sheeran, and Orbell (1998) underlined the importance of preparatory behaviors in performing a behavioral goal. In this way, Conner and Norman (2005) postulated that instrumental acts can be an important meditational variable between intention and behavior. Barz et al. (2014), LaBrie, Lac, Kenney, and Mirza (2011) or Lewis, Logan, and Neihbors (2009) confirmed this mediating role of planning in intention-behavior gap (e.g. physical activities, alcohol-related behaviors). Beyond the context of condom, *protective behavioral strategies* (PBS) (Lewis, et al., 2009) (i.e. behaviors that reduce or limit negative consequences of unsafe sex, such as buying condom use, having them available, communication about it...) have proven to be strongest determinants of consistent condom use (Carvalho, Alavarez, Barz, & Schwarzer, 2014; Lewis, Kaysen, Rees, & Woods, 2010;



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Lewis, et al., 2009; Sheeran, et al., 1999; van Emepelen & Kok, 2006, 2008) : preparatory behaviors mediate the intention-behavior relation among adolescents (13-19 years old). These initial results could be encouraging. A single study tested mediational role 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 preparatory behaviors ( $r = .30$  to  $.53$ ), this last and actual condom use ( $r = .39$  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 previous results among adolescents (Bryan, et al., 2002), the purpose of this study was to test the TPB model to incorporating addition of planning of preparatory behaviors among young adult (see Figure 2). We hypothesized a mediational role of PBS on intention-condom use relation. Within TPB framework, the current study was designed to make a distinction between PBS requiring active behaviors (e.g. buying a condom), communicational strategies (e.g. talking with partner to want to use a condom) and PBS requiring mental planning (e.g. having a mental plan to avoid unsafe sex). This distinction takes into consideration that, in accordance with previous expectations (Bagozzi, 1993; Lewis, et al., 2010; Lewis, et al., 2009), preparatory behaviors not only included regulating behavior but also formulating plans, which would indicate likelihood to implement a behavior. Also, 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 is the first carried out among young adults in France.

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## Method

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### *Participants and procedure*

The sample for this study was 366 young adults from France. To be eligible, participants must have been at least 18 years of age. Participants completed questionnaires about sexuality online. Excluded for the analyses were those who indicated that they had never had sexual intercourse ( $n = 14$ , 3.54%) and were older than 30 years-old ( $n = 2$ , 0.55%). After these deletions, the final sample for analysis consisted of 350 participants. The majority was identified as female ( $n = 232$ , 66.09%). The participants' mean age was 22.31 years ( $SD = 2.49$ ), no significant difference between age ( $t(348) = 1.12$ ,  $p = .26$ ). They had completed approximately 11.16 years of education on average ( $SD = 6.49$ ), no significant difference between age ( $t(348) = -0.70$ ,  $p = .94$ ). Among this sample, 24.57% ( $n = 86$ ) worked and 75.43% were postgraduate students ( $n = 264$ ).

The majority of young adults reported being exclusively heterosexual ( $n = 335$ , 95.7%), 2.86% homosexual ( $n = 10$ ) and 1.43% ( $n = 5$ ) bisexual. A majority was also currently in a relationship ( $n = 221$ , 63.14%). Young adults had been in their current relationship for a mean of 1.42 years ( $SD = 2.02$ ). A little more than twenty-nine percent (29.42%,  $n = 103$ ) reported having already had an HIV testing.

After participants had been notified of the aims of the study, they gave informed consent and completed the online questionnaire. The participants completed a voluntary, anonymous self-reported questionnaire. Young adults were mailed invitations to participate in a 15-min web-based survey assessing sexual behaviors and condom-related PBS. Clear and precise instructions were given, and the importance of giving honest answers was stressed.

### *Measures*

Measures appropriate to the current study include two self-reported questionnaires.

