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AN EXPERIMENTAL EXAMINATION OF THE ECONOMICS OF INFORMATION

The Ohio State University

Ph.D. 1984

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AN EXPERIMENTAL EXAMINATION OF THE
ECONOMICS OF INFORMATION

DISSERTATION

Presented in Partial Fulfillment of the Requirements
for the Degree Doctor of Philosophy in the Graduate
Graduate School of The Ohio State University

By

Joel E. Urbany B.S., M.S.

* * * *

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COLLEGE OF ADMINISTRATIVE SCIENCE

Dedicated to my father Edwin J. Urbany and to
the memory of my mother Elsie B. Urbany.

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Market Share Trends in Wholesale Distribution (with James F. Robeson and H. Lee Mathews). Washington, DC: National Association of Wholesalers, 1983.

CONFERENCE PROCEEDINGS

"An Experimental Methodology for Studying Buyer Price Search Behavior," forthcoming in proceedings for 1985 Winter Educators' Conference, Chicago: American Marketing Association.

"Videotex- Implications for Consumer Behavior" (with Wayne Talarzyk and Robert Widing) in Advances in Consumer Research, 10, Richard Bagozzi and Alice Tybout (eds.), Chicago: Association for Consumer Research, 1983.

PAPERS

"Perceived Brand Differences and Consumer Search" (with Peter R. Dickson), Unpublished Manuscript, Ohio State University, 1984.

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Chapter I

RESEARCH ISSUES AND OBJECTIVES

1.1 MARKETING AND THE IMPORTANCE OF INFORMATION

The term marketing has been defined a variety of ways, but all definitions contain some reference to the notion of "exchange" (i.e. Kotler 1980). The marketing function serves to break down the barriers between buyers and sellers to make exchanges possible. Very important among the barriers to exchange is information. Before an exchange between a seller and a buyer can take place, each party must have some knowledge about what the other has to offer (i.e. the seller offers a product or service and the buyer offers a problem to be solved). An important aim of research in marketing, then, is to understand how buyers gather and use information in purchase decisions. Of particular interest is the extent of information gathering; i.e. to what degree do buyers become aware of their alternatives in a purchase decision?

The study of consumer information search allows both marketers and public policy makers to understand better

how to communicate with consumers. The research proposed here focuses on a specific information search problem: buyer search for the lowest price. This chapter takes a broad perspective in discussing some basic issues related to consumer search, and why it is an important area of research. After discussing the development of thought regarding consumer search, the relevance of understanding search behavior from both a public policy and managerial perspective will be discussed. The chapter will conclude with discussions of the developing economics/marketing interface and the research questions that are generated by that interface.

1.1.1 The Roots of Buyer Search Theory

The way that consumers collect and use information in making purchase decisions has long been a topic of interest in both economics and marketing. It is useful to review briefly the perspectives from which researchers have viewed the consumer as an information gatherer and user.

Katona (1953) has described the classic economic view of the consumer as a "rational man" who has complete information and foresight, is able to rank accurately all decision alternatives, and maintains that ranking without variance over time. Further, the clas-

sic "utility-maximizing" model assumes that there are no barriers which prevent the consumer from translating that rational choice into action (in other words, all choice alternatives are available and are easily accessible).

Stigler (1961) was the first economist to recognize the fallacy of the classic model. He developed a search model which recognizes that different consumers place different emphases on the costs and benefits of search, and therefore will be differentially informed about marketplace alternatives. Troubled by the fact that significant price dispersion had been observed in commodity markets (e.g. Jung 1960), Stigler developed his model with the intention of explaining why that price dispersion existed in a perfectly competitive market. He contended that "optimal search" for some consumers could be very limited in nature. Therefore, the existence of consumers who are less informed, according to the theory, allowed sellers to charge a greater variety of prices. While Stigler's classic model (which will be the focus of this research) looked only at the behavior of the buyer side of the market to explain persistent price dispersion in a commodity market, his work has since been extended to encompass the behavior of sellers in response to consumer search (Salop and Stiglitz 1977, Wilde and Schwartz 1979), as

well as job search (e.g. Stigler 1962, Lippman and McCall 1976a,b), retail location (Van Handel 1975), and many other economic topics. Stigler's classic model (which describes search for low price) still assumes a certain "rationality" on the part of the searcher in that s/he is assumed to make explicit trade-offs of the costs/benefits of search and developing rules that tell when search should be stopped.

Empirical research in marketing has provided evidence about the way consumers actually collect information for purchases. Olshavsky and Granbois (1979) cite a number of studies whose results suggest that the actual information collection and decision-making behavior of consumers is quite limited, leading them to question whether "consumer decision-making" actually does take place. These studies, based primarily on survey results, imply that consumers in general take little time in making even very important purchase decisions, and that often few information sources are consulted before a purchase decision is made (e.g. Kattana and Mueller 1955, Newman and Staelin 1972, Lionial 1983).

The general view of the consumer, then, has evolved from the theoretical "rational man" assumption in economics (one extreme on a continuum of "rationality") to a view from the empirical marketing literature which

suggests that many buyers are somewhat "careless" in making purchase decisions (the other extreme). The cost/benefit model provides an interpretation for the behavior of individuals at either of those two extremes. That interpretation is the following: the individual gathers information until the costs of gathering that information exceeds the benefits likely to be gained from it. The intuitive appeal of this cost/benefit interpretation is reflected in its relatively unquestioned adoption in the marketing literature (e.g. Granbois 1977).

Two major issues leading to the objectives of this research should be raised here. First, the empirical description of consumers, information seeking may suffer from measurement error in respondents' post-purchase recall of pre-purchase search activity (Newman and Lockeman 1975, Newman 1977). A more controlled methodology is needed for studying buyer price search. The development of such a methodology is a major objective of this research.

Second, it should be noted that researchers studying search behavior have tended to cling to the theorems derived from Stigler's cost/benefit model (to be discussed at length in the following chapter), apparently as a function of the theory's intuitive appeal (see, for example, Ratchford 1982). This acceptance of pro-

positions arising from the theory has taken place without convincing empirical support. A second major objective of this research is to determine whether Stigler's theory can provide accurate predictions of searcher behavior in purchase situations of varying uncertainty. The major issue is the "generality" of the propositions derived from the cost/benefit model.

1.1.2 Consumer Search - Public Policy and Managerial Concerns

1.1.2.1 Consumer Information - Public Policy Significance

Many authors have suggested that the efficient operation of the competitive marketplace depends in part on the degree to which buyers are "informed" (e.g. Shepard 1980, Beales et al 1981). This concern for consumer informedness in a policy sense is reflected in the following quote by Thorelli and Engledow (1980):

Naive, unmotivated, defenseless consumers constitute a drag in the marketplace and invite abuse by unscrupulous sellers (p. 17).

This concern is shared by both marketing and economic theorists. Economists, in particular, are interested in the resulting competitive structure of markets. Both groups argue that informed buyers will "police" the competitive marketplace, and that all buyers will benefit from this activity (Thorelli and Engledow 1980, Wille and Schwartz 1979).

A second, more specific level of public policy concern with information is consumer information processing and decision-making. Policy-makers are concerned not only that consumers are exposed to information pertinent to decisions, but that this information can be processed and used "efficiently" in making decisions. (these are "processing normative goals as described by Bettman 1975). Decision "performance" has been a difficult concept to pin down and has been an issue to both consumer economists (Shepard 1930, Sproles et al 1980) and marketing researchers (e.g. Jacoby et al 1974, with comments by Summers 1974 and Wilkie 1974). The major issues are defining what a "good" decision is and determining what and how information should be presented to consumers to facilitate those good decisions. Recently, Sproles (1983) has reviewed measures of consumer decision performance and concluded that this continues to be an area needing work.

The public policy concern for information provision, then, is felt on two levels. One is an aggregate level, in which information disclosure and the search efforts of at least a small group of consumers are assumed to keep competitors on their toes. A second is the individual level, which is concerned with helping consumers make "good" purchase decisions. The current

research focuses primarily on the effort expended in searching for price information under the assumption that it can be integrated easily into the purchase decision.

1.1.2.2 Consumer Informedness - Managerial Significance

Marketers should be concerned with consumers' search behavior and level of informedness because of the fundamental role of information in the exchange process. Retailers (as well as other agents of exchange on the seller side) are concerned with determining how and where information should be provided to consumers to facilitate the exchange process. The level of consumer awareness of available brands for a given product category, for example, may dictate the way the product should be promoted (e.g. relative to competitors), whether or not to advertise (Nelson 1970, Wiggins and Lane 1983), as well as channel strategy decisions (e.g. Van Handel 1976). Understanding how consumers go about gathering information for purchase decisions, then, is a starting point to developing a marketing strategy for communicating the relative advantages of a given product to consumers, and facilitating the exchange. Further, studying consumer search provides insight into the extent to which consumers even care about being informed when they make purchase decisions.

Another issue concerning the managerial significance of studying search behavior is the consumer's future information environment. In particular, researchers who study consumer search must consider the advent of new communication technology which has the potential to make marketplace information available to consumers very quickly. This technology, which has taken on the generic label "videotex," has the potential to change significantly the time and effort "cost/benefit" structure of conducting external search in that product/seller information will be very easily obtained.¹ Various authors have discussed the potential effects of videotex on the practice of marketing and on consumer behavior (e.g. Urbany and Talarzyk 1983), and some have described the adoption of such technology as "inevitable" (McNair and May 1978, Doody and Davidson 1957, Rosenberg and Hirschman 1980). The implication is that this is a new communication medium that marketers in general and retailers, in particular, will have to consider in the future. It is critical to develop an understanding of how consumers respond to computerized in-home shopping systems, in terms of their use of such

¹ Videotex is a two-way communication medium which utilizes computer technology to connect "users" with information and service providers. This medium is expected to allow households to access a wide variety of information and services in their homes via personal computers or television sets with special cable or telephone hook-ups (Talarzyk and Widing 1982).

systems to collect information and to consummate transactions. This research represents a first step in examining the former issue, in that the study will be operationalized via an interactive computer shopping system.

With the broad perspective developed above as background, the more specific research issues will be discussed below. As mentioned above, the focus of this research is on testing the ability of a classic economic theory to explain consumer search behavior. In that light, it is appropriate to discuss briefly the relevance of studying jointly the economics and marketing literatures.

1.2 THE ECONOMICS/MARKETING INTERFACE

The field of marketing has developed as a branch of many different fields, the foremost of which is economics. The economics perspective is theoretical in nature and thrives on the development of mathematical models to describe economic activity. The marketing discipline, however, has developed as a more "observation-oriented" field, with its primary strengths in empirical research. Researchers within marketing are often very critical of the weak theoretical basis upon which many studies are developed (i.e. Olson 1981, Jacoby 1978, Anderson 1983), and discuss the need for de-

veloping a stronger theoretical basis for research in marketing. In this sense, the interface between economics and marketing is a natural one. Russo (1973), in describing the value of each discipline understanding the perspective of the other, suggests that empirical researchers in marketing should follow through in their streams of research, and economists should acknowledge that studies of individual behavior can help in understanding aggregate phenomena. Further, Wilde (1980) argues that "consumer researchers and economists have much to learn from each other" (p. s143).

There are recent signs that a continuing interface between economics and marketing is in the development stages. For example, a conference (Mitchell 1978) and a special issue of the Journal of Business (1980) have provided the forum for interaction between economists and marketing scholars. Also, recent models of search developed in marketing have utilized concepts from the classic economic model of search² (Ratchford 1932, Meyer 1982, Carlson and Gieseke 1983). To this point, however, the borrowing has been primarily unidirectional (i.e. with few exceptions, the marketing discipline

² It should be noted that the economics/marketing interface extends far beyond the study of consumer search, and includes such strategic issues as pricing and market response modeling. Although marketing researchers have made unique contributions in these areas (i.e. Dolan and Jeuland 1980), the underlying theoretical structure of the work is from economics.

has borrowed from economics). This research attempts to make a contribution to both disciplines by empirically examining propositions from a theory that has long been accepted in both fields.

1.3 RESEARCH ISSUES - STATEMENT OF RESEARCH PROBLEM

As noted in the previous section, the interaction between the disciplines of economics and marketing thus far has primarily involved marketing scholars utilizing economic principles of consumer search in model-building or in theorizing about expected findings in empirical research. Researchers in both economics (Rothschild 1974) and marketing (Ratchford 1982) have discussed the need for empirical investigation of the propositions that emanate from consumer search models. Further, at least one paper in the economics literature (Schotter and Braunstein 1981) has confirmed this need by attempting an empirical investigation of search issues. The high frequency with which marketing researchers utilize economic principles of search (to be discussed in the following chapter) indicates a strong need for research that provides a test of those principles.

The need for such tests of economic search theories is apparent in that most of the studies in marketing

that have tested (at least partially) hypotheses of economic search theory have resulted in support that can be most generously described as "mixed." To the extent that new theories of consumer search are based on classic principles that are incorrect in their description of "true" consumer search behavior, those new theories will lead us astray.

The purpose of this research, then, is to empirically test two fundamental propositions from Stigler's classic theory of search that are well accepted in both economics and marketing (for a summary of the research problems and objectives see Table 1). The class of search models of interest here are those that attempt to describe a consumer's search for the lowest priced outlet for a single purchase decision. It is generally assumed in these models that the consumer starts out with some knowledge of the marketplace and that that prior knowledge is used in weighing the costs and benefits of further search. Other economic models of consumer search which assume that the consumer starts off with no prior information (e.g. Rothschild 1974) are not examined here. The propositions that will be tested in this research, however, are assumed to hold generally across all versions of the classic economic search model. Further, these propositions have been borrowed heavily by marketing researchers both in theo-

ry building (e.g. Batchford 1982) and in hypothesizing about empirical research (e.g. Duncan and Olshavsky 1982). The need for controlled empirical tests of factors affecting consumer search has been discussed by several researchers (Wilde and Schwartz 1979, Wilde 1980, Newman 1977).

This research, then, is undertaken in a spirit similar to that of Schotter and Braunstein (1981), who argue that more complex models of buyer and seller search behavior may be rendered "useless" if they are based upon principles which are incorrect. The methodological positioning of their paper describes somewhat the stance taken in this research:

Experimental techniques can be of great use in helping to falsify already established behavioral theorems in economics (marketing). We view experimental methods as tools which will allow us to weed out those results about human behavior which cannot be verified in the laboratory... In short, we feel that experimental techniques can be of benefit to economics (marketing) in casting doubt on previously accepted or seemingly logical behavioral results (p. 3).

It is clear that "established behavioral theorems" should not be weeded out on the basis of one experimental study.³

³ As Anderson (1983) notes, the results of any given study that are contrary to the accepted theory of the day can be explained away on methodological grounds. This suggests that several replications utilizing different methodologies (or situations) may be necessary.

TABLE 1

Summary of Research Problems and Objectives

Problems Addressed by the Research:

1. Lack of controlled tests of theorems arising from the economics of information framework.
2. Continued citation of those theorems without regard for the limited evidence (e.g. Claxton et al 1974, Batchford 1982).
3. Available evidence based on survey research, which may contain measurement error (Newman 1977).

Objectives of the Research:

1. Examine the generality of the following two propositions from Stigler's search theory:
 - a. greater price dispersion--->more search
 - b. lower search cost--->more search
 by evaluating each factor's effect on search behavior under different levels of uncertainty.
2. To accomplish objective 1, develop an experimental methodology which provides for a controlled assessment of the above factors on search behavior.

Stigler's theory of buyer search represents a major contribution to theoretical economics and is reflected in economic theory yet today. Understanding all the

applications of the basic theory (applications to search for wages, investment decisions under uncertainty) is not critical in this thesis. It is important, however, to try and understand the theory's implications for buyer search decisions, because this is the application that many economists and marketing researchers have made. The extent to which predictions made by the theory (and its derivatives) hold across different situations is not known. The major contribution of this research is in assessing the generalizability of the theorems summarized in Table 1, with the objective of challenging marketing's acceptance of these theorems without empirical support.

The rest of the thesis takes the following format. In the next chapter, the buyer search literature from both economics and marketing is reviewed and the extent to which the "economics of information" framework has been supported is discussed. The third chapter presents in detail the hypotheses to be tested in the research, while the fourth chapter describes the methodology developed to test those hypotheses. In the fifth chapter, the results from pilot tests of the methodology are discussed and, in the sixth chapter, the results from the actual running of the experiment are presented. Those results are discussed and future research directions are developed in chapters seven and

eight. The ninth chapter provides a summary and conclusion.

Chapter II

LITERATURE REVIEW

2.1 INTRODUCTION

In this chapter the relevant literature from both economics and the behavioral sciences is reviewed. Stigler's (1961) classic model of search is first described, followed by a discussion of latter day economic models of search. In addition, the application of concepts derived from economic models of search in marketing is discussed. The specific research hypotheses that derive from the literature reviewed in chapter 2 are discussed in the following chapter.

2.2 SEARCHING FOR THE LOWEST PRICE- THE LITERATURE

2.2.1 Stigler- The Economics of Information

Stigler's (1961) work is considered a classic for several reasons. First, he was the first economist to recognize the naivete of assuming that all agents in an economic transaction were perfectly informed regarding their alternative actions. Second, he was the first to attempt to explain why there existed dispersions of

prices for a commodity market (see the evidence provided by Jung 1960). Third, Stigler was one of the first economists to recognize individual differences in the behavior and preferences of "searchers" (consumers or industrial buyers) by acknowledging that different individuals place different emphases on the costs and benefits of searching for lower prices.

The fundamental idea presented in Stigler's paper was that, in searching for price information for a commodity, a buyer would search only up to the point where the expected marginal gain from search equalled the expected marginal costs of that search. The "gain" from search was the reduction in price paid, while the costs were measured (conceptually) in terms of time, effort, and money. The explanation was elegant but simple: price dispersion in a commodity market was a reflection of buyers' ignorance of available market prices. Some buyers placed a high value on the gains from search and, therefore, searched extensively to find a low price. Others, however, valued these gains less, searched less, and paid a higher price. The existence of uninformed buyers in the marketplace allowed for the existence of price dispersion for a homogeneous good.*

* It is interesting to note the differences in perspective between economics and marketing at this point. In marketing, the interest in studying consumer search is to aid marketing managers in being able to better target communications and therefore sell pro-

The reason for explaining Stigler's work in some depth here is that much consumer search theory in marketing centers around the basic propositions arising from this model. These propositions are listed in Table 2. Two of the propositions in this table (the first two) provide the focus for the current research. What follows is a short description of the logic behind each of the propositions. It should be noted that, from this point on, the two propositions will be referred to as "proposition 1" and "proposition 2."

2.2.1.1 Proposition 1: Greater Price Dispersion leads to More Search

Figure 1 shows that the probability of finding a price (for some commodity) lower than \$200 is larger when the standard deviation of the distribution of prices is larger. This, in turn, suggests that the perceived benefits of search are larger, *ceteris pari-*

ducts. In addition, there is a policy concern in marketing that focuses on improving the "informedness" of consumers to allow better product choice decisions to be made. Alternatively, economics is concerned primarily with the efficiency of allocation of resources in the marketplace from a theoretical perspective. This concern requires a focus on both the buyer side of the market and the seller side of the market. Stigler's contribution was in pointing out (and being the first to do so) that the structure of prices in the marketplace (which is a reflection of sellers' strategies) was dependent at least in part on the differential behavior of buyers. Economists' primary concern (the optimality of resource allocation in the economy) is clearly more aggregate than the fundamental concerns of marketing researchers.

TABLE 2

Propositions from Stigler's Theory of Search

1. The dispersion of prices is positively related to the expected savings from a given search.
2. The costs of search are negatively related to the extent of search, *ceteris paribus*.
3. The existence of price dispersion in the marketplace is due only partially to seller heterogeneity. It is also a manifestation of buyer ignorance.
4. The gain from search decreases with continued search (i.e. there are diminishing returns to continued search).
5. The more spent on the commodity (i.e. the larger the quantity of purchase), the greater will be the return from search.
6. The more search that a buyer undertakes, the lower will be his average price paid, and the smaller will be the variance of prices he considers.
7. Seller pricing behavior which results in price dispersion is affected by (1) buyer search, (2) how quickly market information becomes obsolete, and (3) advertising (advertising works to better inform consumers and leads therefore to less price dispersion).

Adapted from Stigler (1961)

bus, when there is a larger variance of prices in the marketplace. The proposition made by Stigler is that

if the dispersion of price quotations of sellers is at all large (relative to the cost of search), it will pay, on average, to canvass several sellers (p. 214).

$P(\text{finding a price} < \$200)$ is larger for the more widely dispersed distribution.

Figure 1: Graphical Interpretation of Proposition 1

The "dispersion" of price is reflected in the variance of the price distribution. Dispersion is also reflected, however, in the "range" of prices (the difference between the high and the low prices). A distribution with a wide range will have a larger variance than one

with a narrow range (if the general form of the distributions is the same). This proposition makes intuitive mathematical sense. The real contention is that if a searcher perceives there to be large differences between sellers of a product, s/he will search more intensely to find the price among those sellers.⁵ Some questions regarding the assumptions underlying this proposition will be raised in a section below.

2.2.1.2 Proposition 2: Lower Costs of Search Lead to More Search

Stigler's framework proposes that a searcher interested in finding the lowest-priced seller in the marketplace will obtain additional information (given the constraint of his/her limited search resources) when the cost of search declines. This is reflected in Figure 2, which provides hypothetical functions representing the costs of and returns from search. Stigler and

⁵ In the class of economic search models which posit that the searcher starts with no knowledge of the price distribution (i.e. Rothschild 1974), it is proposed that the searchers' objectives are twofold: (1) learn about the price distribution, and (2) find the lowest price. Proposition 1 holds theoretically in these models because a buyer learns less from one search when the prices are widely distributed (Douglas 1975). Therefore, search from a wide distribution of prices will be more extensive because it takes the searcher longer to learn the parameters of that distribution. It should also be noted that proposition 2 is predicted to hold under the conditions set forth by models of search from an unknown distribution.

others have proposed that the buyer receives gains from each additional search, but those gains get smaller with each search (hence, the downward sloping MR curve). Assuming that the marginal cost of search is constant across any number searches,⁶ a decrease in the general level of that marginal search cost, ceteris paribus, leads to a larger number of searches by the optimal searcher.⁷

The propositions regarding price dispersion and search cost will be discussed in greater detail in sections to follow. What follows immediately, however, is a discussion of how these propositions have been represented in other, more recent, models of economic search, and also how they have been reflected in the marketing literature. As noted by Stigler (1933) in his Nobel address, the literature regarding the economics of information has blossomed to encompass many different aspects of economic reality and has resulted in the production of at least one hundred articles per year. The review that follows focuses narrowly on the

⁶ This may be an unrealistic assumption (i.e. Manning and Morgan 1982).

⁷ It should be noted that Stigler's theory suggests that different buyers will have different curves reflecting the costs of and returns from search. The recognition that different people put different emphasis on those costs and returns is one of Stigler's major contributions. In the economics search literature, however, the propositions cited here are expected to apply to all types of searchers.

Figure 2: Graphical Illustration of Proposition 2

economic models of buyer search, which represent only a subset of the "economics of information" literature.

2.2.2 Reference to Propositions 1 and 2 in Economic Models of Search

Over the 20 years since Stigler developed his model, there have been many articles that have built upon the basic premise that the buyer searches until the marginal cost of search equals the marginal return from that search. Propositions 1 and 2 discussed above have persisted in the literature, providing both a mathematical and intuitive basis for describing the optimal searcher. Table 3 summarizes the contributions and assump-

tions of several recent models of consumer search and presents their assumptions/conclusions regarding price dispersion and cost of search. It is important to recognize that these models of search in the economics literature are developed conceptually and are rarely tested empirically. In most cases, propositions 1 and 2 are not proposed as theorems in each model, but are included in the models as assumptions.

Just a few of the developments in the economic models of search will be mentioned here. Some researchers (Salop and Stiglitz 1977, Wilde and Schwartz 1979) have acknowledged that there may be individual differences between searchers which result in different degrees of search being undertaken by different groups. This clearly is what Stigler proposed, but these authors go beyond Stigler's model in recognizing that there may exist two distinct groups of searchers: those who do and those who don't. Based on the existence of these two different groups of searchers, these authors describe the conditions under which competitive equilibria might be found.* These authors make the assump-

* These models represent a refocus of search models to the behavior of agents on both sides of the market. Rothschild (1973), in a highly regarded article noted that the mechanism through which seller price behavior was affected by consumer search had not been established. This has since become an area of great interest to economists, but has not been studied on an empirical basis (to the author's knowledge).

TABLE 3

Recent Developments in Search Models from Economics

Author(s)	Contribution to development of Stigler's model	Assumption regarding searcher's a priori knowledge	Contention/conclusions re: price dispersion	Contention/conclusions re: cost of search
Telser (1973)	presented models covering search both with and without prior knowledge of the price distribution.	1. searcher knows the minimum and maximum prices in the marketplace. Model 2 - no prior knowledge of the price distribution assumed.	"The gain (from search) rises with increasing range."	"As the marginal cost of search decreases, both the optimal amount of search and the gain from search increase."
Kohn & Shavell (1974)	Introduced the concept of "switch-points," or reservation utility, to which the searcher compares the products he has found. The searcher stops searching only when s/he has bettered these utility levels.	Searcher has a subjective estimate of the probability distribution F over future draws of product utilities.	Theorem 19 - A mean-utility preserving increase in risk ... can only raise the switch-point level of utility (i.e., a "more spread out" distribution of utilities leads to more search).	Theorem 14 - The switchpoint falls with an increase in next-period expected search costs. (This suggests that less search will take place because the comparison utility is lower).
Avell (1974)	Introducing (along with Kohn and Shavell as well as Rothschild) the concept of "adaptive search." This is where the searcher updates his/her perceptions about the price distribution as they go through search.	searcher has "some idea of the variance (of prices) in the market."	In a simulation: larger price variance led to more search.	In the simulation: higher costs of search led to less search.
Gastwirth (1976)	ran simulations to test Stigler's model, adding a rule whereby searchers could stop early. Looks at sequential search and what happens when the searcher assumes one price distribution, but is selecting for a different one.	the customer has "a fairly good idea of the minimum and maximum prices."		the expected number of searches is always larger when the cost of search is lower.
Salop and Stiglitz (1977)	policy implications - search model considering two specific types of consumers: (1) informed; (2) uninformed. Describing competitive equilibria that can occur given different levels of consumer informedness.	the consumer knows the marketplace price vector p ; however, he does not know the store locations at which these prices are offered.		assumes that the searcher group with a lower search cost is more likely to obtain information to allow them to buy at a lower price.
Wilde and Schwartz (1979)	Also distinguish between types of searchers (those that do and those that do not search). Make policy implication regarding the proportion of searchers necessary to generate a competitive equilibrium takes more of a "supply side" perspective in describing seller response to different levels of consumer informedness.	Consumers are ignorant of the actual price distribution.	assume that market "police-men" search 1 store even when no price dispersion exists.	suggest lowering the cost of comparison shopping by standardizing offerings-- this will allow for a larger number of shoppers in the marketplace.
Manning and Morga (1982)	Defend Stigler's description of fixed sample size search. Their model provides for the searcher determining the number of searches beforehand, and then conducting those searches. Describe the searching shopping for a set of products under a budget constraint.	Consumer perceives sellers as quoting prices for the commodity from a distribution with a known probability density function.		Search cost and optimal search length are related negatively.
Rothschild (1974)	derives a model which accounts explicitly for a searcher who has no knowledge of the distribution of prices. Proposes that consumers search using a reservation price rule.	Section II - searcher knows that prices belong to a finite set, but does not know how they are distributed.	Increased price dispersion increases the intensity of search (because the reservation price drops).	Increasing costs raises the reservation price, and therefore less search will take place.

tion/proposition that lower search cost will lead to more search, but only Wilde and Schwartz address the price dispersion issue. Interestingly, they suggest that some consumers (the ones with low search costs) will continue to search and "police" the marketplace (i.e. help keep sellers on their toes) even when no price dispersion exists. This paper is unique in making this assumption.

A second category of economic search models which has built upon Stigler's work includes "sequential search" models (Axell 1974, Telser 1973, Kohn and Shavell 1974). These models assume that the searcher adjusts or revises his/her perceptions about the marketplace price distribution as search proceeds.⁹ In general, the propositions regarding extent of search as a function of price dispersion and cost of search are assumed to hold in the sequential case.

Finally, the interpretation of consumer search using a "reservation price" should be discussed. Kohn and Shavell's (1974) concept of "switchpoints" can be interpreted as "reservation utilities," which represent

⁹ The sequential model of search was proposed as a more realistic alternative to Stigler's "fixed sample size" search model, in which the searcher determined the number of searches before even starting, based on the expected costs and returns from search. Sequential search is guided by an "optimal stopping rule." Using this rule people stop searching when the expected gain from the next search is less than or equal to the cost of that search.

the lowest level of product utility that the consumer will accept. Considering the concept of a reservation price,¹⁰ it can be seen that the interpretation of search behavior using a reservation price rule can explain nicely the two propositions of interest here. Rothschild (1974) interpreted Kohn and Shavell's arguments as follows: if search costs decline, the searcher lowers his/her reservation price, thereby requiring more search to find that lower price. Likewise, if the price dispersion increases, the searcher's reservation price automatically is lowered, necessitating more search.

Most recently, Wiggins and Lane (1983) have proposed a model which describes the consumer's search for quality. These authors suggest that a wider range in the quality of goods represents higher risk to consumers and therefore will lead to more search. As with the other models of search cited above, search costs are proposed to be related negatively to extent of search.

The point here is that the two propositions regarding the effect of search cost and price dispersion on extent of search have persisted in the economics literature and have laid the basis for the development of many different models of search (only a few of which

¹⁰ Since a lower price is of higher utility to a buyer, the reservation price is the most a consumer is willing to pay for the product.

have been mentioned here. The following section provides a discussion of the "prior knowledge" assumption that lays the foundation for these models of search. The discussion of this assumption will lead us to consider the predictive limits of economic search theory.

2.2.2.1 The "Prior Information" Assumption in Economic Search Models

The class of economic search models that are addressed here assume that the searcher starts off with some a priori knowledge about marketplace prices and that that knowledge helps him/her determine the value of searching.¹¹ The prior knowledge assumptions of several models are presented in Table 3 above and are probably best exemplified by those of Salop and Stiglitz (1977): the consumer knows the market prices, but does not know the store locations at which these prices are offered. In other words, even though the searcher has obtained price information (probably through prior experience), uncertainty is assumed to exist in the form of not being able to associate the prices with store names. As a response to this uncertainty, the searcher

¹¹ Both Axell (1974) and Telser (1973) consider the case where the buyer starts off with no knowledge of the price distribution (as Rothschild does). In general, higher levels of search are predicted by the model for those with no knowledge than for those with knowledge of the price distribution. Propositions 1 and 2 are again proposed to hold within these models.

undertakes an "optimal" search procedure to find the retailer offering the lowest price. From this point on, the prior knowledge assumption underlying these particular models of search will be referred to as "abstract" prior knowledge. It is abstract in the sense that price information is available in memory, but those prices are not associated with specific retailers.

As will be discussed in the final section of this chapter, the assumption that consumers in some situations have "abstract" information about a price distribution is not unrealistic. It will also be pointed out, however, that this "abstract" information assumption certainly does not apply to all consumer decision situations, and may not even describe a majority of them. The fundamental purpose of this research is to compare the behavior of decision-makers whose prior information is abstract (i.e. they are less certain about where to shop) with the behavior of those who have more concrete information (are more certain about where to shop). This will allow an assessment of how generalizable propositions 1 and 2 are. To this point, generalization of propositions 1 and 2 has been made in marketing without recognizing the uncertainty assumption and without strong empirical support. The extent to which these propositions emanating from consumer

search theory have been accepted in marketing will be reviewed in the following section.

2.2.3 Reference to the Two Propositions in the Marketing Literature

In this section, the reflection of the search cost and price dispersion propositions in the marketing literature will be discussed. The first section will address specific models of consumer search and how they encompass these propositions. The second section will deal with less formal references to the these propositions in the marketing literature.

2.2.3.1 Formal Models of Consumer Search in Marketing

Recently, Ratchford (1982) and Meyer (1982) have proposed models of consumer external search. In addition Bettman (1979) has developed a model of consumer search within his model of consumer information processing. These three models will be discussed in turn.

