Risk perception of the self-prescribed use of Over the Counter (OTC) cold/flu medications[1]

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ABSTRACT. In order to examine the risk perception of using Over the Counter (OTC) cold/flu remedies, data were collected on a series of cognitive, attitudinal and intention-to-behave variables in the context of the Theory of Planned Behavior (TPB). This proposal by Fishbein and Ajzen allows for the analysis of relationships between behavior and several psychosocial antecedents. A total of 900 women aged 20 to 60 years, randomly selected from all 16 boroughs of Mexico City participated in this *ex post facto* study. They were of low socioeconomic status and mothers of at least one child. Measurement included validated questionnaires on the components of the TPB: beliefs, attitudes, subjective norms, motivation to please, intentions and behavior. Statistical tools included linear analysis through stepwise multiple regression including the establishment of the relative weight of each component of the theory in predicting the use of medications. Risk perception alone was a relatively poor predictor of medication use, intention and behavior. Subjective norm and motivation to please jointly achieved a better predictive level, in contrast to attitudes and beliefs, which resulted in low predictive values.

RESUMEN. Con objeto de examinar la percepción de riesgo del uso autoprescrito de antigripales que se venden sin prescripción médica, se recolectaron datos sobre variables cognitivas, actitudinales e intencionales en el contexto de la Teoría de la Acción Razonada (TAR). Esta propuesta de Fishbein y Azjen permite el análisis de las relaciones entre el comportamiento y varios antecedentes psicosociales. En el presente estudio *ex post facto* participaron un total de 900 mujeres de edades entre los 20 y los 60 años, seleccionadas aleatoriamente en las 16 delegaciones que conforman la Ciudad de México. La mayoría eran de nivel socioeconómico bajo y todas eran madres de al menos un hijo. Las medidas incluyeron inventarios validados de los componentes de la TAR: creencias, actitudes, normas subjetivas, motivación para complacer, intenciones y conducta. Los análisis estadísticos incluyeron un análisis lineal mediante regresión múltiple por pasos y el establecimiento de la contribución relativa de cada componente de la teoría en la predicción del uso de medicamentos. La percepción de riesgo por sí sola no resultó un buen predictor de la conducta ni de la intención, al igual que las actitudes y las creencias. La norma subjetiva y la motivación para complacer lograron, conjuntamente, el mejor nivel de predicción.

Upper respiratory tract infections have been described as a serious threat to public health in many developing countries and Mexico is no exception. These conditions constitute the first cause of morbidity and mortality in the sphere of acute communicable diseases in the elderly and only second to diarrhea in children 5 years old and younger (Pan American Health Organization, PAHO, 2007; SSA, 2006). Since such infections frequently start as a simple cold and sometimes lead to serious complications ranging from mild to severe, their treatment requires adequate attention. In principle, it would be best to have simple access to healthcare facilities and personnel in order to receive good diagnostic and effective treatment. In developing countries however, this option tends to show a very low probability of occurrence, mainly due to economical, geographical and cultural factors (Sánchez-Sosa, 2007). Under these circumstances using non-prescription medications frequently becomes the next logical choice (IDM Group, 2002; Sen Gupta and Misra, 1977).

As with other substances, the two main possible risks of using self-prescribed over the counter (OTC) cold/flu medications are, on the one hand, overdosing and on the other, defective administration leading to poor symptom control. Overdosing is potentially the more dangerous of the two risks since it may lead to severe intoxication and even death (Gavin, 2004; Kim Ming *et al.*, 2000; Sweet, Brown, Heimberg, and Ciafre 1995). Careful reading of the medication label would hypothetically suffice to decrease the risk of overdose. In practice however, when an individual is functionally illiterate, or tends to guide him/herself by the advice of others due to cultural beliefs and practices, this

possibility gets drastically limited. Ineffectual dosages may, in turn (especially if combined with conditions such as poor nutrition, exposure to severe weather, or old age) lead to exacerbated discomfort, worsening of symptoms and further serious complications (Beers, 2003; Hak, Bont, Hoes, and Verheij, 2005; Sethi and Murphy, 2001). Thus, self medication, even in the case of products that can be obtained without medical prescription, may represent a risk ranging from mild to severe (Albou, 1979).

For decades the concept of risk has received the systematic attention from researchers of diverse disciplines. In general risk is conceived as the proximity of a damaging contingency and has been addressed by experts on Economics (Allen, 1987; Kahneman and Tversky, 1979; Slovic, 1987), Engineering (Bradbury, 1989; Dietz, Scott, and Forthcoming, 1987; Escoffery, 2002), and Epidemiology (Adler, Kegeles, and Genevro, 1992; Ryan, 1998), among many others. In the general area interfacing risk perception, health and psychology, a wide variety of research topics have received recent attention. Among many other, some such lines include: the effects of counseling on risk perception related to decision-making on hormone replacement therapy in healthy women with a family history of breast cancer (Matloff, Moyer, Shannon, Niendorf, and Col, 2006); risk perceptions and care seeking practices for malaria among pregnant adolescents (Mbonye, Neema, and Magnussen, 2006); patients' perceptions of cholesterol and cardiovascular disease risk (Goldman *et al.*, 2006); dimensions of choice in accepting smallpox vaccination (Kaltman, Tractenberg, Taylor, and Green, 2006); treating and drinking well water in the presence of health risks from arsenic contamination (Shaw, Walker, and Benson, 2005); antidepressants use by pregnant women (Bonari *et al.*, 2005), and health beliefs and regimen adherence in minority adolescents with Type 1 diabetes (Patiño, Sánchez, Edison, and Delamater, 2005).

Another topic of risk perception in the health area involves the use of prescribed medications. Within this area, research studies have addressed such problems as institutional recommended terminology on medication side effects (Berry, Raynor, and Knapp, 2003); beliefs on HIV treatment and transmission (Kalichman *et al.*, 2006; Lameiras and Failde, 1998); effects of types of information processing on risk perception (Natter and Berry, 2005) and medication side effects (Berry, 2004; Berry, Michas, and Bersellini, 2002; Charupatanapong, 1996). Although some relatively early research findings suggested that the highest risk perception related to the use of the so called «Generic» medications (*i.e.*, those without a specific brand name) (Bearden and Mason, 1978) more recent findings have pointed out that risk perception depends on how the information on the effects of specific medications is provided and interpreted; for example, risk is perceived as higher and side effects as more severe when a medication is expected to be given to a child (Berry, 2004). Understanding the information on medication effects (both therapeutic and side effects) and actively processing such information (in contrast to just providing it to the potential user) has proven key in perceiving the risk of side effects of prescribed medications (Natter and Berry, 2005). In addition, the perceived risk of side effects and the user's intention to comply with medication recommendations is, in turn, moderated by both the perceived amount of side effect severity and the severity of the diagnosed illness (Berry *et al.*, 2002).

The research literature contains few studies in relation to medications that can be legally purchased without a medical prescription also named «Over the Counter» or OTC, such as cold/flu medications, despite the fact that they are both widely used and may also represent actual health risks if misused. Also, findings in these lines of research tend to relate to specific contexts and are not usually examined in the framework of more articulated theoretical explanations (Ferguson, Dodds, and Flannigan, 1994). One such area of misuse of OTC medications relates to risk perception involving both overdosing and interaction with other substances. For example, some case studies have documented individuals who seek to relieve depression symptoms by inducing a state of euphoria with multi-symptom cold syrup which contains chlorphenhydramine, dextromethorphan, and phenylpropanolamine. These substances may induce behavioral and emotional reactions, especially in prone individuals, leading to potentially serious health risks and consequences (Mendez, 1992). Dangerous substance interactions have received some attention in the psychiatric disorders area. A questionnaire administered to 139 patients diagnosed with either depression or social phobia revealed that 40% of them used OTC cold/flu remedies which had negative interactions with their prescribed medications (Sweet *et al.*, 1995). Another study examined the rate of consumption of TV advertised OTC medications by 471 college students. The results showed that, in addition to frequently using one or more such medications they did so without talking to their physicians about it or specifically determining the conditions under which they were taking such medications. These findings led the authors to emphasize the need to further study the effects of the media on the use of potentially risky OTC medications (Burak and Damico, 2000).

Regarding the theoretical articulation of research findings, one frequently used slant has involved the Health Beliefs (HB) approach (Rosenstock, 1966; Rosenstock, Derryberry, and Carriger, 1959). The concept originated in the late fifties within the prevention area (*e.g.* vaccination) and proposes that preventive health behavior is the result of the interacting beliefs of the individual (Green, 1974). Although the HB approach has been used as explanatory framework for numerous research studies, practically none have addressed the use of OTC medications. In addition, the model seems particularly vulnerable to loose construct definitions which have led to inconsistent research findings (Jette, Cumming, Brock, Phelps, and Naessens, 1981). In contrast to the HB model, more recent proposals such as the Theory of Planned Behavior (TPB) include the analysis of variables related to the cognitive and social (cultural) components of decision-making and behavior prediction, for instance, in the acquisition of smoking (Hill, Amyot, and Godin, 1997). Among other, these variables include: a) attitudes, b) the intention to behave, c) subjective norms (what others relevant to the individual say about a given decision), and d) motivation to please others (Ajzen and Fishbein, 1980; Fishbein and Ajzen 1975).

Some studies have attempted to compare both models (HB and TPB) in predicting health related decision-making. One such study examined prescribed medication use on the basis of several predicting variables. The HB model yielded «perceived benefits» and «perceived disadvantages» as main predictors with results explaining only 10% of variance. After adding the variables typical of the TPB model, a hierarchical multiple

regression analysis raised this value to 19% of explained variance, which led the authors to suggest that the findings support the use of the TPB approach over the HB (Ried and Christensen, 1988). Thus, given the widespread use of OTC remedies and their potential dangers involved in their misuse, the main purpose of the present *ex post facto* (Montero and León, 2007; Ramos-Álvarez, Moreno-Fernández, Valdés-Conroy, and Catena, 2008) study was to examine the predictive value of variables such as attitudes, intention to behave, subjective norms, and motivation to please others on perceived risk and behavior regarding the use of OTC cold/flu medications by Mexican women.

Method

Participants

A total of 900 lower-middle and low income women who were mothers of at least one child participated; their age ranged from 20 to 60 years. Due to the nature and the research questions of the study, participants were selected through the accidental convenience sampling method (Murray, Hannan, and Zucker, 1989). Additional participant characteristics included never being exposed to first-aid (or similar) workshops, having experienced at least two cold/flu symptoms in the last six months, and having used cold/flu medications. Regarding schooling 1.1% had incomplete elementary education, 13.4% had completed elementary education, 14% had incomplete high school, 36.7% had complete high school, and 36.6% had schooling beyond high school. In the context of the present study OTC is the generic term used to designate medications which can be bought without a physician's prescription. Physician-prescribed medications do require a prescription so as to be sold by pharmacies, finally house remedies normally encompass market-available herbs and substances traditionally used to alleviate mild symptoms of widely diverse diseases, for example honey and lime juice for sore throat and cold symptoms.

Instruments

With the aim of measuring the components of the TPB a questionnaire was developed with scales on seven areas: 1) beliefs, 2) attitudes, 3) motivation to please, 4) subjective norm, 5) intention to act, 6) risk perception, and 7) behavior. In order to preserve the comparability between models the same type of semantic differential tool was used. This classical technique allows for the assessment of a psychological perception generated by both the environment and the individual's own responses (Osgood, 1971). It is based on the assumption that any stimulus pattern other than the object itself acts as a sign of such object leading the individual to react in a similar way to that elicited by the actual object. Thus, the stimulation is said to be mediational (Mercado, Ortega, Luna, and Estrada, 1995).

Before developing the final version of the instrument, the experimenters conducted four successive focus groups with ten women each, who shared the same characteristics of the final group of participants. These sessions were conducted so as to gather and organize information leading to the establishment of the scales' structure and contents for the final version of the questionnaire, on the basis of the TPB (Cruz and Da Silva-Filho, 2005; Ellis and Kimmel, 1992). A specific session guide was used to insure that

the focus group sessions involved a replicable structure, sequence and contents, and to reduce the possibility of personal biases. The guide's sequence included:

- Welcoming remarks, information on the purpose of the sessions, current family structure and usage of free time.
- Most frequent illnesses or health complaints in the family.
- Cold/flu issues: most frequent symptoms suffered how symptoms were usually treated, house remedies used, and reasons to visit a physician.
- OTC medications issues: use of OTC medications, reasons to use them, who (if anyone) recommended their use, usual dosages, thoughts associated with their use, beliefs regarding their use, actual knowledge regarding these medications, usual treatment schedules, perceived advantages, disadvantages, risks, and price.
- What do people who are important to the participant say about OTC medications, how important is for the participant the opinion of others who are important to her.
- How would the «ideal» cold/flu medication be, what does she expect from cold/flu medication, and what types of problems arise from using such medications.

Participants were recruited by trained and experienced professionals in sampling procedures and recruitment, using the participant selection criteria. Each session lasted for approximately 75 minutes and was conducted in special facilities equipped with a one-way mirror. Sessions were videotaped and then transcribed for procedure integrity and reliability in the definition of results.

Once an initial version of the questionnaire was developed it was submitted to independent classification/rating by 15 psychologists experts in the health area, who acted as independent validation judges on item clarity and pertinence regarding the categories of the TPB. If an item was not classified in the corresponding area at least 80% of the trials it was rewritten for clarity or discarded, and successive independent classification sessions were then conducted on remaining items.

Finally, the instrument included the following scales:

- Beliefs. Included 19 dichotomous (yes-no) items on prescribed, OTC and house cold/flu remedies, for example: «Do you believe that OTC cold/flu medications (bought without requiring a prescription) help better than others?»
- Attitudes. Included responses toward using cold/flu medications/remedies in three conditions: a) using prescription medications, b) using OTC medications, and c) using house remedies. Items involved 15 semantic differential dyads with five response options each. For example: «Using cold/flu medications bought without requiring a prescription is: safe-unsafe, cheap-expensive,» etc.
- Subjective Norm. Included 18 Likert type items placed on a continuum from *Should be used* to *Should not be used* including the stem: «...the most important (to me) people say that...» and referred to husband, mother in law, best friend, brother, etc.
- Motivation to please. Was measured through six multiple-choice items asking how much they were interested in listening to and pleasing people who were

important to them; for example: «How often you do what other important (to you) people think you should do?», with options: *always*, *most times*, *sometimes*, *almost never*, *never*.

– Risk Perception. Included the following types: effectiveness, wasting time, medication side effects, psychological risk and financial risk. Items included five-interval Likert type questions such as: «How often do you think that there is a risk of taking too long to get better when you use OTC cold/flu medications?»: *always*, *most times*, *sometimes*, *almost never*, *never*.

– Intention to act. Was measured through three items: one for OTC medications, one for prescription medications and one for house remedies. Options included intervals ranging from *highly likely* to *not likely*. For example: «How likely is it that you will use OTC medications next time you experience cold/flu symptoms?»

– Behavior. Usage of OTC cold/flu medications was explored through an item on a five-point scale (*never* to *always*) as follows: «When you experience cold/flu symptoms, do you actually use OTC medications?

In order to assess the structure and validity of the questionnaire and to organize sets of items in specific areas, a discriminability analysis was conducted by contrasting low (first quartile) and high (fourth quartile) scores. This procedure sought to determine the sensitivity of each item to differentiate between extreme values of each dimension on the basis of the total score. Then, a factor analysis through Varimax Rotation yielded a total of 14 factors which explained 61.9% of cumulative variance. On the basis of these results, items were assigned to their appropriate questionnaire factor: beliefs, attitudes, motivation to please, subjective norm and risk perception. All items showed factorial loads higher than .40.

In order to confirm the absence of high correlations among variables, a collinearity diagnostic was conducted. Selected areas included those with high redundancy (singularity among items) (*i.e.*, those providing the same or highly similar information [$r > 0.7$]). Additionally, a tolerance analysis for the items of each factor was conducted. Tolerance refers to the degree to which a given item can be predicted by the other items, in which case its tolerance index would be else to zero, meaning that it adds little or no information to the scale. The analysis yielded tolerance indexes ranging from .70 to .93, while the Variance Inflation Factor (VIF) was < 1.5 for all variables. These two sets of results indicate that there was neither collinearity nor singularity or multicollinearity among the variables according to widely accepted criteria (Tabachnick and Fidell, 1989).

Since items involved ordinal scales with five response options, reliability was estimated through Cronbach's alpha internal consistency coefficient (Hair, Anderson, Tatham, and Black, 1999; Kerlinger and Lee, 2002). Alpha values, with the respective number of items by factor in parentheses, were as follows: .71 (4) for beliefs regarding OTC medications; .58 (3) for beliefs regarding prescription medications; and .65 (4) for beliefs regarding house remedies. For attitudes these values were: .93 (13) for OTC medications; .85 (9) for prescription medications; and .91 (12) for house remedies. Subjective norm produced: .87 (6) for OTC, .90 (6) for prescribed medications, and .91 (6) for house remedies. Finally, risk perception generated: .78 (5) for OTC; .76 (3) for prescribed; and .68 (2) for house remedies.

Procedure

For the definitive application of the questionnaire to the 900 final participants, ten professional survey data collectors were recruited and then received additional training. Training sessions included participant selection procedures, discussion of data collection procedures, as well as modeling and feedback on twenty practice participants. Data collectors were trained to make specific emphasis on insuring participants actually understood each interview item. Finally, training sessions emphasized the standard use of procedures and the reduction of possible personal biases by data collectors.

Data collection involved conventional mapping and sampling procedures on the basis of the Mexico City Statistical and Marketing Compendium (Sierra, 2000). This zoning guide points to the main large-scale everyday activity gathering points such as shopping areas, schools, parks, and other community facilities, classified by socio-economic status. Participants represented all 16 boroughs of Mexico City and their number was proportional to the population density of each borough, ranging from 21 to 90 questionnaires applied, with an average of 56.

Potential participants were approached on the basis of a first look and judgment that they appeared to comply with the proper profile. A set of initial screening questions determined if this was indeed the case, if so the remainder of the interview was carried out, otherwise they were thanked and the approach was politely ended.

Results

In order to examine the predictive power of such variables as attitudes, intention to behave, subjective norms, and motivation to please others on perceived risk and behavior, a series of statistical stepwise regression analyses were conducted. The stepwise procedure allowed for the assessment of the predictive power of the mentioned variables along a statistical model. This procedure preserves and arranges the predicting variables within the theoretical model to be tested, and eliminates those which do now show significantce at predicting the dependent variable. This is a widely used method used in the behavioral sciences since it allows for the analysis of ordinal variables. In the present study most analyses yielded outcomes with an associated probability < .05, which bear a significant contribution of the majority of variables to the model. A key recommendation in using this type of analysis is to insure that groups of participants contain a minimum of five cases for each independent variable so that analyses keep a reasonable level of probabilistic stability (Tabachnick and Fidell, 1989). The present study amply complied with this requirement beyond 893 cases for each variable.

Aditionally, in order to prevent the possibility of spurious regression effects due to cases severely biasing the distribution, data were submitted to outliers identification analysis. This included an univariate inspection of normalized values as well as a multivariate inspection of Mahalanobis distance (Hair *et al.*, 1999; Kerlinger and Lee, 2002; Tabachnick and Fidell, 1989). As a result of these analyses, ten cases were eliminated on the basis of showing standard values higher than plus-minus 3.0 of normalized Z values. Nine of these cases appeared in the Beliefs variable and one in the Risk Perception variable. Next, multivariate outliers were sought on five variables

through the combination of their values in relation to the Mahalanobis distance with the Bonferroni significance correction on the Chi Square test. No case showed values lower than $p = .01$ meaning that no multivariate outliers were present.

Intention to act

When all variables were applied toward Intention the strongest contribution was that of Subjective Norm ($R^2 = .07$; $\beta = .16$); Motivation to Please increased R^2 values to .10 ($\beta = .19$), and perceived risk increased these values to .11 ($\beta = .09$) (see Table 1).

TABLE 1. Total model effects: Attitudes, subjective norm, motivation to please, risk perception and beliefs on intention to act.

Variable	R^2	p (F)	β	p (F)
Subjective norm	.07	.000	.16	.000
Motivation to please	.10	.000	.19	.000
Risk	.11	.000	.09	.000

Model eliminates beliefs and attitudes

Behavior

When all variables were evaluated toward Behavior, the most important predicting variables included Intention with $R^2 = .12$ and a robust b value of .31. Risk perception also added an important value for an $R^2 = .16$ and $\beta = .18$. Motivation to please added little change with $R^2 = .16$ and a negative β value of -.06. Attitudes, Beliefs and Subjective Norm therefore stayed out of the model (see Table 2). Thus, the main predicting variables for Intention to act were different to those for actual OTC medication consuming behavior.

TABLE 2. Total model effects: Attitudes, beliefs, subjective norm, intention to act, risk perception and motivation to please on behavior.

Variable	R^2	p (F)	β	p (F)
Intention	.12	.000	.31	.000
Risk	.16	.000	.18	.000

Model eliminates, attitudes, beliefs, motivation to please, and subjective norm.

Perceived risk

As stated earlier, the questionnaire assessed five distinct type of risks: effectiveness, wasting time, medication side effects, psychological risk and financial risk, all related to two types of medications and house remedies. The assessment of risks for all three substances on behavior showed that medication performance risk was perceived only for OTC medications (i.e., remained in the model) but obtained modest predicting values.

Results on each type of risk perception for using OTC, RX and House Remedies on Behavior revealed that only the Risk Perception for OTC medications remained within the model, but with very low predicting values. Risk Perception of low medication effectiveness yielded the following values: OTC, $R^2 = .02$, $\beta = .14$. Adding RX increased

little the value to $R^2 = .02$; $\beta = .07$. Risk Perception of poor medication effectiveness of House Remedies got eliminated from the model (see Table 3).

TABLE 3. Effects of perceived risk of OTC, RX and HR on behavior.

Variable	R^2	p (F)	β	p (F)
Effectiveness risk of OTC	.02	.000	.14	.000
Effectiveness risk of RX	.02	.000	.07	.000

Model eliminates effectiveness risk of HR.

Results on Risk Perception as predictor of medication use, in terms of how long will it take for a medication to prove effective, revealed that only OTC medications stayed within the model through a low value of $R^2 = .03$ ($\beta = .17$). Thus participants tend to think that OTC medications may take longer to act effectively than RX ones. Regarding the effect of risk perception of side effects on predicting Behavior, only OTC medication stayed within the model through a modest $R^2 = .06$ value ($\beta = .25$). Regarding Psychological Risk Perception as predictor of Behavior (medication does not reinforce the participant's self image or self concept) all variables contributed low values. OTC medications yielded $R^2 = .02$ ($\beta = .15$). RX medications showed $R^2 = .03$ ($\beta = .06$), thus eliminating House Remedies from the model. This finding implies that participants do not feel their self-esteem affected by using house remedies and they perceive little or no risk in doing so. Finally, regarding Monetary Risk Perception as predictor of Behavior (*i.e.*, wasting money trying to solve a health problem) only OTC medications remained in the model with $R^2 = .05$, with a noticeable b value of .22, thus eliminating both RX and House Remedies from the model.

Thus, Risk Perception, in general, yielded the lowest predictive values in the proposed models, a probable direct indication of low perceived risk in using these medications, regardless of their type (RX, OTC or House Remedies) but with OTC remedies reflecting the highest likelihood of being perceived as risky.

In order to further establish the relationship among variables a correlation matrix was developed. Correlation values were lower than .40 with the exception of Intention to Act. In addition, Beliefs showed a negative correlation value with the rest of variables, so it was also excluded from the regression models. This low relationship indicated independence among them.

TABLE 4. Correlation coefficient's among independent variables ($n = 878$).

Variables	Beliefs	Attitude	Subjective Norm	Motivation to please	Risk	Intention	Behavior	Future Intention
Beliefs	-							
Attitude	-.03	-						
Subjetive Norm	-.24	-.17	-					
Motivation to please	-.18	.15	.35	-				
Risk	-.17	.23	.27	.01	-			

TABLE 4. Correlation coefficient's among independent variables (*n* = 878)*(Cont.)*.

Variables	Beliefs	Attitude	Subjective Norm	Motivation to please	Risk	Intention	Behavior	Future Intention
Intention	-.20	.09	.39	.31	.23	-		
Behavior	-.10	.04	.26	.27	.14	.69**	-	
Future Intention	-.11	.10	.15	.06	.25	.38	.13	-

** p < .01, and correlation coefficient > .40

Discussion

The purpose of the present study was to examine Risk Perception of using OTC medications in the context of the main variables of the Theory of Planned Behavior (TPB). In general the TPB model proved useful at evaluating the main proposals stemming from the aims of the study. Results showed reliable identification of the main factors explaining or predicting the use of OTC cold-flu medications in terms of various types of Risk Perception, more specifically related to the participants Intention to Act and their Behavior. Indeed, the model allowed for the establishment of a structured framework for decision-making on OTC and the prediction of factors related to its actual use.

In general participants perceive little risk in using cold-flu medications regardless of their type (OTC, RX or House Remedies). However the perceived risk of using OTC is higher than for the other two. This probably reflects that, under similar cultural and socioeconomic conditions to those of the present study most women with family responsibilities are likely to adopt some cautionary behaviors while using such remedies. In countries with «emerging economies» like Mexico, where approximately 40% of inhabitants make under one hundred Euros per month and average schooling is six years of elementary education (Instituto Nacional de Estadística, Geografía e Informática [INEGI], 2004); access to public healthcare tends to be scarce, slow, bureaucratic and uncomfortable. Perhaps women under these conditions perceive that other persons such as physicians in the case of prescribed medications and trusted relatives with experience in the case of House Remedies are already taking care of decisions regarding the use of medications, including the risk involved. The fact that the Intention to Act showed high influence within the determination coefficients on OTC probably implies that although the perceived risk of their use is relatively low, most users actually take specific precautions before using them.

Regarding the theoretical articulation of social characteristics and psychological variables involved in medication decision-making, the present study suggests that, in general, the TPB is a suitable framework for their analysis. In the present case behavior was best predicted by specific components of the theory including intention, subjective norm, motivation to please and perceived risk. In contrast, the lowest predictive value included beliefs and attitudes. Thus the perceived likelihood that behavior will lead to results and the positive or negative value attributed to behavior seem to have negligible predictive value. This specific finding is inconsistent with the TPB model in the sense that the knowledge of specific beliefs on one's own behavior allows for a better prediction of both attitudes and intention. It is possible that the present results could

have been somewhat affected by the place and time in which data were collected. Perhaps the TBP variables would show different effects if data are collected while the medication purchasing behavior is actually being performed (*i.e.*, if participants are approached while exiting a pharmacy where they bought an OTC product). It is conceivable that the relevant reasons to make a buying decision are different in a hypothetical situation than in the actual condition, for example symptoms, medication availability or product price might show some specific relative contribution to the theoretical model.

The main findings of the present study also indicate that risk perception should be conceived as a multidimensional phenomenon and involve the analysis of social and cultural dimensions (Gordon-Lubitz, 2003; Nexoe, Gyrd-Hansen, Kragstrup, Kristiansen, and Nielsen, 2002). An interesting but probably expected finding from a cultural standpoint involves the fact that Mexican women who participated in the study consider the opinion of others as especially important to decide what medication or remedy to use. By the same token, motivation to please seems an integrated component of decision-making regarding both intention and behavior. Although the extent to which this phenomenon occurs would require further empirical studies, it seems that it is bound to have an effect on effective health self care. In fact there are organizations which already promote access to valid information and responsible decision-making; such is the case of the Mexican Association of Manufacturers of OTC Medications (AFAMELA, 2007). The main findings of the present study are particularly relevant in the context of very little previous knowledge on the elements affecting the use of OTC medications under the cultural conditions prevalent in countries with similar social characteristics to those of Mexico. When self healthcare and responsible self-medication become goals of institutional programs the appropriate use of information such as the present findings will help design and develop effective large scale interventions and campaigns.

In terms of methodology and theoretical approach, the contribution of the present study could be regarded as somewhat exploratory in the sense that the TPB was specifically applied to OTC medication use probably for the first time. The project involved designing and assessing the psychometric properties of a questionnaire expressly designed to this purpose, with especial attention to relevant cultural features. As there is always room for improvement, future studies might well fine tune the questionnaire's validity and reliability and apply stronger statistical tools such as those of structural equations in order to assess the internal congruency of the theoretical model.

Also, future studies should add different socioeconomic and educational levels in order to cover mainly higher strata. On the one hand, higher SES populations will probably be more prone to use OTC medications despite the fact that they perceive higher risk in using them (Muñoz, 1992). On the other, lower strata still represent the predominant population in developing countries. Just as an example, approximately 40% of Mexican families live on a monthly income lower than 150 US Dollars (Instituto Nacional de Estadística geográfica e Información, INEGI, 2004). From the social and ethical viewpoint this represents a contradiction in the sense that these families are the most vulnerable health wise and getting OTC medications represent a heavy financial burden. Finally, this line of research would probably benefit from further analyses such as including risk perception by specific populations such as teenagers and young

adults, pregnant women and the elderly. Also, studies should include a wider array of health problems leading to the use of such OTC medications as painkillers, antacids and laxatives; including the use of the so called generic drugs.

References

Adler, N.E., Kegeles, S.M., and Genevro, J.L. (1992). Risk-taking and health. In F. Yates (Ed.), *Risk taking behavior* (pp. 45-54). West Sussex, England: John Wiley and Sons.

AFAMELA (2007). *Automedicarse responsablemente o autoprescribirse*. Retrieved on March 12, 2006 from www.afamela.org

Ajzen, I. and Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, N.J, USA: Prentice Hall.

Albou, P. (1979). Self-medication. *Bulletin de Psychologie, 32*, 921-935.

Allen, F.W. (1987). Towards a holistic appreciation of risk: The challenge for communicator and policymakers. *Science, Technology and Human Values, 12*, 138-143.

Bearden, W.O. and Mason, J.B. (1978). Consumer-perceived risk and attitudes toward generically prescribed drugs. *Journal of Applied Psychology, 63*, 741-749.

Beers, M.H. (2003). *Respiratory tract infections: Symptoms and complications*. Retrieved on March 12, 2007 from http://www.merck.com/mmhe/sec23/ch273/ch273i.html

Berry, D.C. (2004). Interpreting information about medication side effects: Differences in risk perception and intention to comply when medicines are prescribed for adults or young children. *Psychology Health and Medicine, 9*, 227-234.

Berry, D.C., Michas, I.C., and Bersellini, E. (2002). Communicating information about medication side effects: Effects on satisfaction, perceived risk to health, and intention to comply. *Psychology & Health, 17*, 247-267.

Berry, D.C., Raynor, D.K., and Knapp, P. (2003). Communicating risk of medication side effects: An empirical evaluation of EU recommended terminology. *Psychology Health & Medicine, 8*, 251-263.

Bonari, L., Koren, G., Einarson, T.R., Jasper, J.D., Taddio, A., and Einarson, A. (2005). Use of antidepressants by pregnant women: Evaluation of perception of risk, efficacy of evidence based counseling and determinants of decision making. *Archives of Women's Mental Health, 8*, 214-220.

Bradbury, J.A. (1989). The policy implications of differing concepts of risk. *Science, Technology and Human Values, 14*, 380-399.

Burak, L. and Damico, A. (2000) College students´ use of widely advertised medications. *Journal of American College Health, 49*, 118-121.

Charupatanapong, N. (1996). Knowledge, perceived risks, and self-medication practices of the low-income elderly. *Journal of Geriatric Drug Therapy, 11*, 17-35.

Cruz, M.S. and Da Silva-Filho, J.F. (2005). *Jornal Brasileiro de Psiquiatria, 54*, 120-126.

Dietz, T., Scott, F., and Forthcoming, E.R. (1987). Risk, technology, and society. En R.E. Dunlap and W. Michelson (Ed.), *Handbook of Environmental Sociology*. Westport, CT: Greenwood Press.

Ellis, B. B. and Kimmel, H.D. (1992). Identification of unique cultural response patterns by means of item response theory. *Journal of Applied Psychology, 77*, 177-184.

Escoffery, J.S. (2002). Causes and consequences of comparative risk assessment. *Dissertation Abstracts International: Section B: The Sciences & Engineering, 62,* 9.

Ferguson, E., Dodds, A., and Flannigan, H. (1994). Perceived control: Distinct but related levels of analysis? *Personal Individual Differences, 16*, 425-432.

Fishbein, M. and Ajzen, I. (1975). *Belief, attitude, intention and behavior: An introduction to theory and research*. Reading, MA. USA: Addison Wesley.

Gavin, M.L. (2004). *Cough and Cold Medicine Abuse*. Retrieved on April 13, 2007 from http://www.kidshealth.org/parent/positive/talk/cough_cold_medicine_abuse.html

Goldman, R.E., Parker, D.R., Eaton, C.B., Borkan, J.M., Gramling, R. Cover, R.T., and Ahern, D.K. (2006). Patients' perceptions of cholesterol, cardiovascular disease risk, and risk communication strategies. *Annals of Family Medicine, 4*, 205-212.

Gordon-Lubitz, R.J. (2003). Risk communication: Problems of presentation and understanding. *Journal of the American Medical Association, 289*, 95.

Green, L. (1974). The health belief model and personal health behavior. *Health Education Monographs, 2*, 324-325.

Hair, J.F., Anderson, R.E., Tatham, R.L., and Black, W.C. (1999). *Análisis Multivariante*. Madrid: Prentice Hall Iberia.

Hak, E., Bont, J., Hoes, A.W., and Verheij, T.J.M. (2005). Prognostic factors for serious morbidity and mortality from community-acquired lower respiratory tract infections among the elderly in primary care. *Family Practice, 22*, 375-380.

Hill, B., Amyot, D., and Godin, G. (1997). Predicting the stages of smoking acquisition according to the Theory of Planned Behavior. *Journal of Adolescent Health, 21*, 107-115.

IDM Group (2002). Estudio cualitativo de usos, hábitos y actitudes hacia la categoría de antigripales, antiácidos y analgésicos. Unpublished Report.

Instituto Nacional de Estadística, Geografía e Informática, (INEGI, 2004). *Encuesta Nacional de Ingresos y Gasto de los Hogares, 2000-2005. Información armonizada de acuerdo con la conciliación demográfica*. ENIGH.

Jette, A.M., Cumming, K.M., Brock, B.M., Phelps, M.C., and Naessens, J. (1981). The structure and reliability of health belief indices. *Health Services Research, 16*, 81-98.

Kahneman, D. and Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*, 263-291.

Kalichman, S.C., Eaton, L., Cain, D., Cherry, C., Pope, H., and Kalichman, M. (2006). HIV treatment beliefs and sexual transmission risk behaviors among HIV positive men and women. *Journal of Behavioral Medicine, 29*, 401-410.

Kaltman, S., Tractenberg, R.E., Taylor, K., and Green, B.L. (2006). Modeling dimensions of choice in accepting the smallpox vaccine. *American Journal of Health Behavior, 30*, 513-524.

Kerlinger, E.N. and Lee, H.B. (2002). *Investigación del comportamiento. Métodos de Investigación en Ciencias Sociales*. México, DF: McGraw Hill.

Kim Ming, W., Wai Leung, C., Chi Yuen, Ch., Yiu Han, Ch., Koon Shing, Ch., Ka Foon, Ch., and Chun Sang, L. (2000). Hypokalemic metabolic acidosis attributed to cough mixture abuse. *American Journal of Kidney Diseases, 22*, 390-394.

Lameiras, F.M. and Failde, G.J.M. (1998). Sexuality and health in university men and women: Attitudes, sexual activity, and perception of the risk of heterosexual transmission of HIV. *Análisis y Modificación de Conducta, 24*, 27-63.

Matloff, E.T., Moyer, A., Shannon, K.M. Niendorf, K.B., and Col, N.F. (2006). Healthy women with a family history of breast cancer: Impact of a tailored genetic counseling intervention on risk perception, knowledge, and menopausal therapy decision making. *Journal of Women's Health, 15*, 843-856.

Mbonye, A.K., Neema, S., and Magnussen, P. (2006). Malaria in pregnancy, risk perceptions and care seeking practices among adolescents in Mukono district Uganda. *International Journal of Adolescent Medicine and Health, 18*, 561-573.

Mendez, M.F. (1992) Mania self-induced with cough syrup. *Journal of Psychiatry, 53*, 173-174.

Mercado, S., Ortega, P., Luna G., and Estrada, C. (1995). *Habitabilidad de la vivienda urbana*. México: UNAM.

Montero, I. and León, O.G. (2007). A guide for naming research studies in Psychology. *International Journal of Clinical and Health Psychology, 7*, 847-862.

Muñoz, A. (1992). Characteristics of self-medication and use of medicinal plants in three neighborhoods of the city of Leon, Nicaragua. *Revista de la CIFIL, 2*, 83-92.

Murray, D.M., Hannan, P.J., and Zucker, D.M. (1989). Analysis issues in school-based health promotion studies. *Health Education Quarterly, 16*, 315-320.

Natter, H.M. and Berry, D.C. (2005). Effects of active information processing on the understanding of risk information. *Applied Cognitive Psychology, 19*, 123-135.

Nexoe, J., Gyrd-Hansen, D., Kragstrup, J., Kristiansen, I.S., and Nielsen, J.B. (2002). Danish GP's perception of disease risk and benefit of prevention. *Family Practice, 19*, 3-6.

Osgood, C.E. (1971). Exploration in semantic space: A personal diary. *The Journal of Social Issues, 27*, 5-64.

Pan American Health Organization,PAHO (2007). Surveillance, prevention and control of infectious diseases. Retrieved on January 14, 2007 from http://www.mex.ops-oms.org/contenido/temas/prevencion1.htm

Patiño, A.M., Sánchez, J., Edison, M., and Delamater, A.M. (2005). Health beliefs and regimen adherence in minority adolescents with Type 1 diabetes. *Journal of Pediatric Psychology, 30*, 503-512.

Ramos-Álvarez, M.M., Moreno-Fernández, M.M., Valdés-Conory, B., and Catena, A. (2008). Criteria of the peer-review process for publication of experimental and quasi-experimental research in Psychology: A guide for creating research papers. *International Journal of Clinical and Health Psychology, 8,* 751-764.

Ried, L.D. and Christensen, D.B. (1988). A psychosocial perspective in the explanation of patients' drug-taking behavior. *Social Science and Medicine, 27*, 277-285.

Rosenstock, I.M. (1966). Why people use health services. *Memorial Fund Quarterly, 44*, 94-127.

Rosenstock, I.M., Derryberry, M., and Carringer, B. (1959). Why people fail to seek poliomyelitis vaccination. *Public Health Reports, 74*, 98-103.

Ryan, E.L. (1998). Risk perception, risk attribution, and risk modification beliefs among women with a family history of breast cancer. *Dissertation Abstracts International: The Science and Engineering, 58,* 12.

Sanchez-Sosa, J.J. (2007). Psychotherapy in Mexico: Practice, training, and regulation. *Journal of Clinical Psychology, In Session, 63*, 765-771.

Sen Gupta, S. and Misra, S. (1977). Self-medication practices: An exploratory study. Indian Institute of Management. *Vikalpa, 21*, 17-27.

Sethi, S. and Murphy, T.F. (2001). Bacterial infection in chronic obstructive pulmonary disease in 2000: A state-of-the-art review. *Clinical Microbiology Reviews, 14*, 336-363.

Shaw, W.D., Walker, M., and Benson, M. (2005). Treating and drinking well water in the presence of health risks from arsenic contamination: Results from a U.S. hot spot. *Risk Analysis, 25*, 1531-1543.

Sierra, W. (2000). *Compendio Estadístico-Mercadotécnico de la Ciudad de México*. México, D.F.: WILSA.

Slovic, P. (1987). Perception of Risk. *Science, 236*, 280-285.

SSA (2006). *General Epidemiological Directorship, Master System of Information for Epidemiological Surveillance*. Retrieved on February 24, 2006, from www.dgepi.salud.gob.mx

Sweet, R.A., Brown, E.J., Heimberg, R.G., and Ciafre, L. (1995). Monoamine oxidase inhibitor dietary restrictions: What are we asking patients to give up? *Journal of Clinical Psychiatry, 56,* 196-201.

Tabachnick, G.B. and Fidell, S.L. (1998). *Using Multivariate Statistics*. Northridge, CA: Harper Collins Pulishers, Inc.