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*The Theory of Planned Behavior Variables.* The TPB measures (Potard, et al., 2012) were largely inspired by Gagné and Godin (1999) and in accordance with guidelines from Fishbein and Ajzen (2010); who proposed a methodology for constructing a questionnaire based on the TPB. This questionnaire comprised 21 self-administered items about subjective norms, attitudes, perceived control and intention to use condoms and condom use, scored on a 5-point Likert scale. For example, one item for *subjective norms* is: “ It would be appropriate for a person of my gender to use a condom during every sexual encounter ” (on a scale ranging from 1 ‘ totally agree ’ to 5 ‘ totally disagree ’ ). Subjective norm regarding condom use assess in relation to socio-cultural norms (6 items) and close friends and relatives norms (entourage) (4 items). Questions about *attitudes* (5 items) include: “ Using a condom would be easy/ difficult for me ” (on a scale ranging from 1 ‘ very easy ’ to 5 ‘ very difficult ’ ). One item measuring *perceived behavioral control* (4 items) is: “ I feel capable of using a condom during every sexual encounter/every time I have sex ” (on a scale ranging from 1 ‘ totally agree ’ to 5 ‘ totally disagree ’ ). The item regarding *intention* to use condoms was: “ I intend to use a condom every time I shall have sex with a new partner in the next three months ”. A ‘new partner’ was any person with whom the people had sexual intercourse for the first time. The answer was given on a 5-point scale, ranging from ‘ unlikely ’ to ‘ likely ’. The item regarding *actual condom use* was: “ How many times have you used a condom in the last three months when having sex with a new partner? ”. Answers were quantified as follows: zero, one out of four times, two out of four times, three out of four times, every time. Participants could also tick a box if they had not had any sexual encounters during this time. Final scores were the mean of the items. Table 1 presents the coefficient alpha for each of the scales.

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*The Condom-Related Protective Behavior Scale (PBSS)*. Participants completed the Condom-Related Protective Behavioral Strategies Scale (Lewis et al., 2009) to assess cognitive-behavioral strategies used to reduce unsafe sex. Students reported how often they used 14 condom-related strategies, with Likert response options ranging from 1 (‘ never ’) to 5 (‘ always ’). Items included three dimensions of protective behavioral strategies: *planning act* (4 items e.g. “ Buy condoms”), *communication* (6 items e.g. “ Told a partner I wanted to use a condom”) and *mental plan* (4 items e.g. “ Have a mental plan to use a condom ”). Final score and dimensions scores were the mean of the items. Internal consistency for this sample was higher than .80 for all scales.

### ***Data analysis***

Preliminary data analyses included descriptive and Bravais-Pearson correlations across the TPB variables and the PBS scores. Student t-tests were examined to evaluate gender differences in TPB and PBS scores. Regression analyses were conducted to analyze the impact of the determinants (attitudes, social norms, perceived behavioral control) of the Theory of Planned Behavior on intended condom use and condom use. Then, Structural Equations Modeling (SEM) with AMOS.20 were performed using the maximum likelihood estimation. In this study, greater than 0.95 of the comparative fit index (CFI), less than 0.05 of the root mean-square error of approximation (RMSEA) and less than 5 of the  $\chi^2/df$  were accepted as the cutoff scores for using this method (Hu & Bentler, 1999; Tabachnick & Fidell, 2013). The model was specified with condom use at baseline as a predictor of all variables.

## Results

### *Descriptive results for condom use*

In the current study, 12.57% ( $n = 44$ , excluded for next results on the behavior) stated that they had not had a sexual intercourse during the previous three months. For the 87.43% of participants ( $n = 307$ ) who had had sexual intercourse during the previous three months, 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 used a condom on the occasion of every sexual encounter.

With regard to the intention to use condoms in future sexual encounters, 69.34% ( $n = 242$ ) of young adults declared that their condom use was ‘ absolutely sure ’, 13.47% ( $n = 47$ ) that it was ‘ fairly probable ’, 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.

Differences between male and female are showing in the Table 2. Concerning the TPB variables, girls are significantly higher scores than boys, except for *Perceived Behavioral Control*. No significant differences are found for the PSB variables.

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### *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 condom use (see Table 3). All

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correlations were significant and higher than .30 (.30 to .52). Intention to use a condom and condom use were also associated ( $r = .41, p < .001$ ).

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### ***TPB model for condom use with meditational role of Protective Behavioral Strategies***

In the current study the TPB model explained 44% of the variance in condom use, with SN Norms, intention, Active Planning and Mental Planning variables; and 42% of the variance for the intentional behavior, with PBC, Socio-cultural SN and Attitudes. The classical TPB model (without protective behavioral strategies) explained 27% of the variance in condom use and 42% in intention (see Table 4).

