PREDICTIVE VALIDATION AND CROSS-VALIDATION OF THE FISHBEIN, ROSENBERG, AND SHETH MODELS OF ATTITUDES

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The present study compares the Fishbein, the Rosenberg
and the Sheth models in their ability to predict
behavioral intentions of consumers with respect to
the 'Pinto' car. Since the Rosenberg model is re-
stricted to the prediction of 'attitudinal affect'
it has been extended to the prediction of behavioral
intention for the purposes of this study. Three
stages have been identified in the comparison process
namely predictive validation, cross-validation and
validity generalization. Predictive validation deals
with the comparison based on one sample, cross-
validation extends the comparisons to other samples
from the same population, and validity generalization
indicates the extent to which the results are applicable
to other populations. While most studies have been
restricted to the stage of predictive validation, the
present study also includes cross-validation. Data
were obtained from 243 respondents, comprising of
students and housewives, in the Champaign-Urbana
area. The results indicate that the Sheth model has
high predictive validity and cross-validity, the
Fishbein model has a lower predictive validity but
high cross-validity, and the Rosenberg model has a
low cross-validity so that not much confidence can
be placed in its predictive validity over different
samples.

Although the concept of attitude has been researched for almost a century,
the development of comprehensive attitudinal models is a relatively recent
phenomenon. The recent efforts devoted to the development of these models
can be attributed to the following reasons: 1) they provide a systematic
framework for research by specifying variables that relate to the process,
2) they aid in the generation of new hypotheses, and 3) they provide diagnostic
information which facilitates the determination of future courses of action.

Based on cognitive consistency theories, Rosenberg (1956) showed that
attitudinal affect could be expressed as a simple mathematical function of
cognitive elements. After his pioneering work, several researchers in the
areas of social psychology and consumer psychology have developed other models
of attitudes. However, the emphasis seems to have shifted from predicting
affective tendencies toward the object to the prediction of behavioral intenti
and specific behaviors toward the object. For instance, Fishbein and his

sociates (Ajzen & Fishbein, 1970(a), 1970(b), 1973; Fishbein, 1967, 1972)
ve formulated a model in which behavioral intention is predicted from
rsonal beliefs as well as social normative variables. The Rosenberg and
e Fishbein models have been very instrumental in fostering the expectancy
ue tradition in attitudinal research. In the area of consumer behavior,
r example, Wilkie and Pessemier (1973) report that, apart from numerous
idies conducted in Europe, over forty studies have been published in the
ted States alone within a period of three years. Unfortunately, there is
tle, if any, consistency among these studies in terms of the operationaliza-
n or measurement of constructs, so that their usefulness in drawing broad
ieralizations is rather limited. In addition, expectancy-value models have
en been criticized for their inherent limitations (Day, 1972; Sheth, 1973;
th & Tuncalp, 1974; Wilkie & Pessemier, 1973). Finally, a number of
earchers in social psychology have conceded that attitudes toward the
ect, no matter how they are defined and measured are not the sole determinants
a person's behavioral intention or actual behavior toward the object (Katz
totland, 1959; Rokeach, 1968; Triandis, 1971). Similar suggestions have
o been made in Consumer Psychology and in Marketing (Howard & Sheth, 1969;
dell, 1968; Sheth, 1971; Sheth & Raju, 1973). Recently, Sheth (1971, 1974)
 proposed a model of brand choice behavior which attempts to integrate diverse
nking on the role of attitudes in the prediction of behavior both in social
chology and in consumer psychology. The model states that behavioral
entions and behavior of an individual are a function of 1) evaluative
iefs about the object's potential to satisfy his needs, wants, or desires,
social stereotype of the object as perceived by him, 3) past satisfaction
 resultant predisposition (affect) toward the object, and 4) situational
nts which are either anticipated or which may unexpectedly occur at the
e of behavior.

Criteria Used to Compare Models

In spite of the availability of a variety of models, little has been done
terms of comparative research on these models. As a result, the researcher
often unclear as to the relative strengths and weaknesses of different models,
 their appropriateness for different situations. "Unless we do a comparative
dy under the same setting, on the same issue, and on the same or essentially
 same subjects, it is not possible to claim victory for any model" (Sheth.
2, p. 465). Comparative studies, therefore, need to be conducted over a
iety of situations and behaviors before conclusive assertions can be made
ut the appropriateness of any particular model for a problem area.

Researchers have often utilized one or more of the following four major
teria in comparing competing models or theories:

1) Description: this indicates the ability of the model to describe the
   process or phenomenon being studied. The use of flow diagrams can
   greatly aid the descriptive capacity of a model.

2) Explanation: the extent to which a model can provide the causes from
   the knowledge of the effects determines its rating on this criterion.

3) <u>Prediction</u>: the capability of a model to predict future occurrences based on the knowledge of certain key concepts is indicated·by the rating on this criterion. While explanatory models are usually predictive, the reverse need not necessarily be true (Kaplan, 1964). For instance stochastic models of brand choice are predictive but do not explain the process.

4) <u>Prescription</u>: Often referred to as also the diagnostic ability of a model it essentially deals with the capacity of the model to prescribe courses of action to influence the process in a desired manner.

In conformity with the views presented above, the main aim of this study is to compare the Rosenberg, the Fishbein, and the Sheth models in their ability to predict behavioral intentions of consumers with respect to a brand of a durable consumer product. We restrict ourselves to the single criterion of 'prediction' due to two major reasons:

1) It is beyond the scope of this study to attempt a comparison on all the relevant criteria, and

2) The criteria of 'prediction' and 'prescription' are considered most important and have been used frequently in past research to evaluate attitude models. A comparison on the prescriptive criterion would, however, require a longitudinal study since we would be concerned with the implications of the model for future action. As this study is cross-sectional it is infeasible to test the prescriptive efficacy of the models.

