

THE EFFECT OF *CONSUMER REPORTS'*
AUTO RATINGS ON US CAR SALES

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By

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The effect of *Consumer Reports'* auto ratings on US car sales

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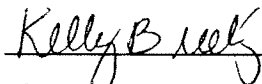
Economics

Abstract

Consumer information search is a key component of the decision making process in the purchase of a new car or truck. One of the largest and most-respected sources of new car information is the *Consumer Reports* Annual April Auto Issue, which rates and ranks new models annually. This study attempts to determine whether *Consumer Reports'* auto ratings have an effect on car sales, based on data from the 2005 *Consumer Reports* Annual April Auto Issue and quarterly sales data for the 2005 model year. Statistical analysis of the data shows that *Consumer Reports'* auto ratings have an effect on car sales.

KEYWORDS: (information search, *Consumer Reports*, product reviews, purchase intention, marketing)

ON MY HONOR, I HAVE NEITHER GIVEN NOR RECEIVED
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Signature

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*Mom, Dad, Grandma, and Grandpa: Thank you for your support,
which you have always offered lovingly and generously.*

*Dad: Thank you for passing on to me your interest in cars, for teaching
me to be an informed consumer (via Consumer Reports),
and for teaching me to take everything with a grain of salt.*

*Mom: Thank you for passing on your organizational skills and attention to
detail, without which I would have never completed this thesis.*

CHAPTER 1

INTRODUCTION

Buying an expensive durable good such as a new car or truck is a major financial decision – it is for most people, perhaps, the largest purchase after buying a home. Most people also look for a new car with a specific purpose in mind. Some need a car to commute to work or school, while others need a vehicle to transport children to and from school and activities and still others want a car just for fun. Due to the large market of cars and trucks available to Americans and the size of the purchase, industry experts always advise that shoppers do some research. A few hours of research can help shoppers save money and reduce the stress of buying a new car as well as insure that they get the features they want or need.¹ Consumers may also research their desired model before and after purchase to justify their emotional desire for a specific model with concrete information. Fortunately for consumers, there are many types of research available.

Dealerships are often bunched together on an “auto row”, so a consumer may easily visit many dealerships to compare models, prices, and service

¹ Denise Trowbridge, "Conquering the Fear of Buying a Car," *The Columbus Dispatch*, 8 October 2006 sec. Business and Financial News, LexisNexis Academic.

centers. Dealers also allow shoppers to test drive different models to compare the features and feel of different cars.

Many people rely on family members or friends for recommendations on new car models. These recommendations may come from someone who is knowledgeable about cars or a family member who really wants a certain type of car. Consumers also rely heavily on past experience. An older consumer who has purchased many cars will know what they want in a car and may have a relationship with a dealer from whom they always buy. Others consumers may be very unhappy with their previous car and will use their experience to find a model that works better for them. Some consumers also have strong feelings concerning their vehicle's country-of-origin and will use that preference to narrow their choices.²

Advertising may also play a large role in influencing a consumer's decision. Consumers may visualize themselves as being like the drivers in car advertisements and wish to actualize that desire by buying that model. A dealership advertisement could convince a shopper that a specific dealership has the best prices or selection and narrow his/her choices in that way.

Finally, consumers rely on product reviews and ratings from independent, or neutral, sources. The increasing popularity of the Internet makes it an important source of independent reviews. Websites such as Edmunds.com offer forums for current owners to rate the model in question and comment on its qualities or deficiencies in addition to offering reviews by the Edmunds.com staff.

² David H. Furse, Girish N. Punj, and David W. Stewart, "A Typology of Individual Search Strategies among Purchasers of New Automobiles," *The Journal of Consumer Research* 10, no. 4 (Mar. 1984): 417-431.

Other websites include TrueDelta.com, JDPower.com, and KelleyBlueBook.com; each website offers a different perspective on auto reviewing and rating.

A well-known and widely-read source of independent product evaluations is *Consumer Reports*, which publishes an Annual Auto issue every April as well as annual new and used car buying guides. *Consumer Reports* objectively rates and reviews nearly all new models for the year. This provides a way for the consumer to wade through the overwhelming number of available models and narrow down his/her options by criteria such as price, safety, and other features. The fact that it is an independent company reassures the consumer that he/she is receiving objective, unbiased information.

Due to the importance of *Consumer Reports* as an independent source of product evaluation, I pose this question: what effect do the ratings in *Consumer Reports'* Annual Auto issues have on the sales of cars and light trucks?

To answer this question, I will collect ratings from the June 2005 issue of *Consumer Reports* and 2005 annual sales data for all 2005 models of cars and light trucks from Ward's, a company that offers many products related to the automotive industry, including datasets. Using a dataset created from the ratings and sales data, I will perform a statistical analysis using the following equation to determine whether there is a correlation between ratings and sales. I expect to find that *Consumer Reports* ratings have an effect on car sales, where a positive rating will increase sales while negative ratings decrease sales.

CHAPTER 2

LITERATURE REVIEW

This chapter reviews the theory and literature concerning the consumer decision-making process. Specifically, consumer information search and the effects of product reviews and ratings are surveyed. The chapter begins with an overview of consumer decision making theory, which comes from psychology and the study of consumer behavior. Consumer decision making theory provides a framework for the study of information search and the effects of product reviews. Second, this chapter discusses the body of literature concerning consumer information search concentrating on information search for durable goods. The final section explores the literature on the effects of product reviews and word-of-mouth (WOM) communications with special attention to studies concerned with the effects of ratings or WOM on purchase intentions.

Consumer Decision Making: An Overview

John Dewey introduced the five-stage decision-making process in 1910;¹ it is now the most widely accepted model of the consumer decision-making process.² The five stages are:

¹ John Dewey, *How we Think*, (Boston: D.C. Heath and Company, 1910), 224.

- (1) need/problem recognition
- (2) information search
- (3) evaluation of alternatives
- (4) purchase
- (5) postpurchase behavior

This particular model comes from Lamb, Hair, and McDaniel's *Essentials of Marketing*,³ but is similar to models in other marketing and consumer behavior texts. During the first stage, a consumer recognizes that there is an imbalance between his actual and desired states. This may be triggered by an advertisement portraying a handsome man speeding around in a fancy sports car or by hunger or thirst. Whatever the stimulus, the recognition that he wants or needs something initiates the purchase process.

During the second stage, information search, the consumer searches for information about the alternatives available to satisfy his want or need. He may engage in internal information search, external search, or a combination of the two. During internal information search, the consumer recalls information stored in his memory. For example, he might recall certain features of a previous car that he particularly liked or disliked. During external information search, the consumer seeks information from the outside environment, either from marketing-controlled sources or nonmarketing-controlled sources. A marketing-controlled information source is biased towards the product since it exists to promote that product, and consequently consumers are wary of these sources. A nonmarketing-controlled source might be a family member or friend of the

² Gordon C. Bruner II and Richard J. Pomazal, "Problem Recognition: The Crucial First Stage of the Consumer Decision Process," *Journal of Consumer Marketing* 5, no. 1 (1988): 53.

³ Lamb, Charles W., Jr., Hair, Joseph F., Jr., and Carl McDaniel, *Essentials of Marketing*, Fourth Edition ed. (USA: Thomson Learning, 2005), 572.

consumer that is considered to be knowledgeable about the product. For example, someone in the market for a car might talk with a friend who knows a lot about cars or always reads car-related magazines. He might also consult *Consumer Reports* or another independent source of product reviews for objective information.⁴ The information search process will be discussed in more detail in the following section.

During the third stage of the decision-making process, evaluation of alternatives, the consumer uses the information he recalled from memory and obtained from outside sources to develop criteria by which he will make a purchase decision. The group of alternatives available to the consumer after his information search is known as the evoked set. Using criteria such as price and attributes, the consumer narrows down the evoked set to the most favorable alternatives, perhaps two sedans that are in his price range and offer features he desires. He will ultimately choose the sedan that offers either more desirable features or the best price based on his criteria, and make a purchase (stage 4).

After purchase, the consumer evaluates how pleased he is with his purchase based on his expectations of the purchase. If he had low expectations but is very happy with his recent sedan purchase, he will have high buyer satisfaction. However, if he had very high expectations, perhaps because he spent a lot of money on a luxury sedan, he may be dissatisfied if his expectations are not met or exceeded.⁵

⁴ Ibid.

⁵ Ibid.

While this model of the consumer decision-making process is widely accepted by marketing managers and researchers in the field of consumer behavior, some researchers claim that consumers often do not undergo such a process when making a purchase. Olshavsky and Granbois question the five-stage decision-making process, and claim that consumer researchers have overstated the extent of prepurchase behavior due to their assumptions that this behavior exists. After reviewing studies from different areas of consumer research (budget allocation, generic allocation, store patronage, and brand purchase), they conclude that a significant proportion of purchases may not be preceded by a decision process.⁶

While it may be true that some purchases are not preceded by a decision process, I believe that consumers undergo at least a very limited version of a decision process before purchase of a new car or truck. The following scenario is an example of a consumer's decision-making process with the least imaginable involvement. First, the consumer recognizes his need or desire for a new car; this may be because his current car has broken down or because he wants to keep up with social trends. In this case, his evaluation of alternatives may occur before information search. Although he may evaluate alternatives subconsciously, he has done some evaluation to narrow down his options, even if he only ends up considering one model. Next, he will test drive this model or visit the dealership to ask about prices; this may be the extent of his information

⁶ Richard W. Olshavsky and Donald H. Granbois, "Consumer Decision Making-Fact Or Fiction?" *The Journal of Consumer Research* 6, no. 2, Special Issue on Consumer Decision Making (Sep. 1979): 93-100.

search. Finally, he will make a purchase and decide afterwards whether he is satisfied or dissatisfied with the purchase.