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We checked the conformity of our data with the hypothesized TPB model (see Figure 2) by structural equation modeling. The model combined the four dimensions of the TPB, the three dimensions of the PBS, intention and condom use. Relationships are shown in Figure 3. The structural model demonstrated following indices:  $\chi^2 = 126.817, df = 16; \chi^2/df = 7.926; CFI = .877,$  and  $RMSEA = .150 [.126 - .175]$ . The values of these indices were not acceptable. The model fits very poorly with a  $\chi^2/df$  ratio higher to 5 and RMSEA higher to .05. Also, variants were tested on the previous basis of correlation and multiple regression results (see Table 3 & 4).

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*An alternative model*

Nonsignificant effects were dropped from the model, after which it was tested again. This resulted in the following:  $\chi^2 = 26.916$ ,  $df = 15$ ;  $\chi^2 / df = 1.794$ ;  $CFI = .987$ , and  $RMSEA = .050$  [.016 – .081]. The RMSEA was .05 and the CFI was .99, which indicates that the model fits the data well. Figure 4 shows the effects according to this last model. The model were retested with a global PBS score and model fits had also acceptable, but fits lower than the previous model ( $\chi^2 = 12.269$ ,  $df = 6$ ;  $\chi^2 / df = 2.045$ ;  $CFI = .990$ , and  $RMSEA = .054$  [.000 – .094]).

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Please Insert Figure 4 here  
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**Discussion**

According to the TBP (Ajzen, 1985, 1991; Ajzen & Madden, 1986) , intention to use condom would be the proximal predictor of behavior achievement. In turn, behavioral intention is influenced by Attitudes toward behavior, Subjective Norms (SN) and Perceived Behavioral Control (PBC). In this model, this last have a direct influence on the behavior. The current study proposed that behavioral preparation (action planning) could be a mediational variable between behavioral intention and consistent condom use. Specially, condom use is a behavior which requires many preparatory strategies for behavioral achievement (Abraham et al., 1999; Bagozzi, 1993; Bryan, et al., 2002). Such as underlined by Lewis, et al. (2010), formulating a mental plan to use a condom (mental planning) or talking about (communication) condom use differed from buying condoms or carrying a condom (active

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behavior). Integrating our reasoning concerning the importance of these preparatory behavioral strategies, the goal of this study is to test this mediational hypothesis within the TPB context among French young adults sexually active. In the current study, the original TPB explained 27% of the variance in condom use. Nevertheless, structural equation modeling analysis on initial TPB model was poorly. An adequate model was found with preparatory behaviors such as mediational role in intention-behavior relationship and between PBC and behavior, especially for active preparatory behaviors. Thus, this model underlined 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.

First result on this study was gender differences in the TPB scores. Women had systemically higher scores than men. Nevertheless, this report is not true for PBC and consistent condom use. These more positive individual and perceived attitudes toward intended and condom use, could reflect a higher degree of concerns with health related-behaviors (e.g. self-protection, health-care) among women (Waldron, 1998). In addition, the condom can be also considered by them such as protection against pregnancies for young women not having other birth control. On the other hand, men and women were not different to consistent condom use and PBC. Especially for women, the intention-behavior gap must be specially taken into account, because of less active control on the choice of using the male condom.

In this study, the initial TPB accounted for 42% of the variance in behavioral intention and 27% in condom use. These results were in line with meta-analyses about TPB applied to condom use (Albarracin, et al., 2001; Bennett & Bozionelos, 2000; Sheeran, et al., 1999). The extended TPB explained 43% in condom use, addition of the PBS variables seems to improve the original TPB. Intention is predicted especially (in the order) by PBC, socio-cultural (nor entourage) subjective norms and individual attitudes. This fact was consistent with Ajzen's