An exhaustive comparison of the models on the basis of 'prediction' would require a three stage analysis comprising of predictive validation, cross-validation, and validity generalization. Since all the models use a multiple regression formulation, as will be discussed later, the three stages are described below with respect to that statistical technique.

Predictive validation provides an indication of the extent to which the model is able to predict the criterion variable for a particular sample representative of the population. A model is considered valid if the correlation coefficient and, therefore, the percentage variance of the criterion variable explained is quite large. By predictive validation alone, however, it is impossible to generalize the results even to other samples from the same population unless the sample size is so large as to cover the entire population. Whereas predictive validity is concerned with a single sample, cross-validity requires that the effectiveness of the predictor composite be tested on a <u>separate</u> independent sample from the <u>same</u> population. Mosier (1951) in an excellent paper on cross-validation states:

"Since both combining weights (β weights) and their effectiveness should be determined on samples representative of the group in which the battery (in our case 'model') will be applied, it is obvious that the two samples should be selected from the same universe." (p.6)

In cross-validation, a single sample is divided randomly into a 'derivation sample' and a 'validation sample' or two independent random samples are drawn from the population. The multiple regression weights and the multiple correlation coefficient are obtained by applying the model to the derivation sample. The obtained regression weights are used in the validation sample to create 'predicted criterion scores' which are then correlated with the

ctual criterion measures for the validation sample. The extent to which this
correlation coefficient is close to that obtained initially in the derivation
sample determines the cross-validity of the model. For perfect cross-validity
the correlation coefficients should be equal. If a model has good cross-validity
it can be presumed that the predictive power will be almost constant over
different samples from the same population.

The test for validity generalization is very similar to that for cross-
validity except that the multiple regression weights and the multiple correlation
coefficient obtained on a sample drawn from one population are tested on a
second sample drawn from a different population. The extent of validity
therefore signifies the applicability of a model to different populations.

With respect to the typology of validation presented above, it is interesting
to note that most validation studies on attitude models have been restricted
to the stage of 'predictive validation' thereby providing biased results, with
no indication of the generalizability to other samples or other populations.
In this study, the validation procedure has been designed to include cross-
validation in addition to predictive validation. Validity generalization has,
however, not been performed because our interest at this stage is limited to
samples from a single population. In summary, this study was designed to
accomplish three objectives:

1) A detailed comparison of the Rosenberg, the Fishbein, and the Sheth
   models, both conceptually and in terms of their ability to predict
   buying intentions of consumers.

2) Predictive validation of the models based on results obtained from
   the total (derivation + validation) sample.

3) Cross-validation of the models by applying the model coefficients
   obtained from the derivation sample to the validation sample.

Brief Descriptions of Models

A brief description of each of the three models used in the study is
provided. A more elaborate treatment of each model is available in the
previous writings of Fishbein (1967, 1972), Rosenberg (1956), and Sheth (1974).

The Rosenberg Model

As a means to understanding the attitude learning and attitude change
processes, Rosenberg (1956, 1960) formulated a structural relationship between
the attitude toward an object and the beliefs about the object. The relative
stable affective orientation $[A_o]$ toward an object or concept is considered to
be a function of two cognitive variables: 1) Value Importance [VI]: the
degree of satisfaction generated by the attainment of a desired value state;
and 2) Perceived Instrumentality [PI]: the extent to which the object or
concept leads to or blocks the attainment of the value state. Every individual,
therefore, develops an attitude in conformity with his basic system of values.
Mathematically, the model is stated as

$$A_o = \sum_{i=1}^{n} (PI_i) (VI_i)$$

where n is the number of desired value states.

Since Rosenberg was mainly concerned with the cognitive processes under-
lying attitude formation and change, he has restricted his model to the predict
attitude. However, our interest in this paper centers on the prediction of
behavioral intention. Rosenberg (1960) has indicated, in the context of action
predicting capability of attitudes, that although attitudes are not the sole
predictors of behavior, they could be effective predictors. He also recognizes
the presence of situational factors and restraints that could possibly
influence behavior. Since Rosenberg has not extended his model to include
these situational factors, we shall restrict ourselves to the prediction
of behavioral intention from the attitude score obtained from his model. The
Rosenberg model, thus consists of a single determinant construct namely the
personal beliefs about the role of the object in attaining differentially
valued states or goals.

The Fishbein Model

According to Fishbein (1967, 1972), behavioral intention is a function of
two components; one attitudinal and the other normative. The model is
represented formally as

$$B \sim BI = [A_{act}] \, w_o + [(NB)(Mc)] \, w_1$$

where B = behavior, BI = behavioral intention, A_{act} = attitude toward the act
or behavior, NB = normative belief, i.e., what others expect or say should
be done in the situation, Mc = motivation to comply with the normative belief,
and w_o and w_1 are empirically determined weights. A_{act} itself is determined as

$$\sum_{i=1}^{n} B_i a_i$$

where B_i = the individual's belief about the likelihood that the behavior will
result in the ith consequence or outcome, a_i = the individual's evaluation of
outcome i, and n = number of salient beliefs.

There are three aspects of the model which need to be pointed out. First,
behavioral intention is considered to be an immediate antecedent of behavior
so that other influences that might be active between the two are ignored. In
the context of consumer behavior this assumption may not be valid because of
the considerable time span that mediates the expression of an intention and
its translation into action (Howard and Sheth, 1969; Sheth, 1971). Second,
the model explicitly recognizes the importance of variables such as social norm
and motivation in influencing behavior. In this sense it is a definite
improvement over the Rosenberg model. However, all other variables influencing
behavior are presumed to operate indirectly by influencing the two components
in the model or their relative weights. Finally the model makes a clear
distinction between 'attitude toward the object' and 'attitude toward the
act'; only the latter being considered an effective predictor of behavior.

