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Modeling Situational Factors in Variety Seeking Behaviour: An Extension of the Lightning Bolt Model

Rajesh Nanarpuzha

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Abstract

Variety seeking behavior and its corollary, purchase reinforcement have been looked at from diverse viewpoints in marketing literature. One specific viewpoint has involved looking at the effects of variety seeking behavior on purchase behavior and brand preference. In the area of marketing modeling, variety seeking behavior has been looked at as a consequence of attribute satiation and inherent user preferences. However, the effect of situational variables on variety seeking behavior has often been overlooked. Chintagunta (1999) has made use of the lightning bolt model (Roy, Chintagunta, & Haldar, 1996) to isolate the effects of variety seeking behavior on brand preferences. However, the author has made use of the attribute satiation approach to model variety seeking behavior. In this paper, the attempt has been made to build on the lightning bolt model (Roy et al., 1996) and the variation proposed by Chintagunta (1999) to propose a conceptual model that incorporates the effect of situational variables on variety seeking behavior and thereby, brand preferences. The Indian *kirana* store and a large-format retail store have been contrasted to set the empirical context for the problem. Alternative methods have been proposed for data collection and for empirically testing the model in this particular context.

Keywords: lightning bolt model, variety seeking, brand preference

Rajesh Nanarpuzha, Doctoral Student, Indian Institute of Management Ahmedabad (*e-mail:rajeshn@iimahd.ernet.in*)

Variety seeking behavior has been studied in diverse ways in extant marketing literature. Multiple models have been developed by marketing researchers to understand the effects of variety seeking behavior on consumer shopping habits. However, the effect of situational factors and their impact on variety seeking behavior has not been modelled explicitly. In this paper, the attempt has been made to extend existing model formulations in literature to develop a generalized model for variety seeking behavior incorporating situational variables. Chintagunta's (1999) modification of Roy et al.'s (1996) lightning bolt model has been considered as the base model for further development.

A specific retail scenario has been suggested for the empirical testing of the model. Further, the different variables in the model have been operationalized and a data collection plan for the same has been suggested. In sum, through this paper, a generalized model incorporating situational variables in variety seeking behavior and the means to empirically test the proposed model have been proposed.

The rest of the paper has been laid out as follows. In section two, the literature related to variety seeking behavior in marketing and the prior attempts at modeling variety seeking behavior have been discussed. In section three, the conceptual model being proposed in this paper has been built. Section four describes the operationalization of the situational variables being considered, the possible estimation approach and the data requirements for the model. Key conclusions and the possible limitations of the paper are discussed in section five.

Related literature

Variety seeking behavior is a widely researched topic in marketing literature. Put simply, the presence of a number of different brands in a consumer's purchase history would be classified as variety seeking behavior (Kahn, Kalwani, & Morrisson, 1986). In their review of literature of variety seeking behavior, McAlister and Pessemier (1982) discuss two dominant schools of thought in relation to variety seeking behavior. The first school of thought considers this behavior to be inherently inexplicable and therefore in the realm of stochastic models. In the second school of thought, variety seeking behavior is explained as being a function of some other motivation (derived) or as a motivation in itself (direct). For derived motivations, the authors discuss two distinct causes, multiple needs and changes in the choice problem. Using Laurent's classification (McAlister & Pessemier, 1982), the authors describe three facets of multiple needs, viz., multiple users (different members in the household exhibiting different preferences), multiple situations (changes in the consumption situation) and multiple uses (the use of the same product in

multiple ways). Changes in the choice problem, on the other hand, are ascribed to changes in the feasible alternatives, changes in taste or individual constraints.

Another approach to looking at variety seeking behavior has been to consider it as a function of the ideal level of stimulation (Menon & Kahn, 1995) and satiation. The key premise in these approaches is that variety seeking behavior is an inherent quality in individuals exhibited either to reach an ideal level of stimulation or when a specific level of satiation has been reached. In McAlister and Pessemier's (1982) classification, this can be considered to be a part of the 'direct' motivation stream of research. Attempts have also been made to incorporate the interaction of individual level characteristics (traits and motives) and product level characteristics (objective and perceived) on variety seeking behavior in purchase behavior (Hoyer & Ridgway, 1984).