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predictions (Ajzen, 1991; Ajzen & Madden, 1986). It is necessary to underline that, within young adults, entourage subjective norms not have significant influence unlike to previous results in a French adolescent sample (Potard, et al., 2012). This finding refers to the developmental change in influence and conformity to peers and parents with age: for the construction of attitudes, young adults would be less affected by important referents' expectations and more turn toward cultural/societal impregnation (based on moral responsibility). On the other hand, the close entourage remains a major source of influence on behaviors as shows the following result. For condom use, regressions analysis retained Entourage subjective norms, intention, active behavior (PBS), Socio-cultural norms and mental plan (PBS) as predictors. This result was in accordance to Ajzen (1985, 1991) and Bryan et al (2002). Unless Attitudes, all determinants of the TPB had predicted condom use, with a major role for intention. Two of three PBS domains were also retained: active and mental preparatory behaviors. The PBC was not seems predicted condom use in contrary to Ajzen's model (Ajzen, 1985; Madden, et al., 1992). Moreover, unexpected, the Structural Equation Model was not concluding to an acceptable model with poor model fits for hypothesized model (for recall see Figures 2 and 3). In adolescent sample (not only sexually active), Bryan et al. (2002) validated this model, nevertheless indices fits reported were not completely satisfying. These first results stressed the importance of preparatory behaviors for the achievement of condom use, according to Abraham, et al.'s postulate (Abraham, et al., 1999). Consistent with previous research (Sheeran et al., 1999), these findings suggest that the PBS variables are proximal predictors of condom use. The hypothesis was that PBS could be also a mediational factor between PBC and behavior.

A second SEM was performed by withdrawing the nonsignificant relations of the original theory. As suggested by Ajzen (1985, 1991; Ajzen & Madden, 1986), PBC, Entourage subjectives norms and individual Attitudes were main determinants of behavioral

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intention in our extended model. Young adults with a high degree of PBC, a positive attitude towards condom use and an entourage favorable to condom use were more likely to develop an intention to use a condom during their next intercourse with a new partner. This analysis was in accordance to those accessible in meta-analyses previously mentioned (Albarracín, et al., 2001; Sheeran, et al., 1999). Only the Socio-cultural subjective norms not predicted intention but impacted directly condom use behavior. This result underlined importance of the cultural and moral context in the compliant use of condom. From this point of view, Jeon, Jo, Jung, and Lee (2014) indicated that societal norms and occupational norms were significant factors affecting condom use. The above findings highlighted the importance of different source of normative influence and subdividing the subjective norms in more details themes (Socio-cultural norms and Entourage norms) for a more effective prevention's programs.

Because, condom use is not entirely under volitional control and inevitably involves a dyadic situation, this situation can specially be related to Perceived Behavioral Control (Abraham, et al., 1999). In previous studies, PBS was conceptualized as mediator between intention-action relationships and between PBC-condom use (Bryan, et al., 2002; Lewis, et al., 2010). The results of the current study provide support for these propositions. SEM shown a direct effect of PBC on behavioral intention and on active preparatory behavior, without direct effect on behavior (Lewis, et al., 2010). These results extended prior researches (Bryan, et al., 2002; Lewis, et al., 2010; Lewis, et al., 2009) by indicating that it was especially the active strategies condom-related which impacted condom use in young adulthood. Our model confirmed also Carvalho et al.'s conclusion (Carvalho, et al., 2014) that PBC could played a major role in the performance of preparatory behaviors in the condom use context. Greater perceived behavioral control should lead to stronger condom use intention and protective strategies. These findings confirm the pregnant role of PBC on intention and PBS would be a mediator in the PBC-behavior relationship (Albarracín, et al., 2001; Gredig, et al., 2006;

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Notani, 1998; Potard, et al., 2012; Protogerou, et al., 2013). It should nevertheless be stressed that, in our model, the data indicated that intention remained the most powerful predictor of condom use. PBC contributed to the prediction of intention, which in turn facilitated to the performance of consistent condom use. These direct and indirect associations between intention and behavior were expected by the TRA and the TPB (Ajzen, 1991; M. Fishbein & Ajzen, 2010; Madden, et al., 1992) and were previously well-documented (Armitage & Conner, 2001).

Also, the current study confirms and specifies previous results on the role of planning or protective behavioral strategies related to safer sex, in context of condom use (Bryan, et al., 2002; Carvalho, et al., 2014; 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 which seemed to have an effect on effective condom use behavior: post decisional acts could be more efficient than post decisional cognitions or communications. Against the background of the above mentioned studies, planning seemed mediated the association between intention and condom use. Other researches will have to confirm this assumption by being focused on the specific role of each of three domains of the PBS. Importantly, a significant relation between PBC and PBS was found. This underlined that action planning was predictive when levels of PBC are high. Beliefs about ability to control condom use could lead to the formation of planning act which, in turn, could lead to effective use. This results was in accordance to previous study on dental care (Pakpour & Sniehotta, 2012).

Other PBS (communication and mental plan) were minor determinants of behavior and were directly predicted by individual Attitudes. These post-decisional volitions (cognitions) traduced individual positive dispositions toward the behavior which promote the formation of communicational and representational competencies towards condom use, but

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were lower efficient than post-decisional act. This conclusion provide support for a distinction between intention to try and actual trying developed by Bagozzi (1993) in a condom use achievement context. Then, these results in the continuation a previous research on body weight suggested that different planning behaviors have been affected differently by attitudes and PBC (Conner & Norman, 1996).

Understanding the role of planning and preparatory behaviors that lead to condom use could reorientated preventative interventions among young adults. On an individual level, post decisional acts (behaviors of obtaining, carrying condoms) interventions could be developed within prevention programs. Programs should focalize on converting mental plans into executed plans, considered such as a commitment decisions. These interventions should be oriented by two times: 1) the identification of risky situation or behaviors and 2) the generation of appropriate behaviors to cope with these situations. This study enhanced also that self-efficacy and technical skills (regulating behaviors) seem more protective than communicational skills (formulating plans) for condom use. From a practical perspective was suggested the utility of increasing a sense of perceived control (obstacles, impediments and resources) among young adults in order to facilitating the active preparatory behaviors. Interventions addressing negotiation and condom use skills could improve the effectiveness of condom use among young adults. On a social level, create a supportive environment (e.g. by community and work-site interventions) which enable to facilitate condom use could be reduce level risks of unsafe sex among young adults. Making condoms available without barriers should also improve access to condoms.

A primary limitation of this research that intention, condom-related PBS and condom use behavior were measured concurrently, longitudinal studies will be necessary to confirm these previous assertions. Also, condom use was measured by online self-reports only with a potential risk of social desirability bias, although researches tend to conclude to an absence or

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lower of online and self-report biases among safer sex measures (Dare & Cleland, 1994; Plummer et al., 2004; Riva, Teruzzi, & Anolli, 2003). This extended TPB model would be retested among a more largely sample of young adults and on particular sexual orientations groups (homosexual, bisexual). Also, a gender specific formulation of the model may be needed; taking into consideration differences between men and women on the TPB predictors. Then, in the condom use context it is obvious that the individualistic/rational approach of the TPB requires a predictor concerning affective dimensions (e.g. affective beliefs, impulsivity).

In sum, this study testing an extension of the TPB model which had performed a better predictability of condom use than the original TPB model. The additional paths in the extended TPB model allowed for more variance explained in both intention and behavior. The results suggested that it is necessary to take into account of specific preparatory actions, which characterize a coping planning (Hagger & Luszczynska, 2014; Sniehotta, Schwarzer, Scholz, & Schüz, 2005) in condom use achievement. This study enhanced the need to examine cognitions in relation to the condom use behavior. Nevertheless, the result that behavior was directly predicted by Socio-cultural subjective norm, and then by intention, which posits socio-cultural beliefs could be a major determinant of condom use among young adult. Nevertheless, this extended model leaved 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 representation of relationships.

