

Relationship between Past Use and Medicating Intention within the Theory of Planned Behavior: A Case of Non-prescription Anthelmintic Medications in Vietnam

Phuong Nguyen
CFVG, University of Economics in Ho Chi Minh City,
Vietnam
nphuong@cfvg.org

— *Review of* —
**Integrative
Business &
Economics**
— *Research* —

ABSTRACT

Past behavior has been suggested as a potential predictor of future behavior in social cognition models but has not been tested in the context of consumer medicating behavior. The purpose of the present study was to examine the relationship between past behavior, operationalized as the frequency of past use, and intention, as defined by the theory of planned behavior. First, based on the theory of planned behavior (TPB), this study tested the predictive utility of an intention of Vietnamese mothers to administer non-prescription anthelmintic medications to their school-age children. Second, it examined the predictive validity of past use on intention. Third, it identified moderating effect of demographic variables on the relationship between past use and intention. A convenient sample of 395 mothers in Ho Chi Minh City, Vietnam, was included in the present study. The original model of TPB explained 32.3% of the variance in the intention to use non-prescription anthelmintics. The addition of past use frequency added 11.7% of the variance in the intention after controlling for the TPB original constructs. Monthly household income of mothers significantly moderated the relationship between past use and intention. Age and educational levels of mothers did not moderate the relationship. Theoretical and managerial implications as well as research limitations are discussed.

Keywords: theory of planned behavior, intention, past use frequency, anthelmintics.

1. INTRODUCTION

Consumer behavior has been examined mostly in terms of the consumer's intention toward and behavior of purchasing and using products or services marketed by firms (Ajzen, 2008). Understanding such consumers' acts has important implications for businesses and for the marketing of the firms' products and services. Consumer behavior towards a pharmaceutical product is different and more complicated compared to consumer goods because of the role of different referent groups and the unique characteristics of consumers' health behaviors (Manchanda et al., 2005; Moss, 2007). Medicating intention and behavior toward pharmaceutical products marketed by pharmaceutical firms are key constructs used to explain and predict consumption of pharmaceutical products in both academic research and professional market surveys. Medicating intention models are highly relevant in research of new products, new consumer segments, repeated consumers, and consumer loyalty of available products in the pharmaceutical marketplace.

Non-prescription medications are important in the management of simple common illnesses among children. Non-prescription medications that can be obtained from retail pharmacies without doctors' prescriptions account for an important market share to fulfill the need of healthcare for children. In many developing countries, public advertisements can promote children's non-prescription medications directly to parents. In essence, parents make the decision on the use of non-prescription medications for their children. From two-thirds to three-fourths of such non-prescription medications are fever relievers, cold and flu remedies, vitamins and mineral supplements, as reported by mothers of preschool children in the United States (Kogan, Pappas, Yu, & Kotelchuck, 1994; Simon & Weinkle, 1997). Seventy-three per cent of children reported using non-prescription medications at some point prior to another study conducted in Australia (Slack-Smith, Read, & Stanley, 1998).

Medicating intention and behavior belong to a distinctive group of health behaviors that have significant effect on his or her health and, to a certain extent, are under one's control (Conner & Norman, 2005). A number of cognitive factors can explain and predict medicating intention and behavior using social cognition models, which are intensively applied in health behavior research. A number of cognitive factors, which are interesting to consumer research academics and professional marketers alike, are assumed to explain parents' behavioral intention to administer non-prescription medications to their children. Social cognition models provide a valid conceptual framework in research on parents' intention to administer non-prescription pharmaceutical products to their children.

Although the theory of planned behavior (TPB) is considered as one of the most powerful and common cognitive models of attitude-behavior relationship in consumer behavior (Ajzen, 2008), suggestions have been offered to improve its prediction power. Among various predictors, past behavior has mainly been tested in health-related behavior domain. In consumer domain, and especially in predicting consumer behavioral intention to use pharmaceutical products, the predictive validity of past behavior, or more specifically frequency of past use, has not been tested intensively. Therefore, the purpose of the present study was to examine the relationship between frequency of past use and intention of Vietnamese mothers to administer non-prescription anthelmintic medications to their school-age children. First, it tests the predictive utility of the intention using the theory of planned behavior (TPB). Second, it examines predictive validity of frequency of past use on intention. Third, the study identifies moderating effects of demographic variables on the relationship between frequency of past use and intention.

2. THEORETICAL BACKGROUND

2.1. Use of Non-prescription Medications

Administering non-prescription pharmaceutical products to children is part of parent consuming behavior and becomes more important when the logic of medicating shifts from medical professionals to consumers choices (Moorman, 2002). A number of studies in the context of non-prescription medications can help understand parents' perception, beliefs, and behaviors. For instance, a study by Ames, Hayden, Campbell,

and Lohr (1982) found that most parents tend to medicate their infant children without consulting healthcare professionals for simple illness, such as fever and nasal congestion. Ecklund (2001) observed that parents' perceived effectiveness of non-prescription medications correlated significantly with the use non-prescription medications, and perceived severity of and perceived susceptibility to illnesses rather than self-medication correlated significantly with the need to visit healthcare professionals.

Anthelmintic medication was chosen for the purpose of the current study. Vietnam is currently classified as one of the countries where intestinal worm infections are a public health problem (Montresor, Crompton, Gyorkos, & Savioli, 2002). It is estimated that 33.9 million people in Vietnam are infected with intestinal helminths (Van der Hoek et al., 2003). Therefore, the repetitive use of anthelmintic pharmaceutical products, which help get rid of helminths from human body, is a common practice in Vietnam. Even though using anthelmintic medications several times per year is highly recommended and supported by the government and health institutions, anthelmintic use among individual families, especially children who are most vulnerable to helminthiasis, accounts for the major contribution to the anthelmintic pharmaceutical market and is of interest to pharmaceutical manufacturers. Anthelmintics represent self-medication market where 97% of the medicines are purchased directly from retail pharmacies without a doctor's prescription (IMS Health, 2011). Hence, it is critical in consumer health behavior and pharmaceutical marketing to understand the intention and behavior of mothers, who are important health caregivers of children, to administer anthelmintic medications.

2.2. Cognition Models of Intention

As intention predicts behavior, most contemporary theories on human social behaviors have utilized intention as an important part. The theories examine factors that lead to the formation of intentions (Ajzen & Fishbein, 2005). Considering medicating intention and behaviors as a distinct group of health behaviors, cognitive factors from social cognition models in which behavioral intention is conceptualized as a dependent variable can explain and predict these constructs. The most widely used social cognition models in research on health behavior are health belief model (Becker, Haefner, & Maiman, 1977), theory of protection motivation (Rogers, 1983), theory of reasoned action (Fishbein & Ajzen, 1975), theory of planned behavior (Ajzen, 1991), which is the extension of the theory of reasoned action with the addition of perceived behavioral control to improve its applicability to partial volitional behaviors, and the joint reasoned action model recently published (Fishbein & Ajzen, 2010). These models explain the desirability of a human behavior by depending individuals' cognitive factors, being summed products of the expectancy and value of specific outcomes (Conner & Norman, 2005). These social cognition models have been proven useful as a conceptual framework in health behavior research, health psychology, and consumer psychology. They have been found to be well supported by empirical studies. As a result, these models are expected to provide valid conceptual frameworks for research concerning medicating intention of pharmaceutical products in the domain of consumer health behavior. The intensity of behavioral intention to use a product or service can be measured by consumer's subjective probability to use such a product or service (Fishbein & Ajzen, 1975).

2.3. Theory of Planned Behavior

The theory of planned behavior by Ajzen (1991), as illustrated in Figure 1, suggests that attitude toward the behavior forms based on the evaluation of the likely consequences of a given behavior. Subjective norm concerns the likelihood of approval or disapproval of a behavior by the subject's friends, relatives, professional people, public media, and the like. Perceived behavioral control involves the presence or absence of factors that make the behavior easier or more difficult to perform. Fishbein and Ajzen (2010) renamed the latest version of the two theories, theory of reasoned action and theory of planned behavior, as the reasoned action model. The author emphasized the additional moderating effects of skills, abilities, and environmental factors on the relationship between salient beliefs, intention and behavior. Further, it is noteworthy that among background factors, perceived risk and past behavior, which were absent from the earlier version of theory, were added to the new model (Ajzen, 2008). Furthermore, attitudes, subjective norms, and perceived behavioral control are shown to be related to a set of salient behavioral, normative, and control beliefs about the behavior. Various socio-demographic factors influence these beliefs (Ajzen & Fishbein, 2005).

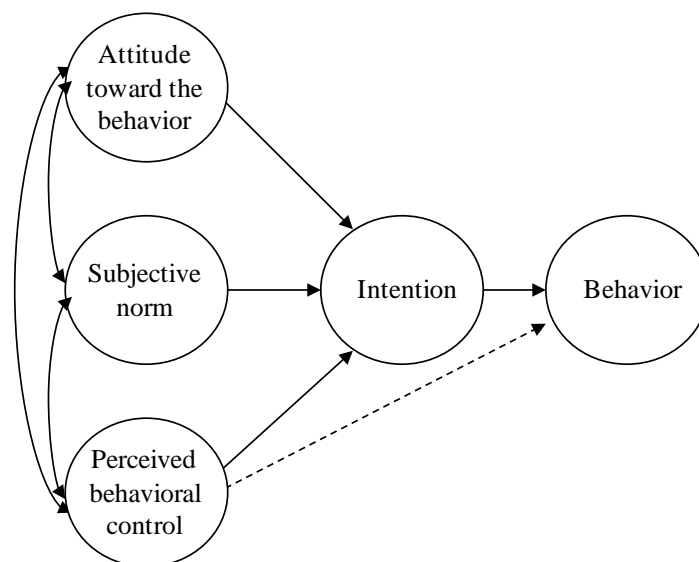


Figure 1: Theory of planned behavior (Ajzen, 1991)

TPB has been found to be well supported by empirical evidence. Attitudes toward the behavior, subjective norms, and perceived behavioral control can predict intentions towards behaviors with high accuracy. The TPB has been intensively employed in the health-related behavior domain to predict different intentions and behaviors (Godin & Kok, 1996; Armitage & Conner, 2001). However, its predictive utility in health consumer behavior is limited. In the context of parents' behavior toward the health of their children, a number of studies have utilized theory of planned behavior. For instance, the theory has been successfully used to predict parents' intention and behavior toward their children's use of oral rehydration products (Hounsa, Godin, Alihonou, Valois, & Girard, 1993), smoking in the presence of children (Moan, Rise, & Andersen, 2005), and sugar intake (Beale & Manstead, 1991).

In the domain of consumer health behavior, several studies have employed the reasoned action approach to build research models. The works of Oliver and Berger (1979) on swine flu vaccination, Chinburapa and Larson (1990) on intention to use over-the-counter analgesics, and Moorman and Erika (1993) on preventive health behaviors also relied on the theory of reasoned action. Other studies, which utilized the theory of planned behavior, included Luce and Barbara's (1999) study on medical testing, and Lodorfos, Mulvana, and Temperley's (2006) study on over-the-counter brand choice decision. However, to the knowledge of the author of this paper, no studies in the domain of consumer health behavior have explored the intention of parents to administer and actual administration of non-prescription pharmaceutical products to their children. Theoretically, attitude toward using a medication, subjective norm and perceived behavioral control on the use of a medication should predict the intention to use the medication. In the present study, it was hypothesized that all three components, attitude, subjective norm, and perceived behavioral control, would predict the intention of mothers to administer anthelmintic medications to their children.

Hypothesis 1: Attitude, subjective norm and perceived behavioral control will relate positively to intention to use anthelmintic medications.

2.4. Past Behavior

Theoretically, there are two types of past behaviors. The first type deals with frequent behavior occurring in daily life in stable contexts. These kinds of past behaviors tend to form habits, and they have been found to have direct effect on future behaviors. The second type deals with infrequent behaviors occurring under uncertain or difficult circumstances. Because of the nature of the settings, habits are unlikely to be formed; therefore, the intention and future behavior is hypothesized to form under reasoned process. The behaviors of this kind have been found to predict behavioral intention directly (Ouellette & Wood, 1998). There has been a need for further research on the predictive validity of past behavior on intention and behavior (Conner & Armitage, 1998).

To examine the effect of past behavior in the domain of pharmaceutical consumer behavior, the use of non-prescription anthelmintic medications was chosen for several reasons. Anthelmintic medications are non-prescription medication, which mothers can purchase easily in Vietnam from retail pharmacies without a doctor prescription. Then intention to use such a medication is therefore under volitional control of mothers. Using anthelmintic medication has been a common practice among mothers in Vietnam for the past 15 years, and the medical recommendation is to take anthelmintics two to three times yearly. The frequency of using medication is not high and circumstances under which anthelmintic medication are used may change from time to time, depending on various factors and consideration of mothers. Therefore, the past behavior in using anthelmintic medications is theoretically considered to have direct effect on the intention and need to take these medications.

Hypothesis 2: Frequency of past use of anthelmintic medications will significantly explain additional variance in intention to use anthelmintic medications.

2.5. Moderating Effects of Demographic Variables

Background factors, such as demographic variables, can increase the understanding of salient beliefs under the original constructs of the theory of planned behavior. However, background factors are not theoretically conceptualized as immediate antecedents to intention (Ajzen & Fishbein, 2005; Fishbein & Ajzen, 2010). Demographic variables have been found to affect people's intention to use non-prescription medications. The present study examined income and education of mothers to see whether they moderate the relationship between past behavior and intention.

Hypothesis 3: Age of mothers will have significant moderating effect on the relationship between past use frequency and intention to use anthelmintic medications.

Hypothesis 4: Income level of mothers will have significant moderating effect on the relationship between past use frequency and intention to use anthelmintic medications.

Hypothesis 5: Educational level of mothers will have significant moderating effect on the relationship between past use frequency and intention to use anthelmintic medications.

3. RESEARCH METHODS

3.1. Data Collection

Out of 395 mothers was conveniently selected from 13 urban and 6 suburban districts of Ho Chi Minh City, 196 mothers were from urban and 199 were suburban districts. University students as interviewers approached potential female subjects at their houses for screening and face-to-face interviews. Screening questions were used to enroll only mothers who had and lived with a child aged between seven and 11 years of age. Mothers who both had and had not administered anthelmintic medications to their child in the previous 12 months were included. However, mothers of children who had been administered an anthelmintic medication under school or government anthelmintic programs were not included in the present study because in such case, the decision to use anthelmintic medications was made primarily by the third parties. In order to explore the moderating effects of demographic variables, quota control sampling was carried out for income and education levels.

The measures were constructed using unipolar 7-point Likert scales for all items except for the frequency of past use of anthelmintic medications. The scales were presented on interviewing cards in the form of numbers and graphics of expressive faces to help respondents understand the rating better. This helped collect more reliable responses from less educated mothers from suburban districts. Further, it also facilitated the understanding of mothers' responses to complex questionnaire. The questionnaire items were written in Vietnamese and were worded for easy understanding. It was pilot tested to ensure that laypersons were able to understand health vocabularies (Zeng & Tse, 2006).

3.2. TPB Measures

The behavior of administering anthelmintic medications was defined according to specific target, action, context, and time elements (Fishbein & Ajzen, 2010). It is defined as mothers' repetitive administration of non-prescription anthelmintic medications every six months in the following 12 months to their child whose age was between seven and 11 years old.

Intention to administer anthelmintic medications was assessed using three items. The verbs used to express the respondent's intention are "to expect to use", "to plan to use", and "will try to use" anthelmintic medications in the following 12 months. The three items were isolated and interspersed with other items in the final questionnaire. Two items using bipolar adjectives reflecting the attitude toward the use of anthelmintic medications, "not beneficial at all - very beneficial" and "unsafe – safe", measured attitude toward the use of anthelmintic medications. Subjective norm was measured using one injunctive item and one descriptive item referring to the subjects as "the people who you trust most" and "the mothers like you". Two items measured perceived behavioral control. The first item, "use of anthelmintic medications is easy", reflects mothers' perceived capability to use the medication, the second item, "it is mostly up to you", illustrates mothers' controllability by assessing whether respondents plan to administer anthelmintic medication to their child every 6 months in the following 12 months.

The frequency of past use was measured using a single item inquiring, "Did you administer anthelmintic medications to your child in the past 12 months?" and if the answer to this question was yes, mothers were asked the second question, "In the past 12 months, how often did you administered anthelmintic medications to your child?" Mothers answered this question by estimating the frequency with which they administered the medication to their child in the previous 12 months. The answer was later transformed into a 7-point scale ranging from 1 = "not using at all" to 7 = "the most frequent use".

The three demographic variables under the investigation were measured using ordinal scales. The age variable ranged from less than 28 years, 28–37 years, 38–47 years, and equal or older than 48 years old. The monthly household income variable ranged from 1 to 4, with 1 = "less than 2.5", 2 = "2.5 to less than 5.0", 3 = "5.0 to less than 8.0", and 4 = "8.0 million Vietnamese dong or more". Education variable was measured on an ordinal scale ranging from 1 to 3, with 1 = "less than high school graduation", 2 = "high school graduation", and 3 = "college degree or higher".

4. RESEARCH RESULTS

The survey was conducted with 395 mothers of primary school age children, of whom 199 mothers were living in peri-urban districts and 196 mothers in urban districts of Ho Chi Minh City. Demographic variables, such monthly household income and educational level of respondents, were collected.

4.1. Convergent Validity and Reliability Analysis

Exploratory factor analysis was conducted using Statistical Package for Social Sciences (SPSS) version 19.0 to evaluate the convergent validity of the measurement scales of attitude, subjective norm, and perceived behavioral control. Six items loaded on three factors, which corresponded to the three independent variables. More specifically, the items measuring subjective norm loaded on Factor 1 (factor loadings 0.961–0.962) and explained 39.4% of the variance. The items measuring perceived behavioral control loaded on Factor 2 (loadings 0.907–0.910) and explained 27.8% of the variance. The items measuring attitude loaded on Factor 3 (0.836–0.843) and explained 17.0% of the total variance. No refinement was necessary for these measures. Reliability analysis was performed with each construct to check the reliability. The internal consistency of the scales were good, given that the Cronbach’s Alpha values were 0.637 for attitude measure, 0.751 for perceived belief control measure, 0.8482 for intention measure, and 0.937 for the subjective norm measure (Appendix 1).

4.2. Descriptive Findings

Correlations among the variables, mean scores, and standard deviations of the variables were computed. Income, education, attitude, subjective norm, perceived behavioral control, past use frequency correlated highly with the intention to use anthelmintic medications ($p \leq 0.001$) and with the frequency of past use ($p \leq 0.001$ for income, education, attitude; $p \leq 0.01$ for subjective norm, and $p \leq 0.05$ for perceived behavioral control). Income correlated significantly with education. This indicates that in this study, mothers with higher education have higher income. The means, standard deviations, and bivariate correlations among the study variables are presented in Table 1.

Table 1: Correlations among all variables, mean scores (M) and standard deviations (SD), N = 395

	AGE	INC	EDU	AT	SN	PBC	PUF	I
AGE		-0.009	-0.002	-0.077	0.044	0.074	-0.019	0.950
INC			0.419***	0.053	0.115*	0.047	0.274***	0.255***
EDU				0.103*	0.071	0.045	0.218***	0.240***
AT					0.275***	0.245***	0.197***	0.493***
SN						0.036	0.152**	0.364***
PBC							0.108*	0.279***
PUF								0.465***
I								
M	2.403	2.572	1.562	5.735	4.420	5.652	3.352	5.839
SD	0.607	0.894	0.739	0.926	1.208	1.088	1.292	1.198

Notes: AGE = age, INC = Income, EDU = Education, AT = Attitude; SN = Subjective norm; PBC = Perceived behavioral control; PUF = Past use frequency; I = Intention; M = Mean, SD = Standard deviation, *** $p \leq 0.001$, ** $p \leq 0.01$, * $p \leq 0.05$.

4.3. Predictors of Intention

To examine the predictive utility of TPB, independent variables of intention to use anthelmintic medications was regressed in a stepwise regression on attitude, subjective norm, perceived behavioral control, and the frequency of past use (Table 2). The results provide strong support for Hypothesis 1, indicating that attitude, subjective norm, and perceived behavioral control explain 32.3% of variance in the intention to use anthelmintic medications. Attitude exerted the strongest influence on intention ($\beta = 0.380, p \leq 0.001$), subjective norm had a moderate influence ($\beta = 0.253, p \leq 0.001$), and perceived behavioral control has the smaller influence on the intention to use anthelmintic medications ($\beta = 0.176, p \leq 0.001$).

The frequency of past use was added to the predictors and regressed in a stepwise regression on attitude, subjective norm, perceived behavioral control, and past use frequency to assess whether it would increase the total variance explained in medicating intention to use anthelmintic medications. The result shows that the addition of the frequency of past use to the regression can increase a significant variance by 11.7% (significant F change ≤ 0.001) of the intention to use anthelmintic medications. Hypothesis 2 was supported. In the extended model, attitude had less effect on intention ($\beta = 0.327, p \leq 0.001$) and the frequency of past use frequency had the strongest influence on intention ($\beta = 0.352, p \leq 0.001$). Subjective norm and perceived behavioral control remained the least influential factors on the intention to use anthelmintic medications ($\beta = 0.215, p \leq 0.001$, and $\beta = 0.153, p \leq 0.001$, respectively).

Table 2: Hierarchical multiple regression predicting intention (N=395)

Step	Variable	Adjusted R ² (R ²)	ΔR^2	F change	B	SE	Beta
1	AT	0.323 (0.329)	0.329	63.79***	0.492	0.058	0.380***
	SN				0.251	0.043	0.253***
	PBC				0.194	0.047	0.176***
2	AT	0.440 (0.446)	0.117	82.38***	0.423	0.053	0.327***
	SN				0.213	0.039	0.215***
	PBC				0.168	0.043	0.153***
	PUF				0.326	0.036	0.352***

Notes: AT = Attitude; SN = Subjective norm; PBC = Perceived behavioral control, PUF = Past use frequency; $\Delta R^2 = R^2$ change; B = Unstandardized coefficient, SE = Standard error; Beta = Standardized coefficient, *** $p \leq 0.001$

4.4. Moderating Effects of Demographic Variables

It is theoretically and managerially relevant to explore the moderating effect of demographic variables on the relationship between the frequency of past use and medicating intention. To do so, moderated regression was conducted with standardized variables or z values (Aiken & West, 1991), which can be computed by

SPSS. The interactions of the frequency of past use with age, income, and education were also computed.

Intention was then regressed on age, income, and education variables separately. In the follow-up analyses, intention was regress individually with the frequency of past use and the corresponding interaction term on the abovementioned variables (Table 3 and Appendix 2). Multiple regression results showed that only income variable moderated the relationship between the frequency of past use and medicating intention. Only Hypothesis 4 was supported.

Table 3: Moderated regression predicting medicating intention, N=395

Variables	Adjusted R ² (R ²)	B	Std. Error	Beta
PUF	0.235 (0.241)	0.399	0.048	0.399***
INC		0.129	0.046	0.129**
PUF x INC		-0.084	0.045	-0.088*
(Constant)		0.023	0.046	

Note: INC = Income, PUF = Past use frequency; B = Unstandardized coefficient, SE = Standard error; Beta = Standardized coefficient, *** p≤0.001, ** p≤0.01, * p≤0.05.

To understand further the nature of the moderating effects of income on the relationship between past use frequency and intention, simple slopes analysis was conducted according to Aiken and West (1991). The graph of the moderating effects is presented in Figure 2. The interpretations of the slope lines indicate that when income of mother is low, the frequency of past use becomes a stronger predictor of medication intention. In other words, as mothers’ income increases, the predictive power of the frequency of past use on medicating intention decreases. According to the result in Table 3 we can have the following regression equation:

$$I = 0.023 + 0.399 * PUF + 0.129 * INC - 0.084 * PUFxINC \tag{1}$$

To construct the equation that would represents the relationship between medicating intention and the frequency of past use when income is below average, -1 was substituted for income in equation (1). We then have:

$$I = 0.023 + 0.399 * PUF - 0.129 + 0.084 * PUF \tag{2}$$

$$I = - 0.106 + 0.483 * PUF \tag{3}$$

Similarly, to construct the equation that would represents the relationship between medicating intention and the frequency of past use when income is above average, +1 was substituted for income in (1). We have:

$$I = 0.023 + 0.399 * PUF + 0.129 - 0.084 * PUF \tag{4}$$

$$I = 0.152 + 0.315 * PUF \tag{5}$$

Graphs are created to illustrate the regression lines from equations (3) and (5) (Figure 2). The slopes indicate that when income is low, frequency of past use becomes a

stronger predictor of intention. In other words, when income increases, the influence of the frequency of past use on intention becomes weaker.

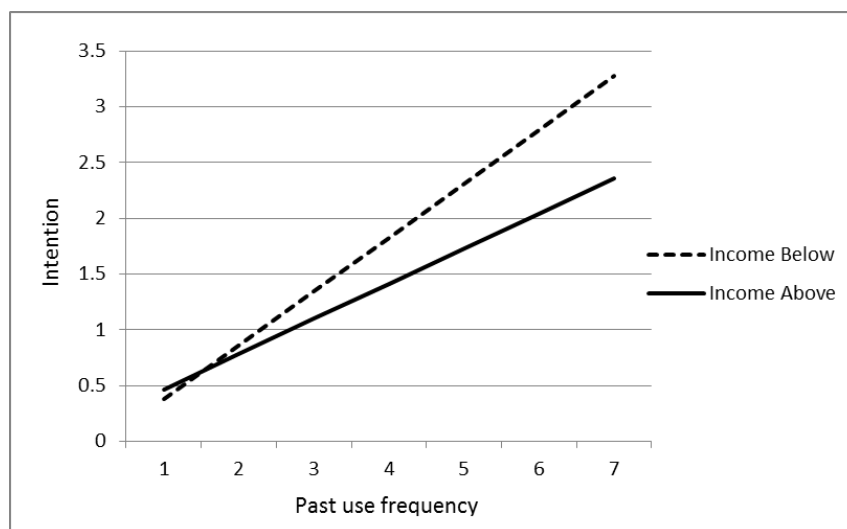


Figure 2: Moderating effect of income on past use frequency – intention relationship

5. DISCUSSION

The predictive utility of the theory of planned behavior model was found consistent with previous meta-analyses. In the present study, TPB model accounted for 32.3% of the variance in intention, which is comparable to 39.0% of the variance in intention reported in a meta-analysis of 195 studies by Armitage and Conner (2001) and to 40.9% of the variance in intention reported in another meta-analysis of 56 studies by Godin and Kok (1996). In the latter meta-analysis, the percentage of variance explained in intention varied from 32.0% concerning eating behaviors to 46.8% for oral hygiene behaviors. Further, in the present study, attitude was found to be the most influential factor explaining intention, which is also consistent with the results of the aforementioned meta-analyses.

With the addition of the frequency of past use, the extended model (Figure 3) has been shown to increasingly and significantly predict the intention of mothers to administer non-prescription anthelmintic products to their children. The frequency of past use appeared to be the most powerful predictor of intention, and its predictive power was higher than that of attitude, subjective norm, and perceived behavioral control. The result is consistent with evidences from several studies in which past behavior was found to significantly predict behavioral intention after controlling the TPB original constructs (Norman & Conner, 2006; Rise, Kovac, Kraft, & Moan, 2008).

Demographic variables have been found to influence people's intention to perform certain behaviors. The present study examined age, monthly household income, and education level of mothers to see whether they have a moderating effect on the relationship between past behavior and intention. The results showed that age and educational levels of mother included in this study do not moderate the relationship.

However, it is interesting that monthly household income of the subjects moderated the relationship between the frequency of past use and intention. As mothers' household income increased, their intention to use anthelmintics became less dependent on the frequency of using the medication in the previous 12 months.

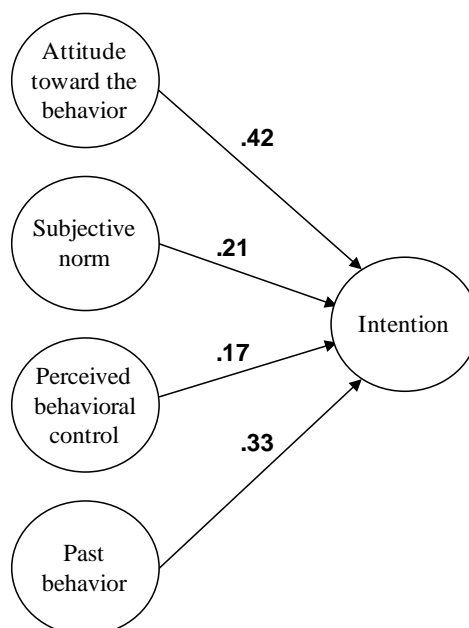


Figure 3: Conceptual framework of the present study

6. CONCLUSION

6.1. Theoretical and Managerial Implications

Theory-driven academic studies have not yet examined the intention and behavior regarding the use of anthelmintic products in Vietnamese people. Therefore, this empirical interdisciplinary research has fulfilled the basic need in both health behavior and consumer behavior domains. Further, the present research provides empirical evidence regarding the predictive validity of past behavior on medicating intention to use non-prescription medications. Future studies should reconfirm this evidence considering other categories of pharmaceutical products. Up to date, most research work in pharmaceutical marketing has been conducted in Western European or North American territories. Research models applicable in these territories must not be assumed to be equally applicable in all regions of the world; therefore, it is essential for future research to consider Asian context.

Managerially, this research tested an extended model that has been developed based on the theory of planned behavior. The model was tested in a Vietnamese population. Vietnam is one of the emerging pharmaceutical markets in Asia Pacific region. The research provides implications regarding the medicating intention of parents to administer non-prescription pharmaceutical products at a category level. It provides an understanding of the relative importance of different cognitive factors and past behavior and their influence on mothers' intention to give commercialized non-prescription medications to their children.

The results of this research provide knowledge that could guide the development of more effective integrated marketing programs for pharmaceutical firms. Such programs should exploit different cognitive components relevant to the strategic and tactical implementation of marketing program based on the solid scientific foundation. Consumer communication campaigns can chose to focus on shaping and changing certain cognitive factors to influence the intention and behaviors of consumers to administer children's non-prescription medications. There are opportunities to leverage on the effect of past use frequency factor as a significant predictor of consumer intention.

6.2. Research Limitations

Although the present research has contributed to the understanding of the extended model of cognition in consumer health behavior, it has a number of limitations that need to be addressed.

First, the present research did not include fathers in the quantitative samples of respondents. As such, the extended model has not been tested among fathers of children. Because fathers' perceptions of prevention and use of medications are different from mothers' perceptions, the present research could not provide a more comprehensive understanding of medicating intention of parents overall. Including fathers would make the interrelationship between fathers and mothers in cognition factors and past behavior even more interesting to both academics and marketers. Furthermore, the present research cannot be generalized to other non-prescription medications and children of other ages. Future studies should include on other medication categories and other age groups to increase the generalizability of findings.

Second, the present research did not study parents' actual medicating behaviors only the intention to medicate. The design of cross-sectional studies is limited in terms of observing actual behaviors, the relationship between the constructs and the behavior itself therefore has not been studied. Future research should observe actual behaviors and test intervention measures to provide insights into the intention – behavior relationship.

APPENDIX

Appendix 1: Factor analysis for the direct measures constructs

Items	Component		
	1	2	3
Attitude, item 1	.161	.089	.836
Attitude, item 2	.077	.155	.843
Subjective norm, item 1	.961	.018	.130
Subjective norm, item 2	.962	.030	.128
Perceived behavioral control, item 1	-.025	.907	.147
Perceived behavioral control, item 2	.070	.910	.106

Note: Extract method: Principal Component Analysis, Rotation method: Quartimax with Kaiser Normalization

Appendix 2: Moderated regression predicting medicating intention, N=395

Variables	Adjusted R ² (R ²)	B	Std. Error	Beta
PUF	0.225 (0.231)	0.466	0.044	0.466 ^{***}
AGE		0.094	0.044	0.094 [*]
PUF x AGE		-0.052	0.041	-0.057
(Constant)		-0.001	0.044	
PUF	0.234 (0.240)	0.467	0.052	0.467 ^{***}
EDU		0.128	0.047	0.128 ^{**}
PUF x EDU		-0.078	0.061	-0.057
(Constant)		-0.017	0.046	

Note: AGE = Age, EDU = Education, PUF = Past use frequency; B = Unstandardized coefficient, SE = Standard error; Beta = Standardized coefficient, *** p≤0.001, ** p≤0.01, * p≤0.05.

Appendix 3: Hierarchical multiple regression predicting intention through moderating effects (N=395)

Step	Variable	Adjusted R ² (R ²)	ΔR ²	F change	B	SE	Beta
1	AGE	0.089 (0.096)	0.096	13.844***	0,098	0.048	0.098
	INC				0.188	0.053	0.188***
	EDU				0.162	0.053	0.162**
2	AGE	0.458 (0.467)	0.371	67.424***	0.058	0.037	0.058
	INC				0.088	0.042	0.088*
	EDU				0.081	0.041	0.081
	AT				0.322	0.040	0.322***
	SN				0.204	0.039	0.204***
	PBC				0.146	0.038	0.146***
	PUF				0.315	0.040	0.315***
	3				AGE	0.479 (0.493)	0.025
INC	0.070	0.041	0.070				
EDU	0.048	0.042	0.048				
AT	0.337	0.040	0.337***				
SN	0.194	0.038	0.194***				
PBC	0.153	0.038	0.153***				
PUF	0.351	0.045	0.351***				
PUF x AGE	-0.034	0.034	-0.038				
PUF x INC	-0.123	0.039	-0.129**				
PUF x EDU	0.191	0.052	0.163***				

Note: AGE = Age, INC = Income, EDU = Education, AT = Attitude; SN = Subjective norm; PBC = Perceived behavioral control; PUF = Past use frequency; ΔR²= R² change; B = Unstandardized coefficient, SE = Standard error; Beta = Standardized coefficient, *** p<0.001, ** p<0.01, * p<0.05.

REFERENCES

- [1] Aiken, L.S., & West, S.G. (1991). *Multiple regression: Testing and interpreting interactions*. Thousand Oaks, CA: Sage.
- [2] Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.
- [3] Ajzen, I. (2008). Consumer attitudes and behavior. In C. P. Haugtvedt, P. M. Herr & F. R. Cardes (Eds.), *Handbook of consumer psychology* (pp. 525–548). New York: Lawrence Erlbaum Associates.

- [4] Ajzen, I., & Fishbein, M. (2005). The influence of attitudes on behavior. In D. Albarracin, B. T. Johnson, & M. P. Zanna (Eds.), *The handbook of attitudes* (pp. 173–221). Mahwah, NJ: Erlbaum.
- [5] Ames, J.T., Hayden, G.F., Campbell, R.E., & Lohr, J.A. (1982). Parents' conception of their use of over-the-counter medicines. *Clinical Pediatrics*, 21(5), 298–301.
- [6] Armitage, C.J., & Conner, M. (2001). Efficacy of the theory of planned behavior: A meta-analytic review. *British Journal of Social Psychology*, 40, 471–499.
- [7] Beale, D. A., & Manstead, A.S.R. (1991). Predicting mothers' intentions to limit frequency of infants' sugar intake: Testing the theory of planned behavior. *Journal of Applied Social Psychology*, 21, 409–431.
- [8] Becker, M.H., Haefner, D.P., & Maiman, L.A. (1977). The health belief model in the prediction of dietary compliance: A field experiment. *Journal of Health and Social Behaviour*, 18, 348–66.
- [9] Conner, M., & Armitage, C. J. (1998). Extending the theory of planned behavior: A review and avenues for further research. *Journal of Applied Social Psychology*, 28, 1429–1464.
- [10] Conner, M. & Norman, P. (2005). Predicting health behaviour: A social cognition approach. In M. Conner & P. Norman (Eds.) *Predicting Health Behaviour* (2nd ed; pp. 1–27) Buckingham: Open University Press.
- [11] Ecklund C.R. (2001). Over-the-counter medication use in preschool children. *Journal of Pediatric Health Care*, 15(4), 168–172.
- [12] Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention, and behavior*. New York: Wiley.
- [13] Fishbein, M., & Ajzen, I. (2010). *Predicting and Changing Behavior: The Reasoned Action Approach*. New York: Psychology Press.
- [14] Godin, G., & Kok, G. (1996). The theory of planned behavior: A review of its applications in health-related behaviors. *American Journal of Health Promotion*, 11, 87–98.
- [15] Hounsa, A.M., Godin, G., Alihonou, E., Valois, P., & Girard, J. (1993). An application of Ajzen's theory of planned behaviour to predict mothers' intention to use oral rehydration therapy in a rural area of Benin. *Social Science & Medicine*, 37(2), 253–261.
- [16] IMS Health, (2011). *Vietnam's pharmacy audit*. Intercontinental Marketing Services, Vietnam.
- [17] Kogan, M.D., Pappas, G, Yu S.M., & Kotelchuck, M. (1994). Over-the-counter medication use among US preschool age children. *Journal of American Medical Association*, 272(13), 1025–30.

- [18] Lodorfos, G.N., Mulvana, K.L., & Temperley, J. (2006). Consumer behaviour: Experience, price, trust and subjective norms in the OTC pharmaceutical market. *Innovative Marketing*, 2(3), 41–66.
- [19] Luce, M.F., & Barbara, E.K. (1999). Avoidance or vigilance? The psychology of false-positive test results. *Journal of Consumer Research*, 26, 242–59.
- [20] Manchanda, P., Wittink, D. R., Ching, A., Cleanthous, P., Ding, M., Dong X.J., et al. (2005). Understanding firm, physician and consumer choice behavior in the pharmaceutical industry. *Marketing Letters*. 16(3-4), 293–308.
- [21] Moan, I.S., Rise, J., & Andersen, M. (2005). Predicting parents' intentions not to smoke indoors in the presence of their children using an extended version of the theory of planned behaviour. *Psychology and Health* 20(3), 353–371.
- [22] Montresor, A., Crompton, D.W.T., Gyorkos, T.W., & Savioli, L. (2002). Helminth control in school-age children: A guide for managers of control programmes. *World Health Organization*.
- [23] Moorman, C. (2002). Consumer health under the scope. *Journal of Consumer Research*, 29(1), 152–8.
- [24] Moorman, C., & Erika, M. (1993). A model of consumers' preventative health behaviors: The role of health motivation and health ability. *Journal of Consumer Research*, 20, 208–228.
- [25] Moss, G.D. (2007). What can the pharmaceutical world learn from consumer branding practice? *Journal of Medical Marketing*, 7, 315–320.
- [26] Norman, P. & Conner, M. (2006). The theory of planned behaviour and binge drinking: Assessing the moderating role of past behaviour within the theory of planned behaviour. *British Journal of Health Psychology*, 11, 55–70.
- [27] Oliver, R.L., & Berger, P.K. (1979). A path analysis of preventive health care decision models. *Journal of Consumer Research*, 6, 113–22.
- [28] Ouellette, J.A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin*, 124, 54–74.
- [29] Rise, J., Astrom, A.N., & Sutton, S. (1998). Predicting intentions & use of dental floss among adolescents: An application of the theory of planned behavior. *Psychology & Health*, 13, 223–236.
- [30] Rise, J., Kovac, V., Kraft, P., & Moan, I.S. (2008). Predicting the intention to quit smoking and quitting behaviour: Extending the theory of planned behaviour. *British Journal of Health Psychology*, 13, 291–310.
- [31] Rogers, R.W. (1983). Cognitive and physiological processes in fear appeals and attitude change: A revised theory of protection motivation. In J.T. Cacioppo and R.E. Petty (Eds) *Social Psychophysiology: A source book* (pp. 153–76). New York:

Guilford Press.

- [32] Simon, H.K. & Weinkle, D.A. (1997). Over-the-counter medications. Do parents give what they intend to give? *Archive of Pediatric and Adolescent Medicine*, 151(7), 654-6.
- [33] Slack-Smith, L.M., Read, A.W., & Stanley, F.J. (1998). The use of medication in children attending childcare in Western Australia. *Journal of Paediatrics and Child Health*, 34(2),183–187.
- [34] Van der Hoek, W., De. N.V., Konradsen. F., Cam. P.D., Hoa. N.T., Toan. N.D., et al. (2003). Current status of soil-transmitted helminths in Vietnam. *The Southeast Asian Journal of Tropical Medicine and Public Health* 34 (1), 1–11.
- [35] Zeng, Q.T., & Tse, T. (2006). Exploring and developing consumer health vocabularies. *Journal of the American Medical Informatics Association*, 13, 24–29.