This section described the basics of the five-step consumer decision making process and discussed the pertinent literature. The following section will cover the step most relevant to the topic at hand: consumer information search.

Information Search

There is an abundant body of literature on consumer information search. This section will concentrate on studies that examine information search of consumers in the market for durable goods such as automobiles or major household appliances. This section will begin by preaching the importance of consumer knowledge, followed by a discussion of the literature on consumer information search.

Alfred Oxenfeldt took on the challenge of measuring consumer knowledge and touting its necessity in 1950. Oxenfeldt used Consumers' Union product ratings to measure relative product qualities, determine the strength of the connection between price and quality, and determine the consistency of quality among different products of a certain brand. He found that the connection between price and quality was relatively weak in most cases, and also found a low level of consistency in quality among different product offered by a brand. Oxenfeldt concluded that with better information, such as that provided by Consumers' Union, consumers would be able to make better purchase decisions and therefore would be better off for less money. He also opined that more and

better information would force inefficient companies out of the market or force them to produce at the level of more efficient companies.⁷

Ongoing Search

The literature on information search can be divided into two main groups: literature focusing on prepurchase information search and literature focusing on ongoing search. Most of the literature falls into the first category, but ongoing search is briefly discussed here.

Bloch, Sherrell, and Ridgway study ongoing search rather than prepurchase search, which is information search undertaken between need recognition and purchase. Bloch et al. define ongoing search as search activity done independently of specific purchase needs or decisions, and identify two motives. A consumer may partake in ongoing search in order to acquire a bank of information that may be useful in the future or he may do so for pleasure or recreation. Bloch et al. surveyed consumers from the general population as well as consumers on clothing stores' mailing lists and computer stores' mailing lists. The authors found that many consumers gather product information on a regular basis to expand their stores of product knowledge and to experience pleasure. Ongoing search may explain why other research has found that consumers do very little prepurchase search – a consumer who regularly gathers product information will be better prepared to make a purchase once he recognizes a need for a product for which he has stored information.⁸

⁷ Alfred R. Oxenfeldt, "Consumer Knowledge: Its Measurement and Extent," *The Review of Economics and Statistics* 32, no. 4 (Nov. 1950): 300-314.

⁸ Peter H. Bloch, Daniel L. Sherrell, and Nancy M. Ridgway, "Consumer Search: An Extended Framework," *The Journal of Consumer Research* 13, no. 1 (Jun. 1986): 119-126.

Prepurchase Information Search

The literature on prepurchase information search can be further divided. Some researchers have sought to create typologies of search strategies, while others propose and test models of information search behavior. Still others measure information search or attempt to explain the differences among consumers' information search processes.

Furse, Punj and Stewart build on and extend previous efforts in the characterization of individual search strategies (Claxton et al., 1974, and Kiel and Layton, 1981). Furse et al. surveyed consumers who had recently purchased a new car and new car salespersons to identify a framework of search patterns. The data from the consumer self-reports allowed the researchers to identify six clusters: low search, assisted by purchase pal, high search, self-reliant shopper, retail shopper, and moderate search. The clusters are defined in the chart below.

Clusters derived from consumer self-reports	
Cluster	Description
Low search	Spend the least time in search activities; greatest prior purchase experience; have owned more cars than average; highest income of all clusters
Assisted by purchase pal	Least experienced car shopper; have owned the fewest cars previously; likely to indicate a father was involved in decision; little confidence in ability to judge cars; many single respondents in this cluster
High search	Spend the greatest amount of time (their own & others) in search activity; lowest confidence of any cluster in ability to judge cars; least satisfied with previous purchase; best educated but of moderate income; car purchased has lowest average sticker price
Self-reliant shopper	Spend greatest amount of own time in search process; consider a large number of makes and models; well educated with high-moderate income; male
Retail shopper	Many decisionmakers involved (many married people in this group); consider a large number of makes; well educated but not necessarily high income; pay highest average price among all clusters for car
Moderate search	Spend below-average amount of time in search process; high certainty they could get a good deal without info search; least likely to involve others in search process; tend to be older males with higher income than average

Table 2.1

The data collected from new car salespersons also allowed them to identify six clusters, confirming their results from the consumer self-reports. The six clusters identified by new car salespersons were: negotiator, inexperienced shopper, lone shopper, family shopper, pain-in-the-neck, and moderate-search shopper; the six clusters are described in the following table.

Clusters derived from salespersons	
Cluster	Description
1. The Negotiator	Spend lots of time at dealerships; gets a "good deal"; higher income; better educated; a "hard sell"; least liked of all clusters by sales personnel; likely to be married and have wife involved
2. The Inexperienced Shopper	Likely to be a first-time buyer; not an efficient shopper; visits many dealerships and returns many times before purchasing; looks at many different models and test drives many cars; most likely to be assisted by an advisor; likely to be single
3. The Lone Shopper	Makes purchase alone; knows what he wants; most experienced shopper; does not visit many dealers or consider many models; engages in little info search; older; an "efficient" shopper; sales personnel like this shopper best (tie with cluster 6)
4. The Family Shopper	Most likely to have family members involved in decision; spends relatively little time at dealership; looks at fewest models of any cluster; not a hard bargainer but does not get a "bad deal"; above average likability
5. The Pain-in-the-Neck	Hardest bargainer; hardest to please; not well liked by sales personnel; visits many dealers; more likely than average to order a car; middle-aged; does not necessarily get a "good deal"
6. The Moderate Search Shopper	Visits few dealerships; easy to please; spends least time on in-store search activities; knows what he wants; upper income; engaged in out-of-store search; best liked of all clusters (tie with cluster 3)

Table 2.2

Furse et al. suggest that their findings might give sales personnel the ability to identify different types of shoppers and use this knowledge to alter their approach accordingly.⁹

Punj and Staelin attempt to analyze the consumer information search process for new automobiles by developing a model of consumer behavior and testing their model. Their model is based on the assumption that consumers

⁹ David H. Furse, Girish N. Punj, and David W. Stewart, "A Typology of Individual Search Strategies among Purchasers of New Automobiles," *The Journal of Consumer Research* 10, no. 4 (Mar. 1984): 417-431.

seek information to make better, more satisfying decisions. They collected data from questionnaires sent to recent car buyers in Phoenix, AZ, Buffalo, NY and Milwaukee, WI to test the model. Among other results, they found a highly significant negative relationship between the amount of usable prior information a consumer possesses and the amount of external information search in which he partakes. They also find a highly significant relationship between cost savings and purchase satisfaction.¹⁰ This relationship shows that consumers seek external information to get a good deal.

Srinivasan and Ratchford build on Punj and Staelin's (1983) model and propose a more complex model of search effort in order to study the determinants of the total amount of search. The authors borrow Beatty and Smith's (1987) categorization of variables that affect search and use seven categories: market environment, situational variables, potential payoff, knowledge and experience, individual differences, conflict and conflict resolution, and cost of search. Srinivasan and Ratchford obtained data through a mail survey of recent car buyers in the Buffalo, NY, standard metropolitan statistical area. They find evidence of a relationship between perceived risk and search, as well as a negative relationship between amount of experience and search effort. A greater amount of experience probably leads to a lower level of perceived risk. Srinivasan and Ratchford's results indicate that more knowledgeable consumers partake in more search. They may do so because they structure the purchase

¹⁰ Girish N. Punj and Richard Staelin, "A Model of Consumer Information Search Behavior for New Automobiles," *The Journal of Consumer Research* 9, no. 4 (Mar. 1983): 366-380.

problem in more complex ways and therefore see a greater need for search, or because knowledgeable consumers are simply more interested in cars.¹¹

Newman and Staelin attempt to measure the amount of information search before purchase of consumer durables (new cars and major household appliances, in this case) and attempt to identify the factors related to differences in information search among buyers. The authors collected data from 653 households that had recently purchased one or more products of interest. Using a series of questions, Newman and Staelin measured in-store and out-of-store information seeking on a scale of 0 to 26. Indications of out-of-store search included: whether the buyer had consulted friends or neighbors, whether the buyer read books, pamphlets, newspapers, or magazines, and whether the buyer had watched TV commercials more carefully prior to purchase. In-store measures included: whether the respondent mentioned using retail outlets as sources of information and the number of stores visited.