The Sheth Model

In the comprehensive model proposed by Sheth (1971, 1974) behavior [B] is
determined by 1) the behavioral intention with respect to the object [BI],
2) past satisfaction from behavior which results in a predisposition
toward the object [S], and 3) Unexpected events [UE] that influence the

ividual at the time of manifestation of the behavior. Mathematically,

$$B = w_1 [BI] + w_2 [S] + w_3 [UE].$$

The unexpected events factor is presumed to be uncorrelated with the disposition or the behavioral intention and it may either enhance or ibit the translation of intentions to actions. It is expected that, as time period between intention and behavior increases, the influence of s factor will correspondingly increase; for example, unexpected events y a major role in the purchase of consumer durable goods.

Although the Sheth model can be used to predict behavior, our interest this study is limited to behavioral intention, which is hypothesized to a function of 1) evaluative beliefs [EB] about the object's potential satisfy needs, wants, and desires, 2) perceived social stereotype [SS] the object, 3) predisposition [S] resulting from past satisfaction, and situational influences [AS] that the person anticipates will be effective the time of behavior. In a functional form,

$$BI = w_1 [EB] + w_2 [SS] + w_3 [S] + w_4 [AS].$$

Evaluative beliefs represent the individual's perception of the object's ability to satisfy a set of relevant needs, wants and desires. In this pect, evaluative beliefs closely resemble the perceived instrumentality cept in the Rosenberg model, the major difference being in the definition valued states. While Rosenberg model has been limited to more fundamental ies of the individual, the valued states in the Sheth model are specific the class of objects on which research is conducted. Evaluative beliefs are ectly related to the instrumental-utilitarian function that attitudes are sumed to perform in Katz's functional formulation (1960). However, luative beliefs are presumed to be multidimensional which requires a ile analysis of the object's capability to satisfy diverse functional ls of the individual.

Social stereotype represents the individual's perceptions of the social otations or social imagery the object possesses. For example, a brand of rettes such as Virginia Slims may be perceived to be more feminine other brands such as Marlboro although functionally the two cigarettes highly similar in their characteristics. The social stereotype is umed to be due to the identification of the object with specific segments he society based on life cycle factors (age, marital status, children, etc.), ocioeconomic factors (education, occupation, income, housing, mobility,), on life style factors (activities, interests, opinions, and values, etc.), cultural factors (religion, tradition, language, etc.) and biological ors (sex, race, etc.). The Sheth model presumes that social stereotype lso a multidimensional concept which requires dimensional analysis on a ile of perceptions of the individual about the goal object as a social ct.

Anticipated situation pertains to all the relevant situational infleunces the individual expects will occur, and all the relevant activities that individual expects he will engage in at or around the time of manifestation ehavior. Expectation of certain occurrences would therefore enhance the ntions whereas expectation of certain others might inhibit them. Events as vacations, moving, and marriage are usually anticipated by a person in rmining his intentions.

Finally, Satisfaction represents the postive or negative predisposition toward an object based on past experience with the object as instrumental to the attainment of certain desirable goals. Satisfaction is measured by the individual's affective tendency toward the object.

For a more elaborate treatment of the constructs the reader is referred to the earlier writings of Sheth (1971, 1974).

A Conceptual Comparison of the Three Models

In this section, we will briefly point out similarities and differences among the models with respect to three broad areas; number of constructs, definition and measurement of constructs and operationalization of the models.

Number of Constructs

The extended Rosenberg model used in this study is the simplest of the three models since it uses only one construct namely 'attitudinal affect' in the prediction of behavioral intention. While recognizing the importance of the attitudinal variable, Fishbein also incorporates in his model social normat influences and hence takes into account the fact that behavior is not a function of attitude alone. While definitely an improvement over the Rosenberg model, the Fishbein model still does not consider the effect of other important variables such as situational influences. The 'evaluative belief' and the 'social stereotype' constructs in the Sheth model (restricting to the behavioral intention level) are roughly the counterparts of the 'attitudinal' and 'social normative' constructs respectively of the Fishbein model. Sheth, however, has two additional constructs that make the model more comprehensive. One of these constructs 'predisposition resulting from past satisfaction' takes into account the fact that affect need not always be a result of the beliefs held by the individual. The other construct 'Anticipated situations' recognize the importance of situational influences that a person is able to forsee in determining his intentions.

Finally, in contrast to the assumption made by Fishbein that behavioral intention is an immediate antecedent of behavior Sheth explicitly considers unexpected events to intervene between the two. However, research still needs to be done to effectively operationalize this construct. Recent research efforts concerning situational influences on behavior (Belk, 1974; Sandell, 1968) have provided valuable insight into the problem.

Definition and Measurement of Constructs

The models can be compared with respect to three distinct types of construc that are utilized in the prediction of behavioral intention: 1) Attitudinal 2) Social and 3) Situational. In addition, there are important differences between the Fishbein and the Sheth models in the measurement of behavioral intention. All three models use the attitude type construct, only the Fishbein and the Sheth models use the social type construct, and the situationa type construct is used only by the Sheth model. As a result, no comparison can be made with respect to the measurement of situational constructs, the comparison is restricted to the Fishbein and the Sheth models for the social type constructs and all three models are compared with respect to the attitudinal construct.

