

## **Decision States for Purchasing a DVD Player: A Preliminary Study**

David Waller, University of Technology, Sydney  
Paul Wang, University of Technology, Sydney  
Harmen Oppewal, Monash University  
Mark Morrison, Charles Sturt University  
Cam Rungie University of South Australia  
Jordan Louviere, University of Technology, Sydney  
Tim Devinney, Australian Graduate School of Management

### **Abstract**

*Consumers go through a series of states as they progress from becoming aware of a new product category, or product offering, to making a final purchase decision. This paper presents preliminary results of a study into the relationship between these decision states and brand choice in the DVD player category. Using a multinomial logit formulation we model survey responses from 1336 people as a function of consumer decision states indicators, product features and information channel use.*

**Key words:** Choice models, new product adoption, consumer information processing, information acceleration, decision states.

### **Introduction**

It is commonly understood in marketing that consumers progress through a series of decision stages or a hierarchical system of decision states associated with the purchase of “high-involvement” products, beginning with awareness, eventually resulting in decisions to purchase or not (eg, Nicosia 1966; Howard and Sheth 1969; Engel, Blackwell and Kollat 1978; Louviere 1981). These states include: being aware that a category/class of choice options exists; having an impression about choice options (generally, their features or “attributes”) that leads to some level of interest (or lack of interest) in a category/class and/or brands; being capable of acting on awareness, impressions and interest; deciding whether to act/choose now, delay or never choose; and deciding which one or more options to choose if deciding to choose now.

An understanding of the various decision states and the factors that influence them are vital for the understanding of consumer choice. There have been a number of papers that propose/suggest various frameworks for these states, such as those dealing with a hierarchy of effects, but there are very few papers that have actually examined the distributions. There is work on particular states like awareness vs non-awareness or consideration vs non-consideration (Roberts and Lattin 1991, 1997), or choice of brand (eg, Louviere, Hensher and Swait 2000). Kardes, Kalyanaram, Chandrashekar and Dornoff (1993) and Kalyanaram and Putler (1997) have modelled a limited sample of states. Waller and Louviere (2003) and Louviere, Waller and Smith (2003) have presented a conceptual framework and undertaken some preliminary modelling of empirical results that indicate overall support for the basic framework. Further, there seems to be little recognition that this implies that, in real markets, at any moment in time there is a distribution of consumers in the various states. For example, when a new product is first released there may be little awareness or interest, or high

constraints (price), but as time moves on and the product becomes more available various people will move into different decision states.

This paper will present the preliminary results of a study on the decision states towards the purchase of a DVD player. Using a multinomial logit formulation we model survey responses regarding choice of DVD player brand from 1336 people as a function of consumer decision states indicators, product features and information channel use.

## **Background**

This study is based on a conceptual framework developed by Waller and Louviere (2003) to model distributions of consumer decision states. The framework posits a series of conditional states leading from consumer awareness of need(s) or want(s), to interest and capability of choosing, to ultimate choices of brands, purchase volumes and timing. Waller and Louviere (2003) and Louvier, Waller and Smith (2003) have preliminary evidence that distributions of consumers in various states exist in two categories studied (Queensland island holidays and DVD Players). Their results suggest that both markets can be described by a series of conditional probabilities in which consumers transit from: 1) pre-awareness to 2) awareness to 3) deciding how interested they are in what a category offers (if at all) to 4) assessing if personal or other constraints limit their ability to purchase a product in the category through to 5) purchase or choice.

To date only two other papers directly relate to the conceptual framework, but each deals with only a small portion of it. Specifically, Kardes, Kalyanaram, Chandrashekaran and Dornoff (1993) observed and modelled the effect of pioneering brands on various stages of the decision process, while Kalyanam and Putler (1997) concentrated just on the effects of demographic variables on decision processes. This study will model the effects of a number of variables through the decision-making process. Therefore, this study is both broader and less restrictive than past studies, and will significantly develop the practical knowledge in this area.

## **Method**

The data used for the model comes from a random sample of 1,336 respondents of the AMR Interactive On-Line Panel. The respondents were presented with a number of questions relating to the purchasing of DVD players and were asked to indicate the brand that they would most likely choose to purchase. Each respondent could choose only one brand. A number of media activities were also presented (such as advertisements, reviews, and sales people) and respondents were asked which would they use as an information source for purchasing a DVD player.

For the analysis the choice alternatives are divided into five groups: Sony, Panasonic, Pioneer, Philips, and Other Brands (which included a number of cheaper brands). The choices from among these five alternatives are modelled using using a multinomial logit model (MNL). Choice modelling has long been used to assist in understanding real market behaviour (Louviere, Hensher and Swait 2000), ever since Thurstone's (1927) seminal contributions to random utility theory (RUT) and the method of paired comparisons.

## Results

A descriptive analysis shows that Sony was chosen most often (289 or 21.6%), followed by Panasonic (201 or 15%), Pioneer (113 or 8.5%), Philips (70 or 5.3%) and Other Brands (663 or 49.6%). Next, several multinomial logit models were estimated. Table 1 shows the estimation results for a model with a generic specification of the utility function. This means that one parameter is estimated for each of the listed attributes, regardless of brand. The model includes parameters for indicators of decision state indicators, product features, perceived category benefits and purchase constraints, intended use of information sources, and demographics. Some of these variables were measured with multi-item scales.

**Table 1: Results of Estimation for DVD Purchase**

PARAMETER	N=1336		
	ESTIMATE	T-RATIO	P-VALUE
1 HEARD OF	0.34	1.71	0.088
2 USED BEFORE	0.48	8.11	0.000
3 HEARD GOOD THINGS ABOUT	0.30	4.44	0.000
4 KNOW OF	0.19	2.64	0.008
5 INTERESTED IN USING	0.48	10.65	0.000
6 VALUE FOR MONEY	0.09	1.18	0.240
7 QUALITY / WILL LAST LONG	0.20	2.67	0.008
8 WARRANTY	0.36	4.69	0.000
9 BENEFITS	0.22	2.57	0.010
10 CONSTRAINTS	0.11	0.89	0.376
11 WILL USE REVIEWS	0.17	1.37	0.170
12 WILL USE AD INFO	-0.23	-1.90	0.057
13 WILL USE SALES PEOPLE	0.29	2.58	0.010
14 WILL USE FRIENDS	-0.42	-3.51	0.000
15 EDUCATION	-0.07	-1.02	0.309
16 OWN HOUSE	-0.02	-0.23	0.819
17 EMPLOYED	0.16	2.02	0.044
18 ASC SONY	-0.77	-2.71	0.007
19 ASC PANASONIC	-0.97	-3.41	0.001
20 ASC PIONEER	-1.30	-4.50	0.000
21 ASC PHILIPS	-1.63	-5.44	0.000
	LOG LIKELIHOOD: -1326.111		
	21 ESTIMABLE PARAMETERS. LOG LIKELIHOOD OF CONSTANTS ONLY MODEL = LL(0) = -1775.501 2*[LL(N)-LL(0)] = 898.780 WITH 17 DOF, CHI-SQ P-VALUE = 0.000 MCFADDEN'S RHO-SQUARED = 0.253		

As seen in Table 1, the fit of the model is quite good (McFadden's Rho-squared = .25) and several predictors are significant. The constants are all negative, which is consistent with the descriptives reported above, of almost 50% of the respondents choosing some other brand than the listed four major brands. Looking at some of the variables, it appears that prior

usage, having heard good things, interest in using, and product warranties have significant positive effects on final choice of brand. The variable, constraints to purchasing in the category, is not significant, neither is perceived value for money. Of the media activities, the item, friends as a source of information, is significant, and so is the sales people item. The negative sign for friends indicates that higher anticipated use of these media activities is associated with a less likely choice of one of the major brands. Reviews do not have a significant influence, nor has advertising. Of the three demographic variables only employment is significant, indicating that a respondent that is part time or full time employed has a higher likelihood of purchase.

These results are for a model estimated across all brands. We also estimated a model with alternative-specific attributes. While the log-likelihood for this generic model is -1326.111 with 21 parameters, the log-likelihood for the alternative-specific model is -1288.216 with 72 parameters, hence has a significantly better fit. Space does not allow to present details but it appears that there are several significant brand specific attribute effects. These include that reviews as a source of information was significant for Philips, while sales people and friends were significant for Sony and Panasonic. For Pioneer, value for money was significant while having a warranty was not significant, which was opposite to the other brands and indicates that people vary in the extent into which they perceive Pioneer as a cheaper brand compared to the others.

### **Conclusion**

As can be seen from the results of this study it is possible to measure items to indicate how consumers' decision states affect their likelihood of purchasing a particular brand of DVD player. These variables include usage, having heard good things, interest in using or purchasing, product warranties, and expecting to use friends as a source of information and sales people were significant in their final choice of brand. Constraints to purchasing, perceived value for money, reviews, advertising, education and house ownership were not significant.

It is believed that this study has presented some relevant findings for the area of consumer decision states. This is, however, only a first step and further research of decision states is recommended to assist in the understanding of real world consumer behaviour. Our further analysis will focus on further establishing the relationships between our decision state indicators and purchase and taking into account the collinearity among the predictors in the current model. Future studies can include measuring the effects of variables like brand choice, demographics, media and other information sources, as well as estimating models that take into account the comparability of samples across a number of years to show any longitudinal effects on consumer decision states. We are currently conducting ARC funded research into this issue. A continuation of research on decision states will be important to track the variables as a new product becomes a product generally available in the marketplace, which will assist practitioners in more efficient market planning and academics in understanding the consumer decision making process.

## References

- Engel, J.F., Blackwell, R.D., and Miniard, P.W., 1995. *Consumer Behavior*. Forth Worth: The Dryden Press.
- Howard, John A., and Sheth J.N., 1969. *The Theory of Buyer Behavior*. New York: John Wiley & Sons, Inc.
- Kalyanam, Kirthi, and Putler, D.S., 1997. Incorporating Demographic Variables in Brand Choice Models: An Indivisible Alternatives Framework. *Marketing Science*, 16 (2): 166-181.
- Kardes, F.R., Kalyanaram, G., Chandrashekar, M., and Dornoff, R.J., 1993. Brand Retrieval, Consideration Set Composition, Consumer Choice, and the Pioneering Advantage. *Journal of Consumer Research*, 20, 62-75.
- Louviere, J.J., 1981. A Conceptual and Analytical Framework for the Analysis of Spatial and Travel Choices. *Economic Geography*, 57 (4): 304-315.
- Louviere, J.J., Henscher, D.A., and Swait J.D., 2000. *Stated Choice Methods: Analysis and Application*. Cambridge: Cambridge University Press.
- Louviere, J.J., Waller D.S., and Smith, M., 2003. *Modelling a Hierarchy of Consumer Decision States: The Choice of Island Holiday Destinations and DVD Players*. Australia New Zealand Marketing Academy Conference (ANZMAC), Adelaide, December.
- Nicosia, F.M., 1966. *Consumer Decision Processes*. Englewood Cliffs, NJ: Prentice Hall.
- Roberts, J.H., and Lattin J.M., 1991. Development and Testing of a Model of Consideration Set Composition. *Journal of Marketing Research*, 28, November: 429-440.
- Roberts, J.H., and Lattin, J.M., 1997. Consideration: Review of Research and Prospects for Future Insights. *Journal of Marketing Research*, 34 (August): 406-410.
- Thurstone, L.L., 1927. A Law of Comparative Judgement. *Psychological Review*. 34, 273-286.
- Waller, D.S., and Louviere J.J., 2003. *A Conceptual Framework and Approach to Modelling Consumer Decision States: Final Report*”, unpublished report for UTS Faculty of Business, February.