Newman and Staelin found that the average total information seeking score was 9.08 (of a possible 26) across all consumers and products purchased. They also found that purchasers who considered only one brand at the outset and purchased the same brand as their current product sought less information than purchasers who did not repeat on brand. Finally, they found that buying experience had a substantial negative influence on the amount of information

¹¹ Narasimhan Srinivasan and Brian T. Ratchford, "An Empirical Test of a Model of External Search for Automobiles," *The Journal of Consumer Research* 18, no. 2 (Sep. 1991): 233-242.

search once a consumer had purchased at least two items of a product in the last ten years.¹²

This section covered the importance of consumer knowledge and the body of literature on consumer information search. It began with a discussion of ongoing search; some researchers believe that consumers do not only undergo information search when they are in the market for a product but continuously collect information on products of interest to them. However, most researchers tend to concentrate on prepurchase information search and attempt to measure, explain, or predict differences among consumer search processes.

Attribution Theory and Learning Theory

Researchers in consumer behavior have applied many theories from the behavioral sciences to the field of consumer behavior and marketing. Two important theories are learning theory and attribution theory. Bennett and Mandell apply the learning theory to prepurchase information seeking behavior of new car buyers. Learning theory maintains that the probability of achieving a correct response increases with the number of positively reinforced trials. Thus, Bennet and Mandell make three hypotheses: (1) as buying experience increases, the amount of effort expended on information search will decrease, (2) as the number of reinforced purchases of a brand increases, the amount of information search before purchase of that brand will decrease, and (3) as the number of

¹² Joseph W. Newman and Richard Staelin, "Prepurchase Information Seeking for New Cars and Major Household Appliances," *Journal of Marketing Research* 9, no. 3 (Aug. 1972): 249-257.

sequential reinforced purchases of a brand increase, the amount of information search before purchase of that brand will decrease.

The authors mailed questionnaires to 146 recent car buyers in Harrisburg, PA that asked respondents to reconstruct their auto purchase history. Bennet and Mandell find that there is not a significant relationship between the number of cars a customer has owned and the amount of information search he engaged in before his most recent purchase. This directly contradicts Newman and Staelin's findings that buying experience is inversely related to the amount of information search – Bennet and Mandell do not offer any explanation for this unexpected outcome besides a comment that risk for experienced buyers must not be less than that for inexperienced buyers. Finally, Bennet and Mandell find that the amount of information search decreases as the number of purchases and the number of sequential purchases of a brand increases.¹³

Attribution theory concerns the explanations (or attributions) people make to explain their behavior or the behavior of others.¹⁴ Mizerski et al. and Folkes review attribution research in the field of consumer behavior. They divide attribution theory into three concentrations: person-perception, self-perception, and object-perception. Object-perception, developed by Harold Kelley (although derived from earlier work on attribution theory), is the most applicable to consumer behavior. Kelley defines three sources of potential causal inference:

¹³ Peter D. Bennett and Robert M. Mandell, "Prepurchase Information Seeking Behavior of New Car Purchasers: The Learning Hypothesis," *Journal of Marketing Research* 6, no. 4 (Nov. 1969): 430-433.

¹⁴ "Attribution Theory," in Wikipedia, The Free Encyclopedia [database online]. 23 March 2007 [cited 3 April 2007]. Available from http://en.wikipedia.org/w/index.php?title=Attribution_theory&oldid=117329405.

(1) the stimulus object, (2) the observer of the effects, and (3) the context in which an effect occurs.¹⁵

Folkes picks up where Mizerski et al. leave off, and reviews recent attribution research through 1988. Folkes points out that some in the field of consumer behavior have questioned the impact of attribution theory. However, Folkes goes on to say that attributional concepts have been underutilized for a variety of reasons, but not because attribution theory has little to offer.¹⁶

Urbany, Dickson and Wilkie investigate the relationship between consumer uncertainty and information search. They look at two dimensions of uncertainty: knowledge uncertainty and choice uncertainty. Knowledge uncertainty is uncertainty regarding what is known about the alternatives, while choice uncertainty is uncertainty regarding which alternative to choose. Urbany et al. mailed questionnaires to consumers who had recently purchased a major household appliance. They found that choice uncertainty appeared to increase search, while knowledge uncertainty had a weak negative effect on search, possibly because a lack of product knowledge may increase search costs, thereby reducing search.¹⁷

¹⁵ Richard W. Mizerski, Linda L. Golden, and Jerome B. Kernan, "The Attribution Process in Consumer Decision Making," *The Journal of Consumer Research* 6, no. 2, Special Issue on Consumer Decision Making (Sep. 1979): 123-140.

¹⁶ Valerie S. Folkes, "Recent Attribution Research in Consumer Behavior: A Review and New Directions," *The Journal of Consumer Research* 14, no. 4 (Mar. 1988): 548-565.

¹⁷ Joel E. Urbany, Peter R. Dickson, and William L. Wilkie, "Buyer Uncertainty and Information Search," *The Journal of Consumer Research* 16, no. 2 (Sep. 1989): 208-215.

Product Reviews and Word of Mouth Communications

Three topics will be discussed in this section. First, the market for product reviews will be discussed briefly as an introduction to this section. Second, literature regarding recommendation agents and information intermediaries will also be briefly discussed. Finally, literature regarding the effects of product reviews and word of mouth communications will be discussed in detail.

Faulhaber and Yao introduce a model in which information about experience goods (such as movies and restaurants) is available through product reviews and reputation. Reputation based on a firm's past quality is an indicator of future quality. Product reviews allow consumers the opportunity to observe the quality of a new product before purchase and supplement the message sent by a firm's reputation. Faulhaber and Yao find that decreasing the cost of producing and distributing reviews increases the rents received by high-quality firms. They also find that different types of reviews have different user costs, which may play a part in their effectiveness. Simple OK/not OK ratings have low user costs, which makes them more accessible than complex review strategies.¹⁸ This study looks at the market for product reviews for experience goods, which carry lower risk than a durable good such as automobiles. However, the study still displays the need for product reviews as supplements to reputation. Product reviews allow consumers to know more about a product before purchase of said product, and therefore allow consumers the opportunity to make better and more satisfying purchase decisions.

¹⁸ Gerald R. Faulhaber and Dennis A. Yao, "'Fly-by-Night' Firms and the Market for Product Reviews," *The Journal of Industrial Economics* 38, no. 1 (Sep. 1989): 65-77.

Recommendation Agents and Information Intermediaries

Recommendation agents and information intermediaries have become popular as the Internet has become a widely used venue for product research and shopping. Haubl and Trifts investigate the effects of two interactive decision aids: recommendation agents and comparison matrices. The authors perform a study using a simulated online store to test their hypotheses. Haubl and Trifts find that the use of a recommendation agent reduces consumers' search effort for product information and improves the quality of their evoked set. Use of a comparison matrix, which allows consumers to organize alternatives by product attributes, also increases the quality of consumers' evoked sets¹⁹ and has a favorable effect on some facets of decision quality.^{20,21}

Swaminathan examines recommendation agents that use consumers' stated preferences for attributes to identify product most suited to their needs. Examples include Epinions.com and ConsumerReports.org. Swaminathan formed three hypotheses: (1) recommendation agents will have a greater impact on amount of search and decision quality in more complex categories (categories with a large number of alternatives or attributes), (2) recommendation agents will have a greater impact when the perceived risk associated with purchasing a product is greater, and (3) recommendation agents will have a greater impact when the consumer has a higher level of category knowledge.

¹⁹ A consumer's evoked set is the group of alternatives available to him/her after information search.

²⁰ Decision quality indicates a consumer's ability to choose the best product (of highest quality or most important attributes to consumer) that the consumer can afford.

²¹ Gerald Haubl and Valerie Trifts, "Consumer Decision Making in Online Shopping Environments: The Effects of Interactive Decision Aids," *Marketing Science* 19, no. 1, Special Issue on Marketing Science and the Internet (Winter 2000): 4-21.

Undergraduate students and staff were recruited to participate in the study, which asked participants to log on to a Web site where they would “purchase” a toothbrush and a tent. All products in both categories were described on seven attributes. After completing their purchases, participants filled out a survey regarding their shopping experience, category knowledge, etc. Swaminathan found that recommendation agents do have a greater impact on decision quality when perceived risk is greater. The author also found that recommendation agents have a greater impact on reducing the amount of search when fewer attributes are used to describe a product.²²

Lee and Cho study consumers' use of information intermediaries in the financial market. They attempt to identify the factors that increase the likelihood that a consumer will use an information intermediary and evaluate their effect on consumers' reliance on other information sources by testing a number of hypotheses. Lee and Cho use data from a biennial survey that collects information on consumers' attitudes, behaviors, and motivations as related to financial services. They find that risk propensity does not have a significant effect on the perceived value of information intermediaries. They also find that perceived expertise has a significant, negative influence on the perceived value of information intermediaries. Finally, Lee and Cho find that the total amount of

²² Vanitha Swaminathan, "The Impact of Recommendation Agents on Consumer Evaluation and Choice: The Moderating Role of Category Risk, Product Complexity, and Consumer Knowledge," *Journal of Consumer Psychology* 13, no. 1/2 (2003): 93.

assets invested in the financial market is positively related to the perceived value of information intermediaries.²³

Effects of Product Reviews/WOM

There have been a number of studies done on the effects of product reviews or ratings on consumer response or judgment. West and Broniarczyk acknowledge that consumers are likely to seek the opinions of others in order to reduce uncertainty as perceived risk associated with purchase increases. West and Broniarczyk examine the way in which consumers integrate critics' opinions into their own product evaluations and the way critic consensus or lack thereof affects this process. The authors ran four related studies using movies and restaurants to test how aspiration levels influenced subjects' response to critic consensus and the ways that aspirations levels could be manipulated using price and social risk. Results from the four studies indicate that consumers respond differently to critic disagreement based on whether or not product quality or performance is perceived as above or below their aspiration level.²⁴

Lynch, Chakravarti, and Mitra explore the distinction between contrast effects due to changes in mental representations and contrast effects due to changes in scale anchoring and create a method for distinguishing between the two types of contrast effects. An example of a contrast effect is the way a ten pound weight feels heavy in comparison to

²³ Jinkook Lee and Jinsook Cho, "Consumers' use of Information Intermediaries and the Impact on their Information Search Behavior in the Financial Market," *Journal of Consumer Affairs* 39, no. 1 (2005): 95-120.