The effect of situational factors on variety seeking behavior has also been explored in marketing literature. This is in line with the importance attributed to multiple situations by Laurent (McAlister & Pessemier, 1982). Acknowledging the futility of trying to incorporate all possible situational factors in a purchase situation, Belk (1975), nevertheless, describes five characteristics of a situation that can be incorporated, viz., physical surroundings (location, décor, sounds, aroma etc.), social surroundings (impact of other persons), temporal perspective (time since last purchase, time constraints etc.), task definition (intent of shopping) and antecedent states (momentary moods, momentary conditions etc.). However, a brief look at the approaches taken to model variety seeking behavior in marketing provides evidence that situational factors have not been prominently used in the modeling of variety seeking behavior.

Extant modeling approaches and gaps

Variety seeking behavior has been modeled in a variety of different ways in marketing literature. Jeuland (1979) has modeled variety seeking behavior based on the experience of the specific item consumed and the resultant levels of satiation reached. McAlister (1982) specifies that it is the sum of the attributes of the items consumed that leads to satiation. Givon (1984) uses a stochastic modeling approach to arrive at the conclusion that brand switching and repeat buying are a combined result of underlying brand preferences and consumers' preference for change. Kahn et al. (1986) combine existing approaches to test seven stochastic models using panel data. They conclude that many different types of variety seeking behavior are exhibited. Specifically, they conclude that variety seeking and reinforcement tendencies differ across product classes

and across brands within product classes. A brief synopsis of the limitations of the models developed thus far is provided below:

- The effect of marketing mix variables on variety seeking behavior cannot be estimated in the present model (Kahn et al., 1986)
- Situational factors have not been considered. Situational factors along with consumption histories will provide a better picture of purchase behavior (Kahn et al., 1986; Givon, 1984)
- The implicit assumption being made that the variety gained by switching between the brands is independent of the brands themselves seems intuitively unappealing (Givon, 1984)
- Consumer/Household heterogeneity has not been considered in the model.

Later research in the area has tried to plug these gaps. To illustrate, Kahn and Louie (1990) and Kahn and Raju (1991) have explored the effect of price promotions as a marketing mix variable in their models on variety seeking. Bawa (1990) has incorporated consumer heterogeneity into a hybrid model which allows estimates of variety seeking behavior and inertial behavior simultaneously. As a proxy to situational variables, Yang, Allenby, and Fennel (2002) have modelled the role of the objective environment and motivating conditions to gauge their effect on variety seeking behavior. These attempts at modeling variety seeking behavior consider individual gaps identified in earlier modeling attempts and attempt to find modeling solutions for them.

A more comprehensive model which attempts to tackle many of these issues in a single model is the lightning bolt model proposed by Roy et al. (1996). Consistent with the theory of random utility maximization of consumer choice behavior, the model allows the usage of explanatory variables, feedback from the last purchase, habit persistence and consumer heterogeneity. This model has been used to identify the separate effects of each of these criteria. At its core, the model builds on the basic logit model to include the effects of habits, feedback and heterogeneity. A key drawback of the lightning bolt model is the inability to isolate variety seeking effects.

Chintagunta (1999) has further modified the lightning bolt model to incorporate the effects of variety seeking behavior into the lightning bolt model. The approach taken by the author is to model the attribute satiation aspect of variety seeking behavior into the lightning bolt model. Though comprehensive in many different aspects, the effect of situational factors on variety seeking behavior continues to be ignored in this formulation.

For the purpose of this paper, the effect of situational variables on variety seeking behavior has been modeled specifically with respect to the problem situation defined. The attempt made is to build on existing work. Specifically, the lightning bolt model specified by Roy et al. (1996) and modified by Chintagunta (1999) has been considered as the base model. Cues have been taken from existing literature with regard to the modeling of situational variables. Belk's (1975) taxonomy of situational variables has been considered and situational variables specific to the problem statement have been incorporated.

Model setup

The representative consumer considered for the model setup is from the underlying population with a finite set of brand alternatives in a particular product class over several different purchase occasions. Marketing mix variables are in use for the different brands to improve the relative utility of a particular brand for the consumer vis-a-vis the consumer utility for the competing brands.

The standard logit model has been used, where the brand choice probability of choosing brand m (m = 1, 2, ..., M) at time t, $P[J_t = m]$ is given by

$$P[J_t = m] = \frac{\exp(V_t^m)}{\sum_{l=1}^{M} \exp(V_t^l)}$$

Where V_t^m is the observed component of utility for brand m.

Habit persistence has been defined as the prior propensity towards a particular brand in the choice set (Roy et al., 1996). This is in contrast to state dependence which is based on the purchase choice that has been made previously. Though similar in nature, the model attempts to estimate their effects separately. To account for habit persistence or inertia, the transition probability of choosing brand m at time t, given that a brand r was chosen at time s is given by the following equation

$$P[J_t = m \,|J_t = r] = (1-\rho)\frac{\exp(V_t^m)}{\sum_{l=1}^{M} \exp(V_t^l)}, \text{ if m} \neq \text{r}$$

$$P[J_t = m \,|J_t = r] = (1-\rho)\frac{\exp(V_t^m)}{\sum_{l=1}^{M} \exp(V_t^l)} + \rho, \text{ if m = r,}$$

Where $0 < \rho < 1$, ρ is defined as habit persistence.

Till now, the approach used by Roy et al. (1996) in proposing their lightning bolt model has been adopted. For ease of understanding and to reduce confusion, the notations adopted by Chintagunta (1999) for the model specifications have been used in the model formulation. Till this stage, the approach followed by Chintagunta (1999) is in line with the model set up by Roy et al. (1996).

However, it is in the definition of the observed component of utility, V_t^m that Chintagunta (1999) differs markedly from Roy et al.'s (1996) model by bringing in the component related to variety seeking behavior. In their model formulation, Roy et al. (1996) operationalized the observed component of utility as a linear additive combination of the intrinsic preference for the brand and the effect of the covariates. The authors have depicted this as

$$V_t^{mi} = \propto^{mi} + \beta^i X_t^{mi}$$

whereV_t^{mi} is the observed component of utility for brand m and household i, $\propto^{mi}$ is the intrinsic preference for brand m, $\beta^i$is the vector of covariate effects and $X_t^{mi}$is the vector of covariates for brand m.

Chintagunta (1999) adds to this model formulation by defining $\propto^{mi}$more sharply and by adding an additional term to the equation depicting V_t^{mi}. The additions made by Chintagunta (1999) can be described as follows:

1. The author defines the intrinsic preferences of the consumer (consumer heterogeneity) in terms of a linear function of a brand's time-invariant attributes. By doing so, Chintagunta (1999) operationalizes consumer heterogeneity as a measurable quantity. The distribution of preferences is presented in a factor structure and intrinsic brand preference, $\propto^i$is depicted as

   $$\propto^i = Aw_i$$

   Where A is a MxF matrix of the positions of the M brands along the F attributes and w_i is an Fx1 vector household i's importance weights for these attributes
2. The author adds an additional term $\Theta^i I_s^{mi}$ to the operationalization of the observed component of utility,V_t^{mi}, where Θ^i is the effect of the influence of the previous purchase on the current occasion (state dependence). If the estimated value of Θ^i is greater than 0, the conclusion is that the data is consistent with purchase reinforcement. If on the other hand, the estimated value is negative, it provides evidence for variety seeking. A value of zero indicates the absence of state dependence.$I_s^{mi}$is an indicator variable that takes the value 1 if brand m was purchased on the previous occasion, s and 0 otherwise.

Based on this, the formulation of the observed component of utility,V_t^{mi} can be expressed as

$$V_t^{mi} = \propto^{mi} + \beta^i X_t^{mi} + \Theta^i I_s^{mi}$$

Through this formulation, Chintagunta (1999) succeeds in expressing the consumer's intrinsic preferences in terms of the time-invariant attributes of the brand. This in turn, provides a convenient representation of the households' distribution of preferences. Also, by adopting an MxF matrix structure for depicting M brands on F time-invariant attributes, the author is able to create an F-dimensional map relating brands and their attributes. This is particularly useful in assigning locations on the map for brand-attribute combinations. These assigned locations are, in turn used to express variety seeking behavior and purchase reinforcement behavior in terms of the distance in the matrix for brand-attribute combinations for two consecutive purchase occasions. The author does this by expressing the state dependence term $\Theta^i I_s^{mi}$ as shown below

$$\Theta^i I_s^{mi} = -\sum_{f=1}^{F} \theta_{if} \, (A_f^s - A_f^m)^2$$

Where the term $(A_f^s - A_f^m)$ depicts the distance of the brand under consideration (m) from the previously purchased brand. Consistent with the earlier formulation, a negative value of Θ indicates variety seeking behavior while a positive value indicates purchase reinforcement.

The approach taken to arrive at the model specification thus far helps to incorporate the effects of variety seeking behavior into the observed component of utility for brand m. However, the approach followed to incorporate variety seeking is solely dependent on the attribute satiation approach discussed earlier. Situational factors have not been considered in the model formulation suggested by Chintagunta (1999).

For the rest of the paper, the following formulation, suggested by Chintagunta (1999) for the observed component of utility for brand m as the base has been considered to proceed further.

$$V_t^{mi} = \propto^{mi} + \beta^i X_t^{mi} + \Theta^i I_s^{mi}$$

Yang et al. (2002) have tried to include situational variables as 'motivation' in their model formulation. They have operationalized motivation as "concerns and interests relevant to an activity". The authors use the term as a qualitative variable relevant to a physical domain with the capacity to be adjusted, either higher or lower. The authors describe two alternative formulations for studying the effects of respondent and environmental effects on variations in brand preferences. In the first alternative, they

describe an additive model to describe variations in brand preferences, as described below.

$$\beta_{re} = v_r + v_e$$

Where v denotes an effect, r denotes the respondent and e denotes the objective environment. The authors also note that most model formulations focus on the respondent effect but ignore the objective environment. This is in line with the earlier discussions on the lack of focus on situation based variables in determining brand choice and variety seeking behavior.

In the alternative specification, personal and environmental effects are made to interact to produce unique brand preferences for each respondent-environment combination.

In summary, the authors state that the effects of situational variables could have an individual additive effect on brand preferences. At the same time, there could be interaction effects between situational variables and respondent characteristics.

This is also in line with Belk's (1975) observation that situational factors are a "pervasive factor in consumer behavior" (p. 161). Based on this, two additional terms have been introduced into the operationalization of the observed component of utility for brand m. The observed component of utility V_t^{mi} can now be written as

$$V_t^{mi} = \propto^{mi} + \beta^i X_t^{mi} + \Theta^i I_s^{mi} + \alpha^i Y_t^{mi} + \gamma^i I_s^{mi} Y_t^{mi}$$

Where $\alpha^i$is the vector of effects of the situational variables selected, $Y_t^{mi}$is the vector of situational explanatory variables for brand m and γ^i is the vector of interaction effects betweenI_s^{mi}, the indicator variable for variety seeking behaviorand Y_t^{mi}, the vector of situational explanatory variables for the brand m.

The term $\alpha^i Y_t^{mi}$ captures the effect of the situational variables on the observed component of brand preference independently. For the purpose of this paper, the more important term is$\gamma^i I_s^{mi} Y_t^{mi}$. As has been discussed earlier, I_s^{mi} is an indicator variable which can take a value of 1 if the brand m has been bought on the previous purchase occasion and the value 0 if a different brand has been purchased on the previous occasion. For the purpose of this model development, Y_t^{mi}has been operationalized as a categorical variable with the interpretation that Y_t^{mi}would take a value of 1 if a particular situational variable were present and a value of 0 if the particular situational variable were absent. The potential situational variables that could be included in the vector Y_t^{mi}have been discussed in the next section. This operationalization using the interaction

term between two categorical variables helps us to find the effect of situational variables for the values of 1 and 0 of the indicator variable,I_s^{mi}. In effect, this means that, the effect of situational variables in the variety seeking case (I_s^{mi} = 0) and purchase reinforcement (I_s^{mi} = 1) can be estimated separately.