The Ratchford (1982) model represents a normative approach to modeling consumer search for the "optimal" product utility given certain constraints. Ratchford describes an optimal searcher as trading off the cost of search with the gain in the "utility bundle" provided by an additional search (this is essentially the latter-day Stigler model applied to search for "utility

bundles" rather than search for lowest price). The model allows one to conceptually define a consumer's "welfare loss," which represents the consumer's loss by not searching for and finding his/her "best" brand. Ratchford's further contribution is in accounting for the consumer's need for information over his/her life cycle. He acknowledges that prior information should lower the optimal amount of search for the consumer, given that it is current enough to be useful. The consumer is seen as "investing" in information regarding product purchases, and previous investments are seen to have an important effect on future search. Ratchford's model strongly resembles economic models of search. The two propositions of interest here are accounted for explicitly in the hypotheses that Ratchford develops from his model:

1. Since gains to search vary with the dispersion of product class attributes and prices, large dispersion should lead to more information acquisition.
2. Information acquisition should vary inversely with the costs of search. (p. 204)

Ratchford's model represents nicely a "hybrid" position between economics and marketing, as he accounts for both literatures in his work. It is clear, however, that the economics principles of search are represented strongly.

The model of consumer search developed by Meyer (1982) is descriptive rather than normative and attempts to define the process by which consumers decide which product alternatives will be included in their choice set and which will be "inspected." The separation between deciding on a choice set and then determining which alternatives will be inspected reflects two separate stages in Meyer's model. He makes several predictions regarding how a searcher will infer the values of unknown alternatives and also addresses the constructs in propositions 1 and 2. Noting the similarities of his descriptive model to normative models of search behavior from economics, Meyer says that

both (models) predict that increases in inspection cost will decrease search duration and that increases in quality dispersion (across alternatives) will increase the depth of search (p. 105).

Bettman (1979) describes information gathering and processing as a goal-directed process in which the consumer bounces back and forth between "internal" and "external" search in attempting to solve a consumption problem. In Bettman's model, goals are continuously "recycled" in response to new information, but consumers only expose themselves to new information when they feel it is necessary to help reduce conflict or uncertainty. Within his model, Bettman discusses factors that affect the extent of external search. This dis-

cussion again reflects economic principles of search, although it is provided from a behavioral perspective. In particular, Bettman cites several studies which suggest that lower search or shopping costs will lead to more search or shopping (p. 124- to be discussed below). Bettman has nothing to say explicitly about dispersion or variance between alternatives, although he does suggest that the greater the perceived benefits from search, the more search will take place.

2.2.3.2 References to Economic Search Concepts in the Marketing Literature

The economic search literature is cited frequently in the marketing literature, primarily as support for hypothesized relationships or for explaining/interpreting what was found in a given study. Researchers in the marketing literature who have referred to proposition 1 in a manner consistent with economic theory include Beales, Mazis, Staelin, and Salop (1981), Newman (1977), Duncan and Olshavsky (1982), Donnermuth (1965), Kaish (1967), and Granbois (1977). Those who have cited the concepts derived from economic theory in support of proposition 2 include McCracken, Boynton, and Blacke (1932), Newman (1977), Claxon, Fry, and Portis (1974), Bucklin (1966), and Carlson and Gieseke (1983).

The purpose of the previous two sections was to demonstrate the fact that the two propositions under scrutiny here are very well accepted in both the economics and the marketing literatures. The two propositions have become nearly "laws of nature" in the scientific sense, being accepted on face value and laying the foundation for more current models (both normative and descriptive) of consumer information search. The following sections provide an examination of the empirical literature that addresses these propositions. This evidence comes primarily from the behavioral sciences, although the first study discussed comes from economics.

2.3 THE EMPIRICAL EVIDENCE REGARDING THE ECONOMIC SEARCH PRINCIPLES

It has been established that the two principles of economic search to be studied here are well-accepted in both the economics and marketing disciplines. In this section, empirical research which addresses these principles is discussed. The empirical work in economics has been limited, and the abstract world of the economic theorists has remained "intact and unchallenged" (Schotter and Braunstein 1981). Most of the empirical evidence to be cited here comes from the literature of the behavioral sciences (i.e. marketing and psycholo-

gy), and that evidence is generally inconsistent in its support for the economic principles of search which are being studied here. What follows is an examination of the available literature which has tested the "perceived dispersion" and "search cost" propositions from the economic model.

2.3.1 Perceived Decision Alternative Variance and Search

It should be noted at the outset that this review covers research that has addressed product/stimuli variability in general. Stigler's (1961) original proposition regarding price dispersion has been extended (primarily in the marketing literature) to cover what could be called "offering variability." Therefore, the Stigler proposition can be more broadly interpreted as "the greater the perceived variability in the different offerings (i.e. either brand or store), the more search and deliberation over those offerings will take place." The literature addressed below, then, will cover more than simply perceived price differences and search.

2.3.1.1 Experimental Evidence

It has only been recently that researchers in the economics literature have attempted to test empirically the principles of economic search, with the pioneering

effort made by Schotter and Braunstein (1981). Noting that the economics literature is "strikingly devoid of empirical verification," these authors develop an experimental setting in which to test some of those principles. Their "Basic Search Paradigm" was a setting in which Ss search (over an interactive computer terminal) for wages under the following conditions: wages are taken from a known distribution with constant search costs, the searcher is risk neutral, the searcher has an infinite time horizon (no limit to the number of job offers obtained), and the searcher can "recall" wages previously observed. On each search in the experiment, Ss asked for a wage (which represents a new job offer) and decided to either continue searching or to stop. The experiment was a repeated measures design, in which Ss went through wage search under several different sets of conditions (each set of conditions was a trial) which varied from the conditions of the Basic Search Paradigm.

The authors assessed the effect of wage variability on the extent of search in the following manner. In trial 1 of the experiment, the Ss randomly selected wages from a symmetric triangular distribution, while trial 3 involved selection of wages randomly from a rectangular distribution. The rectangular distribution in trial 3, which is considered to be more risky or

uncertain for the searcher (Rothschild and Stiglitz 1970), gives all wages an equal chance of appearing, rather than giving the wages near the mean a higher probability of appearing. In this sense, there is a greater "dispersion" of the distribution since it is not clustered around the mean.

To assess the effect of a greater wage variation on search, the authors compared the search behavior of Ss in trial 1 to their search behavior in trial 3. The authors found that Ss tended to do more searches in trial 3, although the difference was not statistically significant. Nonetheless, this result was interpreted by the authors as generally supporting the idea that searching for wages from a more uncertain distribution will lead to more search.

Irwin and Smith (1957) also looked experimentally at the effect of stimulus variability on the extent of search, using simply a deck of index cards with numbers on them. In this study, Ss were told to continue to pick up and observe cards from the deck until they felt that could make a judgment about whether the mean of the entire deck was greater than or less than 0. These authors found that the larger the actual variance of the numbers in the deck, the more cards the Ss picked up to make a judgment about the deck's mean value. This finding can be taken to support the position of

the economists regarding extent of search and uncertainty.

While the two studies discussed above have been interpreted to be supportive of proposition 1, there are certain caveats that must be pointed out. The Schotter and Braunstein piece, although an important first step from the economist perspective, was poorly designed and conducted. Among the problems with the work are a small sample size ($n=56$ - which, paradoxically, diminished the power of their statistical analysis), a failure to randomize the order in which Ss engaged in the twelve trials, and a failure to check Ss' perceptions of manipulations. Perhaps more importantly, both studies discussed above incorporate the unrealistic notion of the economic model that search is undertaken in a random manner. That is, these authors assume that searchers have no idea what will come up next, but choose randomly from some distribution of wages or numbers or prices. In these experiments, the S "searched" by taking random draws, reflecting decision making under uncertainty in the classic sense (Raiffa 1968). In other words, Ss could (at best) place a very tentative probability on what event (e.g. wage) would be selected on any given draw only after they had made several draws. In the Irwin and Smith study discussed above, all Ss were working under conditions of uncertainty and

were all apparently motivated to collect information. It is not surprising that Ss drawing from a more dispersed distribution would take more searches, given that it would take them longer to learn about that distribution than Ss drawing from a less dispersed distribution.

Schaninger and Scimpaglia (1981) addressed proposition 1 more directly in their study of the impact of subject demographic and personality characteristics on information acquisition. These authors had Ss select information from an Information Display Board in a purchase decision for each of four different product categories: coffee, coffee creamer, instant lemonade, and clothes dryers. The authors predicted that Ss would examine more brands in their dryer selection task than in the selection of the convenience goods because dryers are more complex goods and there are greater perceived differences between dryer brands. They did not, however, find differences in the number of brands examined across the four different product decisions. This finding cannot be interpreted as directly refuting the search theory proposition because the authors did not establish their assumption about Ss' perceived differences for the different product categories. Even in the absence of evidence about differences in Ss' perceptions of offering variability within each product

category, however, one would reasonably concur with the authors' assumption. It is clear that the search theory prediction was not supported in this study.

2.3.1.2 Survey Research Evidence

There has been a large number of studies that have examined consumer search/shopping behavior over the past 20 years, but only a portion have considered the relationship between perceived brand/store differences and extent of search. Most notable (and probably the most frequently cited) among them is the Claxton, Fry, and Portis (1974) study which involved a survey of furniture and appliance buyers. Claxton et al clustered shoppers from the two different samples into different groups, based upon their extent of usage of different sources of information. The finding most relevant here is that "store-intensive" shoppers (those who tended to visit a large number of stores in their search procedure) more frequently said that the reason they searched was because product differences appeared to be substantial, than did "non-store intense" shoppers. The finding that those who shopped a larger number of stores tended to perceive large differences between alternatives appears to support proposition 1 from the economic model of search. A closer look at the re-

sults, however, reveals that this conclusion might be somewhat unfounded. Looking only at the furniture buyers in the Claxton et al study, it can be seen that "store-intense" shoppers made up only six percent of the sample. The rest of the sample was classified as either "thorough" or "nonthorough," depending upon the extent to which they sought information for their furniture purchase. In comparing these two groups, one finds that the non-thorough group tended to cite substantial differences between products as a reason for search more frequently than did the thorough group (although not significantly). This finding runs counter to proposition 1. The Claxton et al study, therefore, provides conflicting evidence regarding proposition 1.

Bucklin (1969) studied more directly the effect of perceived price dispersion on extent of search, although his analysis was only correlational. Using indices which represented the number of stores patronized in a specific period, Bucklin found the number of grocery stores shopped per week to be related positively (and significantly) to perceptions of price dispersion. This study directly supports proposition 1. An alternative explanation of this finding is that a greater extent of shopping resulted in housewives being more knowledgeable about prices in the marketplace (assuming that prices were actually dispersed).

Other studies have shown little support for the idea that perceptions of differences in the prices or attributes of product alternatives lead to more search. Goliman and Johansson (1978), for example, found that perceptions of differences in prices across retail gasoline outlets were unrelated to panel members' "propensity to search." Also, Dickson (1981) found evidence contradictory to proposition 1 in his study of a number of hypotheses emanating from an "interactionist" framework of buyer behavior. One series of hypotheses examined shoppers' perceptions of brand differences and the extent of search undertaken. There were no significant differences between those shoppers who perceived large overall brand differences and those who perceived small overall brand differences in terms of their time spent shopping and number of stores shopped. Further, those perceiving small overall differences between brands tended to consider more than one brand significantly more frequently than did those who perceived large overall differences between brands.

In a further analysis of this data, Dickson and Urbany (1984) looked at appliance buyers' post-purchase brand difference perceptions. These authors defined a group called "predisposed minimal shoppers" (those who shopped only one store, considered only one brand, and had an a priori store preference) and compared their

post-purchase brand difference beliefs to the rest of the sample. A multivariate group comparison found no difference between the two groups' average responses on six perceived brand difference measures. Since economic theory would predict that those buyers who had done little search would perceive smaller difference between brands (because they had not seen enough benefit to search), the authors concluded that the theory had not been supported.¹²

Finally, Duncan and Olshavsky (1982) examined the viability of explaining recent television purchasers' search behavior on the basis of their "general marketplace beliefs." These authors found no relationship (in a multivariate regression analysis) between beliefs relating to the size of brand differences and extent of search (which was measured using a weighted index of search "effort"). They did, however, find that the extent of search was related negatively to agreement with the following statement:

¹² An alternative explanation of the finding is that, since perceived brand differences were assessed after search, the group that searched more extensively (who may have started off perceiving large differences) may have reduced their difference perceptions based on the brands they had observed. This would explain why no significant difference occurred between the predisposed minimal shopper group and the group that shopped more extensively. The data do not allow a further examination of this possibility.

Local, independently owned stores give you better and more personalized service than do larger department or chain stores.

Shifting the analysis to store selection for a moment, agreement with this statement suggests that the shopper acknowledges a wide dispersion between different outlets, but indicates a preference (on service) for local independent stores. The perceived dispersion of stores in this case was a significant negative predictor of extent of search, apparently because searchers were aware of large differences in service but knew where the better service was available. This finding is important in the current research in which it is proposed that perceptions of large differences in price may not affect search because the buyer knows where a low price is available.

The survey evidence addressing proposition 1, then, is mixed in its support. The studies available for examining this proposition are limited and their methodologies are varied. This suggests a clear need for additional research on a survey level and also suggests a need for a more controlled approach to studying the issues.

2.3.2 Cost of Search - Effect on Extent of Search

Similarly, the empirical evidence regarding the cost of search is not well developed and tends to address the cost of search-->extent of search relationship on a "main effect" level. The effect of the cost of shopping has been a major thrust of theorizing in the economics literature and is becoming more important in marketing because of expected changes in the information environment.

2.3.2.1 Experimental Evidence

The experimental evidence generally favors proposition 2 from the economics literature. Lanzetta (1963) varied the monetary cost of information in a decision-making task and found that Ss obtained more information when the information cost less. Irwin and Smith (1957), in their experiment with numbered card decks, found that Ss tended to select more cards when the cost of each card was low. Other studies which have examined Bayesian decision-making have resulted in similar findings (Green 1966). The Schotter and Braunstein (1981) study provided mixed support for proposition 2. Although Ss tended to obtain more wage offers when the cost of obtaining those offers was lower, an insignificant difference occurred between the low and high

search cost groups.¹³ Winter (1975) found that Ss in a "low opportunity cost" condition apparently put more effort into processing information (because they had higher recall scores) than did Ss with high opportunity costs. This finding is supportive of proposition 2.

The research in laboratory settings, then, has generally supported proposition 2. It is not surprising that highly motivated experimental Ss responded to lower search costs by gathering more information. It is interesting, however, to note one further finding in the Lanzetta (1963) paper. Lanzetta's Ss participated in a "concept-attainment" task, in which they had to identify a geometric concept based on information which they could "buy" from the experimenter. In the experiment, the cost of that information was related negatively to the number of acquisitions made, but only in the condition called "high initial uncertainty." In the "low initial uncertainty" condition,¹⁴ the cost of search had no impact on the number of information acquisitions made. The results of this study provide

¹³ This finding may have been a reflection of a manipulation of search cost that was imperceptible to Ss, or may have been a function of an order of presentation bias, as all Ss participated in the trials in the same order.

¹⁴ The Ss' task was to pick the correct concept from a group of concepts (i.e. a multiple choice task). In the low initial uncertainty condition, there were fewer of these concepts to choose from than in the high initial uncertainty condition.

support for the hypothesized interaction between search cost and uncertainty in this research (to be discussed in the following chapter).

2.3.2.2 Survey Evidence

The survey evidence which ties cost of search to extent of search is generally sparse, although some interesting theorizing has taken place. For example, it has been argued for a long while in the economics literature that higher income translates into a higher opportunity cost of search, and therefore those with higher incomes will generally engage in less search than those with lower incomes (see, for example, Marvel 1975). The survey results, however, have generally failed to support a negative relationship between income and extent of search (e.g. Bucklin 1969, Farley 1964, Goldman 1976). The effect of income on amount of search is important in attempting to describe searchers, but it is not clear why income would be an indicator of the cost of external search.

More direct evidence regarding proposition 2 is provided by Bucklin (1966), who found that shoppers tended to make more interstore comparisons when the cost of search was lower (i.e. when the stores were closer together). Bucklin's results are supportive of proposition 2 only in the aggregate. That is, he found that

housewives who were shopping for a nonfood item worth more than \$5.00 tended to do more interstore comparisons when they were shopping downtown than when they were shopping in a "non-downtown" setting.

A different conclusion emerges, however, when the results are broken down into specific trading areas. Bucklin presents the percentages of shopping situations in which two or more stops were made (at different stores) for shoppers who initiated their shopping at different shopping places (see Table 4). The author logically ranked these shopping places in terms of the effort required by the shopper to make interstore comparisons. In other words, the author expected (on an a priori basis) that the downtown areas of the three cities would provide easy means of interstore comparisons, while the smaller, further out shopping places would make it more difficult for comparisons to take place.¹⁵

These results provide an interesting story, showing very similar percentages across the board. The interpretation of the numbers goes as follows: of all

¹⁵ It is clear that this ranking makes strong assumptions about the types of stores in the more "clustered" areas as well as the ease of shopping in those areas. One important reason for discussing this study in some depth is that it is frequently cited in the marketing literature in support of Proposition 2. It will become clear that this study does not support Proposition 2.

TABLE 4

Selected Interstore Comparison Results- Bucklin (1966)

	Shopping Places						
	City of San Francisco	Downtown Oakland	Large plazas	Small plazas	Secondary centers	"String streets"	Convenience centers
<i>All stops</i>							
Two-plus stops	20.4% (11)	20.7% (95)	22.2% (9)	18.7% (6)	15.1% (19)	18.0% (9)	26.8% (7)
Number of products also shopped for in other areas	0% (0)	8.9% (18)	7.7% (3)	5.6% (2)	14.3% (18)	16.0% (8)	31.6% (6)
<i>Area only stops</i>							
Two-plus stops	20.4% (11)	18.1% (83)	23.1% (9)	12.5% (4)	8.2% (4)	4.0% (2)	10.5% (2)
<i>Total products</i>	100% (54)	100% (450)	100% (22)	100% (22)	100% (126)	100% (50)	100% (19)

the shoppers who began their search in downtown San Francisco, 20.4% visited two or more stores. It is clear that, as you move to the right on the continuum of "effort required" for interstore comparisons, the incidence of multiple stop shopping is not largely different from that 20 percent (except for those starting in convenience centers). Bucklin goes on to suggest that the real evidence is in looking only at the number of comparisons that took place in the specific area where the shopping process began (i.e. look only at the number of stops made in the immediate area). When this analysis is conducted, it is clear that more comparisons are made in the downtown shopping areas or in the large plazas.

The important point is that, if one looks only at the number of comparisons in the immediate area of the initial shopping activity, it becomes obvious that the downtown area facilitates comparison shopping simply in the mere existence of numerous stores in the immediate area. In other words, the respondents who initiated shopping in the outlying areas who wanted to do comparison shopping tended to go outside the immediate area, therefore expending more effort in their comparisons than those who made interstore comparisons in a downtown shopping district. The more appropriate comparison point is the "all stops" comparison point, given that it reflects the total amount of effort undertaken by the shoppers in making comparisons. With this frame of reference, it is clear that shoppers with lower costs of making comparisons did not make more comparisons than shoppers with higher costs of making comparisons. This is contrary to the proposition 2 emanating from the economic search literature.

Dommerauth and Cundiff (1967), in their study examining housewives' search behavior for a variety of "shopping" goods, found that shopping areas qualitatively described as "making inter-store search easy" were associated with a greater incidence of inter-store comparisons. Emphasizing the limited amount of search undertaken by the majority of their sample, however,

the authors noted that, even at the most convenient shopping area, the majority of customers continued to visit only one store for 11 of the 15 product lines being studied. The implication is that, even where the shopping area was deliberately planned for ease of making comparisons, there was still not a great deal of comparison shopping taking place.

Finally, Goldman and Johansson (1978) found no relationship between a factor which could be interpreted as the "importance placed on convenience" and respondents' propensity to search for lower gasoline prices. To the extent that the convenience factor represents the "costs" placed on searching by the searcher (i.e. greater importance placed on convenience = higher costs of search), proposition 2 from the economics model is not supported by the results of this study.

The empirical evidence cited above presents a picture of consumer search is inconsistent with the fundamental propositions which have been taken from economic models of search. The experimental evidence that has generally supported the propositions emanating from Stigler's model has been somewhat contrived in the sense that little was done to create a situation which was "psychologically equivalent" to that of the real world situation the theory is attempting to describe. No controlled tests of the theory of consumer search

have been undertaken and one must therefore conclude that the framework has not been substantiated empirically.

The difficulty in trying to empirically substantiate the economics of information framework may be due to the somewhat unrealistic assumptions that the framework makes about searchers' prior knowledge. The following sections provide a reexamination of the uncertainty construct. Uncertainty is discussed as a potential mediator of the effects of price dispersion and search cost on search behavior.

2.4 CONSUMER SEARCH AS A RESPONSE TO UNCERTAINTY

The final major section of this chapter examines and reviews the potentially boundaries of the economic theory of consumer search. We first define "uncertainty" in a specific manner, citing both the economics and marketing literatures. The nature of search under conditions specified by economic search models will then be reviewed, and some empirical evidence regarding consumers' uncertainty in different purchase situations will be presented. A discussion of the predictive strength of Propositions 1 and 2 under different conditions of uncertainty will be presented, leading to some general hypotheses. The chapter will conclude with a summary of the research issues.

2.4.1 Defining Uncertainty- The Economic Search Context

In economics, decision making under uncertainty means generally that the decision-maker has imperfect information about future events (Raiffa 1968). Economists further distinguish between different levels of uncertainty, suggesting that the more precise a probability that one can place on an event (e.g. the event that Store A has the lowest price), the less uncertainty the decision-maker experiences (Douglas 1975).

Marketing researchers have traditionally examined consumer uncertainty under the label of perceived risk,¹⁶ and have acknowledged that the perceived risk construct has many dimensions (psychosocial risk, performance risk, psychological risk, financial risk, physical risk- Tarpey and Peter 1975). The focus here will be on what Cunningham (1967) has defined as simply "event" uncertainty: a consumer's perception of the probability that a given brand will "work" as it should (or better than another brand). Since this thesis involves the study of search for the lowest-priced retail store, the concern will be with Ss' perceptions of whether a given store will "work" or not (e.g. will have the lowest price).

¹⁶ The classic work in this area was done at the Harvard school (Cox 1967) with the initial impetus provided by Bauer (1960).

The notions of uncertainty from economics and marketing can be combined to derive an operational definition of uncertainty. In this research, uncertainty will be defined as the searcher's ability (or inability) to place a probability (different from chance) on the event that a given store will have the lowest price. In this respect, a searcher who is able to place only a chance probability on his expectation that Store A will have the lowest price is experiencing greater uncertainty than a searcher who can place a more precise probability on that event. Note that, by using this definition, we can represent the conditions assumed under economic theories of search. In most of the models reviewed earlier in the chapter, the decision-maker is assumed to have some knowledge of the distribution of prices confronting him, but does not know (even on a general level) what prices are offered at each store.¹⁷ Therefore, he cannot say what the probability is that Store A will have the lowest price.

¹⁷ May (1947- cited in Taylor 1974) has discussed uncertainty and the potential associated anxiety. He makes an interesting analogy between having uncertain expectations regarding future events and travelling unexplored roads, which "cannot be known since no one has yet traversed them." The interesting comment is that, in the optimal models of consumer search in economics, the searcher is assumed to have "travelled" the road before (knows the distribution of prices), but does not know the specific destinations along that road (does not know where specific prices are offered).

As a consequence, he undertakes search by sampling sellers in a random manner.

Given the definition described above, the decision-maker working under conditions set forth by economic theories of search works under complete uncertainty (at least initially). This is a realistic situation. For example, a person who is moving and has to select a moving company may be under the subjective impression that the distribution of seller prices has a wide dispersion. Further, s/he may not know which company to call first and may call several movers to reduce uncertainty about the available prices. This is exactly the purchase situation that economic search theory is intended to describe.

In the next section, it will be shown that consumer decisions are not always characterized by complete uncertainty. Consumer decision makers are more likely able to place at least subjective probabilities on decision outcomes (usually based on past experience) and use that knowledge to narrow down the set of decision alternatives.

2.4.2 Consumer Decisions and Uncertainty - Empirical Evidence

In considering the generalizability of the conditions set forth by economic models of consumer search,

the important question to ask is "are there situations in consumer decision-making that are not characterized by a high level of uncertainty?" The answer to this question is a simple yes, and some evidence is presented.

In a study of grocery shoppers' perceptions of perceived risk, Cunningham (1967) classified respondents into several perceived risk categories,¹⁸ ranging from high to low. The majority of respondents (totaled over three product classes) fell into the "low" category, leading Cunningham to conclude that this probably is the norm for grocery products. These low levels of perceived risk in purchasing grocery products may be due in large part to the fact that the economic/social consequences of bad decisions are slight.

Two recent studies provide insight into buyer uncertainty in the purchase of products of greater financial consequence. Dickson (1981), in his study of the shopping/search behavior of appliance purchasers, found that a large percentage of white appliance buyers reported that they were "very sure" about what they were going to do before they even began their shopping. For example, 49 percent of them reported that they were

¹⁸ Cunningham's classification scheme was based upon Ss' perceptions of their uncertainty regarding product performance and the "danger" they perceived in the product not performing (p. 85).

very sure about what store they would shop before they began their shopping. Thirty- nine percent said that they were very sure about what brand they were going to select. Further, shoppers' a priori sureness was related negatively to several measures of extent of search. This a priori "sureness" may reflect the decision-maker's ability to place probabilities on the events that specific stores and brands would meet their needs.¹⁹

The second recent study of note is Furse, Punj, and Stewart's (1984) examination of car buyers' search strategies. These authors go beyond previous studies which classified consumers on the basis of search behavior by describing in detail the car buyers' responses to a variety of survey items. Of particular interest here is the cluster of car buyers that the authors labelled "low search," which represented fully one fourth of the sample. This group appeared very certain of how they would proceed in the car shopping, spending the least time of all clusters in search-related activity, and being the most certain of the manufacturer and

¹⁹ In the models described earlier in the chapter and in the experiment devised below, the way that retail stores "meet searchers' needs" is by providing low prices. This is not entirely realistic because it does not consider the service offerings of the stores (e.g. providing credit). In this research the loss of realism in focusing only on the price attribute of retail stores is compensated for by greater experimental control.

dealer that they would patronize in advance. Consistent with the findings in other studies (Bucklin 1966, Newman and Staelin 1972, Moore and Lehmann 1980), the "low search" group was found to have the greatest prior purchase experience of the entire sample.

Many other studies over the years have found there to be a fairly large group of consumers who, in the course of shopping for even "important" products, tend to do very little search and comparison (Katona and Mueller 1955, Claxton, Fry, and Portis 1974, Lionial 1983). While the respondents' "certainty" was not measured in these studies, it is not inconceivable that many shoppers in these groups were highly certain beforehand where they were going to shop and what brand they were going to buy.

The evidence reviewed above suggests that many consumers are sure of themselves when going into purchase decisions. In other words, they tend not to do much search, apparently because they are confident that a certain brand(s) or store(s) will be able to meet their needs. It is important to assess the ability of economic theory to predict the search behavior of consumers like those described in this section. Consumer decisions under some level of "certainty" appear to be pervasive in the marketplace. The following section addresses this situation and explains how the intuitive

power of economic search theory may be limited in predicting the behavior of consumers who are not uncertain.

2.4.3 The Potential Limits of Economic Search Theory

The logic of the cost/benefit framework is intuitive and sound. It makes sense to explain human behavior as resulting from an individual's weighing the costs and returns from the behavior, even if this "weighing" process takes place subconsciously. Other authors have suggested such a framework (see review in Payne 1982), but Stigler was the first to apply it to explaining buyer behavior.

The implicit weighing of costs and benefits is not something that can be directly observed and tested. The theory, therefore, must be tested on the basis of the propositions that arise from it. Cost of search, price dispersion, and uncertainty are all constructs which can be measured empirically. Further, empirical measurement of these constructs allows an assessment of the relationships among them, to see if they are logically consistent with the theory's predictions. The theory's description of buyer search behavior is intuitively appealing, but it has not been established that the propositions arising from the theory are as generalizable as many have intimated.

Under conditions of higher uncertainty, individuals may be quite motivated to search (it was suggested earlier that experimental studies addressing search behavior have put Ss in a high uncertainty situation- random search). Under these conditions, it is likely that individuals will be responsive to changes in search cost and price dispersion because they are in a highly motivated state. There is a great deal of benefit in collecting more information when Ss are uncertain about their decision outcomes and are anxious to "perform" well in an experiment. Therefore, as economic theory would predict, experimental subjects respond to lower search costs or wider dispersions with more search.

However, many consumer purchase decisions may take place under conditions of low uncertainty. As a result of previous experience in the purchase situation (or perhaps interaction with experienced consumers), consumers seem to place a priori probabilities on the likelihood that certain stores will meet their needs. It is very likely that they narrow down the number of stores/brands they consider. Under conditions where consumers are not completely uncertain about the alternatives, it is unlikely that they will respond to changes in search cost and price dispersion as strongly as they would under conditions of uncertainty. The major argument is that consumers with more specific know-

ledge about the decision alternatives may feel they have less need for information. Therefore, they may not collect more information as search costs become lower or as price dispersion increases.

To make a strong evaluation of the generalizability of economic theory, comparison is needed of the search behavior of consumer decision-makers under two conditions: low uncertainty and high uncertainty (as defined above). The most appropriate approach to such an evaluation is experimental research, which allows the control of many factors not controlled in survey research.

It is also of interest in this research to consider how the costs and benefits of search might be traded off. Extending Stigler's arguments, some researchers (e.g. Telser 1973) have contended that a reduction in search costs automatically raises the benefits of searching. This would suggest that even under conditions of low uncertainty a searcher with low search costs will search more because it is easy to do so. This is a provocative argument that has important implications for the diffusion of in-home communications technology for shopping. It suggests that, even though shoppers know that "Sun TV" always has the lowest prices for appliances (little uncertainty about where to shop), they may still browse through the available in-home system just in case there happens to be a sale go-

ing on at another local store. This has important implications for the structure of retail prices in the future information environment.

2.4.4 Summary and Conclusions

The specific question raised by this research is the following: will the propositions from economic search theory accurately predict the behavior of searchers in both high uncertainty and low uncertainty purchase situations? The lack of strong support for these propositions in the survey literature may simply reflect the fact that a large number of consumer purchases are made under conditions of low uncertainty. Under these conditions, the classic search theory may apply to a lesser degree.

Addressing these research questions allows more precise judgments to be made about the general question in the research: can the economics of information framework be used generally to predict buyer search behavior? The following chapter presents the specific research questions as formal hypotheses.

Chapter III

RESEARCH HYPOTHESES

3.1 INTRODUCTION

In the previous chapter, the following points were raised:

1. Two propositions coming out of the economics literature (relating search cost and price dispersion to extent of search) have become firmly entrenched in marketing thought.
2. A review of the empirical literature in marketing shows that these propositions have found only mixed support.
3. In particular, researchers have failed to recognize that the classic search model explains most appropriately the behavior of buyers who begin the search process under high uncertainty.

In this chapter, the specific hypotheses to be tested in the current research will be presented. The research will involve the manipulation of three independent factors (price dispersion, cost of search, and uncertainty), each with two levels. The dependent variable of primary importance is the "number of stores searched." All hypotheses described below make reference to that dependent variable. The specific research design will be discussed in the following chapter.

The next section examines the three main effects that would be expected in the experiment and discusses four different interactions. The findings related to the interactions will be of primary interest and have the most important implications. Each hypothesis will be stated and then explained.

3.1.1 Research Hypotheses - Main Effects

3.1.1.1 Main Effect 1 - Price Dispersion

H1: Ss will search more retail stores for price information when they know the dispersion of market prices to be wide than when they know the dispersion to be narrow.

Consistent with the search literature in both economics and marketing, the prediction here is that the searcher will tend to search more when s/he knows that prices in the marketplace are dispersed widely than when the prices have a narrow dispersion (Stigler 1961, Ratchford 1982). This main effect is expected to occur when aggregating across all Ss because the response of one group of Ss (those with greater uncertainty about where to shop) will be stronger than the response of the remaining Ss. The response of the former group is expected to be strong enough to create a main effect for price dispersion.

3.1.1.2 Main Effect 2 - Cost of Search

H2: Ss will search more retail stores for price information when the cost of that search is low than when it is high.

It is expected here that the main effect of cost of search will duplicate that which has been found in the experimental studies cited in Chapter 2. That is, on the average, Ss will tend to search more when the cost of search is lower. The current experiment, which provides for search in a laboratory setting, will involve a strong manipulation of search cost by varying both the economic and time costs of obtaining information. This manipulation is stronger than the experiments cited above (i.e. Irwin and Smith 1957, Green 1966) which manipulated cost only on a "monetary" basis. The strength of the responses of "uncertain" Ss to the search cost manipulation should ensure a main effect.