All the three models consider 'attitude' to be a univariate unidimensional
nstruct; but measure it in different ways. In the Rosenberg model it is a
mmated product of perceived instrumentality and value importance. Rosenberg
commends a 21 point scale ranging from -11 to +11 to measure value importance
d a 11 point scale ranging from -5 to +5 to measure perceived instrumentality.
has been suggested, especially after the work of Miller (1956), that such
ales might be inappropriate because a person usually connot distinguish
re than five to nine different levels of a concept (Sheth & Park, 1973;
ncalp, 1973). In this study, therefore, these components have only been
asured using scales ranging from -3 to +3, although the wording of the scales
consistent with the recommendations of Rosenberg. Fishbein also uses
e expectancy-value approach and the two components of 'belief' and 'evaluation'
e measured by scales ranging from -3 to +3. However, Fishbein measures
ttitude toward the act' as opposed to 'attitude toward the object'. In the
eth model, the evaluative beliefs are not combined into a single construct
lled 'attitude', but there are essentially the counterpart of such a construct
used by Rosenberg and Fishbein. The evaluative beliefs are measured by
ales ranging from 1 to 7 and a further distinction is that all the scales
ed not necessarily be bipolar. They are anchored at the ends by the
tremities of the normal range of the belief that a person uses. For example,
e scale for the evaluative belief regarding durability of Pinto ranges
om 'very durable' to 'only average in durability' rather than from 'very
rable' to 'not at all durable'. Further differences in the wording of
e scales for the three models will become evident from the sample of
ales that will be presented in the 'Method' section.

The 'social stereotype' construct considered by Sheth is quite different
om the social normative construct as defined by Fishbein. While Fishbein is
inly concerned with what others want the person to do and whether the
rson wants to comply with their wishes, Sheth is concerned with the social
nnotations and social imagery of the object. Again Fishbein uses scales
nging from -3 to +3 to measure each component of the social normative
nstruct whereas Sheth uses scales ranging from 1 to 7 to measure social
ereotypes.

Finally, a major distinction between the Fishbein and the Sheth models
in the measurement of behavioral intention. Fishbein has convincingly
gued that for better prediction, behavioral intention should be measured
th respect to a specific object rather than a generalized group of objects
ishbein, 1967). Thus, buying intention should be measured with respect to
into' rather than toward the general product category of 'automobile'. While
eth agrees with this point, he measures buying intention not only with respect
a specific brand such as 'Pinto' but also qualifies it with respect to the
ed or motivational level of the buyer. His scale, therefore, measures how
riously a person would consider buying a 'Pinto' if he were to buy an auto-
oile. Since Rosenberg does not provide a scale for measurement of behavioral
tention both the Fishbein and the Sheth scales have been used as criterion
asures in the Rosenberg model. The Sheth scale, however, has been recoded
om -3 to +3 (instead of 1 to 7) when used on the Rosenberg model to make
compatible with the way 'perceived instrumentality' and 'value importance'
e measured.

Operationalization of Models

The major difference in the operationalization of the models is the expectancy-value approach adopted by Rosenberg and Fishbein versus the factor analytic approach adopted by Sheth. In the expectancy-value approach, the attitude is determined by the summation of the two components of expectancy and value over the whole range of values (or expectancies). In the process, the positive and negative components cancel each other out leaving a simplified index of the cognitive structure. Such an assumption may not be true. Researchers have suggested that a disaggregated version of the model might perform better than the summated version (Gohen & Ahtola, 1971; Lutz & Howard, 1972; Sheth, 1970). In contrast to this, Sheth performs a dimensional analysis on the profile of evaluative beliefs by the technique of principal components analysis. The resultant orthogonal dimensions of the evaluative beliefs are then utilized as independent predictors of behavioral intention. Such a factor analytic approach has several advantages:

First, it is a compromise between the aggregated version and the completely disaggregate version. The disadvantage of the former has already been pointed out. In the latter, all the beliefs are used as independent predictors of behavioral intention. This could result in too many independent variables especially in cases where there are a number of salient beliefs e.g., automobile purchase. By utilizing only the orthogonal dimensions of the beliefs, the number of predictor variables can be reduced considerably without sacrificing too much predictive power. Second, the factor analytic procedure takes into account the multicollinearity among belief items. Thus, in the aggregated version the correlation between belief items leads to double counting of certain dimensions of the beliefs and in the completely disaggregate version it leads to unstable regression weights. These problems are not encountered in Sheth's approach. Finally, the factor analytic approach is very useful from a policy viewpoint. By using attitude models, the marketer is able to gain some insight as to which beliefs will have to be changed to create a desired change in attitude. However, it is often impossible to influence one belief alone without any impact on other cognitive elements. To avoid undesirable consequences on the beliefs that do not need to be influenced, it is necessary for the marketer to understand the dimensions of the cognitive structure and the beliefs that group together under any given dimension. Different promotional and marketing strategies can then be assessed in terms of their effects on the total cognitive structure as opposed to only certain specific beliefs.

Method

The models were empirically tested by collecting data on 243 respondents in the Champaign-Urbana area. The respondents were mainly students, student wives, and housewives. An indepth interview with about twenty-five housewives and twenty-five students indicated that the Pinto car (a product of Ford Motor Company) was a salient attitude object for this group of respondents. A separate pilot study involving 40 respondents was performed to obtain salient beliefs pertaining to the purchase of an automobile. Twelve belief items mentioned most frequently were finally selected for the main study. Similar belief items have been utilized as product attributes in past studies (Alpert, 1971). A sample of the scales used for measurement of the various constructs is provided

Rosenberg Model

Value importance (VI)

Please check each scale below so as to indicate the extent to which each consequence that is associated with buying an automobile gives you satisfaction or dissatisfaction.

Economy of operation:

Gives me maximum :__:__:__:__:__:__:__: Gives me maximum
satisfaction   dissatisfaction

(11 other value importances measured similarly).

Perceived instrumentality (PI)

Please check each scale so as to indicate to what extent a specific consequence is attained or blocked by buying a Pinto.

Economy of operation:

Completely blocked :__:__:__:__:__:__:__: Completely attained.

Fishbein Model[2]

Belief (B_i)

My buying a Pinto would mean buying an automobile that is economical to operate.

Probable :__:__:__:__:__:__:__: Improbable

(eleven other beliefs were measured similarly).

Evaluation of belief (a_i)

Buying a car that is economical to operate is

Good :__:__:__:__:__:__:__: Bad

(eleven other evaluations were measured similarly).

Normative belief (NB)

Others who are important to me think

I should :__:__:__:__:__:__:__: I should not

buy a Pinto.

Motivation to Comply (Mc)

In general, I want to   In general, I don't want
do   :__:__:__:__:__:__:__: to do

what others who are
important to me think
I should do.

5) Behavioral Intention (BI)

I would : __:__:__:__:__:__: I would not

buy a Pinto.

Sheth Model

1) Evaluative Beliefs (EB)

Pinto is economical   Pinto is expensive
to operate   : __:__:__:__:__:__: to operate

(eleven other evaluative beliefs were measured similarly)

2) Social Stereotype (SS)

Pinto is meant for young people only.

Strongly agree : __:__:__:__:__:__: Strongly disagree

(eight other Social Stereotypes were measured similarly).

3) Predisposition or Past Satisfaction (S)

Please indicate the extent to which you are favorably or unfavorably
disposed toward the Pinto

Most favorable toward   Most unfavorable toward
Pinto   ` : __:__:__:__:__:__: Pinto

4) Anticipated Situation (AS)

Three different scales were used to measure personal (AS_1), buying (AS_2),
and financial (AS_3) situations relating to the purchase of a car.
Personal (AS_1): Is it conceivable that you might change your intention
to buy or not to buy an automobile because of some unforseen events
(for example, moving, getting married, birth in the family, unanticipated
change in your financial status or deciding to take vacations) you did
not anticipate may occur in the next six months?

Not at all conceivable : __:__:__:__:__:__: Very much conceivable

Buying (AS_2): Is it conceivable that you might change your intentions to
consider or not to consider buying a Pinto due to some unforseen events
including a good buy on some other car or friend's advice to reconsider
your plans and intentions?

Not at all conceivable : __:__:__:__:__:__: Very much conceivable

Financial (AS_3): If you were to buy an automobile in the next six months,
would you have any financial problems?

I simply cannot   I can easily raise money
afford it   : __:__:__:__:__:__: to pay for it

Behavioral intention (BI)

If you were to buy an automobile, how seriously would you consider buying a Pinto?

Definitely would : __ : __ : __ : __ : __ : __ : Definitely would not
consider buying   consider buying
a Pinto   a Pinto

Since the Sheth model utilizes factors scores for both evaluative beliefs
~~d~~ social stereotypes, principal components analyses were first performed
~~in~~dependently on the respective correlation matrices using the total sample.
~~Th~~e analyses yielded three major factors in each case and rotated factor
~~lo~~adings were obtained by the technique of orthogonal varimax rotation.
~~Fa~~ctor scores for each individual were obtained from the rotated factor loadings
~~ma~~trix and these scores were kept invariant for all further analyses. Thus,
~~ev~~en when the total sample was split into two for purposes of cross-validation,
~~ea~~ch individual retained the same factor scores. It is essential that the
~~fa~~ctor scores be invariant because, in cross-validation, we are concerned with
~~th~~e stability of regression weights which will be confounded by the change in
~~fa~~ctor scores themselves if these are calculated separately for the derivation
~~an~~d the validation samples.

The predictive validity of each model was determined by a multiple
~~re~~gression technique using behavioral intention as the criterion and appropriate
~~va~~riables as predictors. In the case of the Rosenberg model alone this
~~re~~duces to simple regression analysis since there is only one predictor
~~va~~riable. For purposes of clarity, the regression equations are reproduced
~~be~~low:

Rosenberg's model using Fishbein's behavioral intention scale.

$$BI = p_1 \left[\sum_{i=1}^{n} (PI_i)(VI_i) \right] + K_1$$

Rosenberg's model using Sheth's behavioral intention scale.

$$BI = p_2 \left[\sum_{i=1}^{n} (PI_i)(VI_i) \right] + K_2$$

Fishbein model:

$$BI = w_0 \left[\sum_{i=1}^{n} B_i a_i \right] + w_1 [NB \times Mc] + K_3.$$

Sheth model:

$$BI = b_1 [EB_1] + b_2 [EB_2] + b_3 [EB_3] + b_4 [SS_1] + b_5 [SS_2] + b_6 [SS_3]$$
$$+ b_7 [S] + b_8 [AS_1] + b_9 [AS_2] + b_{10} [AS_3] + K_4$$

~~whe~~re p_1, p_2; w_0, w_1; and b_1, b_2 --- b_{10} are regression weights and K_1, K_2, K_3
~~and~~ K_4 are constant intercept values, all determined empirically. In the

Fishbein model A_{act} was determined by a summated product of B_i and a_i. In the Sheth model, it can be noticed that there are three evaluative belief factors (EB_1, EB_2, and EB_3) and three social stereotype factors (SS_1, SS_2, and SS_3).

The cross-validity of the models was finally determined by utilizing the regression weights obtained from the derivation sample to predict the criterion values in the validation sample. The predicted criterion values were then correlated with the actual criterion values to determine a cross-validation correlation coefficient.

