The Pharmacists' Implementation of Pharmaceutical Care (PIPC) Model

Folakemi T. Odedina,[1,4] Charles D. Hepler,[2]
Richard Segal,[2] and David Miller[3]

Purpose. Study purpose was to develop a theoretical framework that will explain pharmacists' behavior relative to the provision of pharmaceutical care. The model was developed from four attitude models by testing their predictive validity relative to pharmaceutical care implementation. Four hypotheses and one research question were investigated to identify determinants of behavioral intention and behavior.
Methods. 617 community pharmacists in the state of Florida, U.S.A., were surveyed twice using mail survey methodology to collect data. The first survey assessed community pharmacists' attitude, subjective norm, perceived behavioral control, past behavior recency, self-efficacies, instrumental beliefs and affect. The second survey assessed pharmacists' behavior relative to the implementation of pharmaceutical care. After establishing reliability and validity of measures, regression analysis was used to test hypotheses and research question investigated.
Results. The Pharmacists' Implementation of Pharmaceutical Care (PIPC) model developed postulates that (i) behavior is directly determined by past behavior recency, behavioral intention and perceived behavioral control; (ii) psychological appraisal processes—instrumental beliefs, self-efficacies, and affect toward means—influence behavior through past behavior recency; and (iii) behavioral intention is determined by attitude, social norm and perceived behavioral control.
Conclusions. The PIPC model provides a formal scientifically validated theoretical framework which can be used to design successful intervention for pharmaceutical care implementation.

INTRODUCTION

Pharmaceutical care is an outcome-oriented concept that was proposed as a philosophy of pharmacy practice by which pharmacists would work to address drug-therapy problems (1). Pharmaceutical care is defined as "the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life" (1,p. 539). The three major goals involved in the delivery of pharmaceutical care are (i) preventing, (ii) identifying, and (iii) resolving problems associated with drug therapy. By providing pharmaceutical care, pharmacists will improve health care as well as advance the professional maturation of pharmacy.

Despite its advantages, the provision of pharmaceutical care by pharmacists is yet to be part of routine pharmacy practice. This is mainly because the implementation of pharmaceutical care requires changes in both the pharmacist's functions, and relationships with patients and other health care providers (1). Barriers to these changes have been recognized (1,2). The barriers identified by Penna (2) are comparable to the factors Ajzen (3) identified as affecting the enactment of goal-directed behaviors[5] (such as the provision of pharmaceutical care). It thus comes as no surprise that pharmaceutical care is yet to be widely implemented by pharmacists. An approach to help facilitate the implementation of a goal-directed behavior is to have an understanding of specific factors which influence the behavior. Once identified, these factors can be targeted to design effective intervention programs that can be employed in facilitating the goal-directed behavior. For example, one way to facilitate pharmaceutical care implementation is to identify factors which influence pharmacists' provision of pharmaceutical care. These factors can be identified from an empirically validated theoretical framework which predicts and explains pharmacists' behavior.

Attitude theory is a widely used theoretical approach to the study of behavior. The present study evaluated the predictive ability of four related, general attitude theories, in order to construct a specific theory that could describe, in part, the psychological processes that community pharmacists' might go through as they implement pharmaceutical care. Such a descriptive model might be useful to foster wider adoption of pharmaceutical care. A Pharmacists' Implementation of Pharmaceutical Care (PIPC) model was developed in this study from a set of propositions stating the relationships among variables found to be significant in the prediction of community pharmacists' behavior relative to the provision of pharmaceutical care.

Theoretical Background

Perhaps the simplest and most widely used attitude theory is the Theory of Reasoned Action. This theory has been validated by a number of published studies. However, the theory has limited ability to predict behaviors that are either themselves sustained or not under the control of the actor, or behaviors whose goal depends in part on external factors (5,6,7,8). Because of its limitation, the Theory of Reasoned Action has undergone several major modifications (4,5,9,10). Three major modifications include the Theory of Planned Behavior (3), the Theory of Trying (4), and the Theory of Goal-Directed Behavior (7). These four attitude models are presented in more detail below. Although all of these four theories have a fundamental framework of attitude theory common to them, they have unique construct(s) which distinguish them from each other. The validity of these constructs in predicting pharmacists' provision of pharmaceutical care were examined in this study.

The Theory of Reasoned Action

The Theory of Reasoned Action is based on the assumption that human beings make rational decisions and also make sys-

[1] Department of Behavioral and Administrative Pharmacy, School of Pharmacy, Robert C. Byrd Health Sciences Center, 1131 HSCN, West Virginia University, Morgantown, West Virginia 26506-9510.
[2] College of Pharmacy, University of Florida, Gainesville, Florida.
[3] Foundations of Education, University of Florida, Gainesville, Florida.
[4] To whom correspondence should be addressed. (e-mail: FTO@wvnvm.wvnet.edu)

[5] Goal-directed behaviors are defined by Bagozzi and Warshaw (4) as behaviors subject to impediments such as, lack of resources, environmental contingencies, ability limitations, and unconscious habits.

tematic use of the information available to them (6). According to the theory, an individual's intention is the immediate determinant of the behavior of that individual. The attitude of the individual toward the behavior and his/her subjective norm are the immediate predictors of intention. Attitude toward a behavior is defined by Fishbein and Ajzen (6) as a person's general feeling of favorableness or unfavorableness, while subjective norm is an individual's beliefs about whether people who are important to her do or do not want her to perform the behavior. Both attitude and subjective norm are based on an individual's beliefs. Attitude depends on behavioral beliefs while subjective norm depends on normative beliefs.

An individual's attitude towards a behavior is a multiplicative function of the individual's beliefs about probable consequences of engaging in the behavior and subjective evaluation of consequences. The subjective norm of an individual, on the other hand, is a multiplicative function of the individual's normative belief (belief that specific individuals or groups think he should or should not perform the behavior) and motivation to comply with these beliefs.