3.1.1.3 Main Effect 3 - Searcher Uncertainty

H3: Ss will search more retail stores for price information when the prior information they have is abstract in nature than when that prior information is specific.

As will be discussed in chapter 4, this independent variable manipulation is intended to represent the distinction between the assumption about the searcher's knowledge in many models of search in economics (i.e. Stigler 1961, Gastwirth 1976, Schotter and Braunstein 1981) and a more "realistic" assumption about that prior knowledge. The fact that knowledge of or experience with the marketplace tends to reduce the amount of search undertaken by a consumer was discussed in the previous chapter. Consistent with the definition presented in the previous chapter, the manipulation here will introduce two different levels of uncertainty for two groups of searchers by giving one group more information than the other. In other words, the low uncertainty group will be better able to accurately estimate the probability that each seller has the lowest price than the high uncertainty group. It is hypothesized that the group with more information (the lower uncertainty group) will search less than the other group.

3.1.2 Research Hypotheses - Interactions

3.1.2.1 Interaction 1- Price Dispersion by Searcher Uncertainty

H4: There will be a two-way interaction between price dispersion and uncertainty. Under "high uncertainty" conditions, search will be greater when prices are widely dispersed than when they are narrowly dispersed. Under "low uncertainty" conditions, price dispersion is expected to have a much weaker effect on extent of search.

Previous experimental research has shown that, when the searcher has no prior knowledge or only abstract prior knowledge about the task to be undertaken, then the perceived (or discovered) dispersion of information obtained regarding the task does affect search in the manner predicted by economic theory. For example, Ss in the Irwin and Smith (1957) study knew nothing about the deck of index cards containing different numbers when they started selecting cards. In that experiment, Ss attempted to make judgments about the mean value of the numbers in the entire deck, and generally tended to select more cards when they found the variance of the numbers to be larger. Also, in the Schotter and Braunstein (1981) study, Ss randomly selecting from a more widely dispersed distribution tended to make more searches than did those selecting from a less widely dispersed distribution. These studies suggest that Ss

selecting information that is more variable will select more of that information before making the decision. To the extent that one can equate "variable information" with variability in decision alternatives, these studies support the idea that greater dispersion leads to more search for Ss searching randomly.²⁰

Other experimental studies, however, have shown that when the searcher starts out with knowledge about the decision alternatives, s/he gathers less information in a decision-making task. Bettman and Park (1980), for example, found that microwave owners labelled "high" in knowledge about microwaves tended to search less when making a hypothetical choice of a microwave oven. This is consistent with Bucklin's (1966) survey finding which suggested that shoppers with brand/store knowledge tended to shop less than shoppers without that knowledge. Also, the Duncan and Olshavsky (1982) finding that perceptions of large differences between stores was related negatively to extent of search suggested that shoppers' specific beliefs about stores guided their search efforts. These beliefs about stores (representing less uncertainty about where to shop) may have dictated little search in spite of the

²⁰ As discussed in the previous chapter, these studies represent search under high uncertainty because subjects were drawing randomly from an unknown distribution. The subjects in these experiments could not anticipate the value that was to be drawn.

fact that there were wide perceived differences between store types.

This hypothesis suggests, then, that the search behavior of Ss who have prior knowledge of prices but are uncertain about where to find those prices will be affected by price dispersion (see Figure 3). Ss who are more certain about where to find the prices may be less affected by price dispersion in their search, because they are likely to eliminate from consideration the stores at the upper end of the price continuum.

3.1.2.2 Interaction 2 - Cost of Search by Searcher Uncertainty

H5: There will be a two-way interaction between cost of search and uncertainty. When uncertainty is high, cost of search will have a stronger effect on the extent of search than when uncertainty is low.

A fundamental contention of the economic search literature (and of psychologists, marketers, and consumer economists) is that a lower cost of search will lead to more search. Some economists (i.e. Telser 1974) have translated "lower search costs" to mean "greater per-

Figure 3: Predicted Interaction-Price Dispersion and Uncertainty

ceived benefits from search," thereby implying that one's need for information is somehow a function of the money or time cost of obtaining that information. A different stance is taken here. The interaction hypothesized here suggests that search cost will affect the extent of search as expected only when prior information is abstract (provides only a price range). When Ss are uncertain about where lower prices are offered, they should respond to lower costs of search by searching more. In essence, there is a strong benefit to

search under conditions of high uncertainty, and therefore lower search costs should result in Ss gathering more information. This hypothesis is supported somewhat by a close consideration of past studies which have been interpreted as supporting the "cost of search" proposition. That is, previous studies concluding that cost of search is negatively related to search involved tasks in which Ss selected information about decision alternatives in a "blind" or random manner. For example, Sieber and Lanzetta (1964) found that as the cost of information increased, less information was purchased. However, each purchase in this experiment was "blind" in the sense that information purchases were made by dropping tokens in a box and having the relevant information then revealed. Even though Ss learned about the types of information available and that helped them determine whether to continue purchasing information, each search was random or undirected.

The effect of search cost on extent of search for Ss in the low uncertainty condition is hypothesized to be much weaker than in the high uncertainty condition. Lanzetta (1963) found no effect due to search cost in a low uncertainty condition (in his "concept attainment" experiment - discussed in Chapter 2). The argument that individuals who have some direction in their search (i.e. prior brand/store preferences) may be af-

affected very little by changes in search cost is supported by the Donnermuth and Cundiff (1969) study also cited in chapter 2.

The overriding point here is that the relationship between search cost and extent of search may change under different levels of searcher uncertainty. The predicted interaction is presented graphically in Figure 4.

Figure 4: Predicted Interaction Between Search Cost and Uncertainty

3.1.2.3 Interaction 3- Cost of Search by Price Dispersion

H6: There will be a two-way interaction between price dispersion and cost of search. When prices are narrowly dispersed (i.e. there is little benefit to search) search cost will have a weaker effect on extent of search than when prices are widely dispersed (there is greater benefit to search).

This hypothesis is primarily intuitive in nature, and could be interpreted logically within the cost/benefit framework (i.e. that very low benefits to search will lead to less search, regardless of search cost level). Interestingly, the interaction between search costs and search benefits has not been considered in research before. Neither the economic search model nor any literature in marketing makes any speculation as to what will happen when search costs and search benefits interact. The resulting interaction here may be quite similar to the interaction predicted for cost of search and uncertainty (see Figure 5).

Figure 5: Predicted Interaction Between Price Dispersion and Search Cost

3.1.2.4 A Potential Three-Way Interaction

While little has been said about a three-way interaction in the experiment, it might be suggested that the "price dispersion-uncertainty" interaction may differ under the different search cost conditions. It is not inconceivable that subjects working under more cost-intensive conditions will have a reaction to shopping as many real world consumers have been described as having. That is, Ss in the high cost condi-

tion may not respond to wide price dispersion and high uncertainty with more search. They may simply end search to end their frustration and uncertainty (this behavior has been described by Bauer 1960). The possibility of finding this reaction certainly depends on the severity of the search costs in the high search cost condition. Note also that the occurrence of this behavior would affect the two way interactions described above. The purpose of bringing this up is to acknowledge (on an a priori basis) the possibility of such a result.

3.2 SUMMARY OF HYPOTHESES

Table 5 below provides a summary of the hypotheses enumerated in this chapter. The table summarizes the main effect predictions that both greater price dispersion and greater uncertainty will lead to more search and that greater search cost will lead to less search. In addition, the proposed interactions are summarized by showing the predicted effect on search behavior that one factor will have under each condition of the other factor. For example, price dispersion is expected to impact search behavior under high uncertainty, but is expected to have little or no effect under low uncertainty.

The methodology develop to test these hypotheses is presented in the following chapter.

TABLE 5
Summary of Hypotheses

		Predicted Relationship with Extent of Search
<hr/>		
MAIN EFFECTS:		
	Price Dispersion	+
	Search Cost	-
	Uncertainty	+
<hr/>		
INTERACTIONS:		
Price Dispersion	Under Low Uncertainty	0 or slight +
	Under High Uncertainty	+
Search Cost	Under Low Uncertainty	0 or slight -
	Under High Uncertainty	-
Search Cost	Under Narrow Dispersion	0 or slight -
	Under Wide Dispersion	-

Chapter IV

EXPERIMENTAL METHODOLOGY

4.1 INTRODUCTION

The hypotheses presented in the previous chapter will be tested using the following experimental methodology. The experiment involves the manipulation of three independent variables and the measurement of a number of dependent variables which will be used to evaluate Ss' search behavior and their perceptions relating to need for information and costs/benefits of search. Other potential individual difference variables which may explain differences in search behavior will be treated as covariates.

The current chapter consists of several sections. First, the basic design of the experiment will be explained, and will be followed by a discussion of the subjects, the experimental setting and the experimental procedure. After discussing the method, the specific operationalizations of the independent variable will be discussed. Finally, the dependent variables measured in the experiment will be presented and discussed.

4.2 EXPERIMENTAL DESIGN

The experiment in this research utilized a 2 X 2 X 2 completely randomized design. The three independent variables used in the experiment are described briefly immediately below.²¹

1. Price Dispersion (Wide vs. Narrow) - In the experiment, Ss were given information about prices in the marketplace for the clothes dryer brand for which they searched. This information indicated to Ss either that prices were dispersed widely in the marketplace (i.e. there was a wide range of prices in the marketplace for a particular brand) or that prices were dispersed quite narrowly for that brand (there was a small range of prices).
2. Uncertainty (Low vs. High) - As noted in previous chapters, economic search models assume that buyers' search is guided by prior information about the range of market prices, but that buyers do not know where to find the prices that they have observed previously. To reflect this condition, Ss in the high uncertainty condition were given only the dollar price range information. The low uncertainty Ss, on the other hand, were given a ranking of stores (according to their dryer prices) in addition to the price range information. In short, the low uncertainty Ss were given more prior information. This low uncertainty condition was intended to reflect a typical situation in which the consumer begins the search process with some prior information about store prices from advertising or experience.
3. Search Cost (High vs. Low) - This manipulation of search cost involved varying the time and money expenditures required to obtain information about each specific appliance store. The manipulation was structured so that it was less

²¹ The specific operationalizations of the independent variables are presented in a section later in this chapter.

"costly" to obtain store information in the low search cost condition than in the high search cost condition.

4.3 METHOD

4.3.1 Subjects

A student sample was used for the experiment for primarily three reasons. First, it was expected that this group would have little knowledge about the prices and price distributions of durable goods (specifically clothes dryers, which is the product class about which the Ss made their decisions). It was therefore expected to be easier to "create" the Ss' prior knowledge about marketplace prices than if they already had some knowledge about those prices.²² Second, we assumed that a sample of business students would be basically familiar with computer equipment. This is important since the experiment involved information search over an interactive computer shopping system. Ss' previous experience with computers was expected to help them adapt to using the shopping system more easily than a sample who had not had that experience. In support of this assumption, the sample registered strong agreement with the Likert statements "using a computer terminal is easy for me"

²² Thirty of the 191 Ss in the experiment reported having already shopped for a clothes dryer. The analysis of this group will be discussed in the following chapter.

and "I have had a lot of experience working with computer terminals" in the actual running of the experiment.

A third reason for using students is that they represent a relatively homogeneous population. The use of homogeneous populations in experimental research helps to strengthen a test of theory by controlling in part for background factors (Calder, Phillips, and Tybout 1982).

A total of 191 students from sections of an introductory marketing class participated in the experiment. The Ss were distributed throughout the experimental cells as follows:

LOW UNCERTAINTY

Narrow Price Dispersion:
 Low Search Cost- 23
 High Search Cost-25

Wide Price Dispersion:
 Low Search Cost- 24
 High Search Cost-26

HIGH UNCERTAINTY

Narrow Price Dispersion:
 Low Search Cost- 27
 High Search Cost-20

Wide Price Dispersion:
 Low Search Cost- 22
 High Search Cost-24

4.3.2 Experimental Procedure

The experiment required Ss to simulate two shopping trips using an IBM personal computer. The programming for the experiment was done in a language called PC/Pilot, which was developed for interactive testing. The experiment was undertaken over a three day period, with sessions run 5 hours per day. The experiment took place in an IBM microcomputer laboratory on the Ohio State University campus, in which 20 terminals were available. At most, sixteen of those terminals were used during any given hour of the experiment. The experimental sessions actually lasted about 45 to 50 minutes.

The terminals were arranged in a "U" shape around the room, which permitted maximum control and observation of S behavior (see Figure 6 for a schematic of the terminal arrangement). The experimenter (E) could sit at one point in the room and view each Ss' terminal. This allowed E to observe any problems that arose and to find which Ss might be having difficulty with the experimental protocol.

Ss from all 8 cells in the experiment were run during each hour. The room arrangement allowed groups whose behavior might affect one another to be physically separated. The first day subject arrangement is shown in Figure 6 and shows, for example, that the two

search cost groups were located on either side of the room and therefore could not affect one another's behavior. This was the most "obvious" manipulation, so it was very important to keep the two search cost groups as separate as possible. The next most "obvious" manipulation was uncertainty, and Figure 6 shows that each uncertainty group was split into two groups of four during each hour. The four groups of four were alternated across the room (low uncertainty, high uncertainty, low uncertainty, high uncertainty). The price dispersion manipulation was deemed to be the least noticeable of all the manipulations, so the wide and narrow price dispersion Ss were alternated every other terminal.

The first day arrangement shown in Figure 6 was modified for the second day by placing high search cost Ss on the other side of the room. The third day's arrangement was the same as the first day's.

The appropriate subject numbers were set up at the terminals at the beginning of each hour by placing a handout at each terminal (with the subject numbers on them). These handouts were used by Ss for note taking during the exercise and also contained the post-shopping Likert items. Before entering the lab, Ss were instructed to "sit at any terminal with a handout in front of it." Efforts were made by the experimenter to

Key: NPD=narrow price dispersion WPD=wide price dispersion
LSC=low search cost HSC=high search cost
LU=low uncertainty LU=high uncertainty

Figure 6: Schematic of Laboratory Arrangement of
Terminals-Day 1

ensure that Ss in each hour were as evenly distributed
across the experimental cells as possible.

4.4 EXPERIMENTAL TASK

The instructions given to Ss at the outset of the experiment asked them to think of the research as a "shopping simulation" which utilized the computer (the script for these initial verbal instructions is provided in Appendix A). It was important to make sure Ss did not think of the research as an exercise in "in-home shopping" because the purpose of the study is to examine consumers' actual shopping behavior. The Ss were told that the objective of the research was to "see how consumers go about shopping" and that each person was doing something a little different from the others. Subjects were also told that their purchase tasks would involve "price-shopping" (see Appendix A).

The Ss went through two different shopping tasks in their hour of participation. The first task was explained to be a "practice task" and involved shopping for and purchasing a Sealy queensize mattress (in each task, Ss were told the brand that they were to purchase). The second task was labeled the "payoff" purchase task because the Ss' experimental "reward" was determined from this task. In both the practice and payoff tasks, Ss had a choice of seven stores that they could shop (a different group of seven stores was used for each task).

Providing for a practice task ensures that (1) Ss understand the use of the shopping system and (2) they understand the "costs" and "benefits" associated with shopping. The procedure used in the practice task was exactly the same as that in the payoff task. The specific instructions provided to the Ss which described the experiment in general and led up to the beginning of the practice task can be found in Appendix B.

It should be noted that the information provided prior to the practice task was the same for all Ss except for the search cost information. The low search cost (\$3.00 per store/5 second wait) and the high search cost (\$7.00 per store/20 second wait) conditions were put into effect in the practice task to be consistent with the search cost manipulation in the payoff task.

A related point regarding the instructions should be mentioned here. Of critical importance in these early instructions was the explanation that the prices used in the experiment were actual prices from a real city. It was explained to Ss that fictitious names would be substituted for the actual city and store names so their shopping behavior would not be affected by those names. Again, this information was provided to all Ss in the experiment and can be found in the instructions in Appendix B.

4.4.1 Shopping Procedure Used in the Experiment

The procedure by which Ss shopped the different stores on the computer shopping system involved the following steps:

1. Ss selected a store from a menu of seven stores.
2. Ss typed in the name of the product category they were shopping for.
3. Ss typed in the brand name of the product. After this request, they received the price information for that product.
4. Ss "left" the store they had just shopped and given the choice of ordering the product from any of the stores they had shopped, or shopping another store.

The procedure was virtually the same for all Ss in the experiment. A primary function of the practice purchase task was to allow Ss to get used to the procedure for selecting stores and obtaining the price information they wanted.²³

Once the practice task was completed, Ss moved into the instructions for their "payoff" task. This portion of the experiment is discussed in detail in the following section.

²³ It should be noted that, in the interest of time, the experimenter had to encourage some slower Ss (about 2 per hour) to move ahead after they had shopped 2 or 3 stores in the practice task. It was explained to these Ss that, since this was only for practice, they need only to understand how the system works (as opposed to really maximizing their ending balance). The purpose of encouraging slower Ss to move on was to prevent them from holding up the entire group and causing them to run into the next hour.

4.4.2 The Payoff Task Procedure

The specific instructions and information that Ss received after they had completed their practice task are provided in Appendix D. The Ss were initially told that they were in need of a new clothes dryer and that, with the help of others, they had decided upon the Whirlpool brand. It was explained to Ss that their objective in the payoff task was entirely economic: they were to maximize their ending bank balance. There were basically five phases of the experiment (after the practice task) that led up to and included the timed payoff task:

1. Phase 1 - in this phase Ss were given information about the task. An introduction to the task was provided which described the purchase scenario to Ss (including what product and brand they were to purchase).
2. Phase 2 - in this phase the Ss obtained local retailer price information from a previous period (for the brand they were told to purchase in Phase 1) by typing in the command "Price Survey/57." The source of this information was the local newspaper, which prints a report of durable goods prices every year (this is a realistic report, as indicated by Hawkins, Coney, and Best 1983). Ss were told that this information was provided to give them an idea of the range of prices at which the local retailers offer their dryer brand. They were informed further that the price information may be dated.
3. Phase 3 - After reading both the information from the price survey and some comments about that information, Ss were asked to respond to 13 survey questions. As can be seen in Appendix D Ss were told that the purpose of these questions was to obtain their impressions of the price survey information and of the experimental procedure. Ss who completed these questions

early were then asked to wait until the others had completed them. When all had finished, the actual timed shopping task began.

4. Phase 4 - At this point, a seven minute timed payoff task began. Ss were told that, within this seven minute period, they would shop for and purchase the Whirlpool clothes dryer. If there was time left over after the purchase had been made, Ss could then go ahead and answer the "General Business Quiz" questions (to be discussed below) to try and add to their bank balances. During the timed task, the experimenter called out how much time was left at every minute interval.
5. Phase 5 - When the seven minute time limit was up, Ss were told to answer the GBQ question that they were currently on, and then to move on to the last screen of the instructions. This screen simply gave the Ss their final bank balance tally and instructed them to answer the questions on the last two pages of their hand-out.

At this point, the experimenter gave Ss several verbal instructions. The first comment restated the computer's instruction to answer the post-shopping items on their handout. Further, the Ss were urged to give their best and most honest answers to these items (this was emphasized because Ss were typically anxious to leave the lab at the end of the hour). Ss were also asked at this point not to discuss the experiment with any of their friends who might be coming in and, finally, they were asked to type in the word "SAVE" to save their work on the computer.

4.4.3 Subjects Compensation

Subjects' compensation (aside from extra credit points) was tied directly to their shopping "performance." Upon completion of the experiment, a drawing was held for several cash prizes. The number of raffle tickets that each subject had entered in the drawing

was equal to the number of dollars in his/her bank account at the end of the payoff task. In short, Ss began their payoff task with a fresh bank balance and were charged both for each store they shopped and the cost of their purchase. Ss then added \$2.00 to their balance for each correct GBQ answer. The final bank balance, then, was a function of both how "well" the subjects shopped and how well they could answer GBQ questions. A raffle was held for the group of subjects in each cell of the experiment (eight raffles altogether).

Having discussed the procedure that Ss went through in the experiment and subjects' compensation, more detail will be presented about the independent variable manipulations. In the following sections, the intent of each manipulation will be discussed briefly and will be followed by a discussion of their operationalizations.

4.5 MANIPULATION OF INDEPENDENT VARIABLES

4.5.1 The Manipulation of Price Dispersion

In the classic sense, price dispersion represents the "benefits" of search to the searcher (Stigler 1961). Whether or not price dispersion always reflects the benefits of search is a question raised in this research. The independent variable price dispersion was represented here in its literal form- the range of

prices available in the marketplace (for a given brand). The price ranges which represent the two different dispersion conditions are numerically very different, with the wide price dispersion condition (\$111) being three times as large as the narrow price dispersion (\$37). The following section details how the price range information was communicated to Ss.

4.5.1.1 Communication of Price Dispersion Information

As reflected in the initial instructions provided to Ss, each purchase task (practice and payoff) was preceded by a review of last year's price information by Ss. The source of this information was the "Newtown Durable Price Survey" (July 1983 edition), which was said to be published annually by the local Newtown newspaper. Ss were informed that this was intended to "give them an idea of what to expect in the Newtown marketplace" for each purchase they made.

All Ss were given the same price range information in the practice task. The manipulation took place prior to the payoff task and involved telling Ss that the dollar difference between last year's lowest and highest prices was either \$37 or \$111 (see Figure 7).

In addition to the price range information from the Newtown Price Survey, Ss were provided with some information about the "average" range of prices in other ci-

Excerpt from "Newtown Consumer Durable
Price Survey" July 1983 - p. 57

For clothes dryers, we found there to be some difference in prices between retailers.... for the Whirlpool brand, there was a \$37 (\$111) difference between the highest and lowest priced retailers.

The following illustrates the distribution of retailer prices for the Whirlpool clothes dryer in July 1983.

|----- \$ 37 (\$111) -----|
_X__X__X__X__X__X__X__X

Each "X" represents a retailer. Press the RETURN key to continue.

THE LOW UNCERTAINTY SUBJECTS ALSO RECEIVED THE FOLLOWING INFORMATION FROM THE PRICE SURVEY:

Excerpt from "Newtown Consumer Durable Price
Survey" July 1983 - p. 57, continued

The following information about clothes dryer retailers was also available in the Survey:

The ranking of retailers according to their prices for the Whirlpool dryer in July 1983 was:

lowest price	Berry's
	Oldham's
	Banard
	Gibson
	Champion
	Archer's
highest price	Foremost

Figure 7: Prior Information Presentation Format

ties. Figure 8 presents the screen that Ss read after they had finished reading the Price Survey excerpt. The average comparison point was \$74 (which was halfway between \$37 and \$111) and a direct reference was made to whether the Newtown price range was smaller or larger than the average range figure.

The \$37 (\$111) price range for the Whirlpool dryer in Newtown is smaller (larger) than the price range in other cities. The Price Survey reports that, in similar surveys from 10 other markets, the average price range for the Whirlpool dryer was \$74.00. Again, the price range for a city is the difference between the lowest price and the highest price in that city.

Keep in mind that the Price Survey information is one year old and sale prices may have been included in the survey. It should, however, give you some idea about what to expect in the local Newtown marketplace.

Please press the RETURN key to continue.

Figure 8: Supporting Information for Price Dispersion Manipulation

The reason for making a direct reference to whether the price range was smaller or larger than \$74 was to provide the naive Ss with a concrete basis to judge the "size" of the price dispersion.²⁴ The text in Figure 8

²⁴ It should be noted that what is actually being mani-

was presented immediately after the presentation of the Newtown Price Survey "excerpt(s)."

To ensure that Ss would not assume the information to perfectly reflect the current market price conditions, a qualifier was placed at the bottom of the Figure 8 information. This qualifier basically said that, because the price survey was a year old, the information might be somewhat out of date and that sale prices may have been included in the original survey.

The actual prices used in the payoff task are presented in Table 6.²⁵

pulated is the size of the price range relative to some average figure rather than relative to the benefits of search. In other words, a S might initially think that a \$37 price range is quite large in terms of the gain from shopping around but might answer that it is small relative to the comparison figure provided. The point is that perceptions of the "size" of the price dispersion may not reflect the actual perceived benefits of searching. We will be more confident of the manipulation, however, if we find that items which specifically measure the perceived benefits of search differentiate between the two price dispersion groups. These pre-shopping "perceived benefit" measures, as well as measures of the perceived size of the price dispersion are presented in Appendix E and will be discussed in detail in the following chapter.

²⁵ The prices used in the shopping system were determined by consulting retail catalogs and calling appliance retailers. Both the mattress and dryer price distributions were set up (artificially) to be uniform.

TABLE 6

Prices Used in the Payoff Task

Price Dispersion Condition

	Narrow	Wide
	-----	----
Berry's	\$294	\$254
Oldham's	300	272
Ranard	307	295
Gibson	313	313
Champion	318	335
Archer's	324	356
Foremost	334	373

4.5.2 Manipulation of Uncertainty

The intent of the manipulation described here is to create and distinguish between two cases of consumer search- one with low uncertainty and one with high uncertainty. The abstract condition here is one of greater uncertainty, in which Ss are given price range information for their brand without connecting specific stores to the prices.

To operationalize the uncertainty factor, we provided "low uncertainty" Ss with additional information immediately after they viewed the price range information (refer back to Figure 7). This second "excerpt" from the Newtown Price Survey was skipped for the high uncertainty Ss.

4.5.3 Manipulation of Search Cost

The intent of manipulating cost of search is to create two conditions which are distinguishable in terms of the time and money cost required to obtain information. Ss should perceive the "high" cost of search condition as being more costly and more time-consuming than the "low" cost condition. The frustrations and difficulties that a "real-world" shopper might experience should be represented here. The next three sections will address the elements of search cost represented in this experiment. Two of these dimensions of search cost were manipulated in the experiment.

4.5.3.1 Time as a Dimension of Search Cost

In considering consumer shopping behavior, it has been suggested that the time spent shopping should be formally considered as an "expense" of that shopping behavior (Downs 1961). While some consumers place a greater cost on time spent shopping than others do (Bellenger et al 1977), it can be assumed that, in an experimental setting with an objective of quickly finding price information, these individual differences will be diminished. To manipulate the time cost of search, the amount of time it took Ss to "enter" a store was extended. At the point in the shopping

procedure where Ss selected a store for shopping, they all recieved the message: "REQUEST RECORDED- ONE MOMENT PLEASE." At this point, the low search cost Ss had to wait 5 seconds to enter the store, while high search cost Ss had to wait 20 seconds.²⁶ The decision to "aggregate" the waiting time at one point in the search procedure was made when another plan (having longer delay times for high search cost Ss at each of the three decision points in the shopping procedure) failed to produce significant differences in the two groups' perceptions of search time cost in pretests.

4.5.3.2 Money as a Dimension of Search Cost

The most obvious cost of shopping is the money spent for one's time and travel. The manipulation of this dimension of search cost was a simple one- low search cost Ss paid \$3.00 to shop each store while high search cost Ss paid \$7.00. This cost was assessed each time they "entered" a store to obtain price information. It was fully explained to Ss that this cost was to represent the expenditures that they make when they actually shop (see Appendix B).

²⁶ High search cost and low search cost Ss were always on opposite sides of the lab so that neither group could see that others were waiting more or less time to enter a store.

Pilot tests showed that that many Ss could not make a judgment as to how "expensive" or "inexpensive" the monetary search costs were because they had never put their "real world" shopping activities into monetary terms. To address this problem we provided Ss with a "comparison point"- an average shopping cost figure from other cities the same size as Newtown (\$5.00). This figure provided an equi-distant contrast with the \$3.00 and \$7.00 cost points, and was intended to make Ss feel that they were paying either above or below the average.

4.5.3.3 The Opportunity Cost of Search

Mincer (1964) discussed the need to recognize buyers' "opportunity cost" as part of the price paid for a product. In an effort to reflect realistic shopping conditions, Ss were given a chance to answer "General Business Quiz" questions in their remaining time (after the purchase had been made) in the payoff task.

The initial instructions regarding the GBQ are provided in Appendix B. The GBQ serves to provide the Ss with an alternative use of their shopping time. In addition, the opportunity cost should make the actual costs of shopping more salient to Ss. The value of the GBQ for Ss was that they earned "dollars" to be added to their bank accounts for each correct answer (described earlier).

4.6 DEPENDENT VARIABLE MEASUREMENT

4.6.1 Number of Stores Shopped

The dependent variable of primary interest in the experiment is the number of stores shopped by Ss in the clothes dryer purchase task. This is an unambiguous indicator of the effort that Ss put into the search task and is a commonly used measure in survey studies of consumer search behavior (Newman 1977). The measure is a 1 to 7 ratio scale.

Search "effort" is clearly a multi-dimensional construct, involving both mental and physical expenditures. We use only a uni-dimensional measure of that construct here because it reflects the sum of the expenditures made in the laboratory search behavior. It would have been of interest to measure Ss' perceptions of how much effort (perhaps measured on different dimensions) they put into the shopping task, but these would have served primarily as manipulation checks (which were already measured in abundance). In addition, space and time limitations led us to limit the number of post-shopping Likert items presented to Ss to 18. Future versions of this research should include measures of S perceptions of effort "expenditures."

4.6.2 Follow-up (Post-Shopping) Measures

In Appendix G, the handout used by Ss in the experiment is provided. The last two pages contain the items that Ss responded to after they had finished the payoff task. These 18 items address the following issues:

1. Ss' post-shopping perceptions of price dispersion, time and money costs of search, the "direction" given by the 1983 Price Survey information, and the value of extensive search (2 measures).
2. How seriously Ss took the payoff task and how important Ss thought the research results would be to marketers.
3. Ss' actual shopping tendencies.
4. Ss' perceived experience in working with computers.
5. Ss' perceptions of how "confusing" the research study was, and how likely reports like the Newtown Price Survey actually exist.

Some personal information was also collected from Ss which could potentially covary with the dependent variable.

The measures listed above were collected for one of two basic purposes: (1) to serve as manipulation checks for the independent factors, or (2) to examine the potential interaction between person and situation in the experimental setting (Punj and Stewart 1983). The measures used for the latter purpose will primarily be used as covariates in the analysis of the experimental effects on the number of stores shopped.

Chapter V

PILOT TESTING THE EXPERIMENTAL DESIGN

The experimental procedure was pilot-tested over a four month period beginning in March, 1984. The pretests were designed to answer many questions about Ss' behavioral reactions to and perceptions of the experiment. In addition, the pilot tests were undertaken to test the impact of the experimental manipulations on subject perceptions and behavior. The pretest results led to refinement of the experimental protocol and provided insight into issues that would not have been raised had the extensive series of pilot tests not been conducted. Table 7 presents a summary of pretests, describing the sample size, objectives, and design of each.

The current chapter discusses the results of these pilot tests in summary form. The chapter is organized by specific research questions rather than by order of pretests because certain common issues were addressed across pretests. In each section, one of the specific questions is explained and pretest findings regarding that question are discussed. In addition, the steps

that were taken to address problems found in the experimental design prior to the actual running of the experiment are discussed.

TABLE 7
Summary of Pilot Test Information

<u>Study</u>	<u>Sample Size</u>	<u>Objectives</u>	<u>Design</u>
Pilot Test 1	35	<ol style="list-style-type: none"> 1. Assess Ss' general reaction to the experimental protocol. 2. Assess the impact of disconfirming price expectations. 	Single Factor: Confirmed vs. Dis- Confirmed Expecta- tions.
Pilot Test 2	23	<ol style="list-style-type: none"> 1. Assess the impact of disconfirming price expectations. 	" "
Pilot Test 3	41	<ol style="list-style-type: none"> 1. Assess the impact of the search cost and price dispersion manipulations on Ss' perceptions and search behavior. 2. Evaluate the effects of introducing the GBQ. 	2 X 2: low vs. high search cost wide vs. narrow price dispersion.
Pilot Test 4	59	<ol style="list-style-type: none"> 1. Assess whether the lack of a price dispersion effect (in pilot test 3) was due to the GBQ dominating search. 	2 X 2: wide vs. narrow price dispersion GBQ vs. No GBQ in the payoff task
Pilot Test 5	35	<ol style="list-style-type: none"> 1. Replication of Pilot Test 4 with some modification in measures and a change to using <u>uniform</u> price distributions. 	" "
Pilot Test 6	71	<ol style="list-style-type: none"> 1. Assess the impact of search cost and price dispersion manipulations on perceptions and search behavior under revised methodology. 	Same design as Pilot Test 3
Pilot Test 7	15	<ol style="list-style-type: none"> 1. Examine in depth subject response reliability. 	Search behavior and Likert responses studied for Ss in 1 cell
Pilot Test 8	36	<ol style="list-style-type: none"> 1. Further examine the impact of search cost and price dispersion manipulations and examine the effect of changes in the experimental protocol on response reliability. 	Same design as Pilot Tests 3 and 6

5.1 DO SUBJECTS UNDERSTAND THE EXPERIMENTAL TASK?

The evidence throughout all the pretests leads to an affirmative answer to this question. The most important things that Ss should understand in the experiment are the cost-return trade-offs in the shopping tasks and the overall objective of bank balance maximization. Several pieces of evidence show that Ss' understanding of the task was good.

First, a provision was made in pretest 3 for Ss to have the option to go back and review the instructions again before moving ahead with the practice task. Virtually no one took advantage of this review, indicating that the instructions had been understood when initially presented. In pretests 2 and 7, the Ss were asked open-ended questions to determine whether they truly understood their task. In pretest 2 one question asked of Ss was why they had ended their shopping in the payoff task. In response to this question, most Ss made direct reference to the elements of the task that we wanted them to be thinking about: the available price range, the cost of search, and their ending bank balance. The implication was that they were aware of the trade-offs to be made in the task.

Finally, pretest 7 was concluded by asking Ss to explain why they had answered certain pre-shopping questions regarding the value of search as they did. The

pre-shopping questions addressed the value of shopping 6 or 7 stores, and Ss explained their responses to those questions quite logically. In most cases, the responses could be interpreted as reflecting a "cost-benefit" orientation. For example, Ss frequently referred to the narrow price range as indicating that it was not worth the cost of shopping 6 or 7 stores. Alternatively, several Ss communicated that the cost of search was too high to merit shopping 6 or 7 stores.

In short, it appears that Ss understood what was at stake in the experimental procedure and were considering the appropriate issues.

5.2 DO SS BELIEVE THE 1983 NEWTOWN PRICE SURVEY INFORMATION?

The extent to which Ss believed the prior information attributed to the Newtown Price Survey is crucial to the experiment with respect to two of the independent factors (price dispersion and uncertainty). The paradox that arises here is the following: subjects should believe the information, but should not believe it to be "perfect" information. In order to properly create Ss' perceptions in the experiment, this paradox had to be thoroughly examined.²⁷ It is most appropriate

²⁷ It should be noted that the framework being tested (the economics of information) deals with buyer behavior under uncertainty or "imperfect" information. In this light, a situation had to be set up in which

to look at two separate dimensions of this issue. In the next two subsections, the following questions will be addressed: (1) did Ss believe the prior information to be valid?, and (2) did they believe the information to perfectly describe the current marketplace?

5.2.1 Did Ss Believe the MPS Information to be Valid?

In both the very early and very late pretests, Ss were placed in the low uncertainty condition (e.g. they received the previous year's store ranking according to Whirlpool dryer price) to find the extent to which they believed the information. In the initial pretests, Ss were asked to place a probability on the event that each store (judgements were made separately for each store prior to shopping) would be the lowest priced store in the current market. In both pretests 1 and 2, the ranking of the stores according to each store's average probability was identical to the ranking provided in the 1983 price survey. This indicated that Ss were using the 1983 ranking information to make their probability judgments.

Throughout the various pretests, Ss responded to Likert items which assessed their perceptions of the usefulness and helpfulness of the prior information. Alt-

Ss perceived the information with which they were working to be useful but not perfect.

though the wording of these items was changed somewhat throughout the different pretests, Ss consistently agreed that the information would be helpful to them when they shopped in their payoff task. In addition, Ss disagreed (on average) with statements such as "the price information is probably too old to be useful."

Two final pieces of evidence are relevant here. First, the low uncertainty pretest Ss appeared to be directed strongly by the prior ranking of stores in their search behavior. This is evidenced by the fact that 18 of 23 pretest 2 Ss (who were all in the low uncertainty condition) shopped Champion or Oldhams (the lowest-ranked stores). Further, 20 of 23 shopped the three lowest ranked stores. In pretest 7, the effect was stronger in that 80 percent of the low uncertainty Ss shopped at the store ranked as lowest in the 1983 Newtown Price Survey.²⁰ Second, it was found that Ss also used the price range information in their search behavior. During pretest 5, Ss were asked to explain why they had ended their shopping when they did. A

²⁰ The reason that pretest 7 Ss seemed to use the prior information more strongly was probably because they had an opportunity cost of time in their search, while pretest 2 Ss did not. In other words, pretest 7 Ss probably felt more time pressure and therefore used the prior information as a more literal guide to the marketplace than did pretest 2 subjects (the information may have become more valid in their eyes given the time pressure and since that information was all they had to go on).

very common response was that they stopped shopping when they found a price difference that approximated last year's price range. This indicates that the range information was used by Ss in deciding when to stop shopping.

5.2.2 Did Ss Believe the NPS to Perfectly Describe the Current Market?

In the experiment, the intention was not to create "perfect" beliefs; i.e. beliefs that would lead Ss to shop only one store and then stop. In particular, the low uncertainty Ss' beliefs about the current accuracy of the 1983 store ranking were of interest.

Some evidence has been generated which indicates that Ss do not take the 1983 retailer ranking information as current "truth." First, search behavior can be examined. Even though Ss did use the ranking information to guide their search (as reflected in the evidence presented above), the concern that it would lead them to shop only one store was unfounded. For example, only 9 of 23 pretest 2 Ss shopped Champion and Oldham's (the 2 lowest-ranked stores) on their first two searches. Similarly, few Ss in pretest 7 went straight to the two lowest or the lowest and highest-priced stores on the first two searches and then stopped. A common strategy was for Ss to use the lowest

ranked store as a "comparison point" and to explore the stores in both the middle and the high end of the ranking.

More evidence addressing how "perfectly" Ss generalized the 1983 ranking information comes from pretest 2. In this pretest, a group of Ss was asked to stop and answer some open-ended questions before they began shopping. When asked whether they felt the ranking of stores would be the same in 1984 as in 1983, most Ss (11 of 13) said no. The most common reason cited was that the information was a year old and sale prices may have been in effect at the time of the survey. Several Ss made reference to the different stores' pricing strategies in answering this question (e.g. stores may have changed prices in response to changes in economic conditions). The most interesting answers were from Ss who felt that the higher priced stores may have lowered their prices in response to the 1983 price survey information. All of these answers indicated that the Ss had understood and believed the prior information made available to them. Further, Ss did not believe that the 1983 information perfectly reflected what they would see in the current market.

5.3 DOES THE PRICE DISPERSION MANIPULATION WORK?

In experimental research, manipulation checks traditionally address Ss' perceptions of the independent factor being manipulated. In discussing the price dispersion and search cost manipulations, the focus will be on the variables used as manipulation checks. The uncertainty manipulation will be examined behaviorally (by focusing on search behavior) because it was not manipulated in any particular pretest.

In nearly every pretest there were significant differences between Narrow Price Dispersion (NPD) and Wide Price Dispersion (WPD) Ss' perceptions of the price dispersion. This finding came out in earlier pretests in spite of the fact that the question wording being used was later found to be unreliable. Later runs of individual Ss showed that some misunderstanding occurred in interpreting the following statement:

The Price Survey information indicates that there are small (big) price differences between retailers selling the Whirlpool dryer.

The above Likert item was initially used as a manipulation check for price dispersion. It was found that some Ss were not thinking of the "spread" or range between the high and low-priced stores, but instead were considering "pairs" of retailers in answering the question. The biggest problem was that Ss in the WPD condition might disagree that there were large price dif-

ferences because one particular pair of retailers could be very close in their prices. Therefore, there were not large price differences between all retailers.

This wording problem may have also contributed to the inconsistency in Ss' responses to questions throughout earlier pretests. The two opposite Likert statements which assessed perceptions of price dispersion (presented in the above quotation) had low (i.e. -.50 to -.60) correlations in earlier pretests. This low level of correlation is considered unacceptable because the items simply were the reverse of one another.

The improvement of the price information presentation involved presenting a graphical illustration of the distribution of retailers according to price (so Ss would not think that a group of retailers were bunched up together). In addition, the Ss were provided with a "comparison point" in their range information. This dollar figure was said to be the average price range in a national price survey of ten other cities. Finally, the Likert item(s) used for measurement of these perceptions were worded to more directly reflect the definition of range:

There is a very BIG difference between the lowest price and the highest price for the Whirlpool dryer in Newtown.

In Pretest 8, the above Likert item obtained an average agreement of 3.05 and 5.72 from NPD and WPD Ss,

respectively (responses were made on a 7-point scale with 1=strongly disagree and 7=strongly agree). The correlation of $-.57$ was lower than desired but was explained as a function of a few Ss answering inconsistently. This finding, along with the findings from earlier pretests using the above wording indicated that the item was discriminating properly between NPD and WPD Ss and was understood by Ss.

5.4 DOES THE SEARCH COST MANIPULATION WORK?

The search cost factor was manipulated in pretests 3, 6, and 8. Even though the search cost manipulation had a significant effect on search behavior in all 3 pretests, it affected Ss' perceptions of search cost in only pretest 6 (in which LSC Ss disagreed significantly more strongly that "the cost of shopping in the experiment is too high" than did the HSC Ss). Study of individual processes in pretest 7 indicated that Ss had difficulty making a judgment on the statement because they could not place a dollar value on the cost of their "real world" shopping. Two changes were made to address the problem. First, Ss were given a comparison point for their judgments (as described in chapter 4). To review briefly, they were told that the average search cost from ten other markets the same size as Newtown was \$5.00, and that Newtown's cost was either

\$3.00 or \$7.00. A second improvement was a simpler wording of the Likert items assessing search cost perceptions:

The \$3.00 (\$7.00) cost of shopping in this experiment is (IN)expensive.

A final change in the experimental protocol that was made to enhance Ss' understanding of both the time and money costs of search was in the initial instructions (explained in chapter 4 and presented in Appendix A). The Ss were told to think of the experiment as a shopping simulation and not as an exercise in "in-home" shopping. It was explained that real costs would be deducted from Ss' bank accounts as they shopped so the simulation would be realistic. This explanation was intended to make clearer in Ss' minds the idea that the costs represented real costs of shopping (e.g. gas and oil expenditure, car wear and tear). The results presented in the following chapter demonstrate that these modifications were effective in improving S understanding of the search cost information.

5.4.1 Time Cost of Search

The time cost manipulation was more subtle than the money cost manipulation because Ss were not told about it before the experiment. In pretests 6 and 8, four of the five items designed to distinguish between LSC and

HSC Ss' time cost perceptions found significant differences between the two groups. In particular, the post-shopping responses on these variables are very important because they reflect Ss' perceptions of the time cost immediately after the payoff task. In this timed task, the time costs of search should become more salient for Ss after the task than before it. Significant differences between the two search cost groups' post-shopping perceptions of time costs should always be observed. These differences have been observed consistently in each of the pretests in which search cost was manipulated.

5.5 DOES THE UNCERTAINTY MANIPULATION WORK?

There is no direct evidence available from the pretests on this issue because uncertainty was not manipulated directly in those pretests. The evidence that is available is behavioral and implies that the low uncertainty Ss (in pretests 2 and 8) searched less than Ss working under high uncertainty (pretests 3 through 5). Ss searched an average of 2.26 and 2.84 stores in pretests 2 and 8 respectively, and searched an average of 3.48 stores in pretests 3 through 6. These numbers are not perfectly comparable because there were differences in procedure and protocol between all of the pretests. However, the numbers do give an idea about the differ-

ences in search behavior under the different conditions.²⁹

The perceptual measures of how well the prior information "directed" Ss in their search are clearly not comparable across pretests because the wording changed for nearly every pretest. In spite of the lack of evidence regarding the strength of the uncertainty manipulation, it was felt that the manipulation was adequate for two reasons. First, the intent of the manipulation is simply to provide one group with more information than the other. Providing low uncertainty Ss (and not high uncertainty Ss) with ranking information accomplished this. Second, it was found that low uncertainty Ss were apparently using this "extra" information as intended (as noted earlier, their searches were directed at the lower priced stores). Again, evidence obtained from the actual running of the experiment (to be presented in the following chapter) demonstrates that high uncertainty Ss were more uncertain about where to shop than were low uncertainty Ss.

²⁹ It should be noted that the averages for pretests 3 through 6 and pretest 8 go across the different search cost conditions. Pretest 2 was undertaken only under high search cost conditions. Ss working under that high search cost condition in pretest 8 (also under low uncertainty) shopped an average of 2.28 stores.

5-6 DOES THE OPPORTUNITY COST DOMINATE THE EXPERIMENTAL EFFECTS?

After the pretest 3 results showed no behavioral effect for price dispersion, a question was raised as to whether the availability of the GBQ (the opportunity cost of search) may have overshadowed the price dispersion effect. In other words, it was suspected that Ss in both the wide and narrow price dispersion conditions valued the GBQ highly and that its availability made extensive search irrelevant, even for the WPD Ss. Two pretests were run to assess whether the availability of the GBQ washed out the effect of price dispersion on search behavior.

At the time of the two pretests (pretests 4 and 5), the time limit for the payoff task was 10 minutes and Ss could earn \$3.00 for each GBQ question they could answer (there was a high value for the opportunity use of time). In these pretests, both price dispersion and the availability/inavailability of the GBQ were manipulated. Some differences in perceptions between the experimental groups were found. For example, WPD Ss agreed more than NPD Ss that there were large price differences and disagreed more that there were small price differences. Ss who did not have the opportunity cost of time agreed more strongly that the computer responded quickly (i.e. they felt less time pressure), disagreed more that shopping should be done quickly,

and disagreed more that shopping 6/7 stores would be a waste of time (compared to those who had the opportunity cost). The "no opportunity cost" Ss perceived more benefit to shopping.

The expected interaction between price dispersion and opportunity cost availability, however, did not occur. Perceived price dispersion had no significant impact on search behavior in either the GBQ or the "no GBQ" conditions. The expectation that an effect of price dispersion would occur in the "no GBQ" condition and not in the GBQ condition was not supported.

Based on the results of these two pretests, it was concluded that the GBQ (opportunity cost of time) should be left in the experiment for the following reasons:

1. It represents the realistic situation in which consumers have other things to do with their shopping time.
2. Having the opportunity cost makes the costs of search more salient.

In addition, one consequence of not having the GBQ available (and, in essence, eliminating the timed payoff task) is that Ss might finish shopping quickly because this task occurs toward the end of the hour (and many are anxious to finish up). With the formal timed payoff task, Ss seem to get "geared up" for shopping and answering the GBQ questions in the seven minute

time limit. The timed payoff task seems to make more certain that Ss' motivation is heightened even though it does take place toward the end of the hour.

5.7 WOULD DISCONFIRMING EXPECTATIONS AFFECT SEARCH BEHAVIOR?

An early concern with the experimental protocol was whether Ss would take the prior price survey information literally and, again, shop only 1 or 2 stores. If this occurred, then the actual (1984) marketplace store ranking would have to be made to differ from the ranking provided in the prior information .

Efforts to mildly disconfirm Ss' expectations in pretest 2 were unsuccessful because Ss were found to already place uncertainty on the year old information. As mentioned earlier, because Ss felt last year's information may be somewhat outdated, they did not limit their search to 1 or 2 stores generally. Even those Ss whose expectations were "disconfirmed" (i.e. they found 1983's lowest ranked store to be mid-range in 1984) did not search more and did not seem to be that surprised. This was probably because part of their expectation was that there might be some difference between last year's information and this year's current market conditions.

5.8 CONCLUSION

The series of pretests not only allowed the researcher to examine questions initially raised, but also served to identify other problems. Several pretests were needed to test solutions to these problems and provided much insight into Ss' reactions to the experimental protocol. The basic problems which were identified throughout the pretests (not all of which are discussed in detail in this chapter), are summarized in Table 8, along with the respective actions taken to address them. The following chapter presents the results from the actual running of the experiment in detail.

TABLE 8

Summary of Problems Encountered in Pilot Testing

Problems	Responses
1. Lack of S consistency on price dispersion Likert items.	a. provide a graph showing a fairly uniform spread of prices. b. rewording instructions and Likert items to emphasize the concept of statistical "range." c. provide a comparison point- the average dispersion from 10 other similar markets.
2. Ss' inability to judge the "size" of the search costs.	a. provided a comparison point- average shopping cost from other markets the same size as Newton. b. simpler question wording.
3. Problems in S understanding of the "perceived value of search" questions.	a. remove questions regarding 1/2 store shopping strategies. b. Reword 6/7 store shopping questions to reflect a "cost-benefit" trade-off and capitalize a portion of it to make it more explicit.
4. Potential problem with Ss' not considering their prior information when answering the Likert items and when shopping.	a. Insertion of a 30 second pause immediately before the Likert items were presented.
5. S anxiousness to get on to the payoff task- this led to them hurrying through the Likert items.	a. reworded instructions to emphasize that the payoff task would not begin until all Ss had completed the Likert items. b. Shortened the number of Likert items to 12.

Chapter VI

EXPERIMENTAL RESULTS

6.1 INTRODUCTION

The results obtained from the 191 subjects who participated in the experiment are presented in this chapter. A discussion of Ss' general reaction to the experimental scenario (e.g. how "legitimate" they felt the experiment was) will be followed by examination of the impact of previous shopping experience on perceptions and behavior. These more general issues will be followed by a discussion of the most important results of the study: the manipulation check results and the impact of the manipulations on the number of stores shopped. In addition, Ss' shopping "performance" will be examined via other criteria. The final set of results will address the "quality" of subject decisions and provide insight into the distribution of prices at which the dryers were purchased.

For the reader's reference, a listing of all pre- and post-shopping task measures are presented in Table 9.

TABLE 9

Listing of Payoff Task Measures

Pre-Payoff Task Questions

- RANGE- What would you say is the dollar difference between the lowest price and the highest price for the Whirlpool dryer in the Newtown market TODAY?
- PRE1- The Newtown Price Survey Information is easy to understand.
- PRE2- The Newtown Price Survey Information is interesting to read.
- PRE3- The \$3 (\$7) cost of shopping in this experiment is expensive.
- PRE4- It is NOT worthwhile to spend the money necessary to shop 6 or 7 stores IN THE UPCOMING DRYER PURCHASE TASK.
- PRE5- In the Newtown market, there is a very BIG difference between the lowest price and the highest price for the Whirlpool dryer.
- PRE6- The computer responds QUICKLY when I choose which store to shop.
- PRE7- The \$3 (\$7) cost of shopping in this experiment is INexpensive.
- PRE8- The Price Survey Information will be helpful in directing me to a low-priced store for the dryer.
- PRE9- It is worthwhile to spend the money necessary to shop 6 or 7 stores IN THE UPCOMING DRYER PURCHASE TASK.
- PRE10- The computer responds SLOWLY when I choose which store to shop.
- PRE11- In the Newtown market, there is a very SMALL difference between the lowest price and the highest price for the Whirlpool dryer.
- PRE12- The Price Survey Information will be helpful to me in deciding where to shop for the dryer.

Post-Payoff Task Questions

- POST1- The Price Survey Information was helpful in directing me to a low-priced store.
- POST2- I have had a lot of experience working with computer terminals.
- POST3- Before I started shopping in the payoff task, I really didn't place much value on answering GBQ questions.
- POST4- It was NOT worthwhile to spend the money necessary to shop 6 or 7 stores in the dryer purchase task.
- POST5- The Price Survey Information was easy to understand.
- POST6- I enjoy spending my free time shopping.
- POST7- The cost of shopping in this experiment is expensive.
- POST8- When I'm making a purchase, I find that shopping several stores for the best price is not usually worthwhile.
- POST9- The computer responds QUICKLY when I choose which store to shop.
- POST10-When I shopped during my payoff task, I made sure to leave a lot of time to answer the GBQ questions.
- POST11-In the Newtown market, there was a very BIG difference between the lowest price and the highest price for the Whirlpool dryer.
- POST12-The results of this research will be very important for marketers.
- POST13-It was worthwhile to spend the money necessary to shop 6 or 7 stores in the dryer purchase task.
- POST14-I am the type of person who likes to get shopping over with quickly, even if I have free time.
- POST15-In this experiment, I took the payoff task very seriously.
- POST16-Using a computer terminal is easy for me.
- POST17-Price reports like the Newtown Durable Price Survey actually exist.
- POST18-This research study was confusing.

6.2 GENERAL PERCEPTIONS OF THE EXPERIMENTAL SCENARIO

It is important to establish that Ss believed the experimental scenario, along with the information they observed, to be "legitimate." Some evidence toward this end is provided in Ss' responses to several post-shopping Likert items. In Table 10, the sample's average responses to each of the Likert items, along with the test statistic for the comparison of that average to neutral are presented.

TABLE 10

Average Responses to Four "Legitimacy" Likert Items

Likert Item	Mean	p-value for test of Ho: Mean=4
The results of this research will be very important for marketers.	4.83	.0001
In this experiment, I took the payoff task seriously.	5.17	.0001
Price reports like the NPS actually exist.	5.13	.0001
This research study was confusing.	1.99	.0001

scale: 1=strongly disagree
7=strongly agree

The responses to each of these items were quite strong, with Ss agreeing that the results of the research would be important to marketers and that they took the payoff task seriously. It was particularly important that Ss did not believe the Newtown Price Survey to be a creation of the experimenter and the response to the third item in Table 10 indicates that they believed that reports like the NPS actually exist. Finally, the Ss very strongly disagreed that the research study was confusing.

The responses to these items lead to the conclusion that Ss took the experimental seriously. Further evidence in this direction will be presented in a section below.

6.3 SUBJECT RESPONSE RELIABILITY

The reliability of Ss' responses in the experiment was examined carefully since several problems were encountered in pretests on this issue (see Chapter 5). The correlation matrix for all the pre- and post-payoff task measures is provided in Appendix H. Below each construct (perceived price dispersion, search cost, and uncertainty) will be examined individually and the correlations between the measures of each will be presented and discussed.

It should be noted that judgments made about reliability here are based on Nunnally's (1967- cited in Peter 1979) argument that .60 is an "adequate" level of reliability for basic research.³⁰

Table 11 presents the correlations of the pre-shopping items measuring perceived price dispersion and benefit to search. PRE5 and PRE11 statements in which the description of the price range (big or small) was changed, making them exact opposites. The RANGE variable was a simple question which asked Ss to estimate the range of Whirlpool dryer prices that existed in the current Newtown market. The correlation between the two opposite items (reflecting "test-retest" reliability) is $-.721$, which is acceptable using Nunnally's standard. Both PRE5 and PRE11 are highly correlated with RANGE, which demonstrates that the correct perceptions are being measured. The correlations between these perceptions and number of stores shopped will be addressed in a section later in this chapter. The Likert items which assessed Ss' perceptions of the "value of extensive search" (shopping 6 or 7 stores) were correlated $-.608$ ($p=.000$). This correlation, although

³⁰ In contrast, Nunnally suggests that scales used in applied research should have reliabilities of at least .90. He requires such a high level of reliability for applied research primarily because the consequences of making incorrect decisions in such research are greater than in basic research.

"adequate" according to Nunnally's standard, is lower than the correlations for the other pairs of opposite items. It may be that, even though the questions are stated in an extreme way, many Ss still felt unable to judge whether a 6 or 7 store shopping strategy was worthwhile (possibly because they were a little uncertain about what to expect in their shopping). The correlation, however, is not low enough to cause real concern.

The correlations for the search cost perception items are presented in Table 12. The $-.706$ correlation between the opposite statements (PRE3 and PRE7) indicates that Ss were reliable in their responses. The fact that Ss were more consistent in their responses to the items measuring "time cost" perceptions (items PRE6 and PRE10) than in pretests may reflect greater attention being paid to the task (as a function of the more explicit instructions given). In other words, Ss may have been giving more attention to the warm-up task, become more aware of time delays that occurred, and therefore developed a more concrete attitude about them. The monetary search cost perceptions are also related minimally to number of stores shopped.

The other pair of perceptual variables that relate to the manipulations are the items measuring how "helpful" Ss perceived the NPS information to be. As shown

TABLE 11

Correlations of Search Benefit Perceptions and NSS

Variable	PRE5	PRE11	Range	PRE4	PRE9
PRE5-There is a BIG price difference.					
PRE11-There is a SMALL price difference.	-721 (.000)				
RANGE-Expected price range.	625 (.000)	-549 (.000)			
PRE4-Not worthwhile to shop 6/7 stores.	-196 (.003)	271 (.000)	-127 (.044)		
PRE9-Worthwhile to shop 6/7 stores.	227 (.003)	-217 (.001)	118 (.056)	-608 (000)	
Number of Stores Shopped	053 (.234)	-070 (.170)	-062 (.199)	-131 (036)	051 (244)

(Decimal points omitted on correlations)
(p-value for $H_0: \text{corr}=0$ in parentheses)

in Table 13, PRE8 and PRE12 have a .652 correlation. This indicates a strong consistency in subjects' reporting of their perceptions on the issue, especially since the items were worded differently.

TABLE 12

Correlations of Search Cost Perceptions and NSS

Variable	PRE3	PRE7	PRE6	PRE10
PRE3-Cost of search is expensive.				
PRE7-Cost of search is INexpensive.	-706 (.000)			
PRE6-Computer responds quickly.	-166 (.011)	093 (.099)		
PRE10-Computer responds slowly.	246 (.000)	-183 (.000)	-708 (.000)	
Number of stores Shopped	-111 (.063)	149 (.020)	053 (.232)	-011 (.492)

(Decimal points omitted on correlations)
 (p-value for test of $H_0: \text{corr} = 0$ in parentheses)

TABLE 13

Correlations of "Uncertainty" Perceptions and NSS

Variable	PRE8	PRE12
PRE3-PS info is helpful in directing me to a low-priced store.		
PRE12-PS info is helpful in deciding where to shop.	.652 (.000)	
Number of Stores Shopped	-.041 (.289)	-.011 (.474)

(Decimal points Omitted on correlations)
(p-value for the test $H_0: \text{corr} = 0$ in parentheses)

6.4 SHOPPING EXPERIENCE AND ITS IMPACT ON EXPERIMENTAL PERFORMANCE

On the final page of each Ss' handout, they were asked to provide some personal information, among which was whether they had shopped for a clothes dryer before (yes or no). A preliminary analysis was undertaken to examine the impact of this experience on subject responses and behavior. The implication was that the "experienced" group should be eliminated if they differed a great deal from other Ss in terms of their perceptions of the experiment. Thirty of the 191 Ss reported having shopped for a clothes dryer in the past.

Several 3-way (price dispersion by search cost by uncertainty) fully crossed ANOVAs were run using the number of stores shopped (NSS) measure, RANGE, and all the Likert items as dependent variables. The shopping experience variable (coded 0 for "no experience" and 1 for "experience") was added as a covariate in the second run for these analyses to see if (1) shopping experience had an impact on S perceptions and behavior, and (2) to see whether accounting for the explanatory power of the experience variable would change the significance of the independent variables in the ANOVA.

Using the shopping experience variable as a covariate had essentially no impact on the ANOVA results. The only perceptual variable which shopping experience affected was RANGE (the expected price range in the current market). Ss experienced in dryer shopping reported wider expected ranges than did those not experienced in dryer shopping (\$87.97 vs \$72.83). Accounting for the impact of shopper experience on the RANGE variable, however, did not change the ANOVA significance levels for the effect of the experimental manipulations on that variable.

Given that shopping experience covaried with neither the dependent or independent variables, the "experienced" shopper group was left in the analysis.

6.5 CHECKING THE MANIPULATIONS

The next three sections examine in detail the impact of the experimental manipulations on measures of subject perceptions. The price dispersion (PDISP), search cost (SCOST), and uncertainty (UNCERT) manipulations will be examined in order. Since the uncertainty manipulation was not assessed directly in pretests, it will receive more attention below than will the other independent variables. It should be noted that, in the majority of tests described below, the variables used as manipulation checks were affected only by the factor predicted to affect it (e.g. response to PRE5 was affected significantly by PDISP but not by SCOST or UNCERT). The exceptions to this general finding are discussed.

6.5.1 Price Dispersion Manipulation Checks

Table 14 presents the means, ANOVA F and significance levels, and omega-squared statistic for each price dispersion manipulation check variable. The ANOVA statistics represent the main effect of price dispersion in the full 2 X 2 X 2 ANOVA model, and the omega-squared is calculated using the formula provided in Keppel (1982).³¹ This presentation format will be

³¹ The omega-squared statistic is analagous to the regression R-squared in showing the amount of variance accounted for by a given effect in an ANOVA model.

used for all of the independent variables.

The preshopping manipulation check measures include both perceptions of price dispersion and perceptions of the benefits of search. There are clear significant differences between narrow price dispersion (NPD) Ss and wide price dispersion (WPD) Ss in terms of the perceived size of the price range. The very large omega-squared statistics indicate that the price dispersion manipulation is accounting for a very large portion of the variance in these variables.

It was mentioned earlier that, since the price dispersion manipulation was operationalized in part by referring to an "average" range across other cities (\$74), Ss might interpret the price range as large or small relative to that average rather than relative to the benefits of search. The measures of the perceived benefits of extensive search help put aside this concern in that significant differences are found between NPD and WPD Ss on these variables. NPD Ss feel (on the average) that it is not worthwhile to shop 6 or 7 stores while the WPD Ss tend to be neutral on the issue. The fairly low omega-squared statistics on these variables may indicate both error variance in responses (as discussed in an earlier section of this chapter) and that there are other factors affecting Ss' responses to these variables. However, the differences bet-

TABLE 14

Results for Price Dispersion Manipulation Checks

Variable	MEANS		ANOVA F SIGNIF	OMEGA SQUARED
	NPD	WPD		

PRE-SHOPPING:				
PRE5-Big diff bet ween low and high prices.	2.91	5.80	.000	.510
PRE11-Small diff between low and high prices.	4.76	2.25	.000	.482
PRE9-Worthwhile to shop 6/7 stores.	3.38	4.08	.006	.034
PRE4-Not worthwhile to shop 6/7 stores.	5.16	4.19	.000	.063
RANGE	43.78	106.58	.000	.619
POST-SHOPPING:				
POST11-Big diff between low and high prices.	3.28	5.60	.000	.455
POST13-was worth- while to shop 6/7 stores.	3.08	3.09	.902	-
POST4-was not worthwhile to shop 6/7 stores.	5.01	5.14	.659	-

Scale for all variables except RANGE:

1=strongly disagree

7=strongly agree

ween NPD and WPD Ss' mean responses to these variables

imply that the two groups had somewhat different perceptions of the benefits of search in the experiment before they shopped.

Examining the post-shopping measures, it is interesting to note that there was no difference between the NPD and WPD Ss in terms of their perceived benefits of extensive search. The WPD Ss matched the NPD Ss' negative opinion of a 6 or 7 store shopping strategy after shopping. This demonstrates the dynamic nature of the search process in that WPD Ss clearly learned that shopping 6 or 7 stores was not worthwhile. Note that a strong difference between NPD Ss' and WPD Ss' perceptions of the "size" of the price range still existed after shopping.

It should be pointed out that Ss' average responses to POST4 and POST13 were also affected by the uncertainty manipulation. The mean responses of the low uncertainty (LU) and high uncertainty (HU) groups on those variables (for POST4: LU=5.35, HU=4.78; for POST13: LU=2.86, HU=3.33) indicate that LU Ss felt more strongly that the benefit to shopping 6 or 7 stores was low. Given the conclusion (in a later section) that the uncertainty manipulation was effective, it is understandable that the LU Ss felt that there was somewhat less merit to shopping 6 or 7 stores than HU Ss did (after search).

6.5.2 Search Cost Manipulation Checks

Table 15 presents the means and ANOVA main effect results for the variables which were intended to act as manipulation checks for search cost. Significant differences exist between the two groups on each variable. In particular, it is important to note the responses to the first two variables presented in the table: low search cost (LSC) Ss disagreed that the cost of shopping was expensive but were neutral in judging whether it could be considered "inexpensive." This demonstrates that LSC Ss were using that \$5.00 comparison point (described in chapter 4) to infer that the \$3.00 cost of shopping was not expensive. This is a more positive result than the pretest findings which showed LSC Ss generally agreeing that the \$3.00 search cost was expensive. The high search cost (HSC) Ss agreed strongly and disagreed strongly with PRE3 and PRE7, respectively. In addition, the effect size for each main effect (with PRE3 and PRE7 dependent) is large (although not as large as the effect sizes for the price dispersion perceptions). The two group means are somewhat closer on the post-shopping measure of perceived money cost, but are still significantly different.

It has been clear throughout the pilot tests that all Ss (including HSC Ss) felt that the computer responded quickly to their store selection. The same re-

TABLE 15

Results for the Search Cost Manipulation Checks

Variable	MEANS		ANOVA F SIGNIF	OMEGA SQUARED
	LSC	HSC		
PRE-SHOPPING:				
PRE3-Cost of shop- ing is expensive.	3.22	5.27	.000	.277
PRE7-Cost of shop- ping is inexpensive.	4.21	2.69	.000	.204
PRE6-Computer responds quickly.	5.36	4.73	.004	.038
PRE10-Computer responds slowly.	2.81	3.53	.001	.047
POST-SHOPPING:				
POST7-Cost of shop- ping is expensive.	3.64	4.96	.000	.164
POST9-Computer responds quickly.	4.72	3.79	.000	.061

Scale:
1=Strongly Disagree
7=Strongly Agree

sult came out in the running of the experiment, although there was a significant difference between LSC and HSC Ss' mean responses on both PRE6 and PRE10. The direction of the finding is appropriate with HSC Ss agreeing (disagreeing) less strongly that the computer

responded quickly (slowly). Note also that both groups (on average) revised their opinions of how quick the computer responded in the post-shopping measure. Both LSC and HSC Ss agreed less strongly after shopping that the computer responded quickly. This may be because the delays became more noticeable and bothersome to Ss in the timed task.

It should be noted that the uncertainty manipulation affected significantly Ss' responses to PRE6 and PRE10, both of which reflect perceptions of the time cost of search. Judging from the mean responses (PRE6:LU=5.23, HU=4.85; PRE10:LU=2.92, HU=3.43), LU Ss perceived there to be less of a wait for the computer to respond than HU Ss did. The results to be discussed below indicate that the LU Ss were more certain (prior to search) about where to shop than were HU Ss. It appears as though this greater certainty contributed to LU Ss' being less cognizant of the wait for the computer's response. The fact that a significant difference between LU and HU Ss occurred for both PRE6 and PRE10 suggests that this is not a random finding.

6.5.3 Uncertainty Manipulation Checks

Extra attention will be devoted to the uncertainty manipulation in this major section, as this factor was not manipulated directly in pretests. In the first

section following the mean responses of the two uncertainty groups to the variables intended to act as manipulation checks will be examined. In the second section following, the search behavior of LU and HU Ss will be the focus of analysis.

6.5.3.1 Analysis of Mean Responses

The mean and ANOVA results for the uncertainty manipulation check variables are presented in Table 16. For all three measures (two preshopping and one postshopping) LU Ss strongly agreed that the NPS information gave them some "direction" in their search while HU Ss tended to agree less strongly or be neutral. HU Ss did not disagree with the statements (as one might expect), but this might be explained in that they felt the information they got was helpful relative to having no information at all. The effect sizes for the three dependent variables are moderate.

6.5.3.2 Behavioral Evidence Regarding the Uncertainty Manipulation

If the uncertainty manipulation has been effective in providing LU Ss with more information than HU Ss, LU Ss should actually have been "better directed" in their search (e.g. shopped the lower priced stores more frequently). Table 17 shows the percentages of each of

TABLE 16

Results for Uncertainty Manipulation Checks

Variable	MEANS		ANOVA F SIGNIF	OMEGA SQUARED
	LU	HU		

PRE-SHOPPING:				
PRE8-NPS is helpful in directing me.	5.22	4.18	.000	.079
PRE12-NPS is helpful in deciding where to shop.	5.39	4.44	.000	.031
POST-SHOPPING:				
POST1-NPS info was helpful in direct- ing me.	5.47	4.40	.000	.100

Scale:
1=Strongly Disagree
7=Strongly Agree

the uncertainty groups who shopped the various stores on their first search. The ordering of stores in the table is on the basis of lowest to highest price (the NPD and WPD prices are in parentheses). Note that the rank ordering in the table is exactly the same as the prior ranking given to LU Ss.

As can be seen in the table, Berry's (the lowest-priced store) was shopped much more frequently by LU Ss

(63.3%) than by HU Ss (15.1%) on the first search. The difference between these two proportions is statistically significant ($Z=6.80$, $p=0.00$) and the 15.1% figure is clearly not significantly different from the proportion of the sample who would have chosen it by chance ($1/7 = 14.3\%$).

TABLE 17

Percentages Shopping Each Store on the First Search

Store (NPD, WPD prices)	% Shopping Store on the first search		Z for diff LU vs. HU
	LU Ss	HU Ss	
1. Berry's (294, 254)	63.3*	15.1	6.80
2. Oldham's (300, 272)	10.2	14.0	- .80
3. Ranard (307, 295)	3.1*	4.3*	- .79
4. Gibson (313, 313)	4.1*	15.1	-2.59
5. Champion (318, 335)	1.0*	9.7	-2.88
6. Archer's (324, 356)	15.3	32.3*	-2.75
7. Foremost (324, 373)	3.1*	7.5	-1.38

(chance % = 14.3%)

*proportion is significantly different from chance
($|Z|$ for $H_0: \text{prop} = .143 > 1.96$)

A few comments should be made about the respective distributions of first time shoppers. First, it can be

seen that the distribution of LU Ss is pretty much what would be expected- i.e. most shoppers are clustered on the lower-priced stores. It should be noted, however, that 15.3% of the LU Ss shopped Archer's first. This may reflect certain tendencies on the part of Ss: (1) a tendency to pick the store presented first (since the stores were presented in alphabetical order) in spite of the prior information, and/or (2) a tendency to "experiment" toward the expected higher end of the distribution to get a comparison price (although this is not evident for Foremost).

The expectation for the HU Ss was that they would select each store (on the first search) at a proportion no different than chance. For five of the seven stores (Berry's, Oldham's, Gibson, Champion, and Foremost), the selection proportion was not significantly different from the chance proportion. Archer's, however, was selected at a much higher rate than chance and Banard's was selected at a rate lower than chance. The simple explanation for this result is the the order in which the stores were presented affected how some Ss made their initial selections (note that order effects are more evident when Ss have less information to guide search). Archer's was selected proportionately more often than chance because it was presented first on the menu of stores. Banard's, on the other hand, was pre-

sented last on the menu. It appears that many HU Ss were trying to establish some basis for making their selection and tended to choose the first store. Since there may be some systematic difference between those initially selecting the first listed store and those not selecting it, the impact of this tendency on the results was examined by comparing the two groups (1. HU Ss shopping Archer's on the first search vs. 2. HU Ss not shopping Archer's on the first search) on their search behavior (measured by number of stores shopped). No significant difference was found in both ANOVA and chi-square analyses.

Table 18 presents the percentages of each uncertainty group who shopped each store on the first or second search. It can be seen that the percentages for the HU group begin to fill out. Focusing again on the lowest priced store, note that 75.5% of the LU Ss had shopped Berry's on the first two searches while only 29% of the HU Ss did so (Z for difference = 6.43, $p=0.00$). A similar difference occurred in terms of the stores at which purchases were made. Eighty percent of the LU Ss and fifty-one percent of the HU Ss purchased their dryer at Berry's ($Z=4.23$, $p=.00$ - these results are not shown in the table).

An important point to make regarding the believability of the NPS prior information is that one-fourth of

TABLE 18

Percentage Shopping Each Store on the First or Second Search

Store (NPD, WPD prices)	% Shopping Store on 1st or 2nd search		Z for diff LU vs. HU
	LU Ss	HU Ss	
1. Berry's (294, 254)	75.5*	29.0	6.43
2. Oldham's (300, 272)	37.8	25.8	1.77
3. Banard (307, 295)	14.3*	18.3*	- .75
4. Gibson (313, 313)	10.2*	26.9	-2.98
5. Champion (318, 335)	10.2*	30.1	-3.44
6. Archer's (324, 356)	22.4	41.9*	-2.89
7. Foremost (324, 373)	13.3*	21.5*	-1.51

(chance % = 30.9%)

*proportion is significantly different from chance
(|Z| for $H_0: \text{prop} = .309 > 1.96$)

the LU group had not shopped at Berry's after two searches. This indicates that there was some doubt (or uncertainty) attached to the prior information in terms of its ability to describe the current market. In other words, the NPS information provided to LU Ss was not perceived to be all they needed to make their decision.

6.6 SEARCH BEHAVIOR AND OUTCOMES

Given that the manipulations have had the intended effect on Ss' perceptions and search patterns, the impact of those manipulations on number of stores shopped can now be examined. This dependent variable represents more than just the effort expended by Ss in making their purchase, it represents how "informed" the experimental consumers are in their purchase decision. It should be noted that Ss' shopping "performance" can be examined here by looking at other criteria. In particular, "optimal" search behavior can be defined and used as a comparison point for actual search behavior. In addition, search "outcomes" like distance from best price can be used to evaluate shopping behavior. In the next two major sections, the impact of the experimental manipulations on all of these measures will be discussed.

6.6.1 Search Behavior- Number of Stores Shopped

6.6.1.1 ANOVA Results- 3-Way Interaction

The ANOVA results for the effect of the experimental main effects and interactions on number of stores searched are presented in Table 19. The major finding is one which was not anticipated: a three-way interaction. The three-way interaction will be discussed first and will be followed by a discussion of the results directly addressing the research hypotheses.

TABLE 19

ANOVA Results for Number of Stores Shopped

Source	d.f.	Sums of Squares	F	Signif.	Omega Squared
PDISP	1	.04	.05	.829	--
SCOST	1	13.19	14.19	.000	.061
UNCERT	1	7.06	7.59	.006	.030
P X S	1	1.08	1.16	.283	--
P X U	1	.94	1.01	.315	--
S X U	1	2.76	2.97	.086	
P X S X U	1	4.61	4.96	.027	.018
Explained	7	30.56	4.70	.000	
Residual	183	170.08			
Total	190	200.64			

Simple Two-Way ANOVAS

Interaction	Condition of Third Factor	F-statistic for Interaction*
A. PDISP by SCOST	Under LU Under HU	.60 5.52**
B. SCOST by UNCERT	Under NPD Under WPD	7.82** .12
C. PDISP by UNCERT	Under LSC Under HSC	.73 5.25**

* F = Mean square (interaction)/full model MSE

**significant at alpha=.05

In chapter 3, the two-way interactions were of primary interest and only limited space was devoted to discussing a potential three-way interaction. The significant three-way interaction that resulted in the research, however, is fully intuitive (even though it was not initially anticipated).

In Figure 9, three different graphic interpretations of the three way interaction are presented, while in Table 20, the means, percentages, and simple main effect F-statistics are presented. For clarity, the points on the graphs are numbered. Note that the bottom section of Table 19 presents F-statistics from three sets of simple two-way ANOVAs. These simple two-way ANOVAs provide information about the significance of the interaction in each graph in Figure 9 (six graphs - six ANOVA F-statistics). The ANOVA results are labelled A, B, and C as each corresponds to a pair of graphs in Figure 9.

The first graph in Figure 9 will be the focus in this discussion, as it depicts the differences in the behavior of the two different uncertainty groups. Under low uncertainty, there is no significant interaction between search cost and price dispersion. In addition, both the simple main effects of price dispersion and search cost are insignificant (as indicated by the F-statistics for the simple main effects

Figure 9: Three Plots of the Three-Way Interaction

³² It should be noted that no adjustment was made in the error rate for the multiple comparisons here. The Bon Ferroni approach (using an F-critical value for $\alpha = .05/\#$ of comparisons) was too conservative

TABLE 20

Three-way Interaction: Means and Simple Main Effects

POINT	PDISP COND	SCOST COND	UNCERT COND	MEAN # STORES	% SHOPPING 4 OR MORE
1	narr.	low	low	2.78	21.7
2	narr.	high	low	2.64	12.0
3	wide	low	low	2.79	25.0
4	wide	high	low	2.35	11.5
5	narr.	low	high	3.56	44.0
6	narr.	high	high	2.30	10.0
7	wide	low	high	3.23	40.9
8	wide	high	high	2.92	16.7

Critical Point Comparisons	F-ratio (compare to 3.84**)
3 vs. 4	2.21
1 vs. 2	.26
5 vs. 6	19.50*
5 vs. 7	1.41
6 vs. 8	4.47*
6 vs. 2	1.38
1 vs. 5	7.99*
7 vs. 3	2.34
8 vs. 4	4.37*
7 vs. 8	1.19
2 vs. 4	1.18
3 vs. 4	2.67
5 vs. 8	5.58*

*significant difference in group means at alpha=.05

**the appropriate F-critical for 1,189 d.f. at alpha=.05

in that nearly all simple main effects were found to

in Table 20).³² The logical inference is that low uncertainty Ss, feeling less need for information, were unresponsive to changes in the cost and benefits of search.

Under high uncertainty, search cost had a large impact on search in the narrow price dispersion condition, but had no impact on search under wide price dispersion conditions. A simple main effect is found for price dispersion in this high uncertainty condition, but only when search costs are high. In other words, WPD Ss shopped significantly more than NPD Ss when all were working under limited information (high uncertainty) and high search costs. This simple two-way interaction (PDISP by SCOST under high uncertainty) is significant at the .05 level (see bottom of Table 19).

The interesting issue is that WPD Ss, on average, searched at or slightly above three stores regardless of the search cost (in the HU condition). Considering the high uncertainty and the wide price dispersion conditions together, then, it was worthwhile to shop three different stores regardless of search cost (the search cost might seem less prohibitive here given the wide

be insignificant. Keppel (1982) notes that there is no generally accepted method for experiment-wise error rate correction for more complex factorial designs. Under these circumstances, a higher Type I error level was deemed tolerable, especially since the research is in its early phases.

price dispersion). The marginal benefit of shopping the fourth store, however, was evidently very small.

6.6.1.2 Results for Hypothesized Effects

In this section, the hypotheses presented in chapter 3 will be discussed individually. The findings should be considered in the context of the three-way interaction described in the previous section.

Hypothesis 1 -Price Dispersion and Search - While price dispersion was predicted to positively affect search, there was no significant main effect in the research. The absence of an aggregate main effect has to be qualified by the fact that a simple main effect for PDISP (in the proper direction) under HSC/HU conditions. The existence of a ceiling effect, together with the additional pressure created by the GBQ, may have prevented a more general effect of price dispersion from occurring.

Hypothesis 2 -Search Cost and Search - The search cost manipulation had a significant impact on search behavior, both in terms of the average number of stores shopped (LSC=3.10, HSC=2.56, $p=.00$) and in terms of the proportions of Ss shopping 4 or more stores (LSC=.33, HSC=.12, $z= 3.35$). The specific conditions under which search cost did and did not affect search behavior will be discussed in detail in the following chapter.

Hypothesis 3 -Uncertainty and Search - The uncertainty manipulation affected search behavior as predicted. Summing over the other two manipulations, HU Ss shopped an average of 3.04 stores while LU subjects shopped an average of 2.63 stores ($p=.03$). In addition, the two groups differed significantly in terms of the proportion of each shopping 4 or more stores (HU=.29, LU=.18, $z = 1.86$).

Hypothesis 4 -Price Dispersion X Uncertainty - It was predicted that PDISP would have a strong effect on search behavior under high uncertainty conditions, while that affect would be diminished or nonexistent under low uncertainty conditions. What resulted was an insignificant interaction, with PDISP essentially having no effect under either uncertainty condition. Relevant results describing the prices and price ranges seen by the HU Ss were discussed above in the section describing the search ceiling. Those results may help to explain why NPD and WPD Ss did not differ in their search behavior under conditions of high uncertainty. The bottom portion of Table 19 presents the observed F-statistics for the "simple" two-way interactions. Referring back to that table and Figure 9 C, it can be seen that the predicted interaction did occur for Ss working under high search costs.

Hypothesis 5 - Search Cost by Uncertainty - In Figure 10, the two-way interaction between search cost and uncertainty is plotted. The means for each point on the graph and relevant *F*-values and significance levels for the tests of simple main effects are presented in Table 22 (note that the graph points are numbered for reference purposes). This two-way effect is marginally significant ($p=.086$) but the strength of the simple main effects merits some discussion. Both the graph and table results indicate that LSC Ss shopped more than HSC Ss only when uncertainty was high. Under the condition of low uncertainty, the two search cost groups did not differ in their search behavior.

Another possible interpretation of this finding should be mentioned. That is, the uncertainty manipulation had a significant impact on search behavior only when search cost was low. In the face of stiff search costs, greater uncertainty did not lead to more search. Reference back to Table 19 and Figure 9B shows that the true interaction between search cost and uncertainty occurred under Narrow Price Dispersion.

Hypothesis 6- Price Dispersion by Search Cost - There was no significant interaction between PDISP and SCOST in their impact on search behavior. As discussed earlier, however, there was a significant interaction under high uncertainty (see Figure 9a and Table 19).

Figure 10: Plot of the Search Cost X Uncertainty Interaction

6.6.1.3 The Tendency to Shop Three or Fewer Stores

One interesting occurrence in the experiment was that a large percentage (77 percent of all Ss) of the sample shopped only three stores or less. Partitioning out the low uncertainty Ss, we find that even 71 percent of the high uncertainty Ss shopped just three or fewer stores. One interpretation of this result is that, given the levels of search cost and price dispersion used in the experiment, there existed a "ceiling" on search behavior. A second interpretation recognizes the potential difficulty in trying to capture Ss' perceptions of the value of search using a discrete measure (number of stores shopped). Both interpretations

TABLE 22

Results for the Search Cost X Uncertainty Interaction

Point	Uncertainty Condition	Search Cost Condition	Mean Num Stores Shopped
1	Low	Low	2.79
2	Low	High	2.49
3	High	Low	3.41
4	High	High	2.64

Simple Main Effects F-ratios (compare to 3.94**)

Graph Points Compared	F-ratio (df=1,190)
1 vs. 2	2.32
3 vs. 4	14.86*
1 vs. 3	9.96*
2 vs. 4	.54

*significant difference between group means at $\alpha=.05$

**The critical F-value for 1,189 d.f. and $\alpha=.05$

may help explain why larger group differences in search behavior were not found in the experiment.

Search Ceiling - There may be several reasons why a ceiling effect occurred in this research. First, three may be the maximum number of stores that Ss would shop in an actual purchase situation. Second, selecting

from a population of just seven stores makes it fairly likely that a randomly searching shopper would find a low price (i.e. the lowest or next-to-lowest price). By sheer chance, 52.4% of the randomly searching HU Ss should have observed one of the two lowest prices in two searches (see Appendix I for the calculation of this probability). Similarly, 71.4% of the HU Ss should have seen one of the two lowest prices within three searches (see Appendix I). The observed percentages are not significantly different from these chance figures. By the end of two searches (including Ss who searched once and stopped), 46 of the 93 HU Ss (49.5%) had observed one of the two lowest prices. Of the 68 HU Ss who shopped 3 or more stores, 52 (76.5%) had seen one of the two lowest prices by the third search. Interestingly, this group of 52 had also observed (on average) a fairly wide range of prices. The 24 NPD Ss in this group of 52 had observed an average price range of \$28, while the 28 WPD Ss had observed an \$88 range (on average). In being likely to see a low price and a fairly wide range of prices in three searches, HU Ss may have had little incentive to go beyond 3 or 4 stores. Finally, the time pressure in the task and the availability of another profitable activity may have further reinforced this "lid" on search.

Difficulty in Capturing the True "Value" of Search -

In using the "number of stores shopped" as the dependent variable here, we are attempting to capture the "value" that Ss place on search on a discrete 7-point scale. (The term "value" here is intended to represent the perceived worth of searching given particular search cost and price dispersion conditions.) The actual value of search construct may exist (conceptually) on a continuum in people's minds. If Ss' "true" perceptions of the value of search (which would exist along that continuum) could have been measured, we may have found significant average differences between WPD Ss and NPD Ss working under high uncertainty, for example. It was found in the research that there was no significant difference between these two groups in terms of the average number of stores they shopped. It is possible that a difference between the groups' "true" scores occurred and was covered up by the discrete measure used in the research. This could have happened if both groups average "true" search value scores were located on the true score continuum in a range that led to three stores being shopped. The conclusion is that, with a small number of discrete points representing the dependent variables, the complexity of Ss' actual perceptions or behavior might be masked.

The two explanations above are proposed to explain Ss' general tendency to shop three or fewer stores. These alternative explanations of the search behavior that occurred in the experiment suggest that factors other than the independent variables may have affected search behavior in the experiment.

6.6.1.4 Analyses of Covariance for NSS

A number of variables were measured in the study that could act as covariates in our ANOVA model. These variables measure Ss' experience with computers, perceptions of how "believable" the experiment is, shopping tendencies, and other factors that might explain some variance in the number of stores shopped. These variables are listed in Table 23. Also presented in that table are the correlations between NSS and the potential covariates. The major criterion in analysis of covariance is the covariate(s) be correlated with the dependent variable. The only variable that is correlated with NSS (and therefore is a potential covariate) is response to POST10, which reflects Ss' perceptions of the "value" of the GBQ.

When placed into the ANOVA model as a covariate, POST10 was significantly and negatively related to NSS, suggesting that those who shopped more stores tended to disagree (or agree less) that they saved a lot of time

TABLE 23

Potential Covariates and Correlations with NSS

Variable	Correlation with NSS (p-value)
-----	-----
POST2-I've had a lot of experience with computer terminals.	.035 (.314)
POST3-Before I started the payoff task, I didn't place much value on GBQ.	.010 (.447)
POST5-PS info was easy to understand.	.010 (.444)
POST6-I enjoy spending my free time shopping.	.100 (.092)
POST8-When I make a purchase, I find shop- ping several stores not worthwhile.	.043 (.277)
POST10-When I shopped during the payoff task, I made sure to leave a lot of time for the GBQ.	-.251 (.000)
POST12-The results of this research will be very important for marketers.	-.011 (.439)
POST14-I like to get shopping over with quickly.	-.003 (.454)
POST15-In this experiment, I took the payoff task seriously.	.044 (.275)
POST16-Using a computer terminal is easy for me.	.040 (.293)
POST17-Price reports like the NPS actually exist.	.043 (.277)
POST18-This research study was confusing.	-.075 (.150)

for the GBQ. The error term in the ANOVA model was reduced by adding in POST10 as a covariate, but the significance levels of the original model changed only slightly.

In short, it appeared that the perceptions that we captured with our post-shopping measures account for very little of the variance in search behavior, and cannot be used to sharpen our experimental results via ANCOVA.

6.6.1.5 Comparison of Actual to "Optimal" Behavior

It is relevant to compare results about search behavior relative to some standard. A standard can be created by calculating the "optimal" search behavior of randomly searching shoppers. In Appendix J, the basis for calculating optimal search behavior is presented. The procedure involves calculating the mathematical "expected" price for each search step, determining how much that expected price improves from one search to the next, and determining the point at which search cost exceeds the improvement in expected price. In Table 24, three numbers are presented for each experimental cell. The first number is the "optimal" number of random searches as determined in Appendix J, the second number is the actual average amount of search for that cell, and the third number is the standard deviation of

Ss' actual number of searches around the optimal figure. As noted in Appendix J, the "optimal" levels of search may be somewhat overstated because neither the time costs of search nor the time pressure placed on Ss is taken into account in the calculation.

TABLE 24

Figures for Comparison of Actual to Optimum Search

 HIGH UNCERTAINTY SUBJECTS:

		Low SCOST	High SCOST
		cell 5	cell 6
Narrow PDISP		3.00	2.00
		3.56*	2.30
		1.20	.95
		cell 7	cell 8
Wide PDISP		6.00	4.00
		3.23*	2.92*
		2.90	1.47

In each cell:

Expected Optimal Number of Searches
 Actual Average Number of Searches
 Standard Deviation of Actual around Optimal

*Actual is significantly different from Optimum
 (alpha=.05)

Each of the four groups of HU Ss differed significantly from optimal search with the exception of the HSC/NPD group. It is interesting to note that the author's initial impression was that this HSC/NPD group was acting irrationally by searching so little. Yet it is the closest to "optimal" of the four HU groups.

Clearly, the higher the optimal search is, the more the actual search deviates from it. This is especially true of the wide price dispersion Ss. The cell 7 group, again working under "wide open" conditions, deviated the most from optimal of any of the 4 HU groups. The large deviation for cell 7 probably reflects (1) their reaching the search ceiling and (2) the fact that the calculated optimum is a fixed sample size optimum³³ while those subjects may have been searching sequentially (i.e. weighing and re-weighing search costs and benefits after each search).

³³ The search rule that Stigler developed is a fixed sample size rule, which means that the searcher assesses the price distribution and his/her search costs and determines how many sellers will be sampled before search begins. This is essentially how the optimum levels of search were calculated here.

6.6.2 The Outcomes of Search Behavior- Individual and Aggregate

In this major section two outcomes of search behavior will be examined, both of which relate to the prices paid by subjects. The first is a measure of how far each individual came from purchasing at the lowest price available and the second is aggregate, examining the overall distributions of prices paid by subjects. These dependent variables measure "consumer welfare" (in the context of the experimental setting) and provide information about what outcomes Ss in different experimental conditions were willing to settle on. These measures allow some judgments to be made as to the "quality" of Ss' search behavior.

6.6.2.1 Distance from Lowest Price

The percentage "distance from the lowest available price" measure for a subject is simply the difference between the purchase price and the lowest available price divided by the range of available prices (this measure will be referred to as %DISTANCE).³⁴ The ANOVA

³⁴ The score that is obtained from this calculation is a percentage which indicates how far from the lowest price the person came with their purchase price. A person purchasing at the lowest price would get a score of 0. NPD Ss' and WPD Ss' %DISTANCE scores were based on different ranges (the range being the denominator in the calculation). The same ANOVA was run with a simple dollar distance measure (purchase price minus lowest price) dependent, but the interpretation of those results is confounded by the

results and means with %DISTANCE as the dependent variable are presented in Table 25.

As would be expected, UNCERT has a strong impact on the %DISTANCE measure of shopping performance. HU Ss ended up an average of 17% away from the lowest price while LU Ss averaged 6% above the lowest price.³⁵ This main effect simply suggests that HU Ss settled on a higher price more frequently than did LU Ss. There is no overall main effect for SCOST, but the three-way interaction does show some effect of SCOST on %DISTANCE. Price Dispersion does have a marginally significant main effect on %DISTANCE. This main effect is the result of a very large simple main effect for price dispersion in the three-way interaction.

There is a two-way interaction between SCOST and PDISP. Discussion of this interaction will be set aside to discuss the more important three way interaction (which reflects the two-way interaction).

The graphs for the significant three-way interaction for %DISTANCE are presented in Figure 11 and show clearly the impact of uncertainty. Under low uncertainty, the four cells had virtually the same average

large price range differences between NPD and WPD Ss.

³⁵ Note that 65% of the entire sample ended up purchasing at the lowest priced store (i.e. 65% got 0 scores on %DISTANCE). Therefore, these %DISTANCE scores will tend to be low.

TABLE 25

ANOVA Results with %DISTANCE Dependent

Source	Sums of Squares	d.f.	F	Signif.	Omega Squared
PDISP	.105	1	3.11	.080	.010
SCOST	.035	1	1.03	.311	-
UNCERT	.533	1	15.74	.000	.068
P X S	.237	1	6.99	.009	.028
P X U	.091	1	2.69	.103	-
S X U	.075	1	2.22	.138	-
P X S X U	.181	1	5.36	.022	.020
Explained	1.23	7			
Residual	6.20	183			
Total	7.43	190			

Overall Omega-squared= .126

MEANS

Price Dispersion	Search Cost	Uncertainty
NPD- .14	LSC- .10	LU- .06
WPD- .09	HSC- .12	HU- .17

MEANS FOR PDISP BY SCOST INTERACTION

Cell	Mean
NPD,LSC	.10
NPD,HSC	.18
WPD,LSC	.11
WPD,HSC	.07

%DISTANCE scores (5 to 7%). This indicated that, re-

garless of the search cost or price dispersion, Ss were "careful" in their shopping (careful in the sense that they directed their search toward lower priced stores).

Figure 11: Three way interaction for %DISTANCE

The high uncertainty condition, however, reflects large differences in prices paid in the different cells. The finding is understandable in light of the finding for the number of stores searched, as the HSC,NPD group both searched the lowest amount and had

the largest %DISTANCE scores. The other three cells under this HU condition searched nearly the same average number of stores and ended up with very similar %DISTANCE scores (10 to 16%). Two points are of interest here. First, the large difference between the LU/NPD/HSC group (which shopped 2.64 stores) and the HU/NPD/HSC group (which shopped 2.35 stores) is clear. The former group (working under low uncertainty) ended shopping knowing where the lowest price would probably be, and ended up paying very low prices. The latter group (working under high uncertainty) ended shopping despite the fact that they had less of an idea where the low prices were. Both groups seemed to be reacting to the high search costs and the "lesser" benefits to search (as reflected in the NPD), but the HU group did not shop significantly more than the LU group. Consequently, the HU Ss "paid" for this higher uncertainty by paying higher prices.

The second point requires a focus on the two right-most groups in the righthand graph in Figure 11. The huge simple main effect between the NPD and WPD groups (working under high search cost and high uncertainty) on the %DISTANCE measure reflects the consequences of the WPD Ss shopping more (2.92 stores to 2.30 stores). The interesting point is that, with only an average incremental search effort of .62 stores, the WPD Ss

greatly improved the price they paid over the NPD Ss. In the high uncertainty condition, then, it appeared that shopping that extra little bit (e.g. going to the "ceiling") had an important effect on price paid. The NPD group working under high uncertainty and high search costs was not willing to shop that extra bit and ended up paying much higher prices.

6.6.2.2 Purchase Price Structure

Although not often cited in this context, Stigler's work was intended primarily to explain the occurrence of price dispersion in a commodity market. Stigler contended that even the most well-intentioned buyer could not become aware of all sellers in a marketplace because of spatial barriers. He argued that buyers searched till they equated their marginal return and marginal cost, so there would always be some less informed buyers (because of differences in perceived MR's and MC's). Hence, some price dispersion would always occur.

The conditions set up for the HU Ss in the current experiment were intended to replicate the conditions under which a buyer in Stigler's model might search, with the exception of the discontinuous distribution of prices used here. Figure 12 provides a graph with the distributions of prices paid for both LU and HU Ss (ag-

gregated across price dispersion and search cost groups). The stores are represented by letter on the horizontal axis and are ordered according to price ("B" = Berry's which was the lowest-priced store). Eighty percent of the LU Ss purchased from the lowest priced store, while only 50 percent of the HU Ss did so. However, both accepted price distributions are skewed severely to the left. Seventy percent of the HU Ss purchased their dryer at one of the two lowest priced outlets.

Figure 13 provides four graphs, each comparing the price distributions of LU and HU subjects under some combination of price dispersion and search cost. All the graphs except one indicate that the buyer market would not tolerate the prices of the high end sellers. The exception is the HSC/NPD/HU cell which had the lowest level of search for any of the high uncertainty cells. As has been noted, this group paid the highest prices of any group in the experiment. The graph provides the additional information regarding how the prices were distributed across the seven sellers, and indicates that all sellers except Foremost (the highest priced store) obtained some sales. We obviously cannot make any judgments about the amount of sales necessary for survival, but it is clear that, when HU subjects were working under conditions of narrow price disper-

Figure 12: Distribution of Purchase Prices - LJ vs. HU Subjects

sion and high search cost, more sellers were in the game. In that cell, the market supported about a \$30 range of prices for the marketplace, with several sales occurring at sellers on the higher end of the price range. Of the four Narrow Price Dispersion cells, this HSC/HU cell paid the greatest dispersion of prices (indicated by the standard deviation of prices paid). The

cell associated with the least search (which was also undertaken in a random manner) seemed to fare worse than other comparable groups.

*sd=standard deviation of prices paid
 range=range of prices paid

Figure 13: Distributions of Prices Paid- All Experimental Cells

6.7 SUMMARY

The experimental results are encouraging in that strong effects were found for the manipulations and subjects responded consistently to perceptual variables. The results for Ss' search behavior came out partially as predicted, but the major finding was an unanticipated three-way interaction. The behavioral results in the experiment are discussed in detail in the following chapter.

Chapter VII

IMPLICATIONS OF EXPERIMENTAL RESULTS

7.1 INTRODUCTION

The significance of studying buyer search behavior rests on the fact that marketing activities are undertaken to overcome the many barriers that exist between buyers and sellers. Important among these barriers is the informational barrier. The extent to which buyer decisions are made without "enough" information is a matter of both managerial and public policy interest. While there is no currently agreed upon basis for determining what is "enough" information to make good decisions, that is simply a matter of measurement. The point is that buyers who are unaware of their options in product/service purchase decisions are a concern both managerially (to the extent that they are unaware of a marketer's offering) and public policy-wise.

The fields of economics and marketing, although quite different in scientific perspective and philosophy, generally agree on the importance of understanding how and why buyers become informed about sellers. The

current study has taken the marketing perspective in studying empirically how certain factors affect individual consumer search behavior. As noted in earlier chapters, the issues addressed here have long been accepted but not empirically confirmed in spite of the urging to do so in both the economics (Rothschild 1973, Wilde and Schwartz 1979) and marketing (Ratchford 1982, Newman 1977) literatures.

This chapter begins with a discussion of the theoretical and practical relevance of each of the independent variables in the experiment. Following that, the experimental findings and the implications of those findings will be discussed. Research directions which spring from this research will be discussed in the following chapter.

7.2 THEORETICAL/PRACTICAL RELEVANCE OF THE INDEPENDENT VARIABLES

7.2.1 Price Dispersion

The dispersion of prices (for a commodity) is a fundamental concept in the economics of information framework and provides the principle thrust in explaining buyer search behavior. Many marketing researchers, however, do not realize that Stigler (1961) proposed price dispersion as being both an antecedent to and an outcome of search behavior. In other words, if a wide

price dispersion reflects greater intuitive and mathematical benefit to search, then more buyers (on the whole) will search and lower-priced stores will be patronized. The dispersion of prices, then, will be reduced because some higher priced sellers will respond with lower prices. The dispersion will never be zero, however, for two reasons: (1) even well-intentioned buyers do not always find the lowest price (given the random nature of search assumed) and (2) some buyers search less than others even for the same perceived benefit. Theoretically, then, the implications of price dispersion for buyer and (subsequent) seller behavior are quite interesting. This "interplay" will be addressed in a later section.

The managerial relevance of this proposition and manipulation is that if consumers perceive there to be large differences between the offerings of retailers in the marketplace, they may be prompted to shop more of those retailers in quest of a particular good (assuming spatial barriers do not prevent such search). This may be particularly true in markets where price information becomes obsolete fairly quickly (i.e. uncertainty about prices is greater). If this is the case, then greater brand/store differentiation will lead to an increase in the intensity of competition (e.g. on the basis of price, advertising, and product development) because

consumers will shop more and become more aware of alternatives. On the other hand, even if consumers perceive very large differences between product or retail alternatives, they may have concrete knowledge about what brand to buy or where to shop and therefore may limit search. In a similar light, the costs of search may be large enough to prevent buyers from searching additional stores (or considering additional brands) in spite of perceptions of large differences between alternatives. Sellers should understand the effect of their differentiation efforts on consumer search (if they occur). The laboratory setting allows the impact of price dispersion on search to be isolated to see if it actually exists.

7.2.2 Search Cost

The costs associated with shopping/information gathering/decision making may be a driving force of consumer behavior (as Stigler (1961) noted). The importance of these mental/physical effort costs is reflected in the postulations by several researchers that decision-making (and associated information gathering) can be described as a "cost minimization" process rather than a "utility maximization" process (Beach and Mitchell 1978, Payne 1982, Kukla 1972, Kahneman 1975). In other words, consumers may decide upon acceptable (satisfic-

ing) : outcomes as a function of the time, money, and effort costs experienced in their behavior.

Consumers may end search and settle on a less preferred alternative because the cost of collecting information becomes greater than the benefit (which actually is utility maximization). Many consumer decisions may be made on the basis of "rules of thumb" (e.g. "always shop at Sears) or other indicators (i.e. market signals - Salop 1979). Much consumer behavior may be affected by the costs involved in performing that behavior. The most universal statement made about search behavior in any literature is that, all else equal, the lower the cost of the information, the greater the search effort will be put forth. This universal proposition has led to a public policy call for action to improve consumer informedness: lower the cost to the consumer of gathering information (Wilde and Schwartz 1979, Russo 1977). The experimental manipulation of both the money and time costs of search, although not perfectly realistic, do allow us to look specifically at the effect of a change in search costs under different conditions of price dispersion and uncertainty (between subjects).

7.2.3 Uncertainty

There is a great deal of interest in the effect of uncertainty on human and firm behavior in psychology (Kukla 1972, Lanzetta 1963), economics (Alchian 1977), marketing (Bauer 1960, Cox 1967, Shimp and Bearden 1982), and even macro organizational behavior (Pfeffer and Salancik 1978). Interest in marketing comes from our need to understand how consumers deal with complex and uncertain environments so both marketers and public policy makers can more accurately target their activities. Although not a particular focus of the current study, it is interesting to note the conflicting theoretical views of uncertainty: Berlyne (1960) proposed a direct positive relationship between uncertainty and decision-making effort while others (i.e. Kukla 1972) have proposed an "inverted U" relationship between uncertainty and effort (whereby people under very high and very low levels of uncertainty put forth very little effort). There is still much theoretical interest in humans' behavioral response to uncertainty, as it may play an important role in the benefit side of the cost-benefit model (i.e. the benefit from search is reducing uncertainty - Bauer 1960).

In addition to having theoretical significance, the manipulation of uncertainty in this research can be interpreted in a more practical way. The high uncertain-

ty group in the experiment can be considered to represent buyers who are "new" to a market (i.e. either having just moved or purchasing an unfamiliar product).³⁶ The LU subject group represents an experienced group of shoppers who are more familiar with the marketplace than is the HU group. The search and information processing literature is full of evidence which suggests that "experienced" consumers both limit their search behavior (Furse et al 1984, Westbrook and Fornell 1979, Newman and Staelin 1972) and use shortcut strategies in decision-making (Johnson and Russo 1984). Studying the extent to which such a group is affected by levels of search cost and price dispersion was an important objective of this research.

7.2.4 Summary

The relevance of reviewing the "meaning" of each independent variable is that such a review provides a more knowledgeable perspective in considering the discussion of the results. In addition, it is important to recognize that the independent variables can be placed in a marketplace context - i.e. they may (although perhaps in different form) have an impact on con-

³⁶ Although note that these experimental "new" buyers start with some information about a range of prices. Many actual buyers do not have such information before they begin search.

search behavior in the actual marketplace.

7.3 RESULTS AND THEIR IMPLICATIONS

7.3.1 Main Effects

7.3.1.1 Uncertainty and Search Cost

The main effect results for uncertainty and search cost were significant and in the hypothesized direction. The low uncertainty group was found to be "better-directed" in their search than the high uncertainty Ss, with the LU Ss shopping fewer stores. Several interpretations of this finding can be made, one of which is to "infer" the subjects' objective function. We might infer the value of search to be the reduction of uncertainty about where a low price was available. Since HU Ss had more uncertainty to reduce (therefore a greater perceived benefit to search), they searched more.

In the aggregate, higher search cost reduced the extent of shopping that took place. The findings of the current experiment (i.e. Ω -Squared for the search cost main effect = .061), taken with the findings of the various pretests indicate that search cost was a driving force in Ss' search behavior (relative to the other independent factors). In particular, the monetary cost of search may have had the largest impact on the extent of Ss' shopping because they were given a financial ob-

jective in the experiment. That is, Ss' outcome in the research was placed in monetary terms and search cost was an explicit factor in determining that outcome.

7.3.1.2 Price Dispersion

The consistent finding that price dispersion had no main effect on search behavior in the experiment or in any of the pretests (even for high uncertainty Ss) was discussed in the previous chapter. The lack of a main effect does not imply no effect for price dispersion in the experiment, however, because there was a complex three-way interaction (to be discussed in a later section). The fact that a more general effect did not occur, however, does deserve some attention.

It was proposed in the previous chapter that the NPD Ss and WPD Ss appeared, after 2 to 3 searches to place the same (small) value on additional search. In as much as there was no price dispersion by uncertainty interaction for number of stores shopped, this interpretation holds for both the low uncertainty and high uncertainty conditions (although, the LU Ss on the whole shopped less). The surprising finding is the lack of a simple main effect for price dispersion under the high uncertainty condition, where we would expect Ss to be searching randomly. Acknowledging that the results varied with search cost, we can still look more

closely at why price dispersion did not have a more general effect.

The evidence cited in the previous chapter indicates that HU Ss were likely to see a low price and observe a fairly wide range of prices after three searches. This may explain why Ss in cell 7 searched only 3.23 stores under conditions that the normative search model would suggest merits 6 searches. The likelihood of observing low prices early, seeing a large price range (i.e. a large percentage of the expected range), and the pressure created by the GBQ may have all contributed to no effect of price dispersion on the behavior of HU Ss (as a group).

The point is that the classic notion that price dispersion affects search may hold under very specific conditions (to be reviewed below). Other conditions which may be required for a general effect of price dispersion include:

1. The number of alternatives which the buyer is searching and deciding between is larger than seven, and/or
2. The dispersion information is known only subjectively or has to be "discovered" (i.e. is not known at all going in to the search process).

In addition, whether price dispersion affects search or not may depend on how the prices are distributed. Stigler (1961) for computational simplicity, assumed a uniform distribution of prices. In the experiment, the

actual prices used were uniformly distributed to give the proposition its best chance of working. Prices in the actual marketplace are probably not so evenly distributed- they may be "grouped" together as stores competing for the same geographic/demographic markets battle on price. This would provide much less a chance for this proposition to work because buyers may sample (even randomly) from the same "clump" of sellers.

The overriding point in that, if perceptions of price dispersion actually do affect search behavior, they must work only under particular conditions.

7.3.2 Search Cost X Uncertainty Interaction

Although the three-way interaction subsumes this two-way interaction, the search cost x uncertainty interaction has some interesting implications that should be dealt with separately. There are two ways to interpret the interaction, first comparing the impact of the search cost manipulation on the different uncertainty groups and, second, comparing the impact of the uncertainty manipulation on the different search cost groups. For the first comparison, we find that the search cost manipulation affected the search behavior of the high uncertainty group, but not the low uncertainty group. The significance of this is that the LU group, as a function of a lower need for information,

did not respond to a lowering of search costs by searching more.

Although we cannot confidently generalize this result to the actual marketplace (because, unfortunately, the world does not exist in convenient conditions of two levels), we can draw some conclusions about an actual marketplace issue. Several researchers (i.e. Wilde and Schwartz 1979, Salop 1979, Beales et al 1981, Russo 1975) have suggested that consumer "informedness" can be improved by lowering the costs of information attainment and processing. This common sense argument is not questioned here. What is questioned, however, is the extent to which consumers will be more motivated to collect and process information simply because the cost is lower. It is important to recognize that a need for information (see Burnkrant 1976) seems to underly the motivation to collect and process that information. The low levels of consumer search found by many researchers (i.e. Katona and Mueller 1955, Newman and Staelin 1972, Claxton et al 1974) implies that a strong need for information (beyond what can be obtained from internal search and from informal sources like friends and relatives) does not exist for many consumers. To the extent that this has caused a dispersion in the competitive distribution of store offerings and prices (that may result in consumers making

purchase decisions without knowing that a better buy is available), a problem exists (see Maynes and Assun 1979 for evidence regarding price dispersion for convenience products). However, simply lowering the costs of search/shopping may not make a consumer population with little perceived need for information consider more alternatives. What is needed in this light is research that examines the degree to which consumers make "nonoptimal" decisions (i.e. could have made a "better" buy elsewhere) and to see what extent this degree of nonoptimality leads to dissatisfaction. If this research showed a strong lack of consumer awareness of other purchase alternatives, then it should be publicized in the aim of communicating to consumers the "benefits" of shopping around.

The second interpretation of the two-way interaction is simply that the uncertainty manipulation affected the search behavior of LSC Ss but not HSC Ss. Having to spend less on each search, the LSC Ss shopped more under high than under low uncertainty. However, in the face of high search costs, HU Ss apparently satisfied on their decisions by searching no more than the LU Ss did. One would have to assume that the same level of "benefits to search" existed for the LSC/HU group as for the HSC/HU group. However, the high search costs of the latter group apparently equated the MC of search to the MR of search after a smaller number of searches.

Overall, this interaction would probably be predicted by economics of information theorists (because the MC of the HSC group might not "divide into" the MR associated with the HU condition while the MC of the LSC group would). However, it shows that the unquestioned acceptance of the proposition that "lower search costs lead to more search" is not justifiable.

7.3.3 Three-Way Interaction

In Figure 14, the three graphs depicting the different interpretations of the three-way interaction for number of stores shopped are presented. In the previous chapter, the results of this interaction were discussed only by comparing the low uncertainty and high uncertainty samples in terms of how search cost and price dispersion interacted for each of those samples (Figure 14a). It was noted that, under low uncertainty, there were no significant simple main effects nor a significant search cost X price dispersion interaction. The LU group's search behavior was simply not affected by the SCOST and PDISP manipulations. It may likely be that, on the whole, the LU SS needed fewer searches than the HU SS because they were working to confirm/disconfirm their initial (uncertain) expectations about the price distribution of stores. Guided by those prior expectations, they were affected little by the other manipulations.

Figure 14: Plots of the Three Way Interaction

The right hand graph of Figure 14a shows that there are simple effects for both search cost and price dispersion and an interaction. We do find a simple main

effect for price dispersion under the HSC/HU condition and find a simple main effect for search cost under the NPD/HU condition. This was discussed in the previous chapter.

Given the complexity of the three-factor design and the associated complexity of integrating all the angles from which to interpret a significant three-way interaction, a nontraditional approach to the interpretation will be taken. The essential interest here should be in examining when (under what conditions) price dispersion, search cost, and uncertainty affected search behavior. Each manipulation will be examined individually in the next three sections. In each section, the specific conditions under which the respective manipulations affected search behavior and did not affect search behavior will be discussed.³⁷

7.3.3.1. The Conditions Under Which PDISP Affected Search

The impact of price dispersion on search can be examined under four different sets of conditions (made up by combinations of the search cost and uncertainty manipulations): LSC/LU, HSC/LU, LSC/HU, HSC/HU. The price dispersion manipulation affected search behavior only in the HSC/HU condition. Price dispersion was not

³⁷ Note that the dependent variable referred to here is the average number of stores shopped.

expected to impact search under either of the low uncertainty conditions so those conditions will not be addressed. The focus, then, will be on the HU conditions.

Judging from the average search behavior of the NPD/HSC/HU Ss (avg = 2.30 stores), there was on average little perceived benefit to them for searching a third store. This is in contrast to the WPD/HSC/HU Ss who shopped 2.92 stores on average. The HSC conditions may dilute the perceived benefit of search due to higher uncertainty. With high search costs apparently causing Ss to take a sharper focus on what they had to gain from searching (i.e. focusing more on the range of prices available), NPD Ss seemed to conclude that that marginal gain of a third search (on average) was not worth its marginal cost. WPD Ss seemed to conclude that a third search was merited (on average). The NPD/HSC/HU Ss seemed to place a larger value on making their purchase decisions quickly and moving on to the GBQ than did the WPD/HSC/HU Ss. This is due to

1. The higher costs of going to another store (time, money, loss of opportunity),
2. The prospect that the next store chosen could be anywhere on the continuum (due to the random nature of search) and may not improve the current price standing, and
3. The prospect that improvement in the current price standing due to a third search may not be that large anyway (as a function of the narrow price dispersion).

The WPD Ss were also faced with conditions 1 and 2 immediately above but, faced with a wider price dispersion, saw a larger potential price improvement by searching a third store.

There was no difference in the search behavior of NPD and WPD Ss under the LSC/HU conditions because both groups could tolerate paying the lower costs of search to the point where a potential search ceiling was reached (and the WPD conditions did not merit search beyond that ceiling). We should note that the simple effect of price dispersion described above was not strong enough to result in any difference between PDISP groups in any two-way interactions nor on a main effect level.

7.3.3.2 The Condition Under Which SCOST Affected Search

We can examine the effect of search cost on "average" search behavior under four different sets of conditions: NPD/LU, WPD/LU, NPD/HU, WPD/HU. Incredibly, (given the powerful main effect for search cost), SCOST had an impact on search behavior only under high uncertainty/narrow price dispersion conditions in the experiment (this can be seen in Figure 14a). This effect for search cost (LSC avg = 3.56 stores, HSC avg = 2.30 stores) was strong enough to come through on one two-

way interaction and a main effect. The lack of effect for the search cost manipulation in the LU condition is due to both LSC and HSC Ss using their specific prior information to guide their search. The simple main effect for search cost occurred when uncertainty was high and prices were narrowly dispersed and is intuitively explainable. The uncertainty and price dispersion manipulations can both be interpreted as reflecting the gains to search. When both were on the high levels (HU/WPD), both search cost groups searched (on average) about three stores (WPD/HU/LSC = 3.23, WPD/HU/HSC = 2.92).³⁸

When the benefit of search was reduced because price dispersion was narrow (i.e. the NPD/HU condition), a very distinct difference between the search behavior of the different search cost groups (NPD/HU/LSC avg = 3.56 stores, NPD/HU/HSC avg = 2.30 stores) emerged. The

³⁸ It is interesting to note that the average of the WPD/HU/HSC group was around 3 (avg=2.92) because the bulk of its members (62.5%) shopped 3 stores. Only 36 percent of the WPD/HU/LSC group ended up shopping 3 stores but its overall average was also around 3 (avg=3.23). This was because 22 percent of the latter group shopped 2 or fewer stores while 40.9 percent shopped 4 or more stores. There clearly was a larger variance on the behavior of the WPD/HU/LSC group than the WPD/HU/HSC group but the averages turned out to be the same. The purpose of pointing this out is to recognize that there were qualitative differences between the search behavior of these groups, although the mean number of stores shopped came out to be the same. It is important to recognize, however, that the bulk of both groups went to the third store.

overall benefit of search reflected by price dispersion and uncertainty is lower when we go from WPD to NPD holding high uncertainty constant. The HSC Ss under these conditions clearly placed a low marginal gain to making a third search (the percentage of the NPD/HU/HSC group searching 3 or more stores was 40% - the same percentage for the NPD/HU/LSC group was 89%).

Given this finding, it can be concluded that price dispersion did impact the extent to which search cost affected search behavior. Under the high uncertainty situation, Ss searching through a wide dispersion of prices were not affected by a change in search cost. Under that same high uncertainty situation, however, Ss searching through a narrow dispersion of prices were affected greatly by the change in search cost, with HSC Ss dropping way off in the average number of stores shopped. While price dispersion did not have a significant main effect in the experiment, it is evident that it influenced the relationship between search cost and search behavior (under high uncertainty).³⁹

³⁹ Note that this was the basic thrust of the interaction predicted in chapter 3 aggregating over both uncertainty conditions. It was supported, then, only for the high uncertainty condition.

7.3.3.3 The Conditions Under Which UNCERT Affected Search

Uncertainty is considered to be a universal motivator and has been studied on the individual level (Kukla 1972) as well as on an organizational level (Pfeffer and Salancik 1978). Given that uncertainty was not found to affect search behavior under all conditions, one must conclude that the searcher's "tolerable" level of uncertainty changes in the face of changes in the circumstances surrounding search.

The effect of the uncertainty manipulation can be examined under four different sets of "circumstances:" NPD/LSC, NPD/HSC, WPD/LSC, WPD/HSC. Uncertainty affected the average number of stores searched under the following two conditions:

1. NPD/LSC- (LU avg = 2.78 stores, HU avg = 3.56 stores) and
2. WPD/HSC- (LU average = 2.35 stores, HU average = 2.92).

Under both sets of conditions listed above, HU Ss shopped more (on average) than LU Ss did.

Since the "norm" (i.e. what would be expected) is that HU Ss would shop more than LU Ss, it is more interesting to discuss the conditions under which uncertainty did not affect search behavior.

NPD/HSC - This is an extreme set of search conditions under which uncertainty did not affect search be-

havior. The explanation seems fairly straightforward, especially taken in the context of the general "cost/benefit" model of search. Of the four combinations of price dispersion and search cost, the NPD/HSC conditions should lead (all else equal) to the lowest level of optimum search (see Chapter 6). The reason that uncertainty did not affect search behavior under these conditions may be that HU Ss were acting in accordance with the cost/benefit model and shopping at a relatively low level. The LU Ss were following the consistent "lower search" pattern that described their behavior in all the cells. Under the NPD/HSC conditions, then, the HU Ss dropped down to the level of the LU Ss because their (HU Ss') higher uncertainty apparently did not raise the benefits of search over the cost barrier.

WPD/LSC - The intriguing thing about finding that the uncertainty did not affect search under these conditions is that the cost/benefit model would predict WPD/LSC to be the condition in which optimum search was the highest. The potential explanations for why this subject group (cell 7) searched as few stores as they did (avg.=3.23) were presented earlier. The 2.79 average stores recorded here for the LU Ss was numerically the largest amount of search done (although not significantly different from the other LU groups). In this situation, the cost/benefit model would clearly not

predict an equivalent amount of search for both the HU and LU groups. It would seem that HU Ss would have much more to gain from searching in these "wide open" conditions because of the high level of uncertainty they had to reduce. The HU Ss in this condition shopped less than would be expected, however. This is one finding in the experiment that is not interpretable in the context of the general cost/benefit model.

7.3.4 Implications of the Three-Way Interaction Findings

Search for the lowest price may be a sequential procedure in that it is likely that searchers' perceptions of the benefits and costs of search may change after each search. It is not unreasonable to assume that, at some point, the marginal benefit of search declines (Stigler 1961, Telser 1973, Kohn and Shavell 1974) and the marginal costs of search increase (e.g. as a function of pressure as time draws near to do other activities-Manning and Morgan 1982). It is difficult to speculate about Ss' perceptions of the costs and benefits of search after a certain number of searches in the current experiment because these perceptions were not measured after every search. However, some inferences can be made about those perceptions based on the Ss' behavior. What follows is a summary

of some of the conclusions which can be made about the economic theory of search based on the findings.

First of all, it was found that price dispersion did affect search behavior, but only in a specific situation. In addition, the effects of search cost and uncertainty were not felt in all the possible experimental conditions that they could have been. The conclusion is that the main effects predicted by the economic search model do not hold universally and did not hold under situations that might be common in the real marketplace. Of particular importance is that both price dispersion and search cost did not impact on search behavior under low uncertainty condition, even though LU subjects still experienced some uncertainty. The LU condition was set up to represent a common situation in the marketplace where consumers have prior knowledge (i.e. experience or familiarity) with a particular marketplace. The findings that the price dispersion and search cost factors had no impact on the search behavior of LU Ss suggests that there are limits to the theory's predictive ability. In addition, the deviation of HU Ss' search behavior from predicted optimal levels suggests that factors beyond search cost and price dispersion are being considered.

While the manipulations affected search behavior under some conditions, the results here lead to the con-

clusion that it is incorrect to take each of the "main effect" propositions literally (i.e. apply them across all situations). The effects of the three independent variables (PDISP, SCOST, and UNCERT) on search behavior are impacted by the interactions between the three as well as other externalities. One externality may be the number of sellers available for purchase. It was observed earlier that buyers randomly searching from a distribution of only seven stores had a high probability of seeing a low price after just three searches. The pressure created by the opportunity cost of time (another externality) may have also "diluted" the effects of the manipulations.

It cannot be said, however, that the general cost-benefit model has been disproven. Almost every significant finding in the experiment can be interpreted by inferring how the costs and benefits of search might have interacted (the exception is the finding that the uncertainty manipulation did not affect the search behavior of WPD/LSC Ss). For example, it is intuitive to suggest that search cost will have less of an impact on search behavior under low uncertainty because the benefits to searching may be low enough that additional search is not necessary (regardless of search cost).⁴⁰

⁴⁰ It is probably safe to conclude that the general cost-benefit model cannot be rejected. Given enough thought, any behavior can be explained (post-hoc) by

However, Stigler's and subsequent models have placed a very general aura around these propositions. In short, to say that lowering search costs will always increase search behavior is simply not true. Likewise, to say that a wider price dispersion will always lead to more search is also not true. Taken at its most general level, the model cannot account for the underlying complexities in information search behavior.

Given the role of theoretical models in guiding research thought and practice, we find a great acceptance of these "canons" of search behavior in the marketing field. The findings of the current study suggest that there are limiting conditions under which the "cost/benefit" model proposed by Stigler will accurately predict behavior.

One important perspective gained from the study of search behavior in economics is that consumer behavior inherently affects the way that sellers behave. While we have not studied the impact of search behavior on seller behavior in this research, we can make some inferences about that behavior by examining the results regarding the prices paid by the student consumers in the current experiment. This provides insight into

considering how the actor might have weighed the costs and benefits of that behavior. However, the model does not appear to provide solid a priori predictions.

what type of a price structure this market of consumers would "support." This discussion is provided in the following section.

7.3.5 Findings Regarding Prices Paid

In the following sections, the experimental findings for the dependent variable %DISTANCE will be reviewed briefly and the distribution of prices paid under the different experimental conditions will be discussed.

7.3.5.1 Distance from the Best Price

This "welfare" analysis showed one basic, common sense thrust: it is better (generally) to shop under more certain conditions than under less certain conditions. The main effect for uncertainty in this context is interesting because it shows that, even though HU Ss shopped more (on the average) than LU Ss, it still was not enough to allow them to pay the same low prices that LU Ss did. In addition, a big impact of limited searching under high uncertainty can be seen as the NPD/HU/HSC Ss shopped only 2.35 stores (on average) and paid much higher prices than all seven other experimental groups.

7.3.5.2 The Distribution of Prices Paid

As noted earlier, the primary thrust of Stigler's work was in explaining the existence of price dispersion in the market for a commodity. His basic answer was that buyers could not be informed about all sellers' offerings because there were costs of search which prevented that much information being collected and there were only limited benefits to searching out sellers. Since Stigler's paper, a number of economists (e.g. Marvel 1976, Nelson 1970) have attempted to show how certain communities or industries associated with different levels of "search cost" would also experience different levels of price dispersion for particular goods.⁴¹

In the previous chapter we examined how the distribution of sales to each seller (ranked on the basis of price and aggregated across both price dispersion conditions) differed between the two uncertainty conditions. Clearly the low uncertainty Ss paid lower prices than the HU Ss. It is important to note, however, that the distribution of prices for both groups are skewed left, with the bulk of the HU purchases (86%)

⁴¹ For example, Marvel (1976) developed a regression model which used price variability as the dependent variable and such aggregate predictors as average educational level and average income level as predictors. He had marginal success in isolating the consumer characteristics which explained price variability.

made at one of the three lowest priced stores. The point is that, with a limited number of sellers (seven), HU Ss managed to identify the "low-end" sellers (for three of the four HU cells).

The implication of this finding is that the "high-end" sellers would potentially drop their prices down to the levels of the three lowest in order to pick up sales. With equal search costs to each store, the seven store market (barring strong differences in service, image, etc.) would not support a distribution of evenly spaced retailers. Assuming a continuous distribution of available prices (and sellers), economists would probably insist that a large number of sellers be used to study the impact of search behavior on "resulting" price structures. In the following chapter, a section is devoted to this issue.

The importance of taking a broadened perspective of consumer search behavior (i.e. considering its potential impact on what sellers do) is clear: that behavior affects sellers' demand functions. The more consumers search, the more elastic the firm's demand function is likely to be. The current research allows only limited consideration of the issue, but it is a fruitful direction for future research.

7.4 SUMMARY

In the first chapter of this thesis, it was noted that the major objective of the research was to assess the generalizability of the propositions derived from the classic theory of price search behavior. While the theory's general "cost/benefit" interpretation of behavior cannot be rejected on the basis of this study, the a priori predictions derived from the theory did not hold up generally.

The experimental study of search behavior presented in this thesis is in its early stages. A series of research ideas which spring from this study and from the general area of the economics of information are presented in the following chapter.

Chapter VIII

RESEARCH DIRECTIONS

8.1 INTRODUCTION

The interplay between marketing and economic thought provides an important groundwork for studying consumer search and decision-making. The economic perspective helps place the study of consumer search in a larger context, making the importance of research in the area more clear. The current chapter will identify and discuss five research directions that are at least in part suggested both by the findings of the current study and by the literature that laid the basis for the research.

8.2 ADVANCING THE CURRENT PARADIGM

The current study can provide the basis for additional work that looks into more complex issues associated with consumer search. We will review several aspects of the paradigm which may be revised in the interest of studying other research questions and in the interest of making the study of search more realistic.

8.2.1 Varying Time Pressure/Opportunity Cost

In light of the argument that search cost is a primary driver of search behavior (Stigler 1961), we can speculate that understanding consumers' search and decision-making behavior under different conditions of opportunity cost and time pressure is quite important.⁴² The basis for some consumer decisions might involve balancing the "benefits of an immediate decision" against the benefits of further search and consideration of the problem.⁴³ In such a model, the costs of search might be viewed as being positively related to the benefits of an immediate decision. We might also postulate that different types of consumers can "tolerate" different levels of time pressure/opportunity costs in shopping. Increased time pressure/opportunity cost may have an important effect on the decision strategies that consumers use in search/buying decisions. It is important for marketers to understand those deci-

⁴² Recognizing the strategic importance of "time cost" to its customers, Sears has recently updated and redesigned its stores. As part of this redesign effort, they have installed cash registers which reduce the average checkout time from 3 minutes to 90 seconds (Time, August 27, 1984). In the process of fully molding its offering to its customers, Sears has recognized the impact that time cost can have on customer patronage.

⁴³ The benefit of making an immediate decision (i.e. making the decision now so the product can be put to use) can be interpreted as time utility, which is a classic utility provided by the marketing function (McCarthy and Perreault 1984).

sion rules in appealing to customers.

8.2.2 Increasing the Number of Sellers

To adequately examine the impact of consumer search on the resulting price structure in a market, it may be appropriate to include a much larger number of sellers than was used in the current experiment. We could provide, for example, the total number of dryer retailers in a city. This would certainly impact the way price dispersion affected search. The scenario could be made realistic by placing "high" time and money search costs on the sellers which are "further away" in the hypothetical city (this would allow an assessment of the degree of "outshopping" that consumers might do). It would be quite interesting to see how increasing the number of sellers would affect the results (relative to the current study), especially with respect to the structure of purchase prices which resulted.

8.2.3 A Complete Uncertainty Condition

It is relevant here to consider the search behavior of completely uncertain consumers - i.e. those who go into a purchase decision with no idea about the sellers or the distribution of prices. Rothschild (1973) postulates that a searcher working under these conditions would not differ from searchers working under Stigler's

conditions (e.g. the HU Ss in the current experiment) in search behaviors other than to search more (the response to changes in search cost and price dispersion would not differ between the two groups). This proposition could be tested against the "inverted U" hypothesis, which would suggest that completely uncertain Ss working under high search costs might simply "give up" and randomly select a seller. This type of behavior has been described by Olshavsky et al (1982).

8.2.4 Shift to a Longitudinal Approach

Some effort should be made in developing studies which examine the behavior of a smaller group of Ss over a period of time (i.e. weekly purchases). The advantage of such a longitudinal approach is that Ss can come to conclusions about the dispersion of offerings between stores in the hypothetical marketplace themselves (i.e. start them out under complete uncertainty). This will likely create stronger beliefs about the marketplace than simply telling the Ss (via a hypothetical price survey) what the general price distribution looks like.

8.3 SEQUENTIAL SEARCH

A second major research area worthy of study involves examining the sequential search process in more detail. Stigler's initial model suggested that consumers followed a fixed sample size rule by which they determined how many sellers they would sample before their search even began. More recently, some theorists (Rothschild 1973, Axell 1974, Telser 1974, Nelson 1970) have disputed the validity of such a procedure, although there is still apparently some debate on the issue (Manning and Morgan 1982). Those disputing Stigler suggest that the more logical description of search behavior is sequential- that is, the searcher sequentially (after each search) revises his/her "priors" about the distribution of prices (and benefits of additional search). The bulk of these sequential models involve simply redefining the original $MR=MC$ idea into optimal "stopping rules" whereby the searcher stops when MC equals or exceeds MR or the price observed is below a reservation price.

The extent to which search is a sequential or a fixed sample size process can be studied with the current paradigm. In addition, the particular "stopping rules" that searchers use can be studied via a protocol or thought listing analysis. Alternatively, SS could be stopped at selected intervals (i.e. before each search)

and their perceptions of the benefits and costs of search can be assessed (or reassessed).

Another intriguing issue is, once searchers' perceptions about a marketplace have been created, what happens to behavior when those beliefs or expectations are disconfirmed? In price search, this disconfirmation might come by switching prices around or by providing each searcher with the same series of prices (which contain a spread different than what the searcher was expecting).

We might look closely also at the impact of disconfirmed expectations on seller patronage. This would involve answering the following question: when a seller has a particular reputation for being low-priced (a perception which could be created in a longitudinal design) and raises prices, what happens to customers' search and buying behavior? This is a matter of practical importance and also one which deals with the essence of the marketing function (creating and meeting expectations). The issue, again, is whether and how the searcher's perceptions of search benefit change over time.

8.4 SELLER BEHAVIOR

A common criticism of Stigler's (1961) model of search has been that he failed to describe the process by which consumer search behavior affected the prices that sellers offered (Rothschild 1974). More recently, economic researchers have developed models which consider seller response and attempt to determine the point (i.e. the number of consumers searching) at which competitive equilibrium will occur (Rothschild 1974, Salop and Stiglitz 1979). These models themselves should be of little interest to marketing researchers except in their orientation toward understanding what makes sellers behave as they do. Whether consumer search/informedness affects seller behavior is not known specifically, although there is some evidence to suggest that it does.**

The initial research question to ask, then, is whether or not sellers are cognizant of and respond to their customers' awareness of competing alternatives. Some anecdotal evidence might suggest that they are. A recent NTW (National Tire Warehouse) radio commercial in a midwestern city told consumers not to worry about

** A study in the consumer economics literature (McCracken et al 1982) found retailer grocer prices (on a market basket of goods) to show a clear increase during the time period when the retailers' prices were being published in local newspapers. In addition, price levels rose back up when the price publication ended.

searching around for low prices. The commercial claimed that NTW called all its competitors every week to ensure that it had the lowest tire prices. In short, this strategy assumes that customers are very interested in comparison shopping because the company undertakes that activity for them (it says).

Comparative advertising is another example of how sellers "search" for consumers by providing information about competitors. The advertiser has to be assuming that consumers know about the other brands, because s/he would not want to draw (even negative) attention to competitors if they felt that consumers perceived only one choice in the marketplace.

The point is that sellers' perceptions of consumers' information gathering habits may affect their competitive strategies. Survey research could examine retailers' assumptions and beliefs about what consumers know about competitors and in what ways (if at all) it explicitly affects their strategy decisions.

The importance of understanding this buyer-seller interaction is that the outcome may affect (1) the structure (i.e. dispersion) of marketplace offerings and (2) the competitive strategies that are successful. Note that this interaction can be studied experimentally (Wilde and Grether 1983 discuss some empirical economic studies of buyer-seller interaction).

8.5 ADVERTISING AND ITS INFORMATIONAL EFFECTS

Nelson (1970, 1974) has produced a framework in the economics literature that addresses consumer information and how it affects market structure, advertising and location strategies, and inventory policies. Nelson's biggest contribution is in making it more clear how consumer information-seeking may affect competitive behavior. This analysis, although oversimplified, proposes an interesting role for advertising that has not been addressed before in the marketing literature. A review of that analysis follows.

Nelson contends that there are two kinds of goods which are associated with different types of search behavior. Search goods are those that can be evaluated by consumers before purchase (i.e. a camera). Experience goods, on the other hand, can be evaluated only by experiencing or consuming them (i.e. a can of tuna). Nelson assumes fundamental differences between the brand search/selection processes of experience goods and search goods which follows this basic logic: since experience goods cannot be evaluated prior to purchase, little information is collected about alternatives and brand selection is essentially random (until several experiments are made and a good brand is decided upon). Since search goods can be evaluated before hand, consumers are assumed to follow Stigler's model in collecting information about alternatives. In short, con-

sumers collect more information about search goods prior to purchase.

Given this basic premise, Nelson proposes and tests (with aggregate data) several relationships:

1. Search goods industries will be less highly concentrated than experience goods industries are (since buyers are more "informed" about the alternatives in the former).
2. Retailers selling search goods will be more clustered than retailers selling experience goods (to facilitate search).
3. There will be larger assortments of experience goods offered than of search goods (since experience good decisions are made randomly).
4. Sellers of experience goods will advertise more heavily than will sellers of search goods.
5. The advertising for search goods will be more factual and informative than the advertising of experience goods will be. Experience good ads will focus on product image.
6. The mere fact that a seller advertises communicates to consumers that the seller has a quality product.

As can be seen above, Nelson's propositions make major statements about how market competition is affected by consumers. He develops these propositions with intuitive arguments, providing little or no empirical evidence to support his conceptualization and providing tenuous evidence in empirical "tests" of the theory.

Several major problems can be cited with Nelson's framework. First, he proposes that product characteristics affect consumer search behavior which in turn affects seller behavior. However, he assumes away the

consumer behavior that is central to his thesis, maintaining that fairly extensive search takes place for what he calls search goods (The marketing literature has shown is not the case). Second, Nelson assumes that goods can be unambiguously classified as either search or experience goods. Third, the conceptual basis on which Nelson attempts to classify goods is not well defined.⁴⁵

In addition, counterexamples to Nelson's hypotheses can be found easily. For example, his contention that advertising for experience goods will be primarily "image" and non-informative is contradicted by current advertising for the leading cigarette brands (an experience good). The cigarette industry is currently engaged in a product development and advertising battle over the low tar issue. The leaders in this industry provide consumers with print advertisements that are very factual and appeal to information needs - i.e. tar/nicotine content relative to competitors. The brands that cannot compete on that "market signal" use advertising more closely in line with what Nelson pro-

⁴⁵ In the empirical tests of his propositions, Nelson classifies goods into one or the other category on the basis of aggregate nonmerchandise receipts for each product category. The logic is that the larger the percentage of nonmerchandise receipts for a product category, the more repairs were made on that product category, so it is more likely that buyers could not evaluate the product before purchase. Clearly there are problems with this approach.

poses for experience goods: they use imagery and "remini" the consumer of the benefits that s/he should be getting out of the product.⁴⁶

Regardless of the problems with Nelson's framework, the basic idea he is proposing is intriguing. This is that the ability of consumers (perceived or real) to evaluate products prior to purchase affects the extent of their search behavior and affects the way sellers make strategy decisions (i.e. how to advertise). Nelson's efforts are in effect similar to Copeland's (1923) classification of products which have been discussed in the context of consumer search behavior by Kaish (1967). The difference is that marketing researchers have not considered seller's assumptions about consumer behavior and their (seller's) marketing strategy responses.

Rather than attempting to classify products into mutually exclusive categories, it may be more realistic to propose that goods can be placed along a continuum that ranges from "easy to evaluate in use prior to purchase" to "difficult to evaluate prior to purchase." All products have intangible and unobservable features (Leavitt 1983) so it is more logical to place them on a continuum. With this framework, the potential differ-

⁴⁶ Paul Miniard has made this observation in discussing consumer attitudes, attitude change, and competitive promotional strategy (class lecture).

ences in consumer and seller toward products on different areas of the continuum could be examined empirically.

Nelson's work also provides an interesting question regarding consumers' perceptions of advertising. Probably most intriguing of all of his hypotheses is the proposition that the mere fact that a seller advertises is an indicator of that seller's quality and standing (particularly for experience goods). There is not an explicit attributional process proposed to underly his hypothesis, but he argues strongly that the existence and amount of advertising for a brand influence consumers' opinions of that brand. Nelson is suggesting that a heavily advertised brand is attributed a higher quality and popularity than a less heavily advertised (or non advertised) brand. In other words, advertising acts as a "signal," because consumers have learned that a brand cannot be advertised to fill a particular need, not fill that need, and expect to survive in the long run. This proposition is intimately related to consumer search because consumers may use such "signals" or indicators as substitutes for search behavior. The use of such signals, then, has implications for the basis on which sellers compete in the market. This area of research seems to be fruitful both in terms of understanding more about consumers' perceptions of advertising and the attributions made about advertisers, and

understanding how sellers can better match offerings and promotional messages to the information needs of consumers.

The Nelson framework is unique in economics in that very explicit assumptions are made about consumer behavior and sellers' response to that behavior. There are several interesting questions about consumer search behavior provided within that framework.

8.6 RESEARCH ON NEW INFORMATION TECHNOLOGY

A discussion of consumer search behavior is incomplete today without discussing in-home communications technology - particularly in the form of videotex. With the recent announcement of a Sears, CBS, and IBM joint venture for the development of a full service videotex system by 1986, the long predicted arrival of videotex as a mass medium appears imminent. The marketing, financial, and technological expertise of those firms seem to provide a perfect synergism for marketing videotex as a widely used method for overcoming marketplace informational barriers.

Several different research questions can be raised about buyers' and sellers' use of the new medium, many of which can be addressed using experimental methodology. A few of these will be discussed below.

The issues raised in the last section's discussion of Nelson help to provide an interesting backdrop to understanding how consumers will use the videotex medium for shopping. A critical question to ask about marketing via videotex is "what products will consumers feel comfortable in purchasing via videotex?" It was noted earlier that there may be certain physical/perceived risk characteristics of products which may affect how well buyers can evaluate those products prior to purchase. Consumers will not be comfortable in purchasing all types of products on the basis of viewing them at home, even if the products are presented on high quality film images. Research can be conducted to find particular products for which there might be consumer resistance in in-home purchasing (e.g. Korgaonkar 1982). The key may be to understand consumers' perceived ability to evaluate the product in use without having to physically inspect it (which is Nelson's underlying theme).

A second issue relates to the fundamental question addressed in this research. To what extent will consumers shop across stores for particular products using videotex? It should be recognized that a videotex in-home system may represent a lower-cost shopping medium, but it is not costless. There are time costs of searching via videotex, which include the cost of get-

ting "into" a retailer's database and then searching through it for a particular product of interest.⁴⁷ In addition, there are the costs of learning to shop on the system and the associated frustrations. Certain "stores" on a videotex system may create loyalties just as they do in the actual retail marketplace, which may lead shoppers to limit their videotex shopping. For example, CompuCard may become the ultimate "discount" on most videotex systems and may, through its low price/brand name positioning, discourage videotex shoppers from shopping other stores. In addition, when the Sears name is placed on a store menu list, shoppers may flock to that database to the exclusion of others.

Although videotex has been discussed by some to be a real opportunity for smaller retailers, the time and effort costs of sorting through product categories and evaluating products once "inside" a store, coupled with strong loyalties which may develop for particular stores may keep shoppers from "canvassing" many stores as some say they will. Again, the current research suggests that lowering the costs of information gathering will affect search behavior only if there is a perceived need for that information. The extent to which

⁴⁷ Note that this discussion assumes that videotex shopping systems will, in the future, be structured by store (much like the shopping "malls" available over the CompuServ system currently).

videotex lowers the costs of information gathering and the extent to which that will promote heavy search by consumers are interesting questions which can be examined in a laboratory setting. The effect on search behavior of including well-known retailers on videotex menus is also an interesting research issue.

An important managerial question to raise is "how can a retailer establish and maintain its positioning on videotex?" For example, Silverman's Inc. is a clothing retailer who has been established in one market (Grand Forks, North Dakota) for 71 years. It has recently taken the plunge into the videotex medium by tapping into Viewtron (the ongoing videotex system in southeast Florida - Seglin 1984). The company now markets its products in a new market via a new medium. The key strategy issue for Silverman's is how to establish the image/positioning that it had maintained in another market for 70 years. This will become an especially important issue as more and more retailers market their goods on videotex systems. The retailers' marketing "program" may become more important as it establishes its positioning via other media and through promoting word of mouth communication among users. In short, the creation of a differential advantage over this new, potentially complex medium will create many challenges to retailers. Consumer response to different

positioning strategies and techniques to communicate them is another issue which can be examined experimentally.

The contribution of this research to the study of videotex-related issues is primarily methodological. This research presents the start-up of a methodology through which consumer comparison shopping over a videotex system can be studied. In addition (and quite importantly), the "barriers" to learning and using a videotex system encountered by consumers can be examined using the current methodology. Finally, the methodology used in this research can be reformulated to examine the "nuts and bolts" issues (like finding what impact the availability of a Sears data base has on comparison shopping behavior).

8.7 CONCLUSIONS

In this chapter some pertinent research issues that spring from the current research and from consideration of the economics of information paradigm have been reviewed. Of particular interest are continued study of the factors affecting search, studying how consumer search behavior might affect seller behavior, and studying how new technology might affect the "strategies" of both buyers and sellers. The final brief chapter presents the concluding comments about the research.

Chapter IX

CONCLUSIONS

In chapter 1 it was noted that the major objective of this research was to empirically test two propositions which come from Stigler's (1961) economics of information framework. The issue addressed here is the generalizability of those propositions across consumer groups with different levels of information. This objective was accomplished via an experimental "shopping simulation" methodology. The evidence produced in the research suggests that the general propositions made by Stigler (and many others since that time) apply only under limited conditions. The purpose of this chapter is to concisely summarize the intent of Stigler's work and to discuss the contribution and limitations of this research.

Stigler (1961) made an analogy between buyer ignorance and cold weather - in short, people do as much as they need to shelter themselves from each. Just as some humans are more tolerant of the cold than others (and therefore purchase less warm clothing/shelter),

some buyers are more tolerant of making purchase decisions under uncertainty about available alternatives. In each case, the person is balancing the perceived costs and benefits of making the expenditures to obtain "shelter."

Stigler's primary thrust was to alert economists to the fact that the information held by buyers and sellers in the marketplace could not simply be assumed away in models of economic processes. In fact, Stigler was one of the first economists to stand up for advertising in its information-provision role. The current research has shown, however, that the generalized predictions made in Stigler's model are not as clear cut as both the fields of marketing and economics have assumed. Buyers working under different conditions were found to respond differently to changes in search cost and price dispersion. Stigler's model cannot be rejected on this basis, but the generalizability of canons that have been taken from the model can be questioned.

It is not appropriate, however, for the current research to end with the conclusion that one school of thought is somewhat incorrect in its modeling of the consumer search process. A definitive model of search

behavior is not presented here, but the contributions of the research to the study of consumer search can be noted. The current study makes a contribution by drawing attention to the following points:

1. Consumers working under low uncertainty differ in their search behavior from those working under higher uncertainty. This translates to differences in both amount of search and the extent to which search is affected by changes in marketplace conditions.
2. The general cost benefit model can be used to interpret search behavior on nearly any level of complexity. However, the propositions made by the model regarding search cost and price dispersion are not generalizable. The findings generally suggest that the constructs fundamental to the economics of information framework (e.g. price dispersion, search cost) have a complex effect on behavior via their interactions.
3. Consumer store search can be studied experimentally by placing subjects under simulated marketplace conditions, complete with an opportunity cost of search. The general response of student subjects to such a setting is enthusiastic. The response of other consumer groups is yet to be determined.
4. A focus on the outcomes of search behavior (i.e. prices paid) is critical in the study of search because of its implications for seller behavior.
5. In light of the immediate previous point, a market of seven stores (with equal costs of search) could not support many different (uniformly distributed) prices. Future research needs to be done on search behavior with larger numbers of stores.

This research is not without its limitations. Controlled experiments in marketing are generally limited in their ability to replicate situations which actually occur in the marketplace. By definition, an experiment

seeks to control for external factors which might impact the variables being studied for their causal effect. In this light, the methodology here does not perfectly replicate the actual price search situation that a consumer would encounter in the real marketplace. The search scenario is simplified by requiring Ss to focus only on price search and ignore other factors that might likely affect their "real" decisions (e.g. store location, service). In addition, placing dollar costs on search behavior may be quite obtrusive because consumers probably do not place an actual dollar cost on their shopping behavior. This could potentially contribute to the artificiality of the search setting. A further limitation in the search task is in "giving" the subjects a brand to purchase rather than letting them make the brand selection decision.

Other limitations have been mentioned earlier. Of particular importance is that the circumstances under which Ss were shopping may have been too restrictive to generate a wide variance in behavior (which might better show the impact of the manipulations). For example, only seven sellers were used in the experiment. As discussed several times earlier, this may have placed a lid on Ss' shopping. In addition, limiting the Ss to a seven minute task (in which was included the opportunity to answer GBQ questions) may have contributed to a

fairly low variance in shopping behavior. This low variance in behavior, then, inhibits the ability of the independent variables to "explain" that variance.

Two things can be said in defense of the methodology on these limitations. First, the purpose of this research was to simplify complex marketplace conditions to provide a test of whether the hypothesized factors affected search behavior. If the impact of those factors on behavior cannot be observed in a controlled experiment, then they (or their actual marketplace equivalents) probably do not impact behavior in the more complex environment. Second, the generally low level of search behavior observed in this study is reminiscent of the limited search behavior reported in survey studies of search (e.g. Newman and Staelin 1972). The conditions reflected in this research were intended to represent (albeit artificially) some of the constraints placed on consumers in their actual search behavior. Subjects' behavior in the experiment may indicate that, in spite of its artificiality, the experimental setting did reflect some of the realities of the actual marketplace.

9.0.1 Conclusion

The fields of marketing and economics appear to be recognizing their differences and are identifying the strengths in approach that each offers to the other. Theoretical interest in buyer search behavior seems high at the current time. At the same time, the classic theory that has guided thought about buyer search seems quite limited in its ability to predict behavior at the individual level. The fact that buyer search behavior is a dynamic process may suggest that researchers can do no better than to provide a very general theory which makes assumptions about individual behavior and makes predictions about aggregate market outcomes (the economists' approach). Studying the individual process empirically (the marketer's approach), however, will provide a better understanding of that dynamic process and may lead to a better ability to describe types of searchers and predict how buyers will respond to changes in the cost of obtaining information. It is important, however, that work by these two schools of thought not take place independently. Insight can be gained into the "larger picture" (e.g. both the buyer and seller sides of the marketplace) by each discipline working to understand the scientific perspective and research aims of the other.

The extent to which buyers make expenditures to "shelter" themselves from the cold winds of ignorance is an issue of interest to both the fields of marketing and economics. The role of future research is to assess the extent to which information drives the behavior of participants in the marketplace. The long run payoff is in gaining a better understanding of how buyer and seller markets operate and in contributing to the efficiency of that operation.

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Appendix A

INITIAL VERBAL INSTRUCTIONS GIVEN TO SUBJECTS

In this appendix, the initial procedure that was used to usher the Ss into the laboratory and the instructions provided to Ss verbally at the outset of the experiment are presented.

Initially, Ss waited in line in the hallway outside the laboratory as the group from the previous hour finished up and the experimenter "reset" the computers. When all of the computers were set up and ready to go, the following instructions were given:

We are now ready for you to come into the lab. Please come in and sit at a computer terminal which has a handout in front of it. I'll ask you to do two things when you go in. First, do not type anything into the computer until I come in and we go through some instructions. Second, write your name, social security number and course section on your handout.

At this point, Ss filed into the lab. Once they were all situated and had finished writing their personal information on the handout, the following series of instructions were given (taking about five minutes):

I will make some introductory comments before we begin the experiment. As I mentioned to you in class, the research that you are about to participate in is part of a program of research that we are developing in the marketing department under the sponsorship of some

companies like CompuServe and Bank One. These companies are interested, as we are, in how people interact with computer technology. More generally, they are also interested in how people behave as consumers. The study that you are participating in today looks very simply at how people go about their shopping. Let me make it clear that we do not want you to think of this exercise as if you were at home shopping over your personal computer. We want you to think of this exercise as a shopping simulation- that is, a "real world" shopping experience that takes place over the computer. You will see what I mean as you go through the instructions in that we will "charge" you a certain amount each time you shop (I then repeated the point that this was a shopping simulation).

The computer instructions are self-explanatory and the system is quite user-friendly, so I will not go into the specifics of the experiment. You do, however, have to know a few things about the keyboard in order to use the computer. (At this point, I explained the location of the RETURN and backspace keys and also explained which set of numbers Ss were to use in typing.)

The handout that you have in front of you is for you to take notes as you go through the experiment. You may want to write down some things about the instructions as you're going through them and you want to make notes about the marketplace that you'll be shopping in as you learn about it. You will certainly want to write down the prices that you see as you shop, because you are essentially price shopping here. Feel free to take as many notes as you like. Also, your subject number is written on the upper right-hand corner of your handout. Please make note of this as the computer will ask you for it.

Finally, let me make a comment about your participation. I want to emphasize that each of you are "doing your own thing" in this experiment. Each of you are doing something a little bit different from the rest, so we want you to work on the task individually. If you have a question please raise your hand and I will come right over and answer it.

Please don't ask questions of anyone around you because it is likely that they will not be able to answer you.

In this same light, please do not look around at what others are doing. In particular, some of you will get to a point in your program where you will be asked to wait for a little while. At that time, we ask you not to look around at others for two very basic reasons: (1) sometimes others are distracted if a person looks at what they are doing, and (2) we do not want you to be influenced in your task by what you see someone else doing. For these reasons, please focus your attention on your own terminal.

At this time, we are ready to begin. Please type in your first name and press the return key.

Appendix B.

P/C PILOT PROGRAMS FOR PRE-PRACTICE TASK INSTRUCTIONS

Practice Purchase Task

```

pr:a
ts:a6
ts:v10,70,6,24
l:a(8)
l:n3(20)
t:Good day. Please type in your first name and press
:the RETURN key.
A:Sam
T:Now type in your subject number and press the
:RETURN key.
A:15
TX:Just to make sure that we've got your correct subject
:number, please double check the number in the upper
:right hand corner of your handout.
:
: Is that number 01515 ?
:
: (Type in yes or no and press the RETURN key)
A:
N:YNS;Y
TY:first
TX:Please type in your correct subject number.
:Be sure to press the RETURN key.
A:1515
*first
C(snum>=100 & snum<=149):cell=1
C(snum>=150 & snum<=199):cell=5
C(snum>=200 & snum<=249):cell=2
C(snum>=250 & snum<=299):cell=6
C(snum>=300 & snum<=349):cell=3
C(snum>=350 & snum<=399):cell=7
C(snum>=400 & snum<=449):cell=4
C(snum>=450 & snum<=499):cell=8
C(cell=1 | cell=2 | cell=3 | cell=4 | cell=9 | cell=10):a(1)=3
C(cell=5 | cell=6 | cell=7 | cell=8):a(1)=7
C(cell=1 | cell=2 | cell=3 | cell=4 | cell=9 | cell=10):a(2)=12
C(cell=5 | cell=6 | cell=7 | cell=8):a(2)=28
C(cell=1 | cell=2 | cell=3 | cell=4 | cell=9 | cell=10):a(3)=27
C(cell=5 | cell=6 | cell=7 | cell=8):a(3)=11
C(cell=1 | cell=2 | cell=3 | cell=4 | cell=9 | cell=10):a(4)=35
C(cell=5 | cell=6 | cell=7 | cell=8):a(4)=19

```

```

C(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(5)=37
C(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(5)=111
TX:
M:10
P:Thank you, inf. Today we are going to have you go
:through a short shopping exercise. We are interested
:in learning how people shop for durable products. Like
:many business firms today, we are also interested in how
:consumers respond to "computer shopping."
:
:We will have you go through two different shopping
:tasks. The shopping system that you will use today
:is quite easy to understand and use.
:
:Please press the RETURN key to continue with the
:instructions.
A:
TX:
M:10
P:The prices used in the experiment are from actual retail
:stores in a real city. The prices were obtained from
:advertisements and by calling retailers in a city in Ohio.
:We will disguise the name of the city and the names of the
:retail stores because we do not want these names to affect
:how you shop. We will call the city "Newtown."
:
:Please press the RETURN key to continue with the
:instructions.
A:
TX:
M:10
P:Here is how you will go about each shopping task:
:
:We will assume hypothetically that you need a particular
:product, and we will tell you which brand from that
:product category to purchase. Your job is to find a
:store in the city with a low price and purchase the
:brand there.
:
:Before you begin your shopping in each task, we will
:give you information about the "range" of available prices
:for your brand. The information we will give you comes
:from the "Newtown Consumer Durable Price Survey." This
:survey is published annually by the local Newtown news-
:paper and is used by consumers to help them in their
:shopping. The most recent "Price Survey" is July 1983.
:
:Press the RETURN key to continue.
A:
TX:
M:10
P:We also make the shopping simulation realistic
:for you by introducing the following conditions
:in your shopping tasks:

```

```

:
: 1. You will start off each task with a "bank
: balance."
:
: 2. We will deduct the cost of your purchase from
: your bank account balance.
:
: Press the RETURN key to continue the instructions.
A:
TX:
W:10
I: Another cost that will be deducted from your bank balance
: is the cost of shopping. When people shop in the actual
: marketplace, they encounter several costs in simply going
: to and from the store: gasoline expenditures, wear and
: tear on the car, and the cost of their own time. We will
: represent these types of expenses in this experiment by
: charging you $ #a(1).00 each time you shop a store. This
: is the Department of Commerce's estimate of the cost
: of shopping a store in the Newtown market.
:
: Press the RETURN key to continue with the instructions.
A:
TX:
W:10
I: To give you a little more perspective on this cost of
: shopping, here is some comparative information. The
: Department of Commerce has estimated the AVERAGE cost of
: shopping a store to be $5.00 in cities the size
: of Newtown. This cost varies from city to city, because
: even cities similar in size differ in traffic patterns and
: store locations.
: The estimated cost of shopping in Newtown, again, is
: $ #a(1).00. Each time you shop a store in the experiment,
: you will be charged $ #a(1).00.
:
: On the next page we show you how the shopping costs
: and purchase price are taken into account in calculating
: your ending bank balance. Press the RETURN key.
A:
TX:
W:10
I: Here is an example of how your ending bank balance will
: be calculated. This is simply an illustration.
W:25
I:
: Beginning Bank Balance $100.00
W:15
I:
: 4 Stores Shopped (4 x $ #a(1)) (#a(2) .00)
W:15
I:
: Purchase Price (61.00)
W:15

```

```

T:
:
:      Ending Bank Balance          -----
:                                     $ #a(3) .00
:
W:15
T:
:Press the RETURN key to continue with the instructions.
A:
TX:
W:10
T:Your objective in each shopping task is to pay a low
:price for your purchase while keeping your costs of
:shopping low. You want your ending bank balance to be
:as large as possible. We will explain why below.
:
:As you know, we will be having a raffle in which all
:participants will be entered. The person whose name
:is drawn will win a cash prize.
:
:Your performance in the second purchase task will
:determine how many raffle tickets will be placed in
:the drawing for you.
:
:Press the RETURN key for further explanation.
A:
TX:
W:10
T:After you finish the practice purchase task, we
:will place you in the "payoff" task, which you will have
:seven (7) minutes to complete. The bank balance that you
:have at the end of the 7 minutes will be exchanged
:for raffle tickets ($1.00 = 1 raffle ticket). Obviously,
:you want your ending balance to be as large as possible
:so you will have a lot of raffle tickets placed in the
:drawing.
:
:There are two ways for you to improve your ending bank
:balance in the 7 minutes you spend on your payoff task.
:One way is to shop carefully and find a low-priced store
:in a few searches. A second way is to answer questions
:from the "General Business Quiz" after you have finished
:shopping.
:
:Press the RETURN key for further explanation.
A:
L: B:FIRST

```

W:10

F: In your payoff task, you may answer "General Business Quiz" questions in the time you have left over after shopping. The GBQ is a pool of questions that tests your general business knowledge. The questions are presented in a multiple choice format. Here is an example of a GBQ question.

: If a reduction in price increases revenue, then the demand curve is said to be:

- : a. elastic
- : b. inelastic
- : c. unitary
- : d. either elastic or inelastic
- : e. not determinable from given information

: The following page has the calculation of the ending balance of a person answering 4 GBQ questions correctly. Press the RETURN key to see this example.

A:

FX:

W:10

T:	Beginning Bank Balance	\$100.00
:		
:	4 stores shopped (4 x \$ 0a(1))	(0a(2) .00)
:		
:	Purchase Price	(61.00)

W:25

F:	4 Correct GBQ Answers	8.00
:		-----
:	Ending Bank Balance	\$0a(4) .00

: Press the RETURN key to continue.

A:

FX:

W:10

F: As you can see, you earn an additional \$2.00 for every GBQ question you answer correctly.

: In your "payoff" purchase task, then, you can spend less time shopping and more time on the GBQ, or vice versa. You can answer up to 20 GBQ questions. Students participating in this experiment have increased their bank balances by up to 40% by answering the GBQ questions.

: Remember that you have 7 minutes for both shopping and answering GBQ questions in your payoff purchase task.

: Press the RETURN key to continue.

A:

```

FX:
W:10
F:We are ready to move ahead with the practice purchase
:task now. Remember that this is simply a practice run-
:through, and is NOT a timed task.
:
:   Please type in the word "practice" and press
:the RETURN key to begin your practice task.
A:
M:PRACTICE|PRAC|"PRACTICE"
JY:pg2
TW:Please type in the word "practice" again.
J:2A

*pg2
FX:
W:10
T: Practice Purchase Task - Sealy Queensize Mattress
:
:This first task involves the purchase of a "firm"
:queensize mattress (assume you already have a boxspring).
:Assume that, based on the advice of your parents and
:several knowledgeable friends, you have decided to
:purchase the Sealy brand.
:
:There are seven stores in Newtown which carry your Sealy
:queensize mattress (assume that all prices quoted are
:for "firm" mattresses). As you go through the shopping
:exercise, write down the name and price of each store
:that you shop. Remember that your objective is to
:maximize your ending bank balance.
:
:Press the RETURN key to continue.
A:

FX:
W:10
F:We will start you off with $280.00 in your bank account.
:Keep in mind that you will be charged $ 1a(1) .00 each time
:you shop a store.
:
:As we mentioned earlier, we will provide you with some
:information from the "Newtown Consumer Durable Price
:Survey." This information is an excerpt from page 23 of
:the Price Survey and refers specifically to Sealy
:mattresses. When you obtain this information, you
:should write it down for your later reference.
:
:To access this information, type in the following command:
:
:           PRICE SURVEY/23
:
:Be sure to press the RETURN key.
A:

```



```

A:
TX:
W:10
T:We are now ready to begin. As you go through the
:shopping task, your bank balance will be displayed
:at the top of the page so you can keep track of it.
:Remember that you are shopping for a Sealy
:Queensize mattress.
:
:Just follow the instructions provided by the computer
:and enjoy your shopping. Type in the word "shop"
:and press the RETURN key to begin.
A:
M:SHOP|SHOPPE
JI:lmshop
FM:Please retype the command.
J:0A
*lmshop
L: B:MSHOP

```


Appendix C

PC/PILOT PROGRAMS FOR PRACTICE TASK SHOPPING AND PURCHASE

```
D:STORES(20)
C:mbal=280
C:C=0
D:mp(3)
TS:V
TX:
:
:|-----|
:| Your Current Bank Balance is $ #mbal |
:|-----|
TS:V
J:menu
*menu
TX:
U:10
F:
: Main Store Menu
:
: Here is the menu of stores that you can shop in making
: your mattress purchase.
:
: 1. Abbott
: 2. Barton's
: 3. Broad
: 4. Harkin's
: 5. Stanley
: 6. Tealman
: 7. Uptown
:
: To "enter" a store, type its number and press the RETURN
: key.
:
A:
S:1|ABBOTT
JB:00
CY:mbal=mbal-a(1)
CY:mp(1)=167.00
CY:mp(2)=269.00
CY:mp(3)=289.00
CY:STORES="Abbott"
CY:C=C+1
U:fixbal
JY:enter
S:2|BARTON
```

```

JN:3H
CY:mbal=mbal-a(1)
CY:mp(1)=149.00
CY:mp(2)=244.00
CY:mp(3)=269.00
CY:STORES="Barton's"
CY:C=C+1
U:fixbal
JY:enter
N:3|BROAD
JN:3H
CY:mbal=mbal-a(1)
CY:mp(1)=167.00
CY:mp(2)=262.00
CY:mp(3)=281.00
CY:STORES="Broad"
CY:C=C+1
U:fixbal
JY:enter
N:4|MARKIN
JN:3H
CY:mbal=mbal-a(1)
CY:mp(1)=157.00
CY:mp(2)=254.00
CY:mp(3)=269.00
CY:STORES="Markin's"
CY:C=C+1
U:fixbal
JY:enter
N:5|STANLEY
JN:3H
CY:mbal=mbal-a(1)
CY:mp(1)=142.00
CY:mp(2)=226.00
CY:mp(3)=249.00
CY:STORES="Stanley"
CY:C=C+1
U:fixbal
JY:enter
N:6|TEALMAN
JN:3H
CY:mbal=mbal-a(1)
CY:mp(1)=170.00
CY:mp(2)=235.00
CY:mp(3)=255.00
CY:STORES="Tealman"
CY:C=C+1
U:fixbal
JY:enter
N:7|OPTJUN
JN:3H
CY:mbal=mbal-a(1)
CY:mp(1)=163.00
CY:mp(2)=278.00

```

```

CY:mp(3)=292.00
CY:STORE$="Uptown"
CY:C=C+1
J:fixbal
JY:enter

```

```

*fixbal
TS:V
TX:
:
:-----|
:| Your Current Bank Balance is $ $bal |
:|-----|
:
TS:V
Z:

```

```

*enter
TX:Request recorded, one moment please.
J(cell=1 | cell=2 | cell=3 | cell=4 | cell=9 | cell=10):50
W(cell=5 | cell=6 | cell=7 | cell=8):200
TX:
:      Welcome to the $STORE$ database.
:
:To help you conduct your shopping, we need to know what
:product category you are interested in looking for.
:
:We ask that you type in the name of the product category
:which you are shopping for. For example, type in
:"microwaves" if you are interested in finding information
:about microwaves. Be sure to press the RETURN key.
A:
J:SEALY QUEENSIZE|SEALY MATTRESS|MATTRESS|MATTRESSES|MATTRESS|MATTRESSES
JY:mbrand
TX:Please type in the name of the product category again.
J:BA

```

```

*mbrand
TX: Request recorded, one moment please.
J(cell=1 | cell=2 | cell=3 | cell=4 | cell=9 | cell=10):15
W(cell=5 | cell=6 | cell=7 | cell=8):15
TX:      $STORE$ Mattresses
:
:Please type in the name of the mattress brand that you are
:interested in shopping for.
A:
J:SEALY|SEAL|SEELY|SEALY QUEENSIZE
JY:mpri:
TX:We do not carry that mattress brand. Please try
:another brand name.
J:BA

```

```

*mpri:
TX:Price information forthcoming.

```

```

#(cell=1 | cell=2 | cell=3 | cell=4 | cell=9 | cell=10):15
#(cell=5 | cell=6 | cell=7 | cell=8):15
IX: The prices for the Sealy mattresses here at $STORE$
:are the following:

```

```

:
:           single      $ %p(1)
:           queensize   $ %p(2)
:           kingsize    $ %p(3)
:

```

```

:If you are price shopping, you should write this
:information down.

```

```

:Press the RETURN key to go on to the next page.

```

```

A:

```

```

IX:

```

```

W:10

```

```

F:You are now out of the $STORE$ database.

```

```

:
:At this point, you have two options. You may either order
:the Sealy queensize mattress from ANY of the stores you
:have shopped so far (there is no extra shopping charge for
:this) or you can go back and shop another store.
:Please select one of the following options.

```

```

:
:       1. I would like to order the mattress now.
:       2. I would like to go back and shop
:           another store.
:

```

```

:Please select a number and press the RETURN key.

```

```

A:

```

```

M:1

```

```

JN:00

```

```

JY:link2

```

```

S:2

```

```

JY:aaaaa

```

```

*link2

```

```

L: B:BBGY.PIL

```

```

IX:

```

```

W:10

```

```

F:           ORDERING YOUR SEALY QUEENSIZE MATTRESS

```

```

:
:Which store would you like to order your Sealy queensize
:mattress from?

```

```

:
:           1. Abbot
:           2. Barton's
:           3. Broad
:           4. Markie's

```

```

:               5. Stanley
:               6. Tealman
:               7. Uptown
:
:
:Please select a number and press the RETURN key.
A:

N:1|ABBOT
CY:a(6)=269
CY:mbal=mbal-269
JY:final

N:2|BARTON
CY:a(6)=244
CY:mbal=mbal-244
JY:final

N:3|BROAD
CY:a(6)=262 CY:mbal=mbal-262
JY:final

N:4|HARKIN
CY:a(6)=254
CY:mbal=mbal-254
JY:final

N:5|STANLEY
CY:a(6)=226
CY:mbal=mbal-226
JY:final

N:6|TEALMAN
CY:a(6)=235
CY:mbal=mbal-235
JY:final

N:7|UPTOWN
CY:a(6)=278
CY:mbal=mbal-278
JY:final

*final
FS:V
FX:
FS:V
FX: The price you have decided upon is $ #a(6).
:Your final bank balance is:
:
:               $ #bal
:
:This marks the end of your practice purchase task.
:
:Please press the RETURN key to move on to the next task.
-----

A:
L: B:WZ4DPRI.PIL

```

Appendix D

PC/PILOT PROGRAM FOR INSTRUCTIONS PRECEDING THE PAYOFF TASK

```
TS:M6
TS:V10,70,6,24
D:dirs(8)
R:FOR THE RECORD, HERE ARE THE EXPERIMENTAL CELLS AND WHAT THEY REPRESENT
R:CELL 1- (100-149) LOW UNCER./NARROW P.D./LOW SEARCH COST
R:CELL 2- (200-249) LOW UNCER./WIDE P.D./LOW SEARCH COST
R:CELL 3- (300-349) HIGH UNCER./NARROW P.D./LOW SEARCH COST
R:CELL 4- (400-449) HIGH UNCER./WIDE P.D./LOW SEARCH COST
R:CELL 5- (150-199) LOW UNCER./NARROW P.D./HIGH SEARCH COST
R:CELL 6- (250-299) LOW UNCER./WIDE P.D./HIGH SEARCH COST
R:CELL 7- (350-399) HIGH UNCER./NARROW P.D./HIGH SEARCH COST
R:CELL 8- (450-499) HIGH UNCER./WIDE P.D./HIGH SEARCH COST
R:CELL 9- (500-549) HIGH UNCER./NARROW P.D./LOW S. COST--NO GBQ
R:CELL 10- (525-549) HIGH UNCER./WIDE P.D./LOW S. COST--NO GBQ
```

```
FX:
W:10
F:      Whirlpool Clothes Dryer Purchase Task
:
:We will describe the "payoff" task now and begin it in
:a little while.
:
:In the task to follow, you will purchase a clothes dryer.
:Assume that you already have a clothes washer, and that
:you need to purchase a dryer.
:Based on your parents' experience and on the comments of
:several knowledgeable friends, you have decided to
:purchase the Whirlpool brand.
:
:You will again be charged $ 1a(1) each time you shop a store,
:and you will pay for the clothes dryer out of your bank
:account. We will start fresh this time, with a bank
:balance of $350.
:
:Please press the RETURN key to go on to the next page.
A:
J(sans<=499):next
J(sans>=500):jump
```

```
*next
FX:
W:10
F:Again, let us remind you that you have 7 minutes to
```

:conduct your shopping and make your purchase. Those
 :who finish shopping before the 7 minute time limit
 :is up may answer the GBQ questions. However, it will be
 :a little while before we begin the timed task.

:
 :Before you start this "payoff" task, we will
 :again have you look at the 1983 Newtown Durable Price
 :Survey. The information about Whirlpool clothes dryers
 :is on page 57 of the Survey. To look at an excerpt
 :from that page, type in the following command:

:
 : PRICE SURVEY/57
 :

:Be sure to press the RETURN key.

A:

B:PRICE SURVEY/57

JY:rept

TN:Please retype the command.

J:BA

*rept

TX:

W:15

T: Excerpt from "Newtown Consumer Durable Price Survey"
 : July, 1983 (page 57)

:
 :For clothes dryers, we found there to be some difference
 :in prices between retailers. ...for the Whirlpool brand,
 :there was a \$ #a(5) .00 difference between the highest
 :and lowest priced retailers.

:
 :The following illustrates the distribution of retailer
 :prices for the Whirlpool clothes dryer in July 1983.

:
 : ----- \$ #a(5) -----
 :

:
 : _X__X__X__X__X__X__X__X__
 :

:
 :Each "X" represents a retailer. Press RETURN to continue.
 A:

J(cell=1 | cell=2 | cell=5 | cell=6):rankag

J(cell=3 | cell=4 | cell=7 | cell=8 | cell=9 | cell=10):skiprk

*rankag

TX:

W:15

T: Excerpt from "Newtown Consumer Durable Price Survey"
 : July, 1983 (page 57, continued)

:
 : The following information about clothes dryer retailers
 : was also available in the Price Survey:

:

:The ranking of retailers according to their prices for
:the Whirlpool dryer in July 1983 was

```

:
:           lowest price      Berry's
:                               Oldham's
:                               Banard
:                               Gibson
:                               Champion
:                               Archer's
:           highest price      Foremost
:

```

:Press the RETURN key to continue.

A:

J:skiprk

*skiprk

:(cell=1 | cell=3 | cell=5 | cell=7):direc\$="smaller"

:(cell=2 | cell=4 | cell=6 | cell=8):direc\$="larger"

FX:

#:10

F:The \$ #a(5) price range for the Whirlpool dryer in Newtown is
:\$direc\$ than the price range in other cities. The Price
:Survey reports that, in similar surveys from 10 other
:markets, the average price range for the Whirlpool dryer
:was \$74.00. Again, the price range for a city is the
:difference between the lowest price and the highest price
:in that city.

:

:Keep in mind that the Price Survey information is one year
:old and sale prices may have been included in the survey.
:It should, however, give you some idea about what to expect
:in the local Newtown marketplace.

:

:Please press the RETURN key to continue.

A:

TX:

#:10

T:We would now like to take a few minutes to find out your
:opinions about the Price Survey information and about the
:experiment. We will ask you a total of 13 questions.
:Several of these questions are asked at the request
:of the "Newtown" newspaper, so management can find
:what consumers think about their price report. Other
:questions deal with your opinions and expectations about
:the upcoming Whirlpool dryer purchase task.

:

:Some of the questions will seem similar in content, but
:each is asked for a specific purpose. Certain words in some
:of the questions have been capitalized to help make the
:meaning of the questions more clear to you. Your answers to
:these questions are very important to us and we ask that
:you read and answer each question carefully.

:
:Press the RETURN key to go on to the next page.
A:
J:wait

*wait
TX:
W:10
T:At this point, we will need about 30 seconds to enter
:the files which contain the survey questions. As you
:wait, you should spend your time thinking about the
:price information that you have just examined and the
:shopping task that you will undertake for your payoff.
:Remember that we will not begin the seven minute payoff
:task until everyone has finished these questions, so
:please take your time and answer them carefully.
:
:Please hold.
W:300
J:pglak

*pglak
L: A:PT3SURV

PC/PILOT PROGRAM FOR PRE-SHOPPING QUESTIONING

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:
:
:Please type in the number that best matches
:your opinion and press the RETURN key.

TS:V3,42,13,17

TX:
F:The Newtown Price Survey information
:is easy to understand.
A:PRE1

TX:
U:10
F:The Newtown Price Survey information
:is interesting to read.
A:PRE2

TX:
U:10
F:The \$ 9a(1) cost of shopping in this
:experiment is expensive.
A:PRE3

TX:
U:10
F:It is NOT worthwhile to spend the money
:necessary to shop 6 or 7 stores IN THE
:UPCOMING DRYER PURCHASE TASK.
A:PRE4

TX:
U:10
F:In the Newtown market, there is a very
:BIG difference between the lowest price
:and the highest price for the
:Whirlpool dryer.
A:PRE5

TX:
U:10
F:The computer responds QUICKLY when I
:choose which store to shop.
A:PRE6

TX:
U:10
F:The \$ 9a(1) cost of shopping in this
:experiment is INexpensive.
A:PRE7

TX:
U:10
F:The Price Survey information will be

:helpful in directing me to a low-
 :priced store for the dryer.
 A:PRE8

TX:
 S:10
 F:It is worthwhile to spend the money
 :necessary to shop 6 or 7 stores IN THE
 :UPCOMING DRYER PURCHASE TASK.
 A:PRE9

TX:
 S:10
 F:The computer responds SLOWLY when I
 :choose which store to shop.
 A:PRE10

TX:
 S:10
 F:In the Newtown market, there is a very
 :SMALL difference between the lowest
 :price and the highest price for the
 :Whirlpool dryer.
 A:PRE11

TX:
 S:10
 F:The Price Survey information will be
 :helpful to me in deciding where to
 :shop for the dryer.
 A:PRE12

TS:V
 TX:
 S:10
 F:Thank you for your answers. At this time, we would like
 :you to wait at your seat until all the other subjects have
 :reached this same point in the experiment.
 :
 : Everyone will start the "payoff" task at the same time so
 :we can have all subjects working under the same time clock.
 :At this point, you should take some time to review the
 :notes you have taken and think about the task you are
 :about to undertake.
 :
 : Please be patient in waiting for others to finish
 :answering the questions that you just completed.
 :When everyone is ready, the experimenter will tell you
 :the command you need to begin your payoff task. Please
 :do NOT type in anything until that time.
 A:
 S:GO
 JY:link5

F:Please do not type in anything until you are told
:to do so.
J:2A

*link5
L: B:DSHOP

Appendix F

PC/PILOT PROGRAMS FOR SHOPPING/PURCHASING IN THE PAYOFF TASK

```

D:sto$ (20)
C:D=0
C:dbal=350
TS:86
FX:
:
:|-----|
:| Your Current Bank Balance is $ #dbal |
:|-----|
:
TS:V10,70,6,24
J:dnean

*inenu
FX:
:Here is the name of stores that you can shop in making
:your clothes dryer purchase.
:
:      1. Archer's
:      2. Berry's
:      3. Champion
:      4. Foremost
:      5. Gibson
:      6. Oldham's
:      7. Ransard
:
:To "enter" a store, type its number and press the RETURN
:key.
A:

M:1|ARCHER
JW:00
CY:dbal=dbal-a (1)
CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(7)=324
CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(7)=355
CY:D=D+1
CY:sto$="Archer's"
U:adjbal
JY:there

M:2|BERRY
JW:00

```

```

CY:dbal=dbal-a(1)
CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(7)=234
CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(7)=254
CY:D=D+1
CY:sto$="Berry's"
U:adjbal
JY:there

```

```

N:3|CHAMPION
JN:3N
CY:dbal=dbal-a(1)
CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(7)=318
CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(7)=335
CY:D=D+1
CY:sto$="Champion"
U:adjbal
JY:there

```

```

N:4|FOREMOST
JN:4N
CY:dbal=dbal-a(1)
CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(7)=334
CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(7)=373
CY:D=D+1
CY:sto$="Foremost"
U:adjbal
JY:there

```

```

N:5|GIBSON
JN:5N
CY:dbal=dbal-a(1)
CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(7)=313
CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(7)=313
CY:D=D+1
CY:sto$="Gibson"
U:adjbal
JY:there

```

```

N:6|OLDHAM
JN:6N
CY:dbal=dbal-a(1)
CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(7)=330
CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(7)=272
CY:D=D+1
CY:sto$="Oldham's"
U:adjbal
JY:there

```

```

N:7|BARBAR
JN:7N
CY:dbal=dbal-a(1)
CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(7)=307
CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(7)=295

```

```

CY:D=D+1
CY:sto$="Ranard"
J:adjbal
JY:there

*adjbal

C(D=1):ione=a(7)
C(D=2):itwo=a(7)
C(D=3):ithree=a(7)
C(D=4):ifour=a(7)
C(D=5):ifive=a(7)
C(D=6):isix=a(7)
C(D=7):isev=a(7)

TS:V
TX:
:
:|-----|
:| Your Current Bank Balance is $ %dbal |
:|-----|
:
TS:V
E:

*there
TX:Request recorded, one moment please.
W(cell=1 | cell=2 | cell=3 | cell=4 | cell=9 | cell=10):50
W(cell=5 | cell=6 | cell=7 | cell=8):200
TX: Welcome to the %sto$ database.
:
:To help you conduct your shopping, we need to know what
:product category you are interested in looking for.
:
:We ask that you type in the name of the product category
:which you are shopping for. For example, type in
:"microwaves" if you are interested in finding information
:about microwaves. Be sure to press the RETURN key.
:
A:
I:DRYERS|CLOTHES DRYERS|DRYER|DRIERS|DRIER
JY:dbrand
PW:Please type the name of the product category again.
J:%A

*dbrand
TX:Request recorded, one moment please.
W(cell=1 | cell=2 | cell=3 | cell=4 | cell=9 | cell=10):15
W(cell=5 | cell=6 | cell=7 | cell=8):15

TX: %sto$ Clothes Dryers
:
:Please type in the name of the clothes dryer brand that
:you are interested in shopping for.

```



```

A:
M:WHIRLPOOL
JY:dpric
TN:Please type the brand name again.
J:BA

*dpric
FX:Price information forthcoming.
W(cell=1 | cell=2 | cell=3 | cell=4 | cell=9 | cell=10):15
W(cell=5 | cell=6 | cell=7 | cell=8):15
FX:The $sto$ price for the Whirlpool clothes dryer is:
:
:           $ Ba(7)
:
:
:If you are comparison shopping, you should write down
:the price of the clothes dryer.
:
:Press the RETURN key to go to the next page.
A:
FX:
:You are now out of the $sto$ database.
:
:At this point, you have two options. You may either order
:the Whirlpool clothes dryer from ANY of the stores you
:have shopped so far or you can go back and shop another
:store. Please select one of the following options.
:
:       1. I would like to order the clothes dryer now.
:       2. I would like to go back and shop another
:          store.
:
:Please enter a number and press the RETURN key.
A:

M:1
JY:link5

M:2
JY:donea

*link5
L: 8:DBUY

C(done=0):done=999
C(dtwo=0):dtwo=999
C(dthree=0):dthree=999
C(dfour=0):dfour=999
C(dfive=0):dfive=999
C(dsix=0):dsix=999
C(dsev=0):dsev=999

FX:

```

```

S:10
P: ORDERING THE WHIRLPOOL CLOTHES DRYER
:
:Which store would you like to order your Whirlpool
:clothes dryer from?
:
:      1. Archer's
:      2. Berry's
:      3. Champion
:      4. Foremost
:      5. Gibson
:      6. Oldham's
:      7. Ranard
:
:Please select a number and press the RETURN key.
A:

S:1|ARCHER
JN:28
CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(8)=324
CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(8)=355
CY:dbal=dbal-a(8)
JY(snum<=499):finito
JY(snum>=500):nogbq

S:2|BERRY
JN:28
CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(8)=294
CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(8)=254
CY:dbal=dbal-a(8)
JY(snum<=499):finito
JY(snum>=500):nogbq

S:3|CHAMPION
JN:28
CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(8)=318
CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(8)=335
CY:dbal=dbal-a(8)
JY(snum<=499):finito
JY(snum>=500):nogbq

S:4|FOREMOST
JN:28
CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(8)=331
CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(8)=373
CY:dbal=dbal-a(8)
JY(snum<=499):finito
JY(snum>=500):nogbq

S:5|GIBSON
JN:28
CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(8)=313
CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(8)=313
CY:dbal=dbal-a(8)

```

JY(snum<=499):finito
 JY(snum>=500):nogbq

S:6|OLDBAL
 JN:0N
 CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(8)=300
 CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(8)=272
 CY:dbal=dbal-a(8)
 JY(snum<=499):finito
 JY(snum>=500):nogbq

S:7|RANDOM
 JN:0N
 CY(cell=1 | cell=3 | cell=5 | cell=7 | cell=9):a(8)=307
 CY(cell=2 | cell=4 | cell=6 | cell=8 | cell=10):a(8)=295
 CY:dbal=dbal-a(8)
 JY(snum<=499):finito
 JY(snum>=500):nogbq

*finito
 TX:
 S:10
 T:The price you have decided upon is \$ #a(8).
 :Your bank balance is:
 :
 : \$ #dbal
 :
 :Your shopping task is now completed. At this time,
 :you should type in the term "General Business Quiz"
 :to get started on the GBQ questions.
 :
 :Be sure to press the RETURN key.
 A:
 S:GENERAL BUSINESS QUIZ|GBQ
 JY:link7
 FN:Please retype the statement.
 J:0A

*nogbq
 TX:
 S:10
 T:The price you have decided upon is \$ #a(8).
 :Your bank balance is:
 :
 : \$ #dbal
 :
 :Your shopping task is now completed. Please press
 :the RETURN key to move on to the last page of
 :instructions.
 A:
 J:link8

*link7
 L: S:GBQ

*link8
 L: S:LASTSURV

Appendix G

HANDOUT PROVIDED TO SS FOR USE IN THE EXPERIMENTAL TASK

(Includes Post-Shopping Measurement Instrument;
Shopping Simulation Exercise)

NAME _____

SUBJECT NUMBER _____

You may use this page to write down any information you like during
your shopping exercises.

I. SEALY QUEENSIZE MATTRESS PURCHASE (PRACTICE TASK)

Product Category: mattresses
Mattress Brand: Sealy

II. WHIRLPOOL CLOTHES DRYER PURCHASE

Product Category: dryers
Dryer Brand: Whirlpool

Please answer the following questions by indicating how much you agree or disagree with each statement. A 7 means that you "strongly agree" with a statement, while a 1 means that you "strongly disagree." A 4 means that you neither agree nor disagree.

	Strongly Disagree				Strongly Agree		
The Price Survey Information was helpful in directing me to a low-priced store.	1	2	3	4	5	6	7
I have had a lot of experience working with computer terminals.	1	2	3	4	5	6	7
Before I started shopping in the "payoff" task, I really didn't place much value on answering GBQ questions.	1	2	3	4	5	6	7
It was NOT worthwhile to spend the money necessary to shop 6 or 7 stores in the dryer purchase task.	1	2	3	4	5	6	7
The Price Survey Information was easy to understand.	1	2	3	4	5	6	7
I enjoy spending my free time shopping.	1	2	3	4	5	6	7
The cost of shopping in this experiment is expensive.	1	2	3	4	5	6	7
When I'm making a purchase, I find that shopping several stores for the best price is not usually worthwhile.	1	2	3	4	5	6	7
The computer responds QUICKLY when I choose which store to shop.	1	2	3	4	5	6	7
When I shopped during my "payoff" task, I made sure to leave a lot of time to answer the GBQ questions.	1	2	3	4	5	6	7
In the Newtown market, there was a very BIG difference between the lowest price and the highest price for the Whirlpool dryer.	1	2	3	4	5	6	7
The results of this research will be very important for marketers.	1	2	3	4	5	6	7

	Strongly Disagree				Strongly Agree		
It was worthwhile to spend the money necessary to shop 6 or 7 stores in the dryer purchase task.	1	2	3	4	5	6	7
I am the type of person who likes to get shopping over with quickly, even if I have free time.	1	2	3	4	5	6	7
In this experiment, I took the payoff task very seriously.	1	2	3	4	5	6	7
Using a computer terminal is easy for me.	1	2	3	4	5	6	7
Price reports like the Newtown Durable Price Survey actually exist.	1	2	3	4	5	6	7
This research study was confusing.	1	2	3	4	5	6	7

Finally, we would like to ask you some questions that will help us determine how people of different descriptions may have responded differently in this experiment. We appreciate your responses.

What is your class rank? 1. Sophomore
 2. Junior
 3. Senior
 4. Graduate/CED student

What is your major? _____

Please write your age in the blanks provided. ____ ____

Please indicate your sex. 1. Male
 2. Female

Do you personally own a clothes dryer? 1. yes
 2. no

Have you ever shopped for a clothes dryer? 1. yes
 2. no

Thank you for your participation.

Appendix H

CORRELATION MATRIX FOR PRE- AND POST-SHOPPING MEASURES

	RANGE	PRE1	PRE2	PRE3	PRE4	PRE5	PRE6	PRE7	PRE8	PRE9	PRE10	PRE11	PRE12	POST1	POST2	POST3
RANGE	100															
PRE1	.97	100														
PRE2	.25	.13	100													
PRE3	.05	.05	.01	100												
PRE4	-.13 ^a	-.07	-.07	.04	100											
PRE5	.63 ^b	-.04	.11	.11	-.20 ^b	100										
PRE6	.03	-.01	.10	-.16 ^a	-.02	.11	100									
PRE7	.03	-.07	.10	-.71 ^b	-.06	.01	.09	100								
PRE8	-.03	.21 ^b	.10	.02	-.01	-.01	.08	.05	100							
PRE9	.12	-.09	.00	-.04	-.61 ^b	.23 ^b	.10	.04	-.05	100						
PRE10	-.03	-.02	-.04	.25 ^b	.11	-.01	-.71 ^b	-.18 ^b	-.10	-.01	100					
PRE11	-.55 ^b	.08	.01	-.03	.27 ^b	-.72 ^b	-.10	-.01	-.02	-.22 ^b	.03	100				
PRE12	-.05	.11	.25 ^b	-.00	-.04	-.08	.03	-.01	.65 ^b	.00	-.01	.10	100			
POST1	.15 ^a	.18 ^b	.26 ^b	-.05	-.06	.05	.03	.06	.42 ^b	.02	-.04	-.03	.49 ^b	100		
POST2	-.02	.12 ^a	-.05	.10	-.03	.06	-.04	-.04	.08	-.03	.08	-.06	.03	-.00	100	
POST3	.02	-.00	.15 ^a	-.10	-.04	-.02	-.03	.01	-.11	.01	.02	-.01	-.01	-.00	-.04	100
POST4	.03	-.05	.11	.04	.34	.07	.21 ^b	.01	.13 ^a	-.36 ^b	-.10	.03	.10	.19 ^b	.06	.03
POST5	.02	.39 ^b	.27 ^b	-.04	-.10	.07	.10	.05	.16 ^a	-.01	-.06	-.03	.23 ^b	.35 ^b	.14 ^a	-.05
POST6	.20 ^b	-.03	.00	-.05	.02	.14	.06	-.01	.03	.04	.01	-.14	-.05	-.04	-.07	.10
POST7	.07	.02	-.05	.76 ^b	.09	.13	-.11	-.65 ^b	-.01	-.08	.24 ^b	-.07	-.01	-.11	.14 ^a	-.05
POST8	.03	.07	-.01	-.02	.15 ^a	.01	-.00	.02	-.13 ^a	-.09	-.00	.05	-.06	-.03	-.04	.09
POST9	.07	.03	.13 ^a	-.21 ^b	-.13 ^a	.01	.60 ^b	.13	.03	.06	-.57 ^b	.01	.01	.06	-.08	.05
POST10	.02	-.02	-.10	.13 ^a	.07	.01	.06	-.07	.08	-.04	-.01	-.05	.04	-.00	.18 ^b	-.34
POST11	.58 ^b	-.34 ^b	-.00	.15 ^a	-.13 ^a	.66 ^b	-.06	-.06	-.08	.15 ^a	.05	-.67 ^b	-.10	.01	.06	-.01
POST12	.10	.03	.08	-.02	.01	.14 ^a	.27 ^b	-.02	.07	.00	-.17 ^a	-.13 ^a	.13 ^a	.22 ^b	.06	-.01
POST13	.03	.04	.09	-.05	-.39 ^b	-.05	-.13 ^a	.09	-.08	.42 ^b	.10	-.01	.03	-.01	-.00	.09
POST14	-.13 ^a	-.06	-.06	-.07	.11	-.06	.09	.09	-.02	-.03	-.01	.08	-.01	.06	-.09	.02
POST15	.04	-.03	-.03	-.01	-.01	.14 ^b	.15 ^a	.04	-.03	.04	-.05	-.22	-.10	.10	.14 ^a	-.06
POST16	.11	.06	-.02	-.11	-.03	.11	.14 ^a	.05	.03	-.03	-.12	-.09	.05	.05	.64 ^b	.06
POST17	-.00	-.09	-.14 ^a	.06	-.04	-.04	-.06	-.01	.02	-.01	.01	.08	.06	.01	.03	-.08
POST18	-.10	-.23 ^b	-.15 ^a	.09	.10	-.10	-.04	-.15 ^a	-.16 ^a	.02	.06	.08	-.18 ^b	-.24 ^b	-.18 ^b	-.02

^aSignificant at alpha=.10

^bSignificant at alpha=.05

POST4 POST5 POST6 POST7 POST8 POST9 POST10 POST11 POST12 POST13 POST14 POST15 POST16 POST17 POST18

POST4	100																
POST5	08	100															
POST6	01	-08	100														
POST7	05	-03	-01	100													
POST8	11	-02	-12	07	100												
POST9	17 ^a	18	-07	-16 ^a	01	100											
POST10	11	-03	-11	07	-02	06	100										
POST11	-06	04	10	13 ^a	05	-02	02	100									
POST12	09	13 ^a	16 ^a	-01	-07	23 ^b	11	11	100								
POST13	-68 ^b	-06	-06	-06	-13 ^a	-02	-11	13	-07	100							
POST14	08	14 ^a	-56 ^b	-14 ^a	19 ^b	09	17 ^a	-08	-01	-10	100						
POST15	06	07	01	01	-06	06	-04	15 ^a	26 ^b	-03	03	100					
POST16	08	18 ^b	02	-02	-04	08	07	04	15 ^a	-03	01	24 ^b	100				
POST17	-05	12 ^a	-05	07	08	-05	-02	-02	08	-02	03	04	13 ^a	100			
POST18	-16	-42 ^b	-09	07	12	-06	08	01	-21 ^b	09	01	-18 ^b	-25 ^b	-25 ^b			

Appendix I
CALCULATIONS OF LOW PRICE OBSERVATION
PROBABILITIES

I. AFTER TWO SEARCHES:

a. P(observing 1 of the 2 lowest prices) =

# combinations in which both low prices could be chosen.	+	# combinations in which 1 of the 2 lowest prices could be chosen.
---	---	--

Total number of combinations
of 2 prices chosen.

b.

$$= \frac{\binom{5}{0}\binom{2}{2} + \binom{5}{1}\binom{2}{1}}{\binom{7}{2}}$$

c.

$$= \frac{11}{21} = 52.4\%$$

II. AFTER THREE SEARCHES:

a. $P(\text{Observing 1 of the 2 lowest prices}) =$

same as step a. above (except 3 prices
are chosen)

$$b. \quad = \frac{\binom{5}{1} \binom{2}{2} + \binom{5}{2} \binom{2}{1}}{\binom{7}{3}}$$

$$c. \quad = \frac{25}{35} = 71.4\%$$

Appendix J

DERIVATION OF OPTIMAL SEARCH LEVELS GIVEN RANDOM SEARCH

In this appendix the procedure used to derive optimal search levels is discussed. The basic procedure can be broken down into two steps. First, expected prices are determined separately for the narrow price dispersion and wide price dispersion groups and, second, the gain for each search step is compared to search cost to find when the searcher should optimally stop. The decision rule for stopping quite simple: at the point where the incremental gain of searching becomes less than the cost of searching, search should be stopped. This technique is derived from behavioral decision theory (e.g. Raiffa 1968).

Derivation of Expected Prices - The technique used to derive the expected prices at each stage of search involved (1) enumerating the number of possible store selection combinations at each search step and (2) taking the average of the low prices in each combination. For expository purposes, the derivation of expected prices for the first and second searches will be presented. For simplicity, the narrow price dispersion prices will be used.

A. Expected Price on First Search

Available Prices:

\$ 294	
300	There are 7 possible out-
307	comes on the first choice.
313	The expected price is
318	
324	$294+300+307+313+318+324+334$
334	$\text{-----} = \$312.86$

7

B. Expected Price on Second Search

With 7 available prices and two random choices made (without replacement), there are 21 possible combinations of 2 prices. These combinations are listed immediately below:

294/300					
294/307	300/307				
294/313	300/313	307/313			
294/318	300/318	307/318	313/318		
294/324	300/324	307/324	313/324	318/324	
294/334	300/334	307/334	313/334	318/334	324/334

\$294 is the lowest price in 6 combinations, \$300 is the lowest price in 5 combinations, and so forth.

The calculation of the expected price for two searches, then, is as follows:

$$\begin{array}{r}
 (6) (294) + (5) (300) + (4) (307) + (3) (313) + (2) (318) + 324 \\
 \hline
 21 \\
 \\
 = \$ 304.33
 \end{array}$$

Comparison of Incremental Search Gain with Search Cost - To determine the "optimal" level of search for each cell, the expected prices must be enumerated and the incremental gain at each search step must be calculated:

Search	Narrow PDISP		Wide PDISP	
	Expected	Increment	Expected	Increment
1	\$312.86		\$313.00	
2	304.33	\$ 8.53	286.62	\$26.38
3	300.26	4.07	273.43	13.19
4	297.74	2.52	265.51	7.92
5	296.04	1.70	260.24	5.27
6	294.86	1.18	256.57	3.67
7	294.00	.86	254.00	2.57

The prescribed optimal number of searches for the different PDISP and SCOST conditions are determined by comparing the search cost with the incremental gain from search at each step. An "optimizing" searcher would not search the next store if the expected cost exceeded the expected gain.

	Low SCOST		High SCOST	
Narrow PDISP	3		2	
Wide PDISP	6		4	

NOTE: The only "cost" of search used in these calculations is the direct money cost of search. Since "time" cost was an element of search cost and there was time pressure placed on the Ss, the total cost of shopping has not been reflected in these calculation. The net effect is that the optimal levels of search may be understated.