In the model proposed by Chintagunta (1999), attribute satiation is the approach adopted to account for variety seeking. To account for attribute satiation, the author cites the compulsion to allow the extent of variety seeking or purchase reinforcement to vary over time. This in turn leads the author to introduce a time varying component of variety seeking / purchase reinforcement. For this the author operationalizes Θ^i to include inter-purchase time. After doing this, the author makes use of the hazard model specification to estimate the model.

As has been discussed earlier, attribute satiation is only one of the methods to operationalize variety seeking / purchase reinforcement. To simplify the model and to ensure that the operationalization of variety seeking / purchase reinforcement remains generic, the time-invariant choice sets as specified in the original lightning bolt model of Roy et al. (1996) have been followed.

With this, the brand choice probability of choosing brand m (m = 1, 2, ..., M) at time t, $P[J_t = m]$ using the logit model has been defined as

$$P[J_t = m] = \frac{\exp(\propto^{mi} + \beta^i X_t^{mi} + \Theta^i I_s^{mi} + \alpha^i Y_t^{mi} + \gamma^i I_s^{mi} Y_t^{mi})}{\sum_{l=1}^{M} \exp(\propto^{li} + \beta^i X_t^{li} + \Theta^i I_s^{li} + \alpha^i Y_t^{li} + \gamma^i I_s^{li} Y_t^{li})}$$

Therefore, the transition probability of choosing brand m at time t, given that brand r was chosen at time s, is therefore given by

$$P[J_t = m \mid J_t = r] = (1-\rho)\frac{\exp(\propto^{mi} + \beta^i X_t^{mi} + \Theta^i I_s^{mi} + \alpha^i Y_t^{mi} + \gamma^i I_s^{mi} Y_t^{mi})}{\sum_{l=1}^{M} \exp(\propto^{li} + \beta^i X_t^{li} + \Theta^i I_s^{li} + \alpha^i Y_t^{li} + \gamma^i I_s^{li} Y_t^{li})}, \text{ if m} \neq \text{r}$$

$$P[J_t = m \mid J_t = r] = (1-\rho)\frac{\exp(\propto^{mi} + \beta^i X_t^{mi} + \Theta^i I_s^{mi} + \alpha^i Y_t^{mi} + \gamma^i I_s^{mi} Y_t^{mi})}{\sum_{l=1}^{M} \exp(\propto^{li} + \beta^i X_t^{li} + \Theta^i I_s^{li} + \alpha^i Y_t^{li} + \gamma^i I_s^{li} Y_t^{li})} + \rho, \text{ if m = r,}$$

This completes the model setup.

Operationalization of situational variables

In this paper, the attempt has been to build on the lightning bolt model (Roy et al., 1996) and the modified lightning bolt model (Chintagunta, 1999). The additional variables being introduced in this paper are the situational variables. Discussion in this section, is therefore limited to the nature of these situational variables.

Belk (1975) has discussed five characteristics of a situation that can be incorporated in studies related to purchase behavior, viz., physical surroundings, social

surroundings, temporal perspective, task definition and antecedent states. For thispaper, the empirical context is defined by the contrast in variety seeking behavior exhibited in a *kirana* store and a large format store based on situational characteristics. Two of the important characteristics that define the shopping experience in the two types of stores are the attributes specific to the store format and the space availability. Out of the five characteristics suggested by Belk (1975), the physical surroundings and social surroundings relate to these specific characteristics. In this particular context, some of the variables that could be used to differentiate the situational characteristics are described below:

1. Self-service – This could be operationalized as a binary variable, 0 for no-self service and 1 for self-service
2. Floor space – This could be operationalized either as a continuous variable (square feet) or as a binary variable with a specific cut-off for the floor space (e.g. 0 for less than 100 square feet and 1 for greater than 100 square feet)
3. Capacity – This can be operationalized as a binary variable for a specific cut-off for the capacity of the store with respect to the number of customers.
4. Floor area ratio for the customer – The floor area ratio for the customer can be defined as the ratio of the area available in the store for the customer to the total area of the store. Again, this can be operationalized as a binary variable with a specific cut-off

The number of situational variables to be considered will depend on the data availability. The present formulation of the model considers the situational variables as discrete variables. The examples of situational variables provided above reflect this concern. However, the situational variables considered can easily be continuous in nature. The interpretation of the results will change accordingly

The other important factor to be considered for operationalization is the product category to be chosen. Kahn et al. (1986) find that variety seeking and purchase reinforcement tendencies differ across product classes and across brands within product classes. By choosing a product category in which customers have been known to exhibit variety seeking behavior, the results from this study would be considered more robust.

Studies dealing with variety seeking behavior have been conducted across product categories like cereals (Kahn et al., 1986), clothing (Kacen & Lee, 2002), and books (Clover, 1950). Across different types of stores, West (1951) has found evidence that toys, candy and nuts, and baked goods show the highest evidence of variety seeking

behavior. Of these, West (1950) notes that the maximum variety seeking behavior across store formats is exhibited in the baked goods category.

For empirical testing, a good approach in this case would be to consider a product category with a high incidence of variety seeking behavior within the context being explored. As has been stated earlier, the proposed model aims to isolate the effects of the situational variables on the variety seeking behavior of customers. So, if the proposed model is able to demonstrate that the effect of situational variables is significant in the chosen product category, the relevance of the result will be higher. Many studies in the North American context note the high incidence of variety seeking behavior in product categories such as cereals (e.g. Kahn et al., 1986; Van Trijp, Hoyer, & Inman, 1996; Inman, 2001). However, cereals as a product category, is a recent entrant into the Indian shopping scenario with few established players and a comparative lack of choice. Hence, the extent of variety seeking behavior in this product category is expected to be low. On the other hand, the biscuits product category in the Indian context is characterized by the presence of a larger number of players and many different varieties on offer. Also, as West (1951) has observed, variety seeking behavior is highest in the baked goods product category. A lack of studies dealing with variety seeking behavior in the Indian context has resulted in the lack of a precedent to follow with respect to choosing a product category. This necessitates a choice. In this scenario, it is proposed that the biscuits product category be used for empirical testing in the study.

Model estimation

In terms of the final formulation, the proposed model is similar to lightning bolt model proposed by Roy et al. (1996). Therefore, estimation of the proposed model can be done through maximum likelihood method. As Roy et al. (1996) observe, "the models with heterogeneity and state dependence can be estimated using standard random effects logit model algorithms" (p. 291). Therefore, the estimation for the proposed model will follow the standard procedure for estimating a logit model.

Illustrative scenario

The Indian retail landscape is dominated by the *kirana* store format. They are characterized as being "family-owned, small in size (100 sq feet and above), carry a limited number of items, and are run mostly by family members" (Kumar, Patwari, & Ayush, 2008, p. 68). As the authors further state, there are close to 12 million *kirana* store outlets in India. On the other hand, organized retailing makes up only about 4% of the existing retail market in India (Kumar et al., 2008). However, as the authors further

argue, the share of organized retail is expected to go up to 30% by 2018. Clearly, both the large format store and the *kirana* store will be part of the Indian retail landscape.

The *kirana* store outlet is characterized by the lack of self-service. The consumer's access inside the store is limited to the store counter. Typically, the consumer states her choice at the shop counter and it is the responsibility of the shop keeper/helper to select the product from the shop shelf and place it on the counter. The *kirana* store is also characterized by the lack of space within the store. With the increase in the number of shoppers in the store, there is an implicit expectation on the shopper to speed up the shopping process.

This shopper experience is in sharp contrast to the one found in large format 'modern' retail. The chief characteristic of the shopping experience in these stores is the availability of self-service. Shoppers have the luxury of evaluating the product options on the shelf before making the purchase decision. Also, the shopping experience is more relaxed with the shoppers encouraged to take their time.

In this paper, it is being posited that the difference in the shopping experience of the consumer in the *kirana* store and in the large format store will also lead to a difference in the shopping behavior of the consumer. More specifically, it is being posited that shopping in the *kirana* store will lead to a consumer being less 'variety seeking' in the shopping behavior as compared to shopping in the large format store. This specific situation has been used as an illustration in this paper to propose a more generic model. The proposed model is applicable to the specific context described.

Data requirements and model comparison

Roy et al. (1996) and Chintagunta (1999) make use of panel data for specific categories of products provided by the Nielsen Company. For example, Roy et al. (1996) have considered data from 300 households and 2798 purchase observations in the Catsup product category. Chintagunta (1999) has considered 1041 households in the soft drinks product category and 400 households in the detergents product category. The focus, in both these studies, is on the product category and inter-purchase times within that category for the specific brands. The data regarding the store from which the data has been collected is not pertinent.

For the purpose of this study, the comparison needs to be done of consumer purchase activities at two different store locations. A solution for this would be to get panel data for at least 3-4 different product categories with a similar re-purchase cycle. For example, it can be assumed that biscuits have a one month repurchase cycle. So, for

the households selected for the study, the time period selected should include at least one repurchase opportunity. The selection of more than one product category would be useful to contrast purchase behavior across product categories.

However, in India, availability of panel data for such research might not be available. Even though research agencies like the Nielsen company conduct retail audits, they use a sample of stores to extrapolate their findings to the population of stores. Ideally, panel data from a number of different stores with variations in the situational characteristics specific to the stores will provide rich data for this kind of analysis. In the absence of the availability of such data, the minimum requirement would be to select at least two stores with significant variation in the situational characteristics. The researcher would approach the store proprietors in the two stores and conduct a store audit to note down the situational variables of interest. Then, the store proprietors could be requested to share purchase information of households for a particular product category for a specified time period. Depending on the quality of the Point of Sales data available from their POS billing systems, data regarding the marketing mix variables for the brands within the category could be mined. In the absence of such information in the billing data, there might be a need to conduct an observation based study combined with purchase information available from the billing data to build data for analysis.

The robustness of the proposed model will be determined by comparing the predictive ability of the model with extant models in the area. Givon (1984) and Erdem (1996) have modelled variety seeking and purchase reinforcement into their models to calculate the transition probabilities. The third model with direct relevance for comparing the model proposed in this paper is the model proposed by Chintagunta (1999). A comparison with these three models will provide an estimate of the model improvement expected from the proposed model.

Possible limitations of the study

This study has focused on time-invariant choice sets. This limitation has been overcome by Chintagunta (1999) by using hazard modeling for the extended lightning bolt model. The use of the hazard modeling approach could be one way in which this limitation could be overcome.

The proposed model makes use of a basic logitmodeling structure as its base. A more complex model formulation involving the use of nested logic functions could result in a better representation of reality. The empirical use of the model is restricted by the formulation of the research problem. This is because the research problem is restricted to

the comparison of variety seeking behavior in two types of stores. However, the proposed model considers situational variables and not store formats. So, this limitation can be overcome by using the model in a variety of different environments, subject to adequate data availability.

Belk (1975) has identified five types of situational variables that could have an impact on purchase behavior. In this paper, only two among them have been used. The choice made has been based on the specific research problem tackled in this study. However, the other types of situational variables could also have an impact. A suitable operationalization of those factors could lead to a more robust model formulation.

As with the model proposed by Chintagunta (1999), the proposed model here also considers household data. The problem with this could be that the household data could represent the aggregation of inertial purchases of individual household members. The model would be unable to distinguish this spurious variety seeking behavior from actual variety seeking behavior. Finally, this paper deals only with the formulation of a model. The use of data and estimation using the data could point to issues in model formulation that might have been overlooked.

Conclusion

The proposed model in this paper extends the lightning bolt model (Roy et al., 1996) by including situational variables into the model formulation. The model builds on the work done by Roy et al. (1996) and Chintagunta (1999) and belongs to the same family of discrete, dynamic brand choice models used in the two preceding studies.

Situational variables have largely been ignored in modeling literature involving variety seeking behavior even though the importance of situational variables in variety seeking have been pointed out by marketing scholars. The lightning bolt model offers an important approach to isolating the effects of habit persistence, state dependence and consumer heterogeneity. The extension of the model by Chintagunta (1999) adds variety seeking behavior into the pool of variables considered for evaluation. The proposed model in this paper attempts to incorporate the effects of situational variables on brand preferences and the impact of situational variables on variety seeking behavior. The problem of interest which motivated this paper is contextual in nature. The difficulties in collecting data specific to the context have been discussed in the paper. A possible solution has also been discussed.

This paper therefore can be considered an initial attempt to model the effect of situational variables on variety seeking behavior in conjunction with other variables that

affect brand preference of consumers or households. The list of situational variables considered in this paper is limited but can be expanded based on the availability of information. A rigorous empirical testing using real data would be compulsorily required to make changes in the proposed model formulation and to gauge the effectiveness of the proposed model.

References

Bawa, K. (1990). Modeling inertia and variety seeking tendencies in brand choice behavior. *Marketing Science*, *9*(3), 263-278.

Belk, R. W. (1975). Situational variables and consumer behavior. *Journal of Consumer Research*, 2 (3), 157-164.

Chintagunta, P. K. (1999). Variety seeking, purchase timing, and the "lightning bolt" brand choice model. *Management Science*, *45*(4), 486-498.

Clover, V. T. (1950).Relative importance of impulse-buying in retail stores. *Journal of Marketing*, 15(1), 66-70.

Erdem, T. (1996).A dynamic analysis of market structure based on panel data.*Marketing Science*, *15*(4), 359-378.

Givon, M. (1984).Variety seeking through brand switching. *Marketing Science*,*3*(1), 1-22.

Hoyer, W. D., & Ridgway, N. M. (1984). Variety seeking as an explanation for exploratory purchase behavior: A theoretical model. *Advances in Consumer Research*, *11*(1), 114-119.

Inman, J. J. (2001). The Role of Sensory-Specific Satiety in Attribute-Level Variety Seeking. *Journal of Consumer Research*, 28(1), 105-120.

Jeuland, A. P. (1979). Brand choice inertia as one aspect of the notion of brand loyalty. *Management Science*, *25*(7), 671-682.

Kacen, J. J., & Lee, J. A. (2002).The influence of culture on consumer impulsive buying behavior. *Journal of Consumer Psychology*, 12(2), 163-176.

Kahn, B. E., Kalwani, M. U., & Morrison, D. G. (1986).Measuring variety-seeking and reinforcement behaviors using panel data. *Journal of Marketing Research*, 23 (2), 89-100.

Kahn, B. E., & Louie, T. A. (1990).Effects of retraction of price promotions on brand choice behavior for variety-seeking and last-purchase-loyal consumers. *Journal of Marketing Research*, 27 (3), 279-289.

Kahn, B. E., & Raju, J. S. (1991).Effects of price promotions on variety-seeking and reinforcement behavior. *Marketing Science, 10*(4), 316-337.

Kumar, V., Patwari, Y., & Ayush, H. N. (2008). Organised food retailing: a blessing or a curse?. *Economic and Political Weekly*, 43 (20), 67-75

McAlister, L. (1982). A dynamic attribute satiation model of variety-seeking behavior. *Journal of Consumer Research*, 9 (2), 141-150.

McAlister, L., &Pessemier, E. (1982). Variety seeking behavior: An interdisciplinary review. *Journal of Consumer Research*, 9 (3), 311-322.

Menon, S., & Kahn, B. E. (1995).The impact of context on variety seeking in product choices. *Journal of Consumer Research*, 22 (3), 285-295.

Roy, R., Chintagunta, P. K., & Haldar, S. (1996). A framework for investigating habits, "the hand of the past," and heterogeneity in dynamic brand choice. *Marketing Science*, *15*(3), 280-299

Van Trijp, H. C., Hoyer, W. D., & Inman, J. J. (1996). Why switch? Product category: level explanations for true variety-seeking behavior. *Journal of Marketing Research*, 33 (3), 281-292.

Yang, S., Allenby, G. M., & Fennel, G. (2002).Modeling variation in brand preference: The roles of objective environment and motivating conditions.*Marketing Science*, 21(1), 14-31.