**Declaration of Conflicting Interests**

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Figures to be inserted

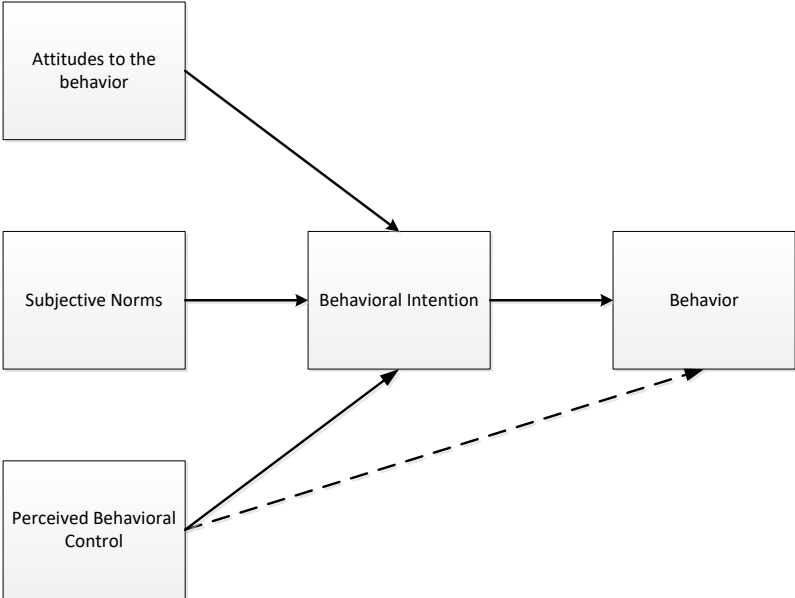


Figure 1:

Ajzen’s Theory of Planned Behaviour (TPB) (Ajzen, 1985, 1991; Ajzen & Madden, 1986)

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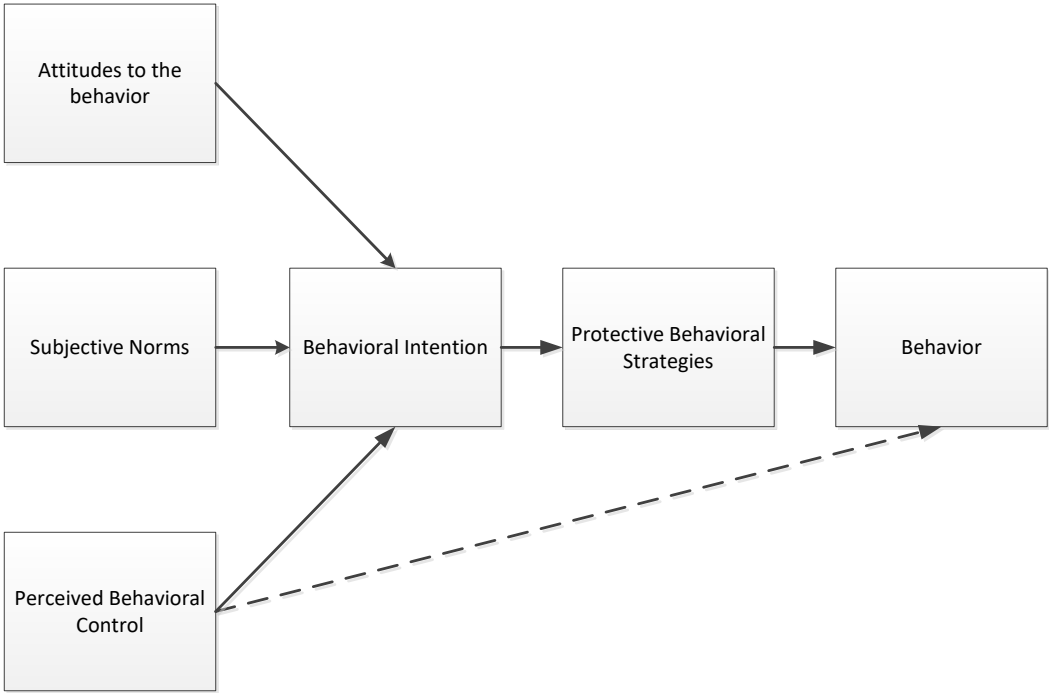


Figure 2:

The extended theory of planned behavior (Ajzen, 1991; Ajzen & Madden, 1986), including mediational role of preparatory behaviors on condom use

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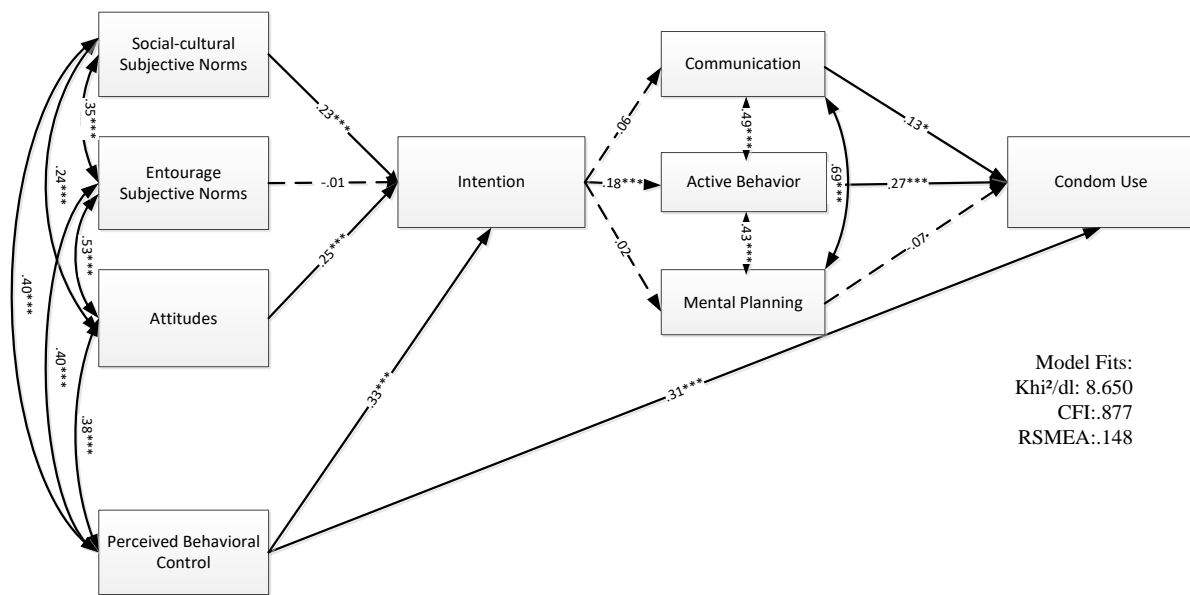


Figure 3:

The extended TPB model predicting condom use, including mediational role of preparatory behaviors ( $n = 307$ ), with standardized path coefficients

Note: \* $p < .05$ ; \*\*\*  $p < .001$ . Chi<sup>2</sup>/ df = degree of freedom; CFI = Comparative fit index;

RMSEA = Root Mean Square Error of Approximation. Dotted lines indicate non significant associations ( $p > .05$ )

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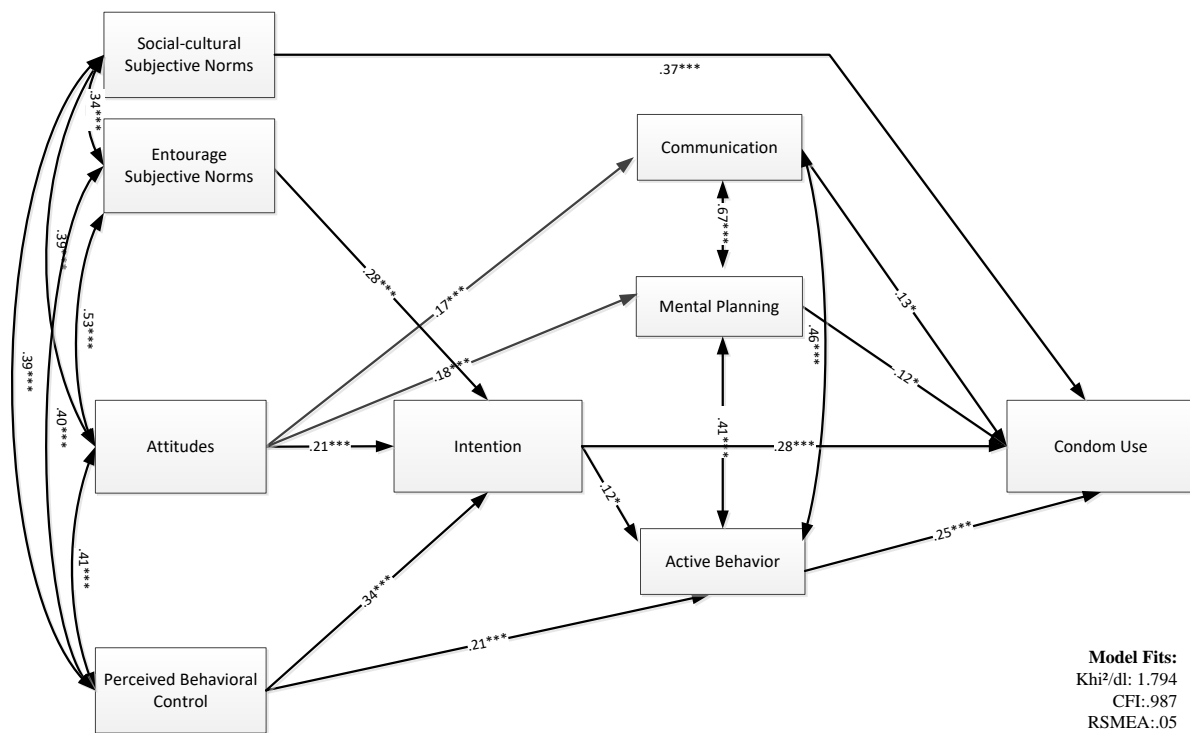


Figure 4:

The final TPB model predicting condom use ( $n = 307$ ), with standardized path coefficients.

Note: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$ .  $\chi^2/df$  = degree of freedom; CFI = Comparative fit index; RMSEA = Root Mean Square Error of Approximation.

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### Tables to be inserted

Table 1:

Internal consistency for the TPB variables

<i>TPB variables</i>	Cronbach's Alpha
Subjective Norms	.80
Socio-cultural norms	.74
Entourage norms	.83
Individual Attitudes	.67
Perceived Behavioral Control	.62



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Table 2:

Means scores (SD) and gender differences for the TPB variables and PBS related to condom use

	Means and SM			<i>t</i> test	
	Total ( <i>n</i> = 350)	Male ( <i>n</i> = 119)	Female ( <i>n</i> = 231)	<i>t</i>	<i>p</i> - <i>value</i>
Subjective norms	4.22 (.65)	4.10 (.69)	4.28 (.62)	2.533	**
Socio-cultural norms	4.21 (.76)	4.08 (.82)	4.27 (.72)	2.19	*
Entourage norms	4.24 (.84)	4.11 (.83)	4.30 (.84)	1.942	*
Individual Attitudes	3.63 (.80)	3.44 (.83)	3.72 (.77)	3.187	***
Perceived behavioral control	4.13 (.78)	4.11 (.79)	4.13 (.82)	0.145	<i>ns</i>
Intention	4.38 (1.10)	4.16 (1.23)	4.51 (1.00)	2.816	**
Condom use behavior ( <i>n</i> = 307)	3.37 (1.68)	3.31 (1.64)	3.40 (1.69)	.469	<i>ns</i>
Protective Behavioral Strategies	2.32 (1.03)	2.41 (1.05)	2.28 (1.03)	-1.133	<i>ns</i>
Active Behavior	2.93 (.92)	2.82 (.84)	2.98 (.96)	1.626	<i>ns</i>
Communication	2.37 (.97)	2.26 (.94)	2.43 (.99)	1.555	<i>ns</i>
Mental Planning	1.95 (.93)	1.87 (.90)	1.99 (.95)	1.108	<i>ns</i>

*ns* : non significant, \**p*<.05, \*\**p*<.01, \*\*\**p*<.001

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Table 3:

Bravais-Pearson correlations between condom use, intention and the three predictors of the TPB.

	Intention	Behavior
Subjective Norms	.49 ***	.38***
Socio-cultural Norms	.46***	.30***
Entourage Norms	.33***	.33***
Individual Attitudes	.44***	.35***
Perceived Behavioral Control	.52***	.34***

\*\*\* $p < .001$

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Table 4:

Stepwise multiple regression results predicting intention and condom use

	$\Delta R^2$	Total $R^2$	$\beta$	$t$	$p$ -value
<b>Intention</b>					
PBC	.29	.29	.34	6.866	***
Socio-cultural SN	.10	.38	.28	5.692	***
Individual Attitudes	.03	.42	.21	4.142	***
<b>Condom use</b>					
Entourage SN	.25	.25	.31	6.009	***
Intention	.10	.35	.19	3.557	***
Active Behavior (PBS)	.06	.41	.25	4.916	***
Socio-cultural SN	.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>

\*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .