

PERSONAL DETERMINANTS OF PURCHASING OF PHARMACEUTICAL PRODUCTS ONLINE

CLAUDIO BARBARANELLI
SARA PODIO GUIDUGLI
SAPIENZA UNIVERSITY OF ROMA

DOMENICO DI GIORGIO
MARTA GRAMAZIO
ITALIAN MEDICINES AGENCY (AIFA)

Our study examines psychological and sociodemographic variables that might influence the intention to purchase pharmaceuticals online. Online questionnaires examining variables in Ajzen's (1991) Theory of Planned Behavior, as well as personal variables such as stimulating risk taking and safety perception (i.e., perception of the behavior as safe for health), were used for the purpose of the study. Results of hierarchical regressions and of structural equation modeling showed that attitude and subjective norm were the main determinants of future purchase intention. A significant effect was found also for past behavior and for safety perception. Safety perception, moreover, resulted the more important determinant of attitude and of subjective norm, thus exerting a significant and *great indirect* impact on future purchase intention. Propensity to risk and age showed a significant but moderate direct effect on attitude and subjective norm but only a modest indirect effect on future purchase intention. Public stakeholders may capitalize on these results to orient their communication campaigns. In particular, messages stressing the risk of health may lower the positive attitude toward the purchase of medicines online, and then the intention to purchase those products online.

Key words: Pharmaceutical products; Online purchase; Theory of Planned Behavior; Safety perception; Propensity to risk.

Correspondence concerning this article should be addressed to Claudio Barbaranelli, Department of Psychology, Sapienza University of Roma, Via dei Marsi 78, 00185 Roma, Italy. Email: claudio.barbaranelli@uniroma1.it

PHARMACY AND THE INTERNET: DANGER OR OPPORTUNITY?

The interest in the market of online pharmacies has been well documented since late '90s (e.g., Roller, 1999). This market gives several advantages and opportunities to consumers, among which shopping from home, privacy, reducing the anxiety or embarrassment of using traditional pharmaceutical channels, anonymity. Such advantages have been recognized also by the U.S. authority FDA (Spain, Siegel, & Ramsey, 2001). In spite of all these benefits, critical aspects of this particular kind of e-commerce have been underlined, especially as far as safety, lack of ethicality, and legal noncompliance are concerned (Fung, Woo, & Asch, 2004). As noted by Ward (2003), the availability of online pharmacies gives patients the opportunity of seeking pharmaceutical products without seeing any doctor. This however may eventually turn into a *deadly situation* and adverse effects when the figures of physician and pharmacist are bypassed.

One of the risks stemming from purchasing pharmaceutical products on the web derives from misinformation and/or lack of information regarding medical products, and this is especially dangerous when the purchase is made without any consultation with a doctor or with a pharmacist. This is testified by “multiple cases of people dying from drugs they purchased online” (Ward, 2003, p. 80). These fatal outcomes resulted from a purchase of noncounterfeit products but without a prior consultation with a physician (i.e., without a prescription), but also from a purchase of counterfeited products from offshore websites. Advertising plays a crucial role in this process. Pop-Up and Pop-Under advertisements, banners, and spam e-mails engulf the cognitive space of target consumers with minimal, if not often misleading information regarding the product. Although the main concern of laws on advertising is consumers’ safety, the current regulatory environments are not always well prepared to enforce what is prescribed: this eventually leaves to consumers the main responsibility of caring for and protecting their own health, by not pursuing behaviors that are dangerous and unsafe.

In this regard psychological components are critical elements: however, these components have often been neglected. Concerning purchasing online in general (without reference to pharmaceutical products) some cognitive and personality variables such as neuroticism, general locus of control, shyness, extraversion, risk-aversion, and self-efficacy have been linked to purchasing online (Amichai-Hamburger & Ben-Artzi, 2000; Amichai-Hamburger, Wainapel, & Fox, 2002; Chak & Leung, 2004; Gupta, Su, & Walter, 2004; Wang, Wang, & Wang, 2006). Among the few studies that examined online purchasing of pharmaceutical products, Rajamma and Pelton (2009) examined some psychological and sociodemographic variables in an attempt to explain why consumers choose to purchase online risk-laden products such as pharmaceuticals. In particular they found that external locus of control and objectivism (as regards the psychological variables), gender, income, and educational level (as regards sociodemographic variables) were found to influence consumers’ propensity to acquire medications online. However, these variables explained a small 10% of the variance of the intention to purchase pharmaceutical products online. Stangl, Stetina, and Kryspin-Exner (2006) compared users and nonusers of e-pharmacies, and found that users were higher in general self-efficacy, internal health locus of control, and risk-taking. Furthermore, consumers tended to perceive medical information in a more emotional way.

Wiedman and colleagues (2010) investigated consumers’ perceptions of risks and their relations with online shopping attitudes, within an e-pharmacy context. They found different clusters of consumers who have differently positive attitudes toward purchasing online pharmaceutical products. In particular, consumers who are more enthusiastic about this behavior have already purchased pharmaceutical products online, they value the convenience of purchasing online and perceive a very low risk associated to this purchase. In contrast, consumers who are more contrary to purchasing online medicines are concerned about the dubious quality of the product delivered online, as well as the risk for their health that is related to the purchase of these products. Holtgräfe and Zentes (2012) examined the factors determining internet use for buying over the counter (OTC) medicines. They found that trust in the opinion of health professionals and accessibility of a doctor or pharmacist who can supply information is the main deterrent to the use of the internet for finding this kind of advice, while perceived ability to search online, perceived usefulness of internet, and perceived credibility of online information were positively associated to preferring internet as a channel.

These studies clearly call for additional research to further explore supplementary psychological variables that may influence consumers' decisions related to purchasing online pharmaceutical products. In this regard a unifying theoretical framework is particularly needed, thus allowing for a systematic interpretation of psychological constructs linked to this behavior.

THE THEORY OF PLANNED BEHAVIOR

The Theory of Planned Behavior (TPB) is an economical and comprehensive model accounting for the formation of behavioral intentions as a basis for explaining behavior (Ajzen 1985, 1988, 1991; see Armitage & Coner, 2001, for a more recent meta-analytic study). This theory is an extension of one of the most established models in the attitude-behavior literature, the Theory of Reasoned Action (TRA), originally developed by Fishbein and Ajzen (1975; see also Ajzen and Fishbein, 1980). Both models assume that the proximal cause of behavior is one's intention to engage in that behavior. However, TRA maintains that intention depends on two predictors: one's *attitude toward the behavior* (i.e., the affective disposition toward the behavior) and one's *subjective norm* (i.e., one's perception of the social pressure put on him/her to engage in the behavior, that is how much those people who are important for the respondent would approve respondent's behavior). TPB considers *perceived behavioral control* (i.e., one's perception of how easy or difficult it is to perform the behavior, a construct similar to perceived self-efficacy; see Bandura, 1997) as a third predictor of intention, independent from attitude and subjective norm. Therefore, a behavioral intention is theoretically represented as a weighted sum of these three predictors. Another independent variable was added to extend TRA and TPB to *past behavior* (cf. Bentler & Speckart, 1979). In this way, researchers intended to improve the model by considering that habits (or, more generally, various types of conditioned responses and of learned predispositions) influence behavior through their impact on intention thus enhancing the explanatory power of the model (Eagly & Chaiken, 1993).

The TPB has been effectively tested in a number of contexts to predict a variety of intentions and behaviors, including health, marketing and consumer researches (see, for a review, Eagly & Chaiken, 1993). We will briefly consider the two main domains relevant for this study. Regarding *health related behaviors*, a recent meta-analytic study conducted by McEachan, Conner, Taylor, and Lawton (2011) evidenced that the efficacy of TPB is dependent on the behaviors that are to be explained or predicted as well as on different moderators of a methodological nature. Among the more important moderators considered, of relevant importance are the length of time separating the measurement of intention and of behavior, sample age, and the behavioral measure used. When appropriate methodological procedures were implemented, TPB resulted in predicting health-related behaviors such as physical activity and diet behavior (with an explained variance in the order of more than 20%), as well as risk, detection, safer sex, and abstinence from drugs (with about 15% of variance explained). Behaviors assessed in the shorter term, and those assessed with self-reports (compared with objective measures) resulted in a better prediction. These results evidence the relevance of TPB as far as health behaviors are concerned. However, variables from the TPB do not explain 100% of health-related behavior: variables from other theoretical models may complete the predictive power of TPB. In this regard the role of perceived value and risk has been examined especially as a determinant of consumers' choices (Claeys, Swinnen, & Abeele,

1995). Among the major types of values involving perceived risk, one of particular relevance for health behavior is physical risk or risk, that is, the probability that the purchased product will result in a threat to human life (see Featherman & Pavlou, 2003). Thus the inclusion of this variable may enhance the predictive power of TPB. As far as *internet-related behavior* such as *purchasing online* is concerned, TPB has been examined especially in the case of shopping online in general (George, 2004; Turan, 2012), although the purchase of specific products has also been investigated (see, e.g., Lee, 2009, for online banking). These studies evidenced the relevance of TPB in explaining online purchasing but underlined the importance of considering also variables and constructs from other theoretical models such as perceived risk and technology acceptance model (Davis, Bagozzi, & Warshaw, 1989).

RISK PERCEPTION AND RISK PROPENSITY

Since purchasing pharmaceuticals online is a behavior representing a risk for health, we believe it is important to take into account also those aspects of personality that are associated to individual differences in propensity to risk (see, in this regard, Wang et al., 2006). Referring to this, risk propensity is one of the most discussed concepts in research on consumer behavior (Cox, 1967). In general terms, risk can be defined as the probability of harmful or negative consequences as a result of circumstances and/or behaviors not always predictable. In consumer research this refers to different dimensions of perceived risk associated with the purchase. Ross (1975) distinguishes between different types of risks, such as functional or performance risk (which occurs when the product does not live up to promises made to the consumer), financial risk (greater in the case of products which are extremely expensive), physical risk (which refers to possible damage suffered by the consumer as a result of purchase), psychological risk (which occurs when the purchase and use of a product can damage self-esteem or self-perception of the consumer), social risk (the choice of product is not approved by the other, generating social rejection or disapproval), and temporal risk (typical of products that become quickly obsolete with the passage of time). These different types of risk are present in different combinations and at different levels of intensity, in various situations where the purchase of products or services is an issue (Gemunden, 1985). In the context of consumer behavior it is also necessary to distinguish between objective risk and risk that the consumer perceives in purchasing decisions (Cox, 1967). In this regard, a wide range of psychological studies has shown that people differ in how they perceive risk (Bromiley & Curley, 1992; Trimpop, 1994). Individual differences in personality traits (Horvarth & Zuckerman, 1992; Wong & Carducci, 1991) and even in biochemical structure (Harlow & Brown, 1990) have been also found to influence purchase choices. Among the different personality dimensions associated to risk, the dimension of stimulating risk taking (SR) was introduced referring to “rapid, effortless, and even automatic behavior, taken as a response to a strong need for immediate sensations and excitement” (Zaleskiewicz, 2002, p. S107). SR does not serve instrumental purposes but refers mainly to a hedonistic orientation. This impulsive characteristic of SR regards the fact that it is associated with an unconscious experience of physiological arousal and positive feelings connected with risky behavior perceived as pleasant: this pleasant arousal leads to wanting to further experience this state. In field studies SR was significantly and positively related to general financial risk taking, gambling, and to context-specific risk behaviors

in ethical, social, recreational, and health domains, while it resulted negatively correlated to financial risk taking in the investment domain. SR thus configures an important dimension of individual differences in risk preferences and risk propensity (see also Dahlback, 1990), a dimension related to a general individual inclination to take risks, which captures the fact that some individuals are inclined to take great risks while others are inclined to take small risks.

AIMS OF THE STUDY

The aims of this study were to investigate the impact of different psychological and sociodemographic variables on the future intention of purchasing pharmaceutical products online. The main psychological variables considered were those included in Ajzen's (1991) TPB (namely attitude, subjective norm, and perceived behavioral control), and past behavior. We aimed first of all to compare the explanatory power of these variables to what is explained by a personality trait such as stimulating risk taking, and to what is explained by the individual safety perception of the purchase behavior, controlling for socioeconomic variables such as gender, age, and education. This aim was pursued by means of hierarchical regression analysis, where three different models were compared to compare the added value of TPB, safety perception, and risk in explaining intention to purchase medicines online, while controlling for sociodemographic variables. Another aim was to test a conceptual model where TPB variables were considered as mediators in the causal chain linking personal and sociodemographic variables to future purchase intention. Accordingly, a structural equation modeling approach was adopted (Bollen, 1989). The basic model reflects the conceptual model underlying TPB.

In particular it examines the following hypotheses:

H1: attitude, subjective norm (SN), perceived behavioral control (PBC), and past behavior explain future intention;

H2: stimulating risk taking (being a personality trait) influences attitude, subjective norm, and perceived behavioral control (see Ajzen, 1985). We further hypothesize that its impact on future intention is only through the mediation of these TPB variables. Finally, we expect also a positive association among SR, safety perception, and past behavior, and a negative association with age;

H3a: Safety perception exerts a direct influence on attitude, subjective norm, and perceived behavioral control. The more a person considers purchasing pharmaceutical products online as a behavior safe for one's own health, the more he/she develops a positive attitude toward future purchases (influence of safety perception on attitude), the more he/she expects that significant others will approve this behavior (influence of safety perception on SN), the more he/she will consider the behavior easy to perform (influence of Safety on PBC);

H3b: Safety perception would exert its impact on future intention to purchase online not only through the mediation of TPB variables but also directly;

H4: we expect a negative impact of age on TPB variables: lower age will be associated with a more positive attitude toward future purchase, a higher expected approval from significant others, a higher perceived easiness of the behavior. We expect that the impact of age on intention is totally mediated by TPB variables. We expect also a negative association of age with past behavior, and with SR.

MATERIAL AND METHODS

Participants

The sample consists of 1,000 participants, and is representative of the total population of adult Italian internet users (at least eighteen years old), that is, Italians who had used Internet at least once in the last seven days before the research was performed. This population was estimated to be around 20,000,000 Italians, in 2012, when the data were collected, and this amounts to 45% of the Italian adult population. Table 1 presents a breakdown of the sample concerning the principal demographic variables.

TABLE 1
Demographic characteristics of the sample

Gender		Age	
Male	47.8%	18/24 years old	9.9%
Female	52.2%	25/34 years old	18.7%
		35/44 years old	18.5%
		45/54 years old	16.2%
		55/64 years old	14.4%
		65/74 years old	22.3%
Education		Occupation	
Elementary studies	2.9%	Executive/Entrepreneur	4.6%
Primary studies	13.2%	Merchant/Craftsman/Dealer	2.4%
Secondary studies	47.9%	Self-employed, freelance	9.4%
University studies	36.0%	Employer	35.8%
		Manual worker	4.0%
		Student	9.1%
		Housewife not otherwise employed	7.6%
		Retired	22.1%
		Unemployed	5.0%

Measures

Online questionnaires were used in order to measure the constructs of interest. To each participant a questionnaire consisting of about 60 items was administered. The questionnaire was composed by different items investigating purchasing habits, knowledge, and beliefs related to purchase of pharmaceutical products on- and off-line, knowledge of information campaigns on counterfeit medicines, internet purchase habits, and internet use. Participants also completed a short demographic page, providing information about age, gender, education, and occupation. In order to explore psychological variables as factors of influence on the intention of buying medicines online several scales were administered.

Stimulating risk taking. Five items from Zaleskiewicz's (2002) Stimulating Risk Taking scale were considered. These items are reported in the Appendix. Exploratory factor analysis on

these items (performed using the Principal Axis Factoring method of factor extraction) revealed a clear monodimensional factor structure, with the single factor explaining 69% of variances, and factor loadings ranging from .76 to .89. Reliability assessed with Cronbach's alpha coefficient was equal to .86.

Measures of TPB. Core components of TPB (attitude, subjective norm, perceived behavioral control, and intention) were measured by four items developed according to what was suggested by Ajzen and Fishbein (1980) and Ajzen (1985). A fifth item was added to measure past behavior. Items are presented in the Appendix.

Safety perception. As noted above, an important aspect that may regulate purchasing online is how much the purchase of pharmaceuticals online is perceived as safe for health. To measure this aspect a single item was used (see Appendix).

Procedure

Data were collected by SWG in 2012 between May 11 and May 18. A quota sample, balanced by geographic area, age, and gender was used. Participants were randomly selected from an online panel run by SWG. The questionnaire was individually administered to participants by means of CAWI methodology. Everybody received a reimbursement of about one Euro for their participation. About 2,800 persons were contacted: of these people, 1,000 completed the questionnaire online within one week from the first contact. About 65% of the initial sample, then, did not complete or refused to complete the survey. After data collection was complete, participants were weighted in order to maximize the representativeness of the sample of the target population.

RESULTS

Descriptive Statistics

Web access and buying online. Concerning participants 92% had daily access to the Internet, the remaining 8% had access at least once in a week. The average time spent on the web daily was about two hours. Ninety-five per cent of participants had purchased at least once online, 64% purchase habitually or often, and 82% are acquainted with the possibility of purchasing pharmaceutical products online. About 16% of participants had purchased pharmaceutical products online at least once, about 2% had had someone purchasing online for them.

Psychological and sociodemographic variables. Table 2 presents the correlation matrix and the descriptive statistics of the variables included in the analyses. Since subjective norm, past behavior, and future intention presented a non-normal distribution, they were transformed using a log10 transformation (Tabachnick & Fidell, 2007). As can be easily seen from Table 2, this transformation reduced non-normality but did not eliminate it completely, especially for past behavior. Attitude, subjective norm, and perceived behavioral control show significant correlations; the correlation between attitude and subjective norm is higher, the two correlations among perceived behavioral control, attitude, and subjective norm are moderate. Future purchase intention results greatly



TABLE 2
Correlations and descriptive statistics of the scales considered

	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	Correlations							
					1	2	3	4	5	6	7	
1. Attitude	3.57	1.35	.46	-1.06	-							
2. Subjective norm+	1.40	0.50	.88	-.55	.63	-						
3. Perceived behavioral control	3.95	2.24	-.02	-1.41	.29	.33	-					
4. Past behavior+	-.87	0.28	1.78	1.28	.44	.48	.13	-				
5. Future intention+	-.74	0.33	.64	-1.38	.71	.73	.26	.56	-			
6. Stimulating risk taking	11.01	4.90	.66	-.29	.23	.27	<i>.08</i>	.24	.27	-		
7. Safety perception	3.15	0.85	-.61	-.62	.72	.67	.30	.47	.68	.24	-	
8. Age	3.73	1.67	-.04	-1.26	-.21	-.18	<i>-.03</i>	-.11	-.16	-.13	-.16	

Note. += Variables have been recoded using a log10 transformation to reduce non-normality. *N* = 862 (this number of participants is obtained after listwise deletion of missing values). All coefficients are statistical significant ($p < .01$) except those in italics that are nonsignificant.

positively correlated with attitude, subjective norm, and past behavior, and with safety perception while it shows lower positive correlations with perceived behavioral control and with stimulating risk taking. Finally, intention shows a low negative correlation with age. Stimulating risk taking is moderately correlated with all the other variables except with age, where it shows negative albeit low correlations. This pattern of correlation evidences the importance of the determinants of intention in explaining this variable, but also gives room to the possibility that other variables not included in TPB have a relevant association with intention. This is the case of safety perception that is not included as a predictor of intention in TPB: this variable moreover seems to be of particular relevance when interventions to highlight the possible negative consequences of purchasing medicines online are concerned.

Hierarchical Regression Analyses

A first set of analyses was aimed at examining and comparing the explanatory power of the variables comprised in TPB, stimulating risk taking, and safety perception for health with respect to future intention of purchasing pharmaceuticals online. Due to high correlations among most of the variables, in order to examine the impact of the different determinants of Future Purchase intention a hierarchical regression approach was used. In this approach different variables are included in the different steps of the regression, and the explanatory power added at each step is evaluated using the incremental R^2 also known as R^2 -Change (Cohen, Cohen, West, & Aiken, 2003; Tabachnick & Fidell, 2007). We therefore tested three different hierarchical models. In all models, Step 1 comprised sociodemographic variables (gender, age, and education). In Model 1, TPB determinants of future intention (namely, attitude, subjective norm, perceived behavioral control, and past behavior) were included in Step 2, and SR and safety perception in Step 3. In Model 2, SR was included in Step 2, and TPB determinants of future intention and safety perception in Step 3. In Model 3, safety perception was included in Step 2 and TPB determinants of future intention and SR in Step 3.

Table 3 presents a summary of the results of the hierarchical regressions. Sociodemographic variables explained a significant 3% of variance, but this is due totally to age, that has a negative impact ($\beta = -.16$) on future intention to purchase: younger participants are more inclined than older participants to manifest future intention of purchasing pharmaceutical products online. In Model 1, TPB variables, when entered at Step 2, added a significant 64% of variance explained. In Step 3, SR and safety perception added less than 1% which, by the way, resulted significant mainly because of the high statistical power of the test due to big sample size. In Model 2, SR added about 7% of variance to what already explained by sociodemographics, when entered at Step 2. TPB variables and safety perception added about 57% of variance, when entered at Step 3. In Model 3, safety perception contributed with about 44% of increment in explained variance when entered in Step 2, while TPB variables and SR added a further 21% at Step 3. These results clearly evidence the prevailing role of TPB variables in explaining future purchase intention: when these variables are entered first, there is almost no room for the effect of other variables entered in further steps. On the contrary, the role of TPB variables is still highly relevant when they are entered in the last step of the hierarchical regression. This seems to evidence that the impact of SR and of safety perception

TABLE 3
 Incremental proportion of explained variance in hierarchical regression models

Models 1, 2, 3	
Step 1: sociodemographic variables	.03
Model 1	
Step 2: TPB variables	.64
Step 3: stimulating risk taking, safety perception	.01
Model 2	
Step 2: stimulating risk taking	.07
Step 3: TPB variables, safety perception	.57
Model 3	
Step 2: safety perception	.44
Step 3: TPB variables, stimulating risk taking	.21

Note. All incremental explained variance is statistically significant ($p < .001$). $N = 862$.

on intention is largely mediated by TPB variables. However, if one considers the large percentage in incremental explained variance due to safety perception in Step 2 of Model 3, there is room for hypothesizing also a direct impact of this variable on intention. This result is consistent with what anticipated in the examination of zero order correlations (see above): safety perception seems to be a very relevant determinant of intention, contributing above and beyond what explained by the “classical” determinants in TPB.

Structural Equation Modeling

All models were tested using Mplus 7.1 software (Muthén & Muthén, 1998/2012). Due to non-normality of some variables (see Table 1) the so-called Satorra-Bentler robust maximum likelihood method of parameters estimation was used. According to a multifaceted approach to the assessment of model’s fit (Tanaka, 1993) as well as to Hu and Bentler’s (1998, 1999) recommendations, the following fit indices were considered: (a) chi square; (b) comparative fit index (CFI; Bentler, 1990); (c) Tucker and Lewis index (TLI; Tucker & Lewis, 1973); (d) root mean square error of approximation (RMSEA; Steiger, 1990); (e) standardized root mean square residual (SRMR; Jöreskog & Sörbom, 1984). In structural equation modeling the χ^2 value is obtained from the minimum of the fitting function used to derive parameter estimates, and it is usually considered a measure of fit rather than a test statistic (e.g., Byrne, 1994). Accordingly, its value is an indicator of the correspondence between the sample and the fitted covariance matrices. However, its dependency on sample size makes it quite probable to obtain large values in large samples and small values in small samples. This fact has led to the development of alternative ways to assess goodness of fit. CFI and TLI assess the reduction in misfit of a target model relative to a

baseline model in which no-structure is specified. Usually values equal to or higher than .95 are indicative of a good fit (Hu & Bentler, 1999). The RMSEA index is a criterion that takes into consideration the error of approximation in the population (i.e., the extent to which the null hypothesis that the population covariance matrix Σ is adequately reproduced by a set of parameters θ is true). Values up to .05 indicate a good fit, and values as high as .08 represent a reasonable error of approximation in the population (Browne & Cudeck, 1993). This index also has the advantage of measuring the parsimony of the model, because it takes into consideration the model's degrees of freedom. Finally, it is complemented by a 90% confidence interval (CI) estimate, and by the *test of close fit* which examines the null hypothesis that the error of approximation is minimal, being lower than .05. The SRMR is an absolute index reported as a summary statistic based upon residuals between the elements of the implied and observed covariance matrices: values lower than .08 indicate an adequate fit (Hu & Bentler, 1998, 1999).

A first model testing H1, H2, H3a, and H4 yielded satisfactory results, fit indices being as follows: $\chi^2(3, N=876) = 18.92, p < .001$; RMSEA = .078; 90% CI [.047, .113]; $p(\text{RMSEA} < .05) = .07$; CFI = .99; TLI = .95; SRMR = .01. However, a significant modification index of 17.13 was associated to the effect of safety perception on future purchase intention. This effect corresponds to H3b, so we respecified the model in order to correspond to H3b. This respecified model yielded an almost perfect fit, with the following indices: $\chi^2(2, N=876) = 1.79, p = .41$; RMSEA = .00; 90% CI [.000, .065]; $p(\text{RMSEA} < .05) = .86$; CFI = 1.00; TLI = 1.00; SRMR = .004. Figure 1 presents the results of this second model, that accounts for 67.4% of future purchase intention variance.

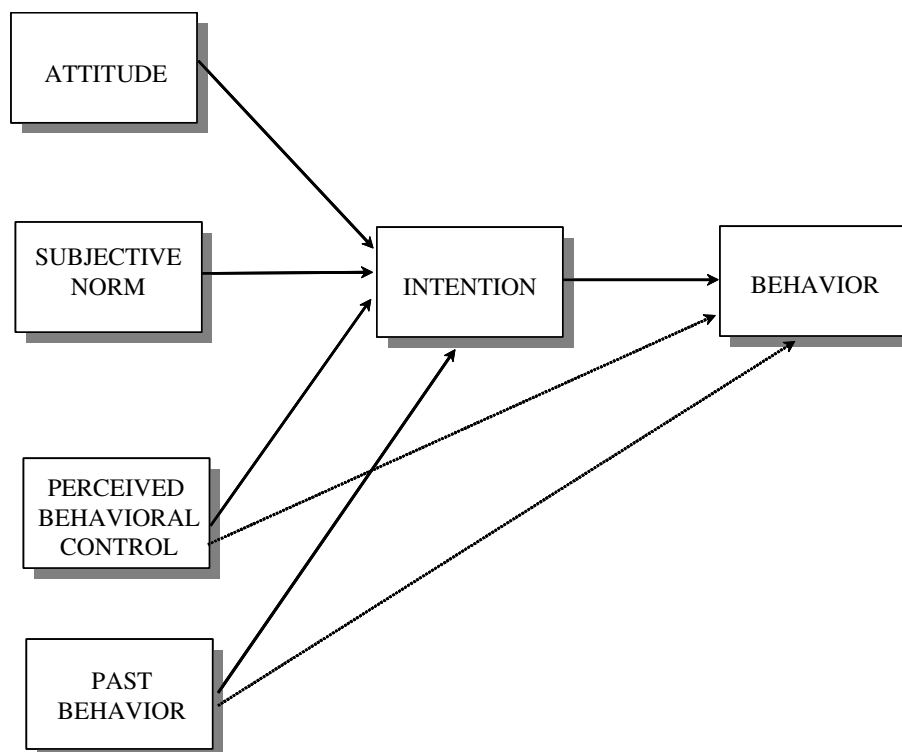
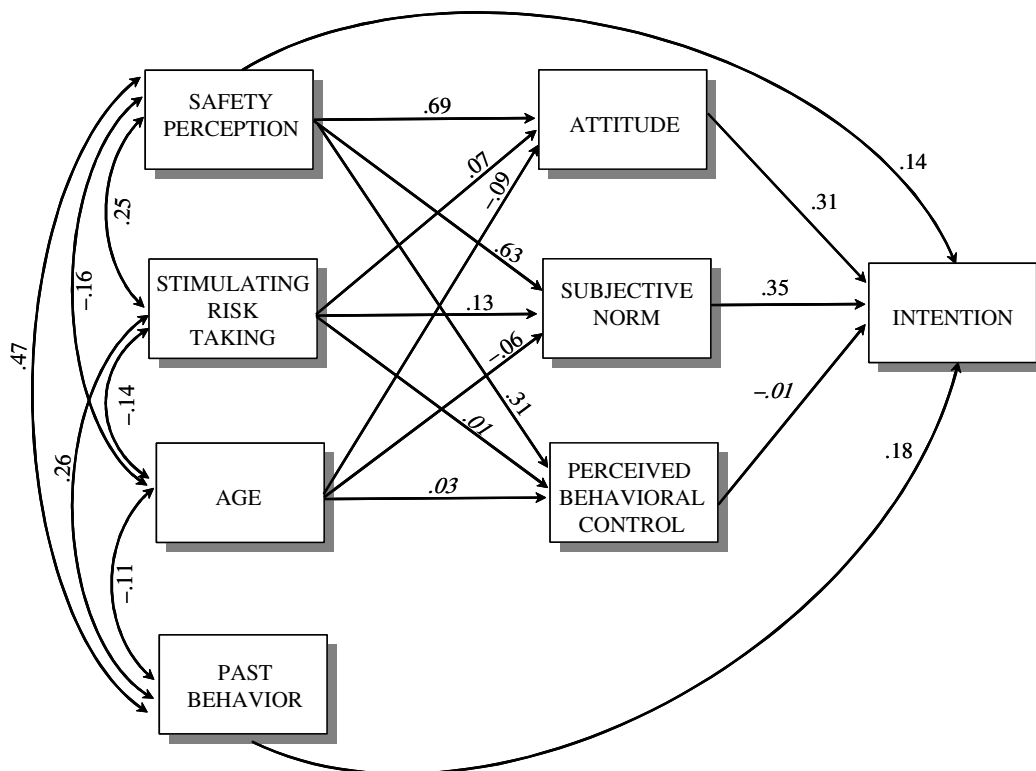


FIGURE 1
Behavior, intention and their proximal determinants in the Theory of Planned Behavior.

H1 was partially confirmed: in fact the impact on future purchase intention of attitude ($\beta = .31$), subjective norm ($\beta = .35$), and past behavior ($\beta = .18$) was statistically significant, but perceived behavioral control ($\beta = -.01$) was not significantly associated to intention. Correlations among residuals of attitude, subjective norm, perceived behavioral control, and past behavior were all positive and statistically significant with the exception of that between past behavior and perceived behavioral control ($r = .00$); these significant correlations ranged from .12 to .27.

H2 stated that stimulating risk taking influenced significantly TPB variables: this is partially confirmed as the impact of SR was .07 on attitude and .13 on subjective norm, but the impact on perceived behavioral control was nonsignificant ($\beta = .01$). All the posited correlations of SR with safety perception, age and past behavior were confirmed.

H3a stated that safety perception exerts a direct influence on TPB variables. As can be seen from Figure 2, this hypothesis is fully confirmed since the impact of safety perception on attitude ($\beta = .69$), subjective norm ($\beta = .63$), and perceived behavioral control ($\beta = .31$) was statistically significant. Moreover, all the posited correlations of safety perception with SR, age, and past behavior were confirmed. Finally, as stated by H3b, safety perception exerts a significant and positive direct influence on intention ($\beta = .14$).



Note. Nonsignificant effects are in italics.

FIGURE 2
 Fitted model of variables predicting intention to purchase pharmaceutical products online.

H4 regarded the negative impact of age on TPB variables: this was confirmed for attitude ($\beta = -.09$) and for subjective norm ($\beta = -.06$), but not for perceived behavioral control ($\beta = .03$). All the posited associations of age with safety perception, SR, and past behavior were confirmed.

To address hypotheses concerning indirect/mediated effects on intention, a mediation analysis was performed (MacKinnon, 2008). Accordingly specific and total indirect effects, Sobel significance test, and 95% CI limits were computed using the procedure included in Mplus 7.1. Table 4 presents a breakdown of the indirect effect analysis. Safety perception exerts on intention a statistically significant total indirect effect equal to .43, 95% CI [.371, .489]. This indirect effect is due to attitude and subjective norm, whose associated specific indirect effects are almost equivalent (being respectively .21 and .22), while the specific indirect effect through perceived behavioral control (.01) is not significant. SR exerts on intention a statistically significant total indirect effect equal to .06, 95% CI [.034, .097]. This indirect effect is due mainly to subjective norm (.05) and to attitude (.02), while the specific indirect effect through perceived behavioral control (.00) is not significant. Age exerts on intention a statistically significant total indirect effect equal to $-.05$, 95% CI $[-.043, -.011]$. This indirect effect is due to attitude ($-.03$) and subjective norm ($-.02$), whose associated specific indirect effects are almost equivalent, while the specific indirect effect through perceived behavioral control (.00) is not significant. These results confirm Hypotheses 2, 3b, and 4 regarding the mediating role of TPB variables: this mediation is total for propensity to risk and age, and partial for safety perception. However, of the total effect of safety perception on intention (this effect is equal to .57, that is the sum of the total indirect effect and the direct effect), 75% is mediated by attitude and subjective norm, and only 25% (the direct effect) is independent of these variables.

TABLE 4
Estimates and 95% CI for specific indirect effects

Indirect Effect	Estimate	95% CI
Safety perception→Attitude→Intention	.21	[.162, .264]
Safety perception→Subjective norm→Intention	.22	[.170, .269]
Safety perception→PBC→Intention	.01	<i>[-.014, .008]</i>
Stimulating risk taking→Attitude→Intention	.02	[.002, .039]
Stimulating risk taking→Subjective norm→Intention	.05	[.023, .067]
Stimulating risk taking→PBC→Intention	.00	<i>[-.001, .001]</i>
Age→Attitude→Intention	$-.03$	<i>[-.043, $-.011$]</i>
Age→Subjective norm→Intention	$-.02$	<i>[-.040, $-.002$]</i>
Age→PBC→Intention	.00	<i>[-.001, .001]</i>

Note. In italics the nonsignificant estimates. CI = 95% confidence interval limits. $N = 862$.

DISCUSSION AND CONCLUSION

The results of our study clearly demonstrate that the variables of the Theory of Planned Behavior explain a big proportion of variance of the declared intention in relation to purchasing pharmaceutical products online. When TPB variables are considered as proximal determinants of future intention, there is no room for other determinants considered here in explaining future intention. An exception is the perception of purchasing online as a safe behavior, which had a mi-

nor albeit significant impact on the direct explanation of intention. However, there are differences among the four proximal determinants of intention: while attitude, subjective norm, and past behavior have a significant (and big) impact on determining future intention, perceived behavioral control has no impact at all. This result is in contrast with what emerged in the recent meta-analysis conducted on health-related behaviors (McEachan et al., 2011), where PBC resulted the second more important predictor of intention toward health-related behavior (i.e., behaviors which impact or have the potential to impact upon the health, such as physical activity, safer sex, drug use and screening, etc.), while it resulted the most important predictor of intention for detection behavior (such as self-screening for breast cancer, etc.). PBC resulted strongly associated to intention also in the meta-analysis of Armitage and Conner (2001) which however was not devoted specifically to health-related behaviors.

It is well known in social psychology that the introduction of PBC is the main element that differentiates TPB from its predecessor, the Theory of Reasoned Action (TRA). In including PBC in the conceptual model of TRA, Icek Ajzen aimed to account for those behaviors that are not completely under volitional control. Behaviors that are under completely volitional control are those that one person “can decide at will to perform or not perform” (Ajzen, 1991, p. 182). When the performance of behavior depends also on availability of resources and of opportunities PBC (the perception of how easy or difficult it is to perform the behavior) results an important determinant of both intention and behavior. PBC is similar to Bandura’s (1977) perceived self-efficacy, “the conviction that one can successfully execute a behavior” (p. 193). According to Ajzen’s theory, the relation that links PBC to intention captures the fact that the more people perceive to control a behavior, or the more they are confident to perform it successfully, the higher will be the intention to perform this. The attainment of a purpose is, in fact, more problematic if one perceives obstacles and difficulties in implementing it. In particular, when the success or the possibility of an action depends on a combination of factors or events that transcend mere will and, therefore, the control that the person believes him/herself capable of exerting for its successful implementation, PBC can play a decisive role. Numerous studies show that PBC is especially crucial for those behaviors related to the protection and promotion of health such as quitting smoking, doing regular physical exercise, losing weight, that are essentially *behavioral goals* depending on the will of the person. Coming back to our results, we have to question why PBC did not show up as a significant determinant of intention. Apparently purchasing pharmaceutical products online appears to be a *completely volitional behavior*, since the role of PBC is totally subsumed by attitude, subjective norm, and past behavior. This is not surprising: our sample is composed by internet users, people who are used to interacting with the web, including buying online (95% of participants had purchased at least once online some products or some services). These people probably do not perceive any difficulty in realizing the purchase of a pharmaceutical product once they have matured their intention, since they do not anticipate any obstacle or hurdle in accomplishing their behavior. We could expect a different impact of PBC if a population of people who do not regularly use the web, or who never buy online were involved in the research.

If attitude and subjective norm are the stronger predictors of intention, we have to ask what causes people to see purchasing pharmaceuticals online as a positive behavior and/or as a behavior that will be approved by other people that are important as far as these issues of health and self-care are concerned. Our theoretical framework helps us to give this question an answer:

according to TPB, attitude and subjective norm are rooted in beliefs people hold regarding the outcome of their behaviors. When asked to specify why the purchase online was perceived as positive (or as negative) participants in our study evidenced crucially important beliefs regarding the consequences of the behavior. These consequences were positive such as: saving money compared to buying the same medicines at the pharmacy; finding medicines not easily available in pharmacies; finding medicines whose sale is not legal; buying online as convenient and fast; buying packs of medicines containing a larger number of tablets/sachets. Conversely, negative consequences of the behavior were evidenced when the purchase was perceived as negative, such as: poor product safety due to inadequate control; counterfeiting; fraud; fear of risk and dangers to health; uncontrolled use or misuse of the product; poor identifiability of seller; illegal behavior. These behavioral beliefs orientate the prevailing direction/latitude of the attitude, toward the positive polarity of the continuum (thus, the purchase is conducive to positive outcomes) or to the negative (hence, the purchase is conducive to negative outcomes).

Perception of the purchase as a behavior with safe consequences for health resulted as a strong determinant of attitude, subjective norm, and perceived behavioral control. It resulted also as a marginal but significant added value in explaining intention. This perception is rooted in beliefs as well. When asked to specify why the purchase online was perceived to be *safe*, participants evidenced beliefs such as: choosing first-hand the medication one needs, or the site or the organization through which the purchase is made; believing that medicines are in any case controlled before being offered for sale on the Internet; or that on the Internet one can find the same medicines that are found in pharmacies. Conversely, when asked to specify why the purchase online was perceived to be *unsafe*, participants evidenced beliefs such as: the purchase is illegal; medicines sold online are not subject to effective control; before buying any medicine it is preferable to speak to a doctor or to a pharmacist. The stronger are the positive beliefs on the safety of the purchase, the safer the purchase is perceived, the attitude is more positive, the expected approval from others is higher, the performance of the behavior is easier, and consequently the future intention to purchase is stronger. Conversely, if one holds negative beliefs concerning the safety of the purchase, the purchase is perceived as unsafe. Accordingly, the attitude toward the purchase will be negative, the expected approval from others for the purchase will be low, and consequently the future intention to purchase will be low as well.

Stimulating risk taking, as a personality variable, has marginal albeit statistically significant importance in explaining attitude and subjective norm: this is in line with what predicted by TPB, where personality traits are one of the determinants of beliefs in which these variables are rooted (Eagly & Chaiken, 1993). However, risk has only a marginal role in explaining purchase intention, its impact on it being only indirect and much lower than the indirect impact of safety perception. A similar result emerged also for age, the unique sociodemographic variable resulting associated with purchase intention: age co-determines attitude and subjective norm (and this is coherent with TPB predictions), and (through the former) it is an indirect determinant of intention. As for risk, however, its role is fairly marginal in comparison with safety perception.

From a policy-maker perspective these results are good news, since they evidence that purchasing pharmaceutical products online is a behavior mainly guided by rational beliefs that can be changed, not by impulsive tendencies that are largely irrational. This is clearly important for communication: communicating that the product purchased online can have dangerous consequences for health (because the product can be counterfeit, because even if it is not counterfeit it

cannot be sold without prescription) may lower the perception of this behavior as safe for health, consequently it could lead to a less positive (or to a negative) attitude toward the behavior, and to the expectation that it will not be approved by relevant others. This eventually will lower the future intention to purchase pharmaceutical products online.

We are aware of limitations of this study with regard to the results and the methods. One should be cautious in inferring causation from correlation despite theoretical arguments that are advanced. Properly designed experimental and quasi-experimental studies should help to clarify the direction of the paths of influences. Another important limitation of this study is related to having used single-item measures for several constructs: we acknowledge that these measures may have lower reliability than multiple items measures, but space limitation and the necessity to reduce the total number of items in the survey oriented this decision. In further studies we have to better address this trade-off between reliability and a shorter questionnaire. Future studies would benefit from relying also upon multiple sources of information to minimize bias because of self-report. Although the sample we used matched the national profile with regard to basic socio-economic characteristics, the aforementioned results need to be corroborated in different samples, and in different cultural contexts. Further studies shall consider the role of other constructs as well as of other variables not included in the TPB: the inclusion of safety perception demonstrated that TPB is not a self-sufficient theory, and that its predictive power could benefit from the inclusion of other variables conceptualized in other theories. Considering the recent literature on purchasing online, the use of variables from the Technology Acceptance Model (TAM; Davis et al., 1989), such as perceived usefulness and perceived easiness to use, seems to be promising. Finally, in future studies it is crucial to consider not only intention but also actual behavior, although most of the studies that have applied TPB consider only intention. This will however complicate the research design since participants must be recontacted to gather the measure of behavior.

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APPENDIX

Items used for measuring the constructs in the model

Attitude. In general, how do you judge the possibility of purchasing medicines directly from your home computer or through any other Internet connection? Answer scale: 5) *Very positively*; 4) *Quite positively*; 3) *Neither positively nor negatively*; 2) *Little positively*; 1) *Not at all positively*.

Subjective norm. How much do you think that other people important to you, as far as the issues of health and self-care are concerned, would approve your (even hypothetical) purchasing of medicines online? To answer use a scale ranging between 1 and 7, where 1 = *They would not approve at all*, and 7 = *They would totally approve*.

Perceived behavioral control. How much do you believe that buying medicines online constitutes an easy behavior for you to implement? To answer use a scale ranging from 1 to 7, where 1 = *not easy at all*, and 7 = *very easy*.

Past behavior. Have you ever purchased medicines online for you or for somebody else? Answer scale: 7) *Yes, I buy them habitually*; 6) *Yes, I often do it*; 5) *Yes, I bought them some time*; 4) *Yes, but rarely*; 3) *I've purchased them only once*; 2) *No, but someone bought them for me*; 1) *No, I've never bought them*.

Future purchase intention. On a scale from 1 to 7 (where 1 = *not at all likely*, and 7 = *extremely likely*), may you report how likely it is that in the next three months, you will purchase medicines online?

Safety perception. From your point of view, how much *safe for your health* do you consider purchasing medicines online? 4) *Very much*, 3) *Quite*, 2) *Little*, 1) *Not at all*.

Stimulating risk taking. While taking risk I have a feeling of a very pleasant flutter; I enjoy risk taking; I make risky decisions quickly without an unnecessary waste of time; I often take risks just for fun; I'm attracted by different dangerous activities. Answer scale: 1= *Does not describe me at all*, to 5 = *Describes me very well*.