²⁴ Patricia M. West and Susan M. Broniarczyk, "Integrating Multiple Opinions: The Role of Aspiration Level on Consumer Response to Critic Consensus," *The Journal of Consumer Research* 25, no. 1 (Jun. 1998): 38-51.

a five pound weight, but feels light in comparison to a twenty pound weight.²⁵

The authors perform two studies; the first illustrates their method and finds contrast effects on mean ratings that reflect changes in response-scale anchoring and not changes in mental representations. The second study explores the way knowledge moderates the type of contrast effects observed. The authors find that contrast effects can affect psychological representations of objects, but do not in all cases. Sometimes, contrast effects on ratings only affect the way consumers label the categories of researchers' scales without changing how they actually think about the objects rated.²⁶

There is also a substantial body of literature concerning the effects of word-of-mouth (WOM) communications. Laczniak, DeCarlo, and Ramaswami study consumers' responses to negative word-of-mouth communication using attribution theory. Negative WOM communication is interpersonal communication that denigrates a product or organization. They proposed seven hypotheses concerning consumers' responses to negative WOM communication and performed two studies to test their hypotheses. Laczniak, DeCarlo, and Ramaswami find that consumers not only generate causal attributions in response to negative WOM communications, but that these causal attributions are used to influence brand evaluation. The authors also find that the strength of

²⁵ "Contrast Effect," in Wikimedia Foundation, Inc. [database online]. 24 October 2006 [cited 19 December 2006]. Available from http://en.wikipedia.org/wiki/Contrast_effect.

²⁶ John G. Lynch Jr., Dipankar Chakravarti, and Anusree Mitra, "Contrast Effects in Consumer Judgments: Changes in Mental Representations Or in the Anchoring of Rating Scales?" *The Journal of Consumer Research* 18, no. 3 (Dec. 1991): 284-297.

the brand name influenced consumers' responses to negative WOM communication.²⁷

Smith and Vogt study the effects of advertising and WOM communications on consumer response. They acknowledge that it is important to study the prepurchase effects of advertising for new brands, but point out that consumers will also collect information from other sources. Smith and Vogt propose and test six hypotheses to measure consumers' responses to advertising, negative WOM communications, and combinations of the two. They find that advertising significantly lessens the detrimental effects of negative WOM communications when the advertisement is processed first. Smith and Vogt also find that the perceived credibility of negative WOM communication increases when subjects process ad content, which suggests that consumers associate advertising with low perceived credibility since the source is biased. This increases the relative credibility of the negative WOM communication.²⁸ This finding suggests that consumers' perceived credibility of *Consumer Reports* car ratings may increase greatly in relation to the credibility of car advertisements since *Consumer Reports* is known to be an independent source of objective information.

Herr, Kardes and Kim perform two experiments to investigate the effects of WOM and other variables on persuasion. For the first experiment, they hypothesized that WOM communications should have a greater impact on

²⁷ Russell N. Laczniak, Thomas E. DeCarlo, and Sridhar N. Ramaswami, "Consumers' Responses to Negative Word-of-Mouth Communication: An Attribution Theory Perspective," *Journal of Consumer Psychology* 11, no. 1 (2001): 57-73.

²⁸ Robert E. Smith and Christine A. Vogt, "The Effects of Integrating Advertising and Negative Word-of-Mouth Communications on Message Processing and Response," *Journal of Consumer Psychology* 4, no. 2 (1995): 133.

product judgments than printed information. To test this, the authors asked undergraduate students to participate in a study, where the students were split up into small groups and received either positive or negative information about personal computers from another person or from a printed source. Herr, Kardes, and Kim found that anecdotal, face-to-face communication was more influential than printed communication.

For the second experiment, Herr, Kardes, and Kim formed two hypotheses: (1) WOM communication should have a reduced effect when a prior impression of the product is available from memory, and (2) WOM communications should have a reduced effect when extremely negative attribute information is available. To test these hypotheses, undergraduates were assigned to one of 24 conditions that varied positive or negative attributes, order of judgment (before memory recall or after), whether the subjects were given positive or negative WOM information, and whether the subjects were asked to form an impression of the brand or to memorize the attributes of the brand. The authors found that the effect of WOM communication was reduced when a well-defined prior impression could be recalled or when extremely negative attribute information was available.²⁹

Effects of Product Reviews on Purchase Intentions

Finally, there is a limited body of literature that investigates the effect of product reviews on purchase or purchase intentions. Arndt studies the effect of

²⁹ Paul M. Herr, Frank R. Kardes, and John Kim, "Effects of Word-of-Mouth and Product-Attribute Information on Persuasion: An Accessibility-Diagnosticity Perspective," *The Journal of Consumer Research* 17, no. 4 (Mar. 1991): 454-462.

WOM communication in the diffusion of a new product. To do this, the author conducted a field experiment, in which a new brand of a frequently purchased food product was placed in a commissary for residents of an apartment complex for married students. Each homemaker was given a coupon that allowed them to buy the new product for one-third of the retail price. After 16 days, about ninety percent of the homemakers were interviewed. Arndt found a number of interesting results. The results suggest that negative WOM was more effective in hindering purchase than positive WOM was in encouraging purchase. Also, WOM seems to have a greater effect on consumers with a higher perceived risk of purchase than on those who see a low perceived risk of purchase.³⁰

Chatterjee studies the effect of online reviews on consumers shopping online. Chatterjee asked undergraduates from two undergraduate courses to purchase their textbook for the course online. The website was structured to contain links to reviews of the merchant and participants were asked questions about their purchase process at each step. The most relevant finding out of a number of results was that negative WOM information affected purchase intentions.³¹

Finally, Lin, Luarn, and Huang study the effect of Internet book reviews on purchase intentions. Prior research has shown that book reviews are an important source of information for librarians and the general public. The increasing popularity of the Internet and Internet bookstores has made the use of

³⁰ Johan Arndt, "Role of Product-Related Conversations in the Diffusion of a New Product," *Journal of Marketing Research* 4, no. 3 (Aug. 1967): 291-295.

³¹ P. Chatterjee, "Online Reviews: Do Consumers use them?" *Advances in Consumer Research*, Vol Xvii 28 (2001): 129-133.

online book reviews widespread. At the time of the study, nearly three million reviews were posted on Amazon.com. The authors asked college students to participate in a series of focus groups led by a trained researcher. Participants used an open-ended questionnaire to engage in discussion about their opinions and experience regarding reviews of two books the participants had not yet read.

The majority of participants stated that Internet book reviews affected their purchase intentions when shopping online. The results from the focus group discussions suggest that the length of the book review makes a difference in its effect on purchase intentions. The order of positive and negative reviews also makes a difference; purchase intention is negatively influenced when the first review in the list is negative. Finally, focus group participants suggested that positive reader comments attract attention to the book and positively influence purchase intention.³²

Conclusion

There is a large body of literature covering topics related to the topic at hand. A substantial amount of research has been done on consumer behavior and the decision-making process, especially studying the information search process. John Dewey created the model of the consumer decision making process we use today, which includes five steps:

- (1) need/problem recognition
- (2) information search
- (3) evaluation of alternatives

³² T. M. Y. Lin, P. Luarn, and Y. K. Huang, "Effect of Internet Book Reviews on Purchase Intention: A Focus Group Study," *Journal of Academic Librarianship* 31, no. 5 (SEP 2005): 461-468.

- (4) purchase
- (5) postpurchase behavior

While there is a great deal of literature on information search, it does not study the effects of information search on purchase intentions. There is only a handful of literature regarding the effect of product reviews on purchase intention. Consumers use product reviews to mine information about a product they wish to purchase. The increase in Internet use has made product reviews more available to consumers, and the importance of research studying this topic has increased at the same time. This paper will attempt to address the deficiency in research examining effects on purchase intentions by studying the effect of *Consumer Reports'* auto ratings on car sales.

CHAPTER 3

BACKGROUND

This chapter provides a background of a wide range of topics. First, the chapter reviews consumer organizations in the US and worldwide to help the reader understand how Consumers Union and *Consumer Reports* fit into the picture. Second, the chapter covers organizations besides *Consumer Reports* that rate and review cars to compare their approaches to that of *Consumer Reports*. Third, the chapter gives a brief history of *Consumer Reports* auto testing and the Annual April Auto Issue. Finally, the chapter looks at the way *Consumer Reports* tests for the variables in my thesis equation and discusses some possible problems with some of *Consumer Reports'* tests.

Background of Consumer Organizations

All of the following consumer organizations were founded to help the consumer. Some organizations such as Consumers International and the Consumer Federation of America exist purely as advocates for consumer rights and consumer education. Other organizations, such as the Good Housekeeping Research Institute and CNET.com, test and review products to help consumers make good choices. Finally, organizations such as Which? and Consumers Union take on both tasks. Most are non-profit, independent organizations.

Consumers International (CI) was founded in 1960 as the International Organization of Consumers Unions by a group of consumer organizations. CI supports and connects consumer organizations; over 230 organizations in 113 countries around the world belong to the Consumers International network. Together, these organizations fight for consumer rights and consumer education. It is a non-profit, independent organization that is not aligned with or supported by any political party or industry. Consumers International is funded by fees from member organizations and grants.¹

The Consumer Federation of America (CFA) began in 1968 as an advocacy, research, education, and service organization. The CFA publishes a website, newsletter and other publications to service other organizations. It receives funding through member dues and Consumers Union.²

Other consumer organizations, such as the Good Housekeeping Research Institute and CNET, Inc., test and review products. The Good Housekeeping Research Institute was founded in 1900 to improve the lives of consumers and their families through education and product evaluation. The Institute reviews all advertisements submitted to the magazine, and only those found acceptable are published. The Institute also prepares the "Buyer's Guides" and "Institute Reports" that appear in *Good Housekeeping*.³ The Good

¹ "About Consumers International," in Consumers International [database online]. [cited 25 January 2007]. Available from <http://www.consumersinternational.org/Templates/Internal.asp?NodeID=89647>.

² "About CFA," in Consumer Federation of America [database online]. [cited 24 January 2007]. Available from <http://www.consumerfed.org/about.cfm>.

³ "About the GH Institute: What is the Good Housekeeping Research Institute?" in iVillage [database online]. [cited 24 January 2007]. Available from http://magazines.ivillage.com/goodhousekeeping/consumer/institute/articles/0,,284511_290570,00.html.

Housekeeping Institute has been awarding the *Good Housekeeping Seal* to products whose ads have been reviewed and accepted by the Institute.⁴

CNET.com offers CNET Shopper, a service which provides information, pricing, and product reviews for consumer electronics and related products. All merchants linked on CNET.com have gone through a rigorous merchant certification program, and a user rating is posted for each merchant as well. CNET Tips & Tricks offers how-to's, expert advice, user postings and forums to help consumers get the most out of their electronics.⁵

The Internet has provided the perfect forum for product reviews. Shoppers can read user reviews as they shop (ex: Amazon.com book reviews), and consumers can post weblogs (blogs) to give their opinion on a product or service. Many websites, such as CNET.com and Edmunds.com (and other car reviewing sites that will be discussed later), offer forums for visitors to post opinions and advice on products they have purchased and used.

Finally, some organizations act as consumer advocates and also provide product reviews. Which? is an organization in the United Kingdom that campaigns for consumers' rights and publishes *Which?* magazine to help people make the right choice when buying products and services. *Which?* magazine has been published since 1957, and now boasts more than 700,000

⁴ "What's Behind the *Good Housekeeping Seal*?" in iVillage [database online]. [cited 24 January 2007]. Available from http://magazines.ivillage.com/goodhousekeeping/consumer/institute/articles/0,,284512_596441,00.html.

⁵ "CNET.Com," in CNET Networks [database online]. [cited 8 February 2007]. Available from <http://www.cnetnetworks.com/aboutus/brands.html>.

subscriptions. Along with offering product reviews, *Which?* surveys hundreds of thousands of consumers annually to find out what matters most to consumers.⁶

Consumers Union (CU), the organization that publishes *Consumer Reports*, is another example of a consumer organization that works for consumers through advocacy and product reviews. Consumers Union was founded in 1936 in New York City. The first issue of *Consumers Union Reports* was published in May of 1936 with articles on milk, breakfast cereal, soap and stockings (CU's budget was slim as it was a new organization operating during the Great Depression).⁷ In 1940, *Consumers Union Reports* surveyed its readers through the first Annual Questionnaire, which is still sent out annually to magazine and online subscribers.⁸

In 1972, Consumers Union established advocacy offices in Washinton, D.C., San Francisco, CA and Austin, TX to ensure that consumer rights are upheld around the country.⁹ In 1992, *Consumer Reports* reached 5 million paid subscriptions; this made it the largest circulating magazine in the US. Consumer Reports Online was started in 1997 and had over 1 million paying subscribers by 2002.^{10,11}

⁶ "Who we are," in *Which?* [database online]. [cited 24 January 2007]. Available from http://www.which.co.uk/about_us/A/who_we_are/overview/Who_we_are_481_58509.jsp.

⁷ "Our History: 1930s," in Consumers Union [database online]. Yonkers, NY [cited 24 January 2007]. Available from <http://www.consumerreports.org/cro/aboutus/history/printable/index.htm>.

⁸ "Our History: 1940s," in Consumers Union [database online]. Yonkers, NY [cited 25 January 2007]. Available from <http://www.consumerreports.org/cro/aboutus/history/printable/1940/index.htm>.

⁹ "Our History: 1970s," in Consumers Union [database online]. Yonkers, NY [cited 25 January 2007]. Available from <http://www.consumerreports.org/cro/aboutus/history/printable/1970/index.htm>.

¹⁰ "Our History: 1990s," in Consumers Union [database online]. Yonkers, NY [cited 25 January 2007]. Available from <http://www.consumerreports.org/cro/aboutus/history/printable/1990/index.htm>.

Car Reviewing Organizations

As the Internet has become a widely-used resource, many websites have been established to provide information and advice for car shoppers. These websites offer shoppers an easy way to perform research outside of the manufacturer's marketing material and the dealership, where sales people only provide information biased towards the brand they sell. In addition to websites, magazines other than *Consumer Reports* also provide a source of car reviews, although most of these magazines also offer an online version.

Examples of such websites are Edmunds.com, Consumer Guide Automotive at howstuffworks.com, Kelley Blue Book at KelleyBlueBook.com, JDPower.com, CarandDriver.com and TrueDelta.com. Edmunds.com, Kelley Blue Book, and Consumer Guide Automotive provide visitors with expert reviews and advice, the ability to compare vehicles or find other cars like the one in which a shopper is interested, and programs to calculate the true owner cost of a car or the trade-in value of a used car.^{12,13,14} Edmunds.com also provides forums that allow visitors to leave comments about their car or car-buying experience or to read comments from other visitors.

JDPower.com, published by J.D. Power and Associates, provides new and used car reviews and ratings based upon the J.D. Power Car Ratings

¹¹ "Our History: 2000s," in Consumers Union [database online]. Yonkers, NY [cited 25 January 2007]. Available from

<http://www.consumerreports.org/cro/aboutus/history/printable/2000/index.htm>.

¹² "Edmunds.Com," [cited 9 February 2007]. Available from www.edmunds.com.

¹³ "Kelley Blue Book," in Kelley Blue Book Co., Inc. [database online]. [cited 9 February 2007]. Available from www.kbb.com.

¹⁴ "Consumer Guide Automotive," in How Stuff Works, Inc. [database online]. [cited 9 February 2007]. Available from <http://consumerguideauto.howstuffworks.com/>.

(developed with consumer surveys).¹⁵ CarandDriver.com, the online source of *Car and Driver* magazine, also provides car reviews and forums for visitors. CarandDriver.com is different from ConsumerReports.org in that visitors do not need a paid subscription to view most articles and features on CarandDriver.com.¹⁶

While many of these websites offer similar products and services to *Consumer Reports*, they do not offer advertisement-free sites or support their reviews and ratings with the same level of disciplined testing used at *Consumer Reports*.

History of *Consumer Reports* Auto Test Division

In 1936 Lawrence Crooks joined the Consumers Union staff to head up its Auto Test Division. As CU couldn't afford to buy new cars itself, Crooks, a wealthy man with an intense interest in cars, bought new cars or borrowed them from friends.¹⁷ The first automobile Frequency of Repair tables, based on responses to the Annual Questionnaire, appeared in *Consumer Reports* in 1952. *Consumer Reports* published its first cover-to-cover auto issue in 1953; the issue included reviews of 50 cars.¹⁸ In the late 1980s, *Consumer Reports* Auto Test Department converted an old drag strip in East Haddam, CT into a state-of-the-

¹⁵ "J.D. Power Consumer Center," in J.D. Power and Associates, The McGraw-Hill Companies, Inc. [database online]. [cited 9 February 2007]. Available from www.jdpower.com.

¹⁶ "CarandDriver.Com," in Hachette Filipacchi Media U.S., Inc. [database online]. New York, NY [cited 9 February 2007]. Available from www.caranddriver.com.

¹⁷ "Our History: 1930s,"

¹⁸ "Our History: 1950s," in Consumers Union [database online]. Yonkers, NY [cited 25 January 2007]. Available from <http://www.consumerreports.org/cro/aboutus/history/printable/1950/index.htm>.

art test track and auto testing facility.¹⁹ In 2003, *Consumer Reports* published its 50th anniversary issue of its Annual April Auto issue.²⁰

Over the years the cars and the testing methods have changed. The 1953 issue included only cars, while the 50th anniversary issue included cars, SUVs, minivans and pickup trucks. When Lawrence Crooks started up the Auto Test Division in 1936 he mainly tested tires; today, *Consumer Reports* tests anti-lock brake systems, road noise, safety belts, four wheel drive transmission abilities, and more.²¹

How *Consumer Reports* Tests a Car

Many things go into testing a car before a review is published in the Annual Auto issue. Before undertaking its vehicle analysis, *Consumer Reports'* shoppers anonymously visit dealers to purchase all new models of the year. *Consumer Reports* does not accept any freebies from dealers or manufacturers; it buys every car it tests at retail price. In 2002, *Consumer Reports* spent over \$1.3 million purchasing cars.²² The price paid by a *Consumer Reports* shopper is the amount used for the variable, PRICE, in this thesis.

Since 1936, *Consumer Reports* has continuously added tests (for acceleration, braking, and others) and upgraded its testing methods as technology has advanced. For instance, speed and distance are now measured

¹⁹ "Our History: 1980s," in Consumers Union [database online]. Yonkers, NY [cited 25 January 2007]. Available from <http://www.consumerreports.org/cro/aboutus/history/printable/1980/index.htm>.

²⁰ "Looking Back: Special 50th Anniversary Section," *Consumer Reports*, April 2003 April 2003, consumerreports.org,

²¹ "Testing then & Now: *Consumer Reports'* Role," *Consumer Reports*, April 2003 April 2003, consumerreports.org,

²² Ibid.

with a computerized device that scans the road surface with a beam, rather than the bicycle-wheel apparatus *Consumer Reports* previously used. *Consumer Reports* has also improved its methods for testing brakes, fuel mileage, and emergency handling.

Consumer Reports' testing facility in East Haddam, CT contains many types of tracks and lab facilities – there is a straightaway, skid pad, off-road course, handling circuit, and tire lab. These tracks are used to test for the variables included in my thesis equation; this is how the descriptions will be organized.

Accident Avoidance

Consumer Reports uses three tests to measure how safely a vehicle would handle in an emergency. The first is a skid-pad test. The skid pad is a round, paved surface, 200 feet in diameter, with lines painted around the periphery of the circle. The car is driven around the circle at higher and higher speeds until the driver can no longer keep the car within the painted circle. An accelerometer records the limit of sideways forces reached during the test.

In the second test, the car is driven around *Consumer Reports'* mile-long, winding, handling course. This test determines what a car does when it is pushed too hard through a corner. The third test is an avoidance maneuver. The car is driven through a course marked with cones, where the driver must first swerve to the left, then to the right, then back to the left to resume his course.²³

²³ Ibid.

Fuel Mileage

Early on, *Consumer Reports* tested fuel consumption on a public highway. One person would drive the car while an assistant would empty measured amounts of gasoline from the cabin into the carburetor. Fortunately, *Consumer Reports* has improved its methods; now, a digital metering system under the hood delivers amounts of gasoline to the carburetor as distance traveled is carefully measured to find the "MPG" value.²⁴

Road Test

The road test score is developed from many tests. These tests measure road noise, turning radius, comfort, handling, and, for SUVs and trucks, off-road abilities. Road noise is tested on a stretch of rough pavement; the amount of noise is tested with a digital sound recorder and compared to other cars in the category.²⁵ The turning circle of a car is simply the smallest circle the car can make. A smaller turning circle means the car is more agile and easier to handle and park.

To test the comfort and ride of a car or truck, *Consumer Reports* testers drive the vehicle around their ride-evaluation course. This course is a two-mile stretch including all the worst aspects of a road: potholes, grates, dips, broken pavement, and more. Testers drive cars along the stretch and compare the comfort and ride among each category of vehicles.²⁶

²⁴ Ibid.

²⁵ Ibid.

²⁶ "At the Track: *Consumer Reports'* Auto Test Center," in Consumers Union [database online]. Yonkers, NY April 2006 [cited 9 February 2007]. Available from <http://www.consumerreports.org/cro/cars/new-cars/at-the-track-consumer-reports-auto-test-center/index.htm>.

Acceleration and daily driving ease are also measured in order to compare a car to others in its category. Acceleration is measured on the straightaway, where testers record acceleration in the standing quarter mile, standing half kilometer, and sprints from 0-30 mph and 0-60 mph. Daily driving ease is measured during the first 2,000 miles driven in each car, while the car is being broken in before testing begins.²⁷

Consumer Reports uses a rock hill and off-road course to measure the off-road abilities of SUVs and pickup trucks. The rock hill includes an easy and a difficult course, where rocks and boulders are cemented into place to insure that the course is consistent between tests. In the off-road course, vehicles must maneuver through rocks and mud, ford a stream, and handle rough surfaces filled with holes and deep ruts.²⁸

A car's performance throughout all of this testing is measured and compared to other cars within its category. *Consumer Reports* combines a car's measurements to create its road test score, which is reported in the Annual April Auto issue.

Safety, mileage, comfort, ride, and other aspects such as tire abilities and price, all go into *Consumer Reports'* decision to recommend a car. To be recommended, a car must do well in all categories.²⁹

²⁷ Ibid.

²⁸ Ibid.

²⁹ "Good News from our Tests," *Consumer Reports*, April 2005 April 2005, April.

Complaints about *Consumer Reports*

Although *Consumer Reports* claims to be an expert, consistent source of car reviews, some have noticed inconsistencies and problems with their testing and rating methods. David Zatz, webmaster of allpar.com (a site for Dodge, Chrysler, Plymouth, and Jeep lovers) and professional statistician, notes a few problems with *Consumer Reports'* Annual Questionnaire and reliability ratings. Zatz points out that, at best, *Consumer Reports* receives a 12% response rate to its Annual Questionnaire. Since many readers probably report on two cars, the response rate may be as low as 6%. Due to this low response rate, Zatz questions the validity of *Consumer Reports'* reliability ratings.

Zatz also questions *Consumer Reports'* practice of lumping together "corporate twins"³⁰ or two or more trim lines of one model when they are built with different engines or transmissions that may have very different repair histories. In other cases, corporate twins are rated very differently, even though they use the same engine and transmission and have similar exterior and interior styling.³¹

Finally, Zatz is critical of the Annual Questionnaire question used to measure reliability. Michael Karesh, webmaster of TrueDelta.com, has a background in research and consumer behavior, and also questions *Consumer Reports'* reliability ratings and methods. Both authors find it a serious problem that *Consumer Reports* uses only one question to determine the reliability rating for a model. This question in the Annual Questionnaire asks the subscriber to

³⁰ Models made by different brands under a single company, which are essentially the same car. Ex: Ford Five Hundred and Mercury Montego are corporate twins.

³¹ "*Consumer Reports* Reliability Ratings for Cars, Trucks, and Minivans: Are they Reliable?" in allpar.com [database online]. [cited 2007]. Available from <http://www.allpar.com/cr.html>.

make a check next to each system or component (brakes, mufflers, etc.) if he/she has had a serious problem with that component in the past year. The survey does not define "serious", beyond instructing the subscriber not to include routine maintenance items or damage from an accident. It also does not allow reports of multiple trips to the shop for the same problem or same component.^{32,33}

Finally, Karesh criticizes *Consumer Reports* use of a relative scale in the reliability ratings. *Consumer Reports* does not report how many times, on average, a model required repairs. Also, with car reliability steadily increasing, the difference between a car with average reliability and one with above-average reliability has steadily declined, so that the difference may not even be worth reporting.³⁴

Although these complaints are all valid, I still believe *Consumer Reports* is at the very least a good starting point for someone in the market for a new car. It provides objective information on different models, such as mileage and price, which is helpful and hard to dispute. In the end, research through *Consumer Reports* and other review sources does not make the decision for you. A shopper will not know whether he really likes a car until he has visited a dealership and test-driven the cars he has researched.

³² "A Truly SERIOUS Problem: I Fill Out My First *Consumer Reports* Survey," in True Delta [database online]. 16 November 2006 [cited 2007]. Available from http://truedelta.com/pieces/cr_survey.php.

³³ Zatz, "*Consumer Reports* Reliability Ratings for Cars, Trucks, and Minivans: Are they Reliable?"

³⁴ "Seven Serious Problems with *Consumer Reports*," in True Delta [database online]. 16 November 2006 [cited 2007]. Available from <http://www.truedelta.com/pieces/shortcomings.php>.

Conclusion

This chapter has given an overview of many aspects related to product reviews, specifically car reviews. First, the chapter introduced some consumer organizations. Consumers Union and *Consumer Reports* make up a very important part of that group, especially in the US. Through *Consumer Reports*, Consumer Reports Online, and other newsletters and websites, Consumers Union fights for consumer rights and works to educate consumers and help them make high quality purchase decisions.

Second, the chapter discussed the growing popularity of product reviews thanks to the increase in Internet usage among consumers. This included an overview of car review sites and magazines. Auto review sites such as Edmunds.com and MotorTrend.com provide information on different makes and models in addition to expert and consumer reviews.

Finally, the chapter looked at the history of *Consumer Reports* auto testing and its methods, and discussed some criticism of its methods. *Consumer Reports* uses extensive testing to determine acceleration, accident avoidance, fuel mileage and more for each model it tests. It also collects data from print and online subscribers on reliability and ownership satisfaction. *Consumer Reports'* methods have come under criticism from outsiders, particularly for statistical problems in the magazine's reliability ratings. The next chapter will describe the equation and methods used in this thesis, and uncover the results.

CHAPTER 4

ANALYSIS

This chapter begins with descriptions of the dependent and independent variables. The variables are organized into four categories: (1) physical characteristics, (2) *Consumer Reports* ratings, (3) results from *Consumer Reports* Annual Questionnaire, and (4) variables that come from lists in the *Consumer Reports* Annual Auto Issue. Next, the chapter describes the dataset with descriptive statistics of the sample. I will then describe the method used to analyze the sample. Finally, I present the results of my analysis.

Regression Equation

Following is the regression equation, with signs indicating the expected relationship between the dependent variable and each independent variable:

$$\text{SALES} = \text{PRICE} (-), \text{USA} (-), \text{ROADTEST} (+), \text{MPG} (+), \text{ACCAVOID} (+), \\ \text{RELIABLE} (+), \text{OWNERSAT} (+), \text{LEASTSAT} (-), \text{MOSTSAT} (+), \\ \text{TOPPICK} (+), \text{Q1}, \text{Q2}, \text{Q3}$$

Dependent Variable

The dependent variable, SALES, is the number of cars sold in the US during 2005, measured quarterly. The sales data came from Ward's, an automotive data company that supplies data to industry experts and companies in the auto industry.

The dummy variables Q1, Q2, and Q3 indicate whether the sales data for a model is from the first, second, or third quarter. Fourth quarter sales data are indicated by a "0" for all three variables.

Independent Variables

Car Characteristics

The first independent variable, PRICE, is the price of the model tested, as paid by *Consumer Reports'* shoppers. Shoppers purchase each car with desirable options, such as air conditioning and power locks and windows. Thus, the price listed in *Consumer Reports* is the Manufacturer's Suggested Retail Price (MSRP) plus the cost of desirable options. Price is measured in US dollars, and is expected to have an inverse relationship with the dependent variable.

The variable USA is a dummy variable to test whether a car's origin has an effect on its sales. "Foreign" cars such as Jaguar, Volvo, Land Rover, and Saab, which are owned by Ford and General Motors, are considered "American". This does not include brands/models manufactured in the US but not owned by an American company. I expect this variable to have a negative effect on car sales.

Consumer Reports Ratings

The ROADTEST variable gives the overall road test score given by *Consumer Reports* for each model. At www.consumerreports.org, a score of 0-100 is available for the most current model tested by *Consumer Reports* (2006 and 2007 models at the time of writing). However, only a 1-5 scale rating is

available in back issues of the magazine; the data for this equations comes from the 2005 issue and uses a 1-5 scale for the road test score, where 1 is the worst score possible and 5 is the best score possible. I expect this variable to have a positive effect on car sales.

The variable MPG gives the average mileage for each model, as tested by *Consumer Reports*. This number is not the mileage estimate found in the window of a new vehicle; *Consumer Reports* carefully measures gasoline used and distance traveled to determine the mileage of each car. I expect mileage to have a positive effect on sales, especially since good fuel mileage has become a very important issue in the past few years as fuel prices have risen.

The final variable extracted from *Consumer Reports'* ratings is ACCAVOID, which is a measure of how capable a car is at avoiding an accident. Accident avoidance is measured on a 1-5 scale, where 1 = worst and 5 = best. Many people, especially *Consumer Reports* readers, consider the safety of a vehicle before purchase. Thus, I expect this variable to have a positive effect on sales.

Annual Questionnaire Data

The data for the variables in this category comes from the results of the Annual Questionnaire sent annually to *Consumer Reports* and consumerreports.org subscribers. The first variable, RELIABLE, is based upon answers to a question which asks owners how many serious problems they have had with their car. Reliability is then rated on a 1-5 scale, where 1 is given to a car with much worse than average reliability, a 3 is given to a car with average

reliability, and a 5 is given to a car with much better than average reliability. I expect this variable to have a positive effect on sales.

Owner satisfaction is also based on responses to the Annual Questionnaire. Owner satisfaction is measured by the percentage of people who would buy the same car again. From March to May, a 0-100% score may be found online, but at all other times and in the magazine, owner satisfaction is rated on a 1-5 scale, where 1 = 0-20%, 2 = 21-40%, etc. I expect that owner satisfaction will have a positive effect on car sales.

Consumer Reports' Lists

The final three independent variables come from lists published in *Consumer Reports*. The first variable, LEASTSAT, comes from a list of the least satisfying cars, as determined by responses to the Annual Questionnaire. Cars with 50% or lower owner satisfaction are included on the least satisfying list. This variable is a dummy variable where 1 = on the list and 0 = not on the list. I expect to find that this variable has a negative relationship on car sales.

The variable MOSTSAT is a dummy variable that indicates whether a model was published in the list of most satisfying cars (1 if yes, 0 if no). Cars with 80% or higher owner satisfaction are included on the list of most satisfying cars. I expect this variable to have a positive effect on sales.

The final variable, TOPPICK, is a dummy variable that comes from the list of *Consumer Reports'* top ten models in ten categories. These models were all-around high performers in every category. I expect TOPPICK to have a positive effect on sales.

Descriptive Statistics

After excluding models rated by *Consumer Reports* that did not match up with sales data received from Ward's, 137 models were included in the sample. Since the equation uses quarterly data, 548 observations were included in the regression, before removing models that did not have complete data from *Consumer Reports*. The average price of a car in the sample is \$33,237.00, while the highest price is \$84,145.00 for the BMW 745Li and the lowest price is \$13,495.00 for the Toyota Echo.

The average fuel mileage for vehicles in the sample is 20.29 mpg. The car with the highest mileage is the Honda Insight (a hybrid), which reached 51 mpg in *Consumer Reports'* tests. The Toyota Echo had the highest mileage for a regular gasoline-powered vehicle, at 38 mpg. The Dodge Durango and the Ford Expedition, both large SUVs, tied for lowest mileage in the sample: they each received 12 mpg during testing.

Below is a chart displaying the breakdown among regions of brand ownership (American, European, and Asian) of the models included in this study.

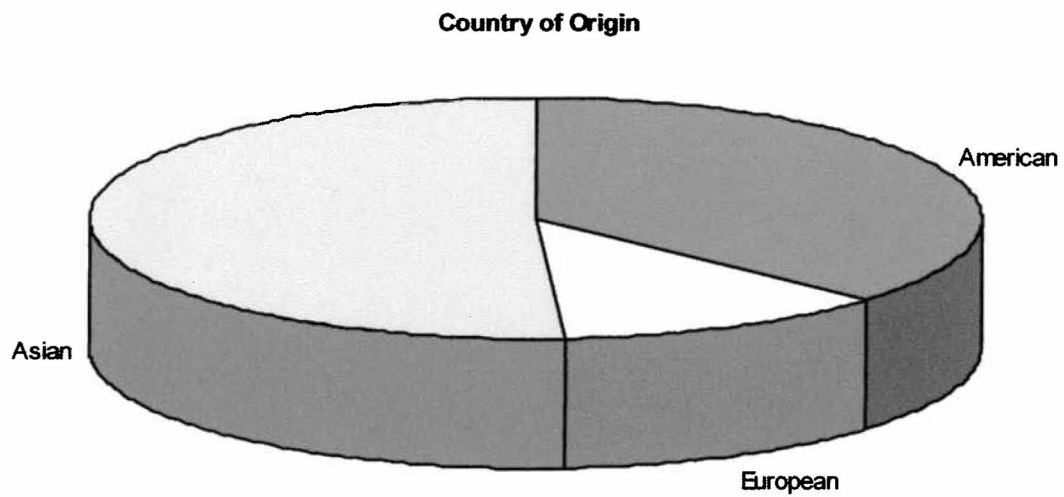


Figure 4.1

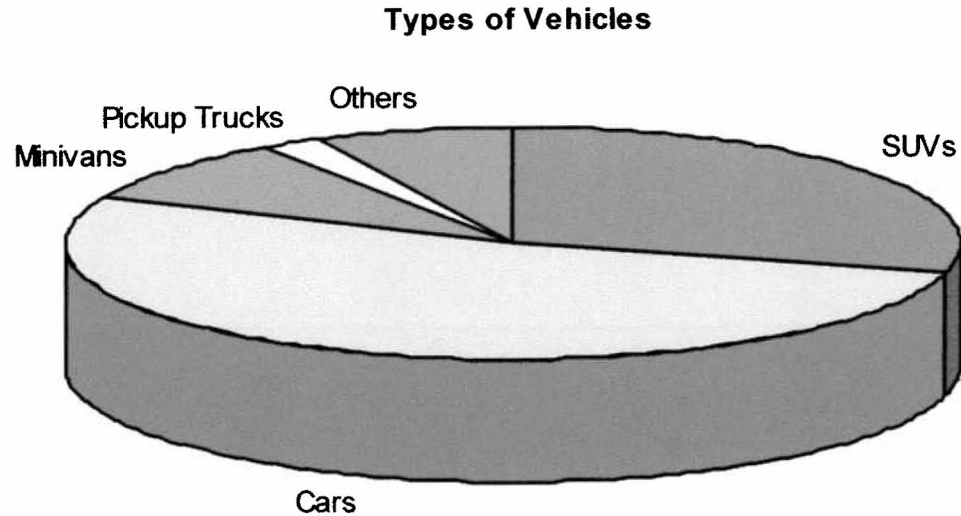


Figure 4.2

This pie chart shows the five categories of cars in the sample: SUVs, cars, pickup trucks, minivans, and others. The car category includes coupes, sedans, and sports cars, while the “others” category includes station wagons and hatchbacks.

The table below shows how many cars from the sample made it onto these three lists: Most Satisfying cars, Least Satisfying cars, and *Consumer Reports’ Top Picks*.

List	No. of cars
Most Satisfying	20
Least Satisfying	6
Top Picks	9

Table 4.1

Method

After creating the regression equation and collecting data, I performed an Ordinary Least Squares (OLS) regression to find the line of best fit. The first regression used the entire sample, using annual sales data, and resulted in no significant variables. After plotting the dependent variable against all of the

independent variables, I realized I had some very distinct outliers. I removed the top five selling models and ran another regression. I gained a few significant variables, but experienced a problem with normality. To address this problem, I removed the next top five sellers, and switched from annual data to quarterly data to increase my sample size, as I would now have four times as many observations.

I once again gained a few significant variables, and after modifying the equation slightly by taking the square root of the dependent variable, was able to fix a slight normality problem. This left me with a heteroskedasticity problem, which I corrected with the White correction, which does not remove the symptoms of heteroskedasticity but does insure that the results of the regression are valid. The following section will describe the results of the final regression.

Results

The following equation displays the value for the intercept and the coefficient for each variable. Below each variable is the t-statistic for that variable at the 95% significance level.

$$\begin{aligned}
 \text{QTLYSALES} = & 262.2935 - 0.4883(\text{PRICE}) + 15.0363(\text{USA}) + \\
 & \quad (9.986) \quad (5.372) \quad (3.099) \\
 & 5.3295(\text{ROADTEST}) - 2.8435(\text{MPG}) - 14.4587(\text{ACCAVOID}) + \\
 & \quad (1.320) \quad (4.936) \quad (4.015) \\
 & 3.4808(\text{RELIABLE}) - 1.8634(\text{OWNERSAT}) - 12.3389(\text{LEASTSAT}) + \\
 & \quad (1.703) \quad (0.487) \quad (0.766) \\
 & 24.9575(\text{MOSTSAT}) + 46.6168(\text{TOPPICK}) + 7.9282(\text{Q1}) + \\
 & \quad (2.843) \quad (4.806) \quad (1.303) \\
 & 15.2963(\text{Q2}) + 12.8516(\text{Q3}) \\
 & \quad (2.363) \quad (1.979)
 \end{aligned}$$

90% significance	95% significance	99% significance	Not significant
ACCAVOID	ACCAVOID	ACCAVOID	LEASTSAT
MOSTSAT	MOSTSAT	MOSTSAT	OWNERSAT
MPG	MPG	MPG	Q1
PRICE	PRICE	PRICE	
Q2	Q2	Q2	
TOPPICK	TOPPICK	TOPPICK	
USA	USA	USA	
Q3	Q3		
RELIABLE	RELIABLE		
ROADTEST			

Table 4.2

This chart displays the variables which lose significance as the significance level rises as well as the variables which are not significant at any level. At a 99% significance level, accident avoidance is the only significant variable that comes from *Consumer Reports* ratings. “Most Satisfying” and “Top Picks” come from *Consumer Reports’* lists and are also significant. However, it is not until the 90% significance level that two other important *Consumer Reports* ratings, the reliability rating and road test score, become significant.

This equation estimation has an adjusted R-squared of 23.24%, which is acceptable. The Durbin-Watson statistic is 1.873; this is very close to 2, so there is no evidence that first order auto-correlation exists. The F-statistic for this model is 10.851 with a p-value of 0.000, so I am able to reject the null hypothesis that the regression coefficients are zero.

The normality test produced a Jarque-Bera statistic of 5.947, which is just under 5.99, showing that there is not a problem with normality in this estimation. Finally, the White Heteroskedasticity Test showed that there is a problem with heteroskedasticity. I fixed this with the White correction, and although the symptoms still exist (high Obs R-squared value), I know that my model is valid.

Conclusion

This chapter described the variables and the sample used to create the regression equation. Next, the chapter covered the method used to arrive at the above results. In the next chapter I will provide statistical analysis of the impact of *Consumer Reports'* annual auto ratings on US car sales.

CHAPTER 5

SUMMARY AND CONCLUSIONS

Before discussing the results, it will be helpful to review what has been accomplished so far. First, the research question was proposed: What effect do the ratings in *Consumer Reports'* Annual Auto issues have on the sales of cars and light trucks? This question is important due to the fact that purchasing a car is one of the largest financial decisions most households make. It is also important due to the increasing popularity of online review services.

The second chapter explored the body of literature related to the topic at hand. This included a review of the five steps of consumer decision making theory: (1) need/problem recognition, (2) information search, (3) evaluation of alternatives, (4) purchase, and (5) postpurchase behavior. The second step, information search, was examined more closely, since reading *Consumer Reports* falls into that step. Finally, the limited body of research looking at the effect of product reviews on purchase intention was discussed. The limited amount of literature available on this topic confirmed the importance of my research question.

The third chapter reviewed the history and background of consumer organizations, online product reviews and the *Consumer Reports* Auto Test

Division. Some consumer organizations function as advocates for consumer rights, while others focus on product testing and reviewing; Consumers Union, which publishes *Consumer Reports*, takes on both tasks. Next, the chapter looked at a few other product review services, such as J.D. Power & Associates, Edmunds.com, and CNET.com. Finally, the chapter reviewed the history of the *Consumer Reports* Auto Division and discussed its testing and ratings methods.

The fourth chapter described the variables and the sample dataset used to study the research question. Predictions were also made for each variable based on how I expected them to affect car sales. Next, the chapter described the method used to analyze the data. Finally, the chapter presented the results.

Although the fourth chapter presented the results, it did not interpret the meaning of those results. This chapter will interpret the results and discuss whether (and why) they agree with my predictions in the fourth chapter. The chapter will also explore what these results mean for the auto industry. Finally, I will propose areas for further research based on what I learned from the current research question.

Interpretation of the Coefficients

To determine the nature of the connection between *Consumer Reports* auto ratings and a model's sales, I will interpret the coefficient for each variable and discuss what this means in regards to my research question.

The coefficient for price is negative, which means that an increase in price will cause a model's quarterly sales to fall. This relationship makes sense; as the

price of a model increases, fewer people are able to afford to purchase that model and will look for a less expensive alternative.

The coefficient for the variable USA is positive, which means that a model's quarterly sales are higher if the model is American. I predicted that being an American model would negatively affect sales, considering the negative attitude many tend to have towards American cars. It seems that the populations I have been exposed to are not representative of the American population as a whole; *Consumer Reports* is considered by many to be biased towards Japanese cars, especially Toyotas, and *Consumer Reports'* readers tend to think similarly. I also grew up in Hawai'i, where a large percentage of the population is of Asian descent and Asian cars are therefore much more popular than American cars. In the end, the results for this variable seem to make sense. Although American companies have been losing market share to Japanese carmakers since the 1970s, General Motors still has the highest market share in the industry, with Toyota in second place followed by Chrysler and Ford in third and fourth place, respectively.¹

The road test variable has a positive coefficient; it is not significant at any confidence level higher than 90% but is an important rating in *Consumer Reports* Annual April Auto issue so I will discuss it here. An increase in a model's road test score (on the 1-5 scale used in this thesis) translates into an increase in quarterly sales. This relationship was expected, since a car that receives a

¹ Nick Bunkley, "Detroit Slips in January as Market Share Declines," *New York Times*, February 2 2007 sec. Autos, www.nytimes.com,

higher road test score is more desirable than a car with a low road test score that may be frustrating or uncomfortable to drive.

The variable for fuel mileage, MPG, has a negative coefficient. This means that an increase in mileage is accompanied by a decrease in quarterly sales. This result is surprising since good fuel mileage has become an important characteristic to many car buyers as fuel prices have gone up the past few years. However, the popularity of trucks and SUVs, which get relatively poor mileage, may account for this unexpected result. Mileage might also be linked to price, since hybrids get better mileage but cost significantly more than cars with regular gasoline engines; we have already seen that price has a negative effect on sales. However, this theory is not supported by the data; when mileage is plotted against price a negative trend becomes apparent.

The coefficient for the accident avoidance variable is negative; an increase in a model's accident avoidance score results in a decrease in quarterly sales for that model. This is contrary to my prediction that safety positively affects sales. This unexpected result might also be explained by a connection between safety and price or the popularity of trucks and SUVs. When accident avoidance scores are plotted against price, there is a weak positive trend to support the theory that there is a connection between safety and price. Another possible explanation is that SUVs and trucks are very popular, although they are not known to be very agile vehicles compared to smaller cars.

The reliability variