Special Session Summary  the Economics and Psychology of Consumer Search: Process-Level Perspectives

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SESSION SUMMARY
The Economics and Psychology of Consumer Search: Process-Level Perspectives
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SESSION OVERVIEW
Most research on consumer search to date has taken as a starting point a normative model of optimal search. Typically, the work has then gone on to show that consumers do not fully adhere to the decision rules prescribed by such models. Relatively little work to date has used alternative approaches to examining consumer search that are closer to the actual search behavior of consumers in real-world settings, e.g., by starting from a more descriptive analysis.

The objective of this session was to bring together recent work on consumer search that takes initial steps in this direction. The session combined three papers that, from different perspectives, examine specific facets of consumer search processes. All three use detailed, process-level data to investigate consumer search using data-rich experiments and survey research. The papers in this session operate at the nexus of economic and psychological analysis, to capture both the normative and behavioral dimensions of consumer search. Thus, by bringing together and discussing three detailed process-level studies that address different facets of consumer search, this session was aimed at stimulating discussion on the theory of consumer search processes and how they can best be investigated.

The first paper (by Ratchford, Lee, and Talukdar) focuses on consumer search for product information. It uses detailed data on types of Internet sources used by automobile buyers from a survey of consumers who recently bought automobiles. The authors study the determinants of the choice of using different types of Internet sources, and substitution patterns between those types and other, non-Internet sources. To do so, they develop and test a general model of the choice of information sources in consumer searches for product information.

The second paper (by Hutchinson and Meyer) experimentally examines the consumer search process for information or products in the context of a finite-sample search problem. The authors address the effect of learning on two psychological phenomena that have been shown to lead to under-searching: risk aversion and underestimation of the future benefits of search. The results suggest that risk aversion is a stable part of search decisions, but that underestimation of maxima is transient and tends to vanish as consumers learn through task experience.

The third paper (by Häubl and Dellaert) conceptualizes the process of consumer search for multi-attribute products as a series of micro decisions and introduces a behavioral theory of consumer product search that augments normative search theory with three extensions: (1) the effects of the complexity of consumers’ micro decisions at each search stage, (2) consumers’ reliance on perceptual cues to simplify their micro decisions, and (3) searchers’ tendency to optimize locally. The authors report the results of an Internet-based shopping experiment, which provide support for the predictions implied by this behavioral theory of search.

This discussion was lead by Eric Johnson, and explored patterns of effects with respect to behavioral aspects of consumer search. Some promising avenues for further research in this area were also discussed. Thus, the session generated promising starting points for furthering a process-level theory of consumer search.

“Consumer Use of the Internet in Search for Automobiles”
Brian T. Ratchford, University of Maryland
Myung-Soo Lee, Baruch College
Debabrata Talukdar, SUNY Buffalo

One can think of the expenditure of time with different information sources as inputs to a process of producing better buys. Using a model based on this approach, we studied consumer use of the Internet as a source of information for purchasing automobiles (2003). One of our findings was that time with the Internet appears to draw time from other sources in equal proportion to their use. However our measure of Internet use was an aggregate across all types of Internet use.

We have since collected more detailed data on types of Internet sources used from a survey of consumers who bought automobiles in Summer 2001. Using these data we extend our earlier study to make more detailed inferences about the determinants of choice of types of Internet sources, and about substitution between those types and other non-Internet sources.

For this purpose we develop and test a more general model of the choice of information than the one used in our earlier study, which had the restrictive IIA property. Our model assumes that consumers add new information to a stock of prior information to produce better choices, defined as moving closer to an optimal choice as compared to a random choice. The new information is produced by allocating time to specific Internet and traditional information sources. The function used to translate time into new information is a modified version of the Cobb-Douglas function, which allows for flexible substitution patterns between information sources. Using this model, we are able to derive expressions for the share of time devoted to each source as a function of the use of other sources and consumer characteristics. We are also able to derive an expression for total search effort.

Employing this framework, we estimate the determinants of shares of use of alternative Internet and non-Internet sources, and we also estimate the determinants of total search effort across all sources. We employ our survey data for this purpose. The data set, which was collected to be compatible with earlier surveys done by us in 1990 and 2000, was obtained by a mail survey done in early 2002 on a sample of new car buyers in the Buffalo, N.Y., MSA who bought in July and August 2001. Our data contain 767 usable responses from a sample of 3000. Though the response rate is slightly lower than in our earlier surveys, it is still above 25 percent, which is reasonable for a mail survey. Our survey asked questions about time spent on 11 categories of search, which can be classified into the categories: friend/relative, 3rd party magazine/book sources such as Consumer Reports, manufacturer/dealer sources, and Internet. In addition we collected data on proportion of Internet time spent with the following Internet sources: manufacturer web sites, dealer web sites, auto buying services (e.g., autobytel), 3rd party information services online, bulletin board/chat online (e.g., Yahoo!Auto).

Our results indicate that approximately 54 percent of the 2001 car buyers in our sample used the Internet, compared to approximately 39 percent in our 1999 sample. Higher uncertainty about dealers, lower satisfaction with previous dealer, lower experience in terms of past car purchases and living in the area, being in the market for higher end cars, lower age, higher education and higher
income are associated with an increased share of search time with the Internet. Compared to 1999, however, we find that people with higher age, lower income and females were more likely to use the Internet in 2001 than in 1999. This is evidence that Internet usage is diffusing across socio-economic groups.

We have examined substitution patterns between the Internet and other sources, and between specific types of Internet sources and other sources. Consistent with our 1999 data, our results indicate that an increased share of time with the Internet is associated with a decreased share of time with dealer/manufacturer non-Internet sources. These sources appear to be substitutes. However, contrary to our 1999 study, our preliminary results indicate that an increased share of time with the Internet is associated with an increased share of time with Friends/relatives, suggesting that these sources are complements.

We have examined relationships between the use of specific types of web sites, and the use of non-Internet sources, something that we could not do in our earlier study. One of our results is that share of use of off-line 3rd party sources is positively related to the share on-line 3rd party sources. This suggests that these sources are complementary, with heavy users of these sources accessing them from both media. Another result is that time spent on-line with manufacturer web sites is negatively related to the share of use of manufacturer/dealer sources. This is consistent with buyers using the web to gather information on what car to buy rather than using the dealer as a source of this information. This allows them to come to the dealer better informed about what they will buy, and to cut down on time with the dealer.

An issue to be investigated with our data by the time of the conference is the relationship between use of different Internet sources and total search effort. While the Internet should lead to increased efficiency at search (presumably consumers would not use it otherwise), it could lead to increased total search if it increases the potential gains to search as well. We would like to know under what circumstances the Internet increases or decreases search, and will investigate this with our data.

**“Are Consumers Really Suboptimal Searchers? The Effect of Learning and Task Format on the Optimality of Stopping Decisions in Sequential Search Tasks”**

*J. Wesley Hutchinson, University of Pennsylvania*

*Robert J. Meyer, University of Pennsylvania*

Dating back to the work of Stigler (1961), optimal search models have been used as a starting point in attempts to study the process that consumers use to decide how much information to gather prior to making a market choice. A common finding in this work is that consumers often systematically depart from the predictions of such models, such as by being sensitive to normatively-irrelevant localized features of a sequential data series (e.g., large contrast in data values between adjacent time periods), and a global tendency to search less than would be prescribed by a risk-neutral normative model. Exactly why we observe these departures from optimality and how robust they are, however, is far from resolved. Unknown, for example, is whether observed tendencies to under search primarily accrue to risk aversion versus underestimating the future benefits of search—two different psychological accounts that predict the same bias. Likewise, also unclear is whether departures from optimality are momentary consequences of task unfamiliarity, and would vanish among consumers who have had extensive experience in conducting searches.

In this paper we examine these issues by reporting the results of two experiments that examine the ability of individuals to learn to solve a finite-sample search problem designed as a casino game. The game involves a player and a house dealer, where the dealer first takes a single draw from an urn that contains 100 balls numbered from 1 to 100, and reveals the outcome to the player. The player is then given the opportunity to purchase a fixed number of additional draws from the urn at a cost of c per draw, with the goal of drawing at least one ball whose value is greater than that of the dealer. The game is equivalent to the class of a priori search problems first considered by Stigler (1961) and more recently explored in Marketing by Feinberg and Huber (1996). To test whether departures from optimality in this task accrue to risk aversion versus mis-estimation of the benefits of search (the expected value of the maximum draw from a certain sample size), we study behavior in a second game that directly requires players to guess the maximum value from N-draws from a uniform distribution.

Analyses of the data reveal two important findings. First, replicating previous work in experimental tests of optimal search models, subjects systematically purchased fewer observations than would be predicted under optimal search theory, however this bias diminished in size—but without completely vanishing—after several rounds of play. Second, respondents displayed a strong systematic tendency to underestimate the maximum value from N draws of a uniform given limited task experience, seemingly supporting a calculation-error explanation for under-searching. In contrast, this bias completely vanished with task experience. The data thus suggest that under-searching is a consequence of a coupling of both forces, with risk aversion being a stable part of search decisions and underestimation of maxima a transient one that vanishes with task experience.

**“A Behavioral Theory of Consumer Product Search”**

*Gerald Häubl, University of Alberta*

*Benedict G.C. Dellaert, Maastricht University*

A well-articulated normative theory of consumer product search, based primarily on the notions of search cost and (expected) returns to search, has been developed in the literature (see, e.g., Ratchford and Srinivasan 1993; Weitzman 1979). However, while this theory makes very specific predictions about the manner in which consumers ought to search for new products, relatively little is known about how consumers actually go about this type of search.

We conceptualize the process of sequential search for multi-attribute products with recall as a series of “micro” decisions. At each stage of the search process (i.e., for each inspected alternative), the consumer, either explicitly or implicitly, makes two related micro decisions: (1) whether the current product is the most attractive one encountered thus far and (2) whether to terminate the search and buy the best of the inspected alternatives or continue searching.

This paper introduces a behavioral theory of consumer product search, which is based on the normative theory, but augments the latter with three broad non-normative extensions. The three extensions are (1) the effects of the complexity of consumers’ micro decisions at each search stage, (2) consumers’ reliance on perceptual cues to simplify their micro decisions, and (3) searchers’ tendency to optimize locally, i.e., to overrely on recently encountered product information. We propose that the first of these extensions will contribute to our understanding of when consumers stop searching, and the latter two will help explain the perceived attractiveness of an inspected product relative to the most attractive one up to that point.

**Effects of the complexity of consumers’ micro decisions.** One of the limitations of normative search theory is that it fails to
recognize that markets vary in how easy or difficult it is for consumers to make a purchase decision. By contrast, we suggest that the complexity of this decision is an important determinant of search behavior. The complexity of searchers’ micro decisions is inversely related to differences between products in terms of total utility (Shugan 1980). We distinguish between two facets of complexity. The first is tied to the degree of variability in both quality attributes and price across the entire set of available products (“market complexity”). The second facet of decision complexity is due to the difference in subjective utility between the current alternative and the most attractive one encountered prior to it (“situational complexity”). Prior research has shown that greater uncertainty as to which alternative is the subjectively most attractive one leads to more extensive consumer search (Moorthy et al. 1998). Furthermore, work on choice deferral suggests that decision makers are more likely to delay their choices and seek new alternatives when choice among the available options is difficult (Dhar 1997). Therefore, we propose that each of the two facets of decision complexity is inversely related to the probability of stopping at a given search stage.

**Decision simplification through use of perceptual cues.** According to normative search theory, consumers make the micro decisions at each search stage based only the marginal cost and the expected marginal benefit of further search. One important implication of this is that products’ concrete attribute levels should affect search behavior only to the extent that they are reflected in consumers’ judgments of subjective product utility. This implies that a searcher processes all available pieces of attribute information about a given alternative and forms an overall evaluation of that product. This represents an instance of alternative-based, as opposed to attribute-based, information processing (Payne, Bettman, and Johnson 1988). However, decision makers rarely choose from a set of multi-attribute alternatives by first determining the subjective utility of each alternative and then comparing alternatives in terms of their utilities (Russo and Dosher 1983). Instead, individuals tend to use simplified decision strategies that are attribute based and involve perceptual heuristics (Tversky 1972). This suggests that, rather than integrating the multiple pieces of attribute information about a product into an overall evaluation, searchers may use the perceptual cues associated with alternatives as direct input for their micro decisions. Consequently, we propose that, in addition to utility-based considerations, consumers’ search behavior is also influenced by perceptual cues in the form of products’ concrete attribute levels.

**Local optimizing.** The normative theory of search with recall suggests that consumers’ micro decisions at each search stage should be based on a comparison of the current alternative and the most attractive alternative inspected up to that point. However, this assumes that consumers have perfect memory for information about the most preferred product. By contrast, we propose that this assumption often does not hold and hypothesize that consumers will also rely upon alternatives that they have encountered since the currently most preferred one. That is, searchers will, in their micro decisions, consider normatively irrelevant information merely on the basis that it has been obtained closer in time than the relevant information. This is consistent with work on order effects suggesting that more recently encountered information tends to have greater relative salience when decision makers—as in sequential product search—obtain and evaluate information in a step-by-step fashion (Hogarth and Einhorn 1992). We, therefore, hypothesize that searchers tend to engage in local optimizing in that they overrely on recently viewed alternatives as reference points when making their micro decisions.

To test our proposed behavioral extensions of the normative theory of sequential product search, we conducted an internet-based experiment with a consumer panel in the Netherlands. Using a simulated electronic shopping interface, participants shopped for a vacation home or a stereo system, completing this task by choosing their preferred alternative. The results provide strong support for the predictions implied by our behavioral theory of search. Situational decision complexity has a negative effect on the probability of terminating search at a given stage. In addition, our results clearly suggest that consumers simplify their micro decisions by relying on perceptual cues in the form of products’ concrete attribute levels. Finally, we show that searchers tend to engage in local optimizing in that they overrely on recently viewed alternatives as reference points when making their micro decisions.

**REFERENCES**