Results

The results of predictive validation for the Rosenberg model are summarized in Table 1. It can be seen that attitude is a significant predictor of behavior intention explaining a minimum of about 15 percent of variance in the total sample using Fishbein's behavioral intention scale and a maximum of about 29 percent of the variance in the derivation sample using Sheth's behavioral intention scale. The cross-validation results of the Rosenberg model are not very impressive. The cross-validity correlation coefficient with Fishbein's behavioral intention scale was about 0.23 as opposed to 0.51 obtained in the derivation sample and with Sheth's behavioral intention scale it was about 0.32 as opposed to 0.54 obtained in the derivation sample. Hence we cannot presume with confidence that the performance of the Rosenberg model will be consistent over different samples from the same population.

TABLE 1

Rosenberg Model - Predictive Validation Results

Predictor	Fishbein's BI scale				Sheth's BI scale			
	Total Sample N=243		Derivation Sample N=124		Total Sample N=243		Derivation N=124	
	β wt.	Std. Error	β wt.	Std. Error	β wt.	Std. Error	β wt.	Std. Error
$A_0 = \Sigma(PI)(VI)$	0.386	0.059	0.509	0.078	0.438	0.058	0.537	0.07
Multiple correlation (R)	0.386***		0.509***		0.438***		0.537***	
Variance explained (R^2)	0.149		0.259		0.192		0.288	
Adjusted R^2	0.149		0.259		0.192		0.288	
F ratio	42.269		42.709		57.201		49.445	
Std. error of estimate	1.664		1.584		1.781		1.640	

*** $p < 0.001$

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The predictive validation results for the Fishbein model are presented in ~ble 2. One interesting finding is that of the two components in the ~del, 'attitude toward the act' is a significant predictor of behavioral ~tentions whereas the social normative component is not. Both the predictors,

TABLE 2

Fishbein Model - Predictive Validation Results

~edictors	Total Sample N=243		Derivation Sample N=124	
	β wt.	Std. error	β wt.	Std. error
~ct $= \Sigma B_i a_i$	0.467***	0.057	0.485***	0.079
~(BxMc)	-0.037	0.057	-0.043	0.079
~ltiple Correlation (R)	0.472***		0.487***	
~riance explained (R^2)	0.223		0.237	
~justed R^2	0.220		0.231	
~ratio	34.318		18.823	
~d. error of estimate	1.594		1.614	

*$p < 0.05$
**$p < 0.01$
***$p < 0.001$

~wever, account for about 22 percent variance in behavioral intention in the ~tal sample and about 24 percent in the derivation sample. The predictive ~ility is, thus, quite stable. Further confirmation of this fact is obtained ~en the cross-validation correlation coefficient is found to be about 0.432, ~ich is not a substantial drop from the value of 0.487 obtained in the derivation ~mple. We could, therefore, expect the Fishbein model to consistently predict ~out 23 percent variance in behavioral intention in other samples drawn from ~e same population.

Table 3 shows the rotated factor structure of evaluative beliefs obtained ~r the Sheth model on the total sample. Three major factors were extracted ~plaining about sixty percent of the total variance. Based on the loadings ~e factors can be interpreted as follows:

The first factor with high loadings on items such as durability, handling, ~fety, ride, acceleration, and resale value pertains to an overall sense of the ~uality' dimension of Pinto. Beliefs related to luxury, size of engine,

TABLE 3

Sheth model - Rotated Factor Structure
of Evaluative Beliefs on Total Sample
(N=243)

Items	Factor I	Factor II.	Factor III	h^2
1. Luxury/Economy	-0.077	0.838	0.160	0.733
2. Big/Small Engine	0.119	0.734	0.260	0.621
3. Pollution	0.064	0.723	-0.066	0.531
4. Sportyness	0.035	0.176	0.847	0.749
5. Expensive/Economical to buy	0.118	0.680	0.018	0.476
6. Economical to operate	0.100	-0.608	0.400	0.538
7. Durability	0.731	0.100	-0.103	0.555
8. Good/Poor handling	0.605	-0.179	0.484	0.632
9. Safety	0.827	0.071	0.037	0.691
10. Ride	0.828	0.047	0.048	0.691
11. Accleration	0.648	0.191	0.216	0.503
12. Resale Value	0.689	-0.097	0.038	0.486

Sum of h^2 = 7.207
Total variance explained = 60.058%

pollution, buying cost, and economy of operation load on the second factor
which can be interpreted as a 'luxury' dimension of Pinto. The last factor
comprising of beliefs pertaining to sportyness, economy of operation, and
handling represents the 'sportyness' dimension of Pinto. The rotated factor
structure of social stereotypes presented in Table 4 can also be interpreted
in a similar manner. The first factor stereotypes Pinto as a car for 'young
unmarried people', the second as a car for 'young people with moderate income',
and the third as a car for 'older people with low income'. The three factors
together account for 56 percent of the total variance in the social
stereotypes.

TABLE 4

Sheth Model - Rotated Factor Structure
of Social Stereotypes on Total Sample
(N=243)

Items	Factor I	Factor II	Factor III	h2
PINTO is meant for young people only	0.146	0.763	0.146	0.625
PINTO is meant for people with moderate income	0.118	0.615	0.095	0.401
PINTO is suitable for older people	0.092	-0.657	0.095	0.450
PINTO is a car meant for everybody	0.180	-0.698	-0.106	0.531
PINTO is great as a second car in the family	0.651	-0.084	0.102	0.442
Teenagers and College students love PINTO	0.747	0.080	-0.220	0.613
Very rich people would never consider buying a PINTO	0.053	0.178	0.867	0.786
PINTO is great for a bachelor	0.568	0.012	-0.484	0.557
Young unmarried women prefer PINTO	0.784	0.014	0.113	0.628

Sum of h^2 = 5.032
Total variance explained = 55.907%

Table 5 summarizes the predictive validation results for the Sheth model.
ere are ten predictor variables in the regression equation; three evaluatiive
lief factors, three social stereotype factors, prior predisposition, and three
ticipated situational variables. The three anticipated situational variables
rtain to anticipated personal situations (such as moving, marriage, etc.),
ticipated buying situation (such as expecting a better buy), and anticipated
nancial situation. The multiple correlation coefficient for the total sample
about 0.73 and for the derivation sample is about 0.75, explaining about
fty-three percent and about fifty-six percent respectively of the variance in
havioral intention. The four significant predictors of behavioral intention
e prior predisposition, anticipated buying situation, the 'quality' dimension
evaluative beliefs, and the 'sportyness' dimension of evaluative beliefs.

TABLE 5

Sheth Model - Predictive Validation Results

Predictors	Total sample (N=243)		Derivation sample (N=1	
	β Wt.	Std. error	β Wt.	Std. error
Evaluative Belief (Factor I)	0.121^*	0.054	0.267^{**}	0.080
Evaluative Belief (Factor II)	-0.016	0.046	0.042	0.063
Evaluative Belief (Factor III)	0.128^{**}	0.047	0.170^*	0.069
Social Stereotype (Factor I)	-0.005	0.051	-0.035	0.072
Social Stereotype (Factor II)	-0.017	0.047	0.032	0.065
Social Stereotype (Factor III)	-0.024	0.047	-0.051	0.071
Prior Predisposition	0.483^{***}	0.058	0.386^{***}	0.088
Anticipated Situation (Personal)	0.039	0.047	0.037	0.068
Anticipated Situation (Buying)	-0.245^{***}	0.051	-0.239^{***}	0.070
Anticipated Situation (Financial)	-0.049	0.046	-0.069	0.064
Multiple Correlation (R)	0.728^{***}		0.749^{***}	
Variance explained (R^2)	0.530		0.561	
Adjusted R^2	0.512		0.526	
F ratio	26.148		14.455	
Std. error of estimate	1.384		1.338	

* $p < 0.05$
** $p < 0.01$
*** $p < 0.001$

The cross-validation correlation coefficient obtained was about 0.665
pointing to the fact that the high correlation coefficients are not due to
idiosyncracies of the sample and that the model can be expected to perform
equally well in other samples from the same population.

Since the three models use different numbers of predictor variables, the
:fficient of determination (R^2) cannot be compared directly. Adjusted R^2
.ues were, therefore, calculated in each case to account for the number of
:dictor variables and degrees of freedom. The formula used was

$$\text{Adjusted } R^2 = 1 - (1-R^2) \frac{N-1}{N-n}$$

:re N=sample size and n=number of predictors. Since the Rosenberg model
:s only one predictor, the adjusted R^2 is not different from the original R^2.
can be seen that even for the Fishbein and the Sheth models the decrease
R^2 due to adjustment is very minimal indicating that, especially in the
:e of the Sheth model, the correlation coefficients are not spuriously
:h due to the number of predictors.

Discussion

The results clearly indicate that the Sheth model has a higher predictive
idity than the Fishbein model. However, both models perform equally well
terms of cross-validation. The Rosenberg model was found to vary considerably
its predictive power over different samples. This points to the fact that
hough the Rosenberg and the Fishbein model are mathematically similar in the
surement of attitude, the nature of the constructs produces vastly different
ults. The better performance of the Fishbein model cannot be attributed
the inclusion of the normative beliefs component because it did not
tribute significantly to the prediction of behavioral intention. The improved
formance of the Sheth model over the Fishbein model, on the other hand, can
attributed to a more complete treatment of variables involved in the process,
factor analytic approach adopted and the measurement of behavioral intention
orporating needs and motives.

Apart from the relative predictive powers of the models, the study also
vides other interesting conclusions.

1) Attitudes are effective predictors of behavioral intentions. This is
   confirmed by all the three models in this study. Further, both attitude
   toward the act (Fishbein model) and attitude toward the object (called
   predisposition in Sheth's model) prove to be significant indicating that
   either they are both important or that the distinction is not useful.

2) Anticipated situational influences are important for prediction of
   behavioral intention and behavior at least in the consumer behavior
   context. The fact that anticipated buying situation was a significant
   predictor of behavioral intention in the Sheth model suggests that buying
   an automobile might be largely influenced by the kind of deal that a
   person gets on a car or his expectation that some other alternative will
   become available before the time of purchase.

3) The poor predictive ability of social beliefs in both Fishbein and
   Sheth models is somewhat surprising in the situation of buying auto-
   mobiles. Our conclusion is that Pinto is probably a universal car
   devoid of any stereotype and that the sample used was homogeneous with
   respect to life cycle, socioeconomic status and life style which
   might have minimized stereotype differences toward Pinto.

Conclusion

This study has attempted to demonstrate the importance of comparing and cross-validating attitude models. The authors agree that one study alone, such as this, is not sufficient to prove conclusively the superiority of any model. The need for replication of such studies over a variety of behaviors and situations is, therefore, imminent. It is possible that one model might be appropriate in a buying situation whereas another might be appropriate in a social situation. Once the models are cross-validated, the next step would be to determine the extent to which they are applicable to different populations, which is labeled as 'validity generalization' in this study. Finally, it is hoped that the extensive validation and comparison of existing models will lead to a better understanding of consumer choice processes

FOOTNOTES

1. P.S. Raju and Rabi S. Bhagat are doctoral students in the Department of Business Administration and Jagdish N. Sheth is Illinois Business Associates Distinguished Professor of Business and Research Professor at the University of Illinois at Urbana-Champaign.

2. We thank Professor Martin Fishbein of the Department of Psychology, University of Illinois for his help in the wording and scale construction aspects of his model.

REFERENCES

Ajzen, I., & Fishbein, M. Attitudinal and normative variables as predictors of specific behaviors: A review of research generated by a theoretical model. Paper presented at the Attitude Research and Consumer Behavior Workshop, University of Illinois, Urbana, 1970.(a)

Ajzen, I., & Fishbein, M. The prediction of behavior from attitudinal and normative variables. Journal of Experimental Social Psychology, 1970, 6, 466-87.

Ajzen, I., & Fishbein, M. Attitudinal and normative variables as predictors of specific behavior. Journal of Personality and Social Psychology, 1973, 27, 41-57.

Alpert, M.I. A canonical analysis of personality and the determinants of automobile choice. Combined Proceedings of the American Marketing Association, Spring and Fall Conferences, 1971, 312-16.

Belk, R.W. An exploratory assessment of situational effects in buyer behavior. Journal of Marketing Research, 1974, 11, 156-63.

Cohen, J.B., & Ahtola, O.T. An expectancy x value analysis of the relationship between consumer attitudes and behavior. Proceedings of the Second Annual Conference of the Association for Consumer Research, 1971, 344-64.

Day, G.S. Evaluating models of attitude structure. Journal of Marketing Research, 1972, 9, 279-86.

:hbein, M.   Attitude and the prediction of behavior.   In M. Fishbein (Ed.),
   Readings in attitude theory and measurement. New York: John Wiley, 1967.

:hbein, M.   The search for attitudinal behavioral consistency.   In J. Cohen
   (Ed.), Behavioral Science foundations of consumer behavior.   Glencoe,
   Ill.:   Free Press, 1972.

ard, J.A., & Sheth, J.N.   The theory of buyer behavior.   New York: John
   Wiley, 1969.

lan, A.   The conduct of inquiry: Methodology for behavioral science.
   San Francisco: Chandler Publishing Co., 1964.

z, D.   The functional approach to the study of attitudes.   Public Opinion
   Quarterly, 1960, 24, 163-204.

z, D., & Stotland, E.   A preliminary statement to the theory of attitude
   structure and change.   In S. Koch (Ed.), Psychology: A study of a
   science. Vol. 3.   New York: McGraw-Hill, 1959.

z, R.J., & Howard, J.A.   Toward a comprehensive view of the attitude-
   behavior relationship: The use of multiple set canonical analysis.
   Proceedings of the Social Statistics Section, American Statistical
   Association, 1971, 215-24.

ler, G.A.   The magical number seven, plus or minus two: Some limits on
   our capacity for processing information.   Psychological Review, 1956, 63,
   81-97.

ier, C.I.   Problems and designs of cross-validation.   Educational and
   Psychological Measurement, 1951, 11, 5-11.

each, M.   Beliefs, attitudes, and values: A theory of organization and
   change.   San Francisco: Jossey-Bass, 1968.

enberg, M.J.   Cognitive structure and attitudinal affect.   Journal of
   Abnormal and Social Psychology, 1956, 53, 367-72.

enberg, M.J.   A structural theory of attitude dynamics.   Public Opinion
   Quarterly, 1960, 24, 319-40.

dell, R.G.   Effects of attitudinal and situational factors on reported
   choice behavior.   Journal of Marketing Research, 1968, 5, 405-8.

th, J.N.   An investigation of relationships among evaluative beliefs,
   affect, behavioral intention, and behavior.   University of Illinois,
   College of Commerce and Business Administration.   Working paper, 1970.

th, J.N.   Affect, behavioral intention, and buying behavior as a function
   of evaluative beliefs.   In P. Pellemans (Ed.), Insights in consumer and
   market behavior.   Belgium: Numur University Publications Universitaires,
   1971.

Sheth, J.N. Reply to comments on the nature and uses of expectancy-value model in consumer attitude research. *Journal of Marketing Research*, 1972, *9*. 462-65.

Sheth, J.N. Brand profiles from beliefs and importances. *Journal of Advertisi Research*, 1973, *13*(1), 37-42.

Sheth, J.N. A field study of attitude structure and attitude-behavior relationship. In J.N. Sheth (Ed.), *Models of buyer behavior: Conceptual, quantitative, and empirical*. New York: Harper and Row, 1974.

Sheth, J.N., & Park, C.W. Equivalence of Fishbein and Rosenberg theories of attitudes. University of Illinois, College of Commerce and Business Administration. Working paper #108, 1973.

Sheth, J.N., & Raju, P.S. Sequential and cyclical nature of information processing models in repetitive choice behaviors. *Proceedings of the Fourth Annual Conference of the Association for Consumer Research*, 1973, 348-58.

Sheth, J.N., & Tuncalp, S. Structural assumptions underlying Fishbein's expectancy-value model of attitudes. University of Illinois, College of Commerce and Business Administration. Working Paper #207, 1974.

Triandis, H.C. *Attitude and attitude change*. New York: John Wiley, 1971.

Tuncalp, S. A study of the relationship between consumer's perceived quality judgements about a product based on the extrinsic and intrinsic product attributes and the underlying cognitive structure: An empirical investigation. Unpublished doctoral dissertation, University of Illinois, 1973.

Wilkie, W.L., & Pessemier, E.A. Issues in marketing's use of multi-attribute attitudinal models. *Journal of Marketing Research*, 1973, *10*, 428-41.