Specifically, the Theory of Reasoned Action can predict voluntary behaviors as long as there is no change in the intent of the individual and the behavioral intention matches the behavior in terms of the action, target of interest, the context of performance, and the time the behavior is performed (7). As mentioned above, the validity of the Theory of Reasoned Action has been questioned relative to goal-directed behaviors (3,4,7,11). This is because the Theory of Reasoned Action assumes that there are no impediments standing in the way of an individual once an intention has been formed to perform the behavior (6).

The Theory of Planned Behavior

The Theory of Planned Behavior addressed the limitation of the Theory of Reasoned Action relative to goal-directed actions by proposing a third variable, perceived behavioral control, as a determinant of behavioral intention. The Theory of Planned Behavior suggests that attitude toward the behavior, subjective norm and perceived behavioral control are the main antecedents of intention. It is also proposed that behavior is directly affected by perceived behavioral control independent of behavioral intention. Perceived behavioral control is defined as the perceived ease or difficulty of performing the behavior (3). Like attitudes and social norms, its antecedents are beliefs. Perceived behavioral control is determined by control beliefs and the evaluation about the effects of these beliefs. Control beliefs are individual's beliefs about resources and opportunities available to the individual.

The Theory of Trying

In this model, behavior is operationalized as "trying" to achieve the goal instead of goal achievement or action. Subsequently, attitude, social norm and intention were made referents to trying, for example, attitude toward trying, social norm toward trying and intention to try. Four other revisions were made in the Theory of Reasoned Action for the proposed Theory of Trying. These revisions are (i) attitude toward trying was suggested to be determined by attitude toward success, attitude toward failure, and attitude toward the process of trying; (ii)

attitude toward success and failure were each weighted by expectations of success and failure respectively; (iii) the construct of frequency of past trying was introduced as influencing intention to try and trying; and (iv) recency of past trying was proposed to affect trying.

The Theory of Goal-Directed Behavior

A common assumption in the Theories of Reasoned Action, of Planned Behavior and of Trying is that behavioral intention leads to behavior. This assumption has been criticized by Bagozzi, Baumgartner and Yi (7). As noted by Bagozzi (11), action does not necessarily follow a formed intention. To address this limitation, Bagozzi, Baumgartner and Yi (9) proposed a Theory of Goal-Directed Behavior which is built on the Theory of Trying. Another criticism these authors made of the Theory of Trying is that the dependent variable, trying, which is operationalized as a single, subjective assessment of one's effort, gives an inadequate interpretation of trying (9,11). Primarily, the Theory of Goal-Directed Behavior takes into consideration the means necessary for an individual to achieve desired behavioral goal.

In the Theory of Goal Directed Behavior, three appraisal processes were introduced as mediating the relationship between behavioral intention and behavior. These processes include specific self-efficacies, instrumental beliefs, and affect toward means. Self-efficacies refer to an individual's beliefs about his or her competence in carrying out the means associated with the behavioral goal (9).

Instrumental means are defined as judgements of the likelihood that each means will lead to achievement of a goal or performance of a target goal (9). The last appraisal process is affect toward means which measures the emotional significance or desirability of the means necessary to achieve the behavioral goals. Self-efficacies, instrumental beliefs and affect are proposed to interact together to predict behavior. In other words, people will be more likely to enact a behavior when they believe they can carry out the means, that the means will lead to the intended behavior and when they have a positive affect towards the means.

Research Questions and Hypotheses

Five research questions were explored to identify factors which influence pharmacists' provision of pharmaceutical care. The research questions and associated hypotheses follows.

1. Would the addition of perceived behavioral control to the Theory of Reasoned Action predictors-attitude, and social norm-significantly improve the prediction of behavioral intention?

> H1: Perceived behavioral control would add significantly to the prediction of pharmacists' intention, over and above the standard Theory of Reasoned Action predictors.

This hypothesis proposes that perceived behavioral control is significant in the prediction of pharmacists' behavioral intention. Findings on Theory of Planned Behavior indicate a strong support for perceived behavioral control as a determinant of behavioral intention. Empirical studies which found perceived behavioral control to be statistically significant indicate an increase in the explained variance ranging from 4.5% (12)

to 45% (13). Based on the incremental variance reported by Netemeyer and Burton in 1990—45% (13); Beale and Manstead in 1991—4.5%, 5.8%, & 11.6% (12); and Ajzen and Madden in 1986—19%, 17% & 16% (14); the mean incremental variance made by perceived behavioral control in the prediction of behavioral intention is about 17%. It was thus expected that perceived behavioral control would improve the explained variance in the prediction of behavioral intention.

2. Would the addition of perceived behavioral control to the Theory of Reasoned Action predictor—intention—significantly improve the prediction of behavior?

> H2: Perceived behavioral control would not add significantly to the prediction of pharmacists' self-reported behavior, over and above behavioral intention.

This hypothesis suggests that perceived behavioral control may not be significant in the prediction of pharmacists' behavior after behavioral intention has been accounted for. Limited empirical support exist for the contribution made by perceived behavioral control in the explanation of behavior. To date, only one study has reported a significant improvement in the explanation of behavior (14). (The incremental variance made by perceived behavioral control in their study was 5%). Findings in the literature seem to suggest that once perceived behavioral control has been taken into consideration before intention is formed, its effect on behavior (after accounting for intention) is minimal. Since pharmaceutical care is an innovative concept, control beliefs are likely to be taken into consideration by community pharmacists before they form an intention. If this is the case, the incremental contribution made by perceived behavioral control in the prediction of behavior when added to behavioral intention may not be significant.

3. Would the addition of past behavior recency to the Theory of Reasoned Action predictor-intention-significantly improve the prediction of behavior?

> H3: Past behavior recency would add significantly to the prediction of pharmacists' self-reported behavior over and above the standard Theory of Reasoned Action predictor.

This proposition is based on findings on the predictive validity of the Theory of Trying. Empirical tests of the Theory of Trying found past behavior recency to contribute significantly to intention in the prediction of behavior. Past behavior frequency was however, found to be nonsignificant in these studies. The incremental contribution made by both recency and frequency of past behavior when added to behavioral intention in these studies range from 10% (15) to 20% (10). Since past behavior recency is the major contributor in these studies, it is likely that the incremental contribution made by past behavior recency alone in the prediction of behavior would be significant.

4. Would the addition of the appraisal processes (self-efficacies, instrumental beliefs and affect) to the Theory of Trying predictor—past behavior recency—significantly improve the prediction of behavior among those who intend to provide pharmaceutical care?

> H4: Among pharmacists who intend to provide pharmaceutical care, self-efficacy, instrumental beliefs, and affect toward means, will add significantly to the prediction of pharmacists' self-reported behavior over and above the standard Theory of Trying predictor.

On the basis of Bagozzi, Baumgartner and Yi's (9) findings, the three-way interaction of the three appraisal processes was found to be significant (p < 0.04) in the prediction of behavior. The variance explained by the overall regression which includes self-efficacy, instrumental beliefs, affect toward means, their two-way interactions and three way interaction as well as past behavior frequency and past behavior recency was 54% (p < 0.001). Thus, these appraisal processes will likely combine multiplicatively to explain a significant variance in pharmacists' self-reported behavior.

In summary, the four hypotheses proposed above suggest that attitude, social norm and perceived behavioral control will directly determine pharmacists' behavioral intention. For pharmacists with high behavioral intention, their behavior will be determined by past behavior recency, self-efficacies, instrumental beliefs and affect toward means. To identify factors which directly influence pharmacists' reports on their current behavior among those proposed by the attitudinal models, the following research question was explored:

5. What variables among those proposed by the Theory of Reasoned Action, the Theory of Planned Behavior and the Theory of Trying will directly determine pharmacists' self-reported behavior?

METHODS

Study Overview

Data were collected from community pharmacists in Florida. A pilot study was first conducted among 20 community pharmacists in Gainesville, Florida to explore the linear association among the variables incorporated by the behavioral-choice models (16). Results of the pilot study suggested that (i) attitude, social norm and perceived behavioral control may affect behavioral intention; and (ii) behavioral intention, self-efficacies, affect toward means and instrumental beliefs may directly affect behavior. Next, the predictive validity of the behavioral choice models relative to the provision of pharmaceutical care were tested in a mail survey.

A random sample of 1,235 full-time community pharmacists in the State of Florida constituted the study sample. The pharmacists were randomly selected from the 1992 Florida Board of Pharmacy mailing list. Pharmacists were surveyed twice within a six-week period. For the first survey, independent variables proposed by the attitude models as influencing behavioral intention (attitude, subjective norm and perceived behavioral control) and behavior (past behavior recency, self-efficacies, instrumental beliefs and affect) were assessed. The second survey was conducted among pharmacists who responded to the first survey. In the second survey, the dependent variable, pharmacists' behavior relative to the provision of pharmaceutical care, was assessed. Pharmacists who did not return the first survey were classified as non-responders while those who returned the first survey but did not return the second survey were classified as partial responders. Reliability and trait validity of measures were established by means of internal consistency estimates, item analysis and confirmatory factor analysis. Tests for multicollinearity were conducted first for the regressors—attitude, subjective norm, perceived behavioral control, behavioral intention and past behavior recency. Another test was conducted for self-efficacies, instrumental beliefs, and

affect as these variables were relevant only to pharmacists who indicate that they do intend to provide pharmaceutical care. To test the hypotheses and research question investigated, regression analysis was employed.

Measures

Study constructs were operationalized following the suggestions of Fishbein and Ajzen (6), Ajzen (3), Bagozzi and Warshaw (4), Bagozzi (17), and Bagozzi, Baumgartner and Yi (9). However as opposed to Bagozzi and Warshaw's recommendation, the independent variables, attitude, social norm, and intention, were not assessed in terms of trying e.g. attitude and not attitude toward trying was measured in the study. A description of measures employed for study constructs follows.

Past Behavior Recency

To assess past behavior recency, pharmacists were provided with a list of direct patient care activities from a Behavioral Pharmaceutical Care Scale (18). Pharmacists were asked to indicate in how many of their last five patients these activities were provided. The score of each scale ranged from zero (indicating none of the patients) to five (indicating all five patients). The total score for past behavior activity was the sum of scores obtained for all the activities.

Attitude Toward Behavior

Three items were employed to assess attitude. For example pharmacists were asked to respond to the following sentence— "My opinion about providing pharmaceutical care to patients in the next six weeks is:" Responses were taken on a 7-point scale ranging from favorable to unfavorable. The score of the scales ranged from 1 (unfavorable) to 7 (favorable). The total attitude score was the sum of the scores of the three items.

Subjective Norm

To assess subjective norm, pharmacists were asked to provide their normative beliefs relative to specific referents and motivation to comply with these referents. Normative beliefs was operationalized using a seven-point approve/disapprove scale. Subjects were asked to indicate whether the specific referents would approve of their providing pharmaceutical care in the next six weeks. Motivation to comply was measured by asking subjects to indicate how likely they will want to do what the referents think they should do. On a 7-point Likert scale, pharmacists were asked to respond to sentences such as: "Generally speaking, I want to do what my supervisor thinks I should do". As suggested by Ajzen and Fishbein (7), subjective norm was the sum of the products of normative beliefs and the corresponding motivations to comply.

Perceived Behavioral Control

Three items were used to assess perceived behavioral control. For example, pharmacists were asked to respond to the following question: "For me, providing pharmaceutical care within the next six weeks is -------". A seven-point easy/difficult scale scored from 7 (easy) to 1 (difficult) followed each question. The scores of each item response ranged from 1 to 7. The

sum of the scores on the three items constituted the perceived behavioral control score.

Behavioral Intention

Three items were used to elicit intentions. Examples include responses to the following sentences: "I intend to provide pharmaceutical care within the next six weeks" on a 7-point likely/unlikely scale and "I will provide pharmaceutical care in the next six weeks", on a 7-point agree/disagree scale. The scale scores ranged from 1 to 7. The total score for behavioral intention was the sum of the scores for the three items. The minimum score for this variable was three while the maximum was 21.

Self-Efficacies with Respect to Means

Subjects were asked to indicate how confident they are that they will successfully carry out means instrumental in the provision of pharmaceutical care. Six means were identified from the literature and include (i) collecting and documenting patient information; (ii) identifying drug-related problems; (iii) determining therapeutic outcomes for each drug-related problem identified; (iv) determining a therapeutic intervention that can be expected to produce the desired outcome; (v) implementing the choice of therapeutic alternative to resolve the drug-related problem identified; and (vi) carrying out a follow-up pharmacotherapeutic monitoring plan to achieve the desired objectives. An example of a self-efficacy measure is. " How confident are you that you will successfully collect and document relevant patient information necessary for the provision of pharmaceutical care on a daily basis?" Responses were taken on a five-point scale ranging from 5 (Extremely confident) to 1 (Not at all confident).

Instrumental Beliefs

This construct was operationalized by asking subjects to indicate the likelihood that the pharmaceutical care means will lead to improved drug therapy outcomes on a five-point likely/ unlikely scale ranging from 1 (very unlikely) to 5 (very likely).

Affect Toward Means

Affect toward means was measured by asking subjects how much they like carrying out each of the pharmaceutical care means. For example, "I _____ collecting and documenting relevant patient information." Subjects were asked to choose from responses ranging from 1 (dislike very much) to 5 (like very much).

Target Behavior

The behavior of interest in this study was trying to provide pharmaceutical care. As with past behavior recency, this was measured by a self-report from pharmacists on direct patient care activities of the Behavioral Pharmaceutical Care Scale (18). Pharmacists were asked to indicate how many of their last five patients were these activities provided. The score of each activity ranged from zero for none of the patients to five for all of the five patients. Target behavior score was a sum of all the items and ranged from 0 to 90.

RESULTS

Response Characteristics of Sample

Of the 1,235 first survey forms deliverable to community pharmacists, 829 were returned (67% response rate). Seven hundred ninety-three of the 829 forms were however considered usable responses. The second survey forms were mailed to these 793 respondents, with 81% response rate (639 forms returned). Six hundred seventeen of the 639 second survey forms were considered usable and employed for data analyses. The characteristics of the final sample are shown in Table 1. 74.8% of sample were male. About 38% were less than 41 years while 23% were over 60 years. The most frequent practice site was drug chain pharmacies (46%), and about half of the subjects have been practicing for over 20 years.

Reliability and Validity of Measures

Scale statistics and reliability are provided in Table 2. The reliability for the measures ranged from 0.66 to 0.95. This is acceptable based on Robinson, Shaver & Wrightsman's (19) estimate of 0.60 as an acceptable level of alpha. The item-remainder correlations calculated for item analysis were also acceptable. The dimensionality of the measures was confirmed by using the confirmatory approach proposed by Joreskog and Sorbom (20). Four hypothesized measurement models were tested. The models analyzed were (i) past behavior measure, (ii) attitude, normative beliefs, motivation to comply, perceived

Table 1. Characteristics of Study Sample (N = 617)

	Frequency	Percent
Gender		
Female	155	25.2
Male	461	74.8
Missing	1	—
Age		
21–30 years	47	7.7
31–40 years	178	30.0
41–50 years	137	22.3
51–60 years	110	17.9
Over 60 years	142	23.1
Missing	3	—
Practice Type[a]		
Independent pharmacy	175	28.4
Drug chain pharmacy	285	46.2
Grocery chain pharmacy	135	21.9
Other community pharmacy	22	3.6
Years of Practice		
1–5 years	49	8.0
6–10 years	69	11.2
11–15 years	110	17.9
16–20 years	89	14.4
Over 20 years	299	48.5
Missing	1	—

[a] Independent pharmacy was defined as traditional independently-owned community pharmacy; drug chain pharmacy as chain units primarily providing pharmacy services; grocery chain pharmacy as chain units with pharmacy services as secondary to other services; and other community pharmacy include consultant practice or home health community-based practice.

behavioral control and behavioral intention measures, (iii) appraisal processes measures, i.e., self-efficacies, instrumental beliefs and affect toward means, and (iv) behavior measure. An examination of the results of confirmatory factor analysis does not indicate any unreasonable value for parameter estimates, the squared multiple correlations and the coefficient of determination. Results of goodness of fit indices also indicated that the models were suitable for the data.

Test of Models

Gross violations of the assumptions of regression analysis was first checked for by conducting a collinearity diagnostic test. By examining the condition number from the diagnostic test results, collinearity problems can be detected. High condition number indicates an ill-conditioned problem. If a component associated with a high condition number contributes strongly to the variance of two or more variables, then a collinearity problem exists (21). The collinearity diagnostic test results show that none of the variables has a high condition number. Thus, presence of a collinearity problem is not indicated. Residual tests for gross violations of homoscedasticity assumptions was also conducted. Results indicated that there was no gross violations of the homoscedasticity assumptions.

Results of study hypotheses and research question are summarized in Table 3. These results are presented next.

Hypothesis 1

The first hypothesis proposed that perceived behavioral control would add significantly to the prediction of pharmacists' intention, over and above attitude and social norm. The Pearson correlation between perceived behavioral control and behavioral intention (0.54) was significant. In a multiple regression prediction of intention with only attitude and social norm as predictors, the total variance explained was 0.38. The addition of perceived behavioral control as a predictor of intention increased the proportion of explained variance to 0.44. The overall regression model for attitude, social norm and perceived behavioral control predictors was significant (p = 0.001). The regression coefficients for the three predictors were significant at the 0.05 alpha level. Standardized regression coefficients were 0.38 for attitude (p = 0.0001), 0.14 for social norm (p = 0.0002) and 0.29 for perceived behavioral control (p = 0.0001). Attitude was found to be the most important of the three predictors. The second important predictor was perceived behavioral control.

Hypothesis 2

The second hypothesis proposed that perceived behavioral control would not make a significant contribution in the prediction of behavior once behavioral intention was accounted for. Perceived behavioral control was found to correlate positively and strongly with behavior (0.43) which suggests that perceived behavioral control has a relatively strong association with behavior. Intention alone as predictor of behavior explained a significant 14% of variance. The proportion of variance explained (R-squared) increased to 20% when perceived behavioral control was added to the regression model. Regression coefficients were significant for both intention and perceived behavioral control. The standardized estimates were 0.23 for

Table 2. Scale Statistics and Reliability Coefficients

Scale	Sample size	Number of items	Mean score[a]	Standard deviation	Range	Reliability estimate
Past behavior						
Documentation	617	6	10.61 (.35)	7.17	0–30	.66
Patient assessment	617	6	6.87 (.23)	7.04	0–30	.88
Therap. obj. implementation	507	3	4.64 (.31)	4.18	0–15	.74
Patient record screening	616	1	4.43 (.89)	1.35	0–5	—
Patient consultation	616	1	3.06 (.61)	1.72	0–5	—
Patient under. verification	615	1	3.31 (.66)	1.77	0–5	—
Social norm						
Normative beliefs	579	4	22.41 (.80)	5.10	4–28	.74
Motivation to comply	585	4	22.43 (.80)	5.14	4–28	.72
Attitude	609	3	17.39 (.83)	4.58	3–21	.90
Perceived behavioral control	607	3	11.71 (.56)	5.42	3–21	.89
Behavioral intention	605	2	10.81 (.77)	3.65	2–14	.95
Self-efficacies	408	6	19.04 (.63)	4.60	6–30	.87
Instrumental beliefs	404	6	24.34 (.81)	5.46	6–30	.90
Affect toward means	405	6	21.12 (.70)	4.20	6–30	.87
Behavior						
Documentation	617	6	10.91 (.36)	7.30	0–30	.72
Patient assessment	617	6	7.46 (.25)	7.44	0–30	.90
Therap. obj. implementation	524	3	4.74 (.32)	4.13	0–15	.74
Patient record screening	614	1	4.45 (.89)	1.27	0–5	—
Patient consultation	615	1	2.88 (.58)	1.66	0–5	—
Patient under. verification	614	1	3.23 (.65)	1.74	0–5	—

[a] The adjusted mean for each scale relative to scale calibration is in brackets.

behavioral intention (p = 0.0001) and 0.29 for perceived behavioral control (0.0001). Interestingly (and disputing the hypothesis) perceived behavioral control was the more important predictor.

Hypothesis 3

The third hypothesis tested the predictive ability of Theory of Trying by proposing a significant incremental R-squared when past behavior is added to intention in the prediction of pharmacists' behavior. The correlation between past behavior and behavior indicates a very strong relationship between these variables. Pearson correlation was 0.73. As expected, past behavior improved overall R-squared in behavior by 41%. Adjusted R-square increased from 0.14 (with intention alone as the predictor) to 0.55 when past behavior was added to the model. The regression model with both variables and each of the regression coefficients for these variables were significant. Standardized regression estimates were 0.14 (p = 0.0001) for intention and 0.68 (p = 0.0001) for past behavior. Not surprisingly, past behavior was the more important predictor.

Hypothesis 4

The significance of the appraisal processes was examined in hypothesis 4. The hypothesis proposed that among pharmacists who intend to provide pharmaceutical care, self-efficacies, instrumental beliefs, and affect toward means, would add significantly to the prediction of pharmacists' self-reported behavior over and above the standard Theory of Trying predictor. Pearson correlation of each of these variables with behavior were rela-

tively low. The incremental R-squared on adding the appraisal processes to past behavior also was small. Adjusted R-square increased from 0.49 to 0.51. Though the overall model of the appraisal processes and past behavior was significant, none of the appraisal processes nor their interactions were significant. Only the past behavior predictor was significant, with a standardized estimate of 0.65 (p = 0.0001).

To check the significance of the appraisal processes in the absence of past behavior, a regression model with only the appraisal processes and their interaction variables as predictors of behavior was examined. The overall model was found to be significant (p = 0.0001). Overall variance explained in behavior was 14%. The regression coefficient for the three-way interaction of these variables was significant (p < 0.05).

Research Question

To identify factors which directly influence pharmacists' reports on their current behavior among those proposed by the attitudinal models, behavior was regressed on attitude, social norm, perceived behavioral control, behavioral intention and past behavior. The regression model was significant (p = 0.0001), with an adjusted R-square value of 0.57. The variables found to significantly determine behavior were perceived behavioral control, behavioral intention and past behavior. Regression coefficients for attitude and social norm were not significant. As expected, the most important predictor of behavior was past behavior. The next important predictor was behavioral intention.

Table 3. Summary of Hypotheses and Research Question[a]

Step	Predictor	r	b* (p)	Adj. R^2	F (p)	Sample Size
		Prediction of Behavioral intention				
Hypothesis 1						
Step 1—	Attitude	0.60	0.51(0.0001)	.38	174.35 (0.0001)	566
	Social norm	0.42	0.18(0.0001)			
Step 2—	Attitude	0.60	0.38(0.0001)	.44	148.00 (0.0001)	565
	Social norm	0.42	0.14(0.0002)			
	Perceived behavioral control	0.54	0.29(0.0001)			
		Prediction of behavior				
Hypothesis 2						
Step 1—	Behavioral intention	0.40	0.37(0.0001)	.14	97.2 (0.0001)	607
Step 2—	Behavioral intention	0.40	0.23(0.0001)	.20	77.28 (0.0001)	603
	Perceived behavioral control	0.43	0.29(0.0001)			
Hypothesis 3						
Step 1—	Behavioral intention	0.40	0.37(0.0001)	.14	97.2 (0.0001)	607
Step 2—	Behavioral intention	0.40	0.14(0.0001)	.55	377.21 (0.0001)	607
	Past behavior recency	0.73	0.68(0.0001)			
Hypothesis 4						
Step 1—	Past behavior recency	0.73	0.70(0.0001)	.49	395.12 (0.0001)	408
Step 2—	Past behavior recency	0.73	0.65(0.0001)	.51	52.60 (0.0001)	401
	Self-efficacies (SE)	0.37	0.49(0.4875)			
	Instrumental beliefs (IB)	0.22	0.79(0.1605)			
	Affect toward means (ATM)	0.24	0.53(0.3279)			
	SE*IB	—	−0.97(0.3555)			
	IB*ATM	—	−1.29(0.1721)			
	SE*ATM	—	−0.76(0.5013)			
	SE*IB*ATM	—	1.57(0.2882)			
Step 3—Exploratory investigation (Appraisal processes)						
	Self-efficacies (SE)	0.37	2.11(0.0220)	.14	10.45 (0.0001)	401
	Instrumental beliefs (IB)	0.22	1.49(0.0449)			
	Affect toward means (ATM)	0.24	1.38(0.0515)			
	SE*IB	—	−2.64(0.0571)			
	IB*ATM	—	−2.30(0.0648)			
	SE*ATM	—	−3.02(0.0430)			
	SE*IB*ATM	—	3.87(0.0465)			
Research question 5						
Direct determinant of behavior						
	Attitude	0.32	0.04(0.2535)	.57	147.87 (0.0001)	565
	Social norm	0.16	0.05(0.1377)			
	Perceived behavioral control	0.43	0.13(0.0004)			
	Behavioral intention	0.40	0.15(0.0001)			
	Past behavior recency	0.73	0.65(0.0001)			

[a] r is correlation; b is standardized regression coefficient; p is attained significance level of test; adjusted R-square is adjusted overall variance explained by the independent variables; F is F test statistic value.

DISCUSSION

Determinants of Pharmacists' Behavioral Intention

The first hypothesis (H1) explored in this study identified the determinants of pharmacists' intention to provide pharmaceutical care. The hypothesis, which stated that perceived behavioral control will significantly increase the prediction of behavioral intention when added to attitude and social norm, was confirmed. Perceived behavioral control was found to be statistically significant in the prediction of intention. Attitude and social norm were also statistically significant in predicting behavioral intention. Standardized regression coefficient was highest for attitude, suggesting that attitude is the most important predictor of intention.

This result is comparable to general findings on the Theory of Planned Behavior. In a review of studies examining the predictive validity of the Theory of Planned Behavior, Ajzen (21) found perceived behavioral control to improve the prediction of intention when added to attitude and social norm. Incremental variances which have been found in the literature range from 4.5% (12) to 45% (13) with a mean of about 17%. The 6% increment in R-squared found in the present study is low in comparison to these findings. It was expected that the addition of perceived behavioral control to attitude and social norm

will improve the explained variance of behavioral intention of pharmacists by at least 10%. The 6% increase is however practically significant. According to Cohen (23), an effect size between 0.05 and 0.10 is of medium size and thus meaningful.

In summary, study results confirm the predictive validity of the Theory of Planned Behavior. Pharmacists' behavioral intention was determined by attitude, perceived behavioral control and social norm with attitude being the most important predictor and social norm the least.

Determinants of Pharmacists Self-Reported Behavior

Factors influencing pharmacists' self-reported behavior were investigated by testing three hypotheses and exploring a research question. Results indicate behavioral intention, perceived behavioral control and past behavior recency as significant determinants of behavior. The appraisal processes proposed by Bagozzi, Baumgartner and Yi (9) were not found to be significant in the presence of past behavior recency. However, in the absence of past behavior recency, the appraisal processes explained 16% of variance in behavior. The main effect of instrumental beliefs and two-way interaction of self-efficacies and affect toward means were significant in predicting behavior. Results of each hypothesis and research question explored is summarized below.

Hypothesis 2

The predictive validity of the Theory of Planned Behavior in the prediction of behavior was examined for this hypothesis. It was proposed that once pharmacists have taken into account their control beliefs (determinants of perceived behavioral control) before forming an intention to provide pharmaceutical care, the control beliefs would not be taken into consideration in the enactment of the behavior. Contrary to this hypothesis, perceived behavioral control increased the prediction of behavior by 6% when added to behavioral intention. The total variance explained by both behavioral intention and perceived behavioral control was 20%. Both variables were statistically significant with perceived behavioral control being the more important predictor.

Evidence for and against the significance of perceived behavioral control in the prediction of behavior is documented in the literature. While studies by Crawley III (24) and Netemeyer and Burton (17) found perceived behavioral control to be non-significant in the prediction of behavior, Ajzen's(22) review found 11 out of the 17 coefficients of perceived behavioral control reported to be significant. The present study provides further evidence of the significance of perceived behavioral control in the prediction of behavior. Although this result contradicts the hypothesized relationship, it is intriguing. As proposed by the Theory of Planned Behavior, this result indicates that some control beliefs are also considered before behavior is enacted. One way to interpret this finding is that the specific control beliefs which determine intention are different from that determining behavior, or that prior beliefs were perhaps re-considered, that is confirmed. Since specific control beliefs were not examined in the present study, it is uncertain whether the same control beliefs affect both behavioral intention and behavior. The importance of perceived behavioral control in the enactment of goal-directed behavior is, however, apparent from its influence on both behavioral intention and behavior.

Hypothesis 3

This hypothesis explored the predictive validity of the Theory of Trying. The proposition that past behavior recency will significantly increase the variance explained in the prediction of pharmacists' behavior when added to behavioral intention was confirmed. The increase in variance is much higher than other findings that have been reported in the literature. Reported incremental contribution made by both past behavior recency and past behavior frequency when added to intention range from 10% (15) to 20% (10). In this study, past behavior recency alone improved the variance explained by 42%.

Hypothesis 4

For this hypothesis, self-efficacies, instrumental beliefs and affect toward means were proposed to add significantly to past behavior recency in the prediction of behavior for pharmacists who report that they will provide pharmaceutical care. This hypothesis was, however, disconfirmed. Though a 3% incremental R-squared was found, none of the appraisal processes or their interactions was significant when added to past behavior recency.

This result contradicts published findings on the predictive validity of the Theory of Goal-Directed Behavior. Bagozzi, Baumgartner and Yi (9) found the three-way interaction of the appraisal processes to be significant in the prediction of behavior when added to past behavior frequency and past behavior recency. Being that the Theory of Goal Directed Behavior is new and not many studies have tested its propositions, an exploratory investigation of the significance of the appraisal processes (without past behavior recency in the regression model) on behavior was conducted. With only the appraisal processes as predictors of behavior, overall variance explained was 16%, which is high. The three-way interaction of self-efficacies, instrumental beliefs and affect toward means were significant in the prediction of behavior. Thus, the appraisal processes do have significant effect on behavior. This effect however disappears in the presence of past behavior recency, suggesting that the influence of the appraisal processes on behavior goes through past behavior recency. It is uncertain whether the relationship between the appraisal processes and past behavior recency is correlational or causal in nature. This has to be confirmed in another study. For the purpose of discussion, it will however be assumed that past behavior recency mediates the effect of the appraisal processes on behavior. If this is the case, it implies that appraisal processes have to be examined before past behavior can be enacted.

Research Question

The research question explored the direct determinants of behavior among the variables, attitude, social norm, behavioral intention, perceived behavioral control and past behavior recency. Past behavior recency, behavioral intention and perceived behavioral control were found to directly determine behavior with an overall variance of 57%. Not surprisingly the most important predictor of behavior was past behavior which had the highest standardized regression coefficient. Behavioral intention was the next most important predictor with perceived behavioral control being the least important.

The Pharmacists' Implementation of Pharmaceutical Care (PIPC) Model

Suggested relationships among variables examined in this study is illustrated in Figure 1, the proposed PIPC model. The model incorporates variables proposed by Theory of Reasoned Action, Theory of Planned Behavior, Theory of Trying and Theory of Goal-Directed Behavior which were found to be significant in the prediction of pharmacists' behavior. Based on study findings, the PIPC model proposes that pharmacists' trying to provide pharmaceutical care is directly determined by past behavior recency, behavioral intention and perceived behavioral control. Behavioral intention in turn, is predicted by attitude, perceived behavioral control and subjective norms while the appraisal processes influence trying indirectly through past behavior recency.

Some of these proposed relationships (though developed by testing the predictive validity of verified behavioral choice models) were based on exploratory investigations and thus need to be validated in another study. It can not be expected that a full theory of the provision of pharmaceutical care can be developed in one study. Though the development of the PIPC model is a step towards this goal, many questions still need to be investigated to confirm the proposed relationship among the variables specified in this model. One important issue is the relationship between the appraisal processes and trying. It is necessary to find out whether the relationship between appraisal processes and trying is direct or indirect. If indirect, what is the exact relationship between the appraisal processes and past behavior recency? For example do these appraisal processes statistically interact to determine past behavior or have separate direct effects on past behavior? Another important issue is the relationship between perceived behavioral control and trying. Does perceived behavioral control have a direct effect on trying over and above behavioral intention? If this is true, under what conditions can this relationship be expected? These issues can be resolved by validating the model suggested in the present study. Simultaneous equation modeling can be used to test whether the proposed model is consistent with data collected from another sample of community pharmacists. By examining

Fig. 1. Proposed pharmacists' implementation of pharmaceutical care (PIPC) model.

the fit indices and the path significance of the analysis, the model could be evaluated and thus validated.

Another future research issue is the operationalization of "trying". In this study, trying was operationalized as self-reports of pharmacists' effort relative to the provision of pharmaceutical care. However, effort is just one aspect of trying as conceived by Bagozzi (17). To fully understand the implementation processes involved in the provision of pharmaceutical care, the other aspects of trying need to be explored. According to Bagozzi, the process of trying can be classified into two major steps, instrumental acts and motivational processes. Instrumental acts consist of three implementation processes which include (i) planning, (ii) monitoring and (iii) guidance and control. This study examined the motivational processes consisting of the psychological commitment to pursue the goal and actual physical effort.

Future research need to investigate all five processes of trying. These processes offer insights as to other personality variables that may be essential for pharmaceutical care implementation. It is important to explore the significance of each of these processes and their relative importance so as to determine definite personality factors which influence pharmacists' implementation of pharmaceutical care. For example, what is the importance of pharmacists' psychological commitment? Other issues which need to be explored include the role of planning towards pharmaceutical care implementation, monitoring the activities needed to achieve pharmaceutical care implementation and guidance and action control on the target behavior. Exploring these issues will provide a better understanding about specific personality variables involved in the provision of pharmaceutical care.

CONCLUSIONS

The Pharmacists' Implementation of Pharmaceutical Care model developed in this study provides a theoretical framework that can be used to generate comprehensive interventions for the implementation of pharmaceutical care. The model provides specific factors that may be addressed to motivate pharmacists in making two major decisions - (i) forming an intention to provide pharmaceutical care and (ii) enacting the behavioral intention. Interventions based on attitude towards pharmaceutical care, perceived behavioral control relative to the provision of pharmaceutical care and subjective norm are likely to improve pharmacists intent to provide pharmaceutical care. The enactment of these intentions, on the other hand, may be fostered through past behavior recency and perceived behavioral control interventions. This information can be used by program planners to design communication or persuasive interventions that encourage pharmacists to try to provide pharmaceutical care. For example, to influence pharmacists' underlying intention toward the provision of pharmaceutical care, the factors that directly affect intention should be targeted for intervention. To change pharmacists' attitude, it is necessary to first identify the outcome beliefs associated with the provision of pharmaceutical care. As suggested by Fishbein and Ajzen (6) and Lutz (25), it may be necessary to modify belief structure and/or modify evaluation of these beliefs and/or introduce new belief structures to change attitude.

Influencing social norms may require seeking the collaboration of significant referents whose opinions are important to
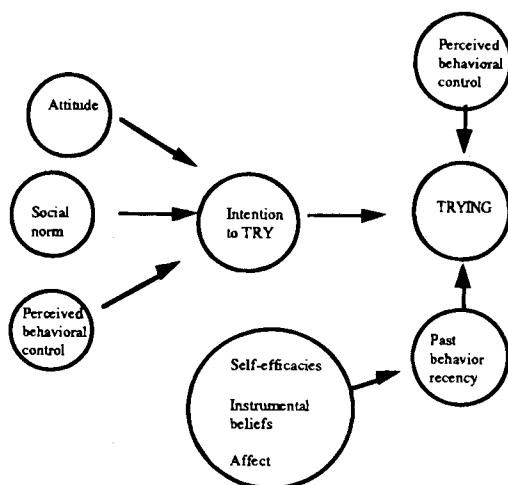
pharmacists. This may involve increasing patient expectations, imploring physicians' cooperation and/or convincing pharmacy managers to adapt pharmaceutical care as a philosophy of practice. With respect to perceived behavioral control, it may be necessary to identify community pharmacists' perceived barriers to the provision of pharmaceutical care. These barriers can then be addressed to enhance pharmaceutical care implementation.

For those community pharmacists who already have an intention to provide pharmaceutical care, the factors past behavior recency and perceived behavioral control can be targeted for intervention in the hope of facilitating the implementation of pharmaceutical care. The indirect effect of the appraisal processes on trying through past behavior recency suggests that past behavior recency may be determined by favorable self-reactions and judgements made about self-efficacies, instrumental beliefs and affect toward means. Perhaps a powerful training technique for pharmaceutical care would include supervised simulations of the new practice behaviors, e.g. with people playing the role of patient, physician, etc. If these simulations are at the appropriate level of difficulty, or if the pharmacist is coached through early exercises until she can perform on her own, the model suggests that they would foster implementation of pharmaceutical care through the mechanisms of (i) directly created behavioral recency, (ii) improving pharmacists self-efficacies relative to each of the means involved in the provision of pharmaceutical care, (iii) convincing pharmacists that these means will lead to positive outcomes such as improved drug therapy and (iv) persuading pharmacists that enacting these means is pleasant. However, an important corollary is that external circumstances not prevent the pharmacist from implementing the new behaviors in actual practice soon after training, while the behaviors are still recent.

ACKNOWLEDGMENTS

REFERENCES

1. C. D. Hepler, & L. M., Strand. *Am J Hosp Pharm.* **47**:533–543 (1990).
2. R. P. Penna. *Am J Hosp Pharm.* **47**:543–549 (1990).
3. I. Ajzen. In J. Kuhl & J. Beckman (Eds.), *Action control: From cognition to behavior*, Herdelberg: Springer-Verlag, 1985, pp. 11–39.
4. R. P. Bagozzi, and P. R. Warshaw. *J Consum Res.* **17**:127–140 (1990).
5. I. Ajzen. *Attitudes, personality, and behavior.* Chicago: Dorsey Press, (1988).
6. M. Fishbein & I. Ajzen. *Belief, attitude, intention, and behavior: An introduction to theory and research.* Massachusetts: Addison-Wesley, (1975).
7. I. Ajzen & M. Fishbein. *Psych Bull.* **84**:888–918 (1977).
8. I. Ajzen & M. Fishbein. *Understanding attitudes and predicting social behavior.* Englewood-Cliffs, NJ: Prentice-Hall, 1980.
9. R. P. Bagozzi., H. Baumgartner, & Y. Yi. *Psych Market.* **9**:469–486, (1992).
10. R. P. Bagozzi, and P. R. Warshaw. *Multivar Behav Res.* **27**:601–634 (1992).
11. R. P. Bagozzi. *Soc Psych Quart.* **55**:178–204 (1992).
12. D. A. Beale & A. S. R. Manstead. *J App Soc Psychol.* **21**:409–431 (1991).
13. R. G. Netemeyer & S. Burton. *J App Soc Psychol.* **20**:661–680 (1990).
14. I. Ajzen & T. J. Madden. *J Exp Soc Psychol.* **22**:453–474 (1986).
15. R. P. Bagozzi, F. D. Davis, & P. R. Warshaw. *Hum Relat.* **45**:659–686 (1992).
16. F. T. Badejogbin & C. D. Hepler. Predicting the provision of pharmaceutical care in community pharmacies. Podium session presented at the annual meeting of the American Pharmaceutical Association, Seattle, Washington (1994, March).
17. R. P. Bagozzi. *Psych and Market.* **10**:215–237 (1993).
18. F. T. Odedina, & R. Segal. *Am J Health-Syst Pharm.* **53**:855–865 (1996).
19. J. P. Robinson, P. R. Shaver, & L. S. Wrightsman. In J. P. Robinson, P. R. Shaver, P. R. & L. S. Wrightsman (Eds), *Measures in personality and social psychological attitudes.* California: The Academic Press 1991, pp. 1–15.
20. K. G. Joreskog & D. Sorbom. *LISREL VI: Analysis of linear structural relationships by maximum likelihood, instrumental variables, and least square methods.* Indiana: Scientific Software 1986.
21. D. A. Belsey, E. Kuh & R. E. Welsch. *Regression Diagnostics.* New York: John Wiley and Sons 1980.
22. I. Ajzen. T. *Organ Behav Hum Decis Process.* **50**:179–211 (1991).
23. J. Cohen. *Statistical power analysis for behavioral science.* New York: Academic Press 1977.
24. F. E. Crawley III. *J Res Sci Teach.* **27**:685–697 (1990).
25. R. J. Lutz. *J Consum Res.* **1**:49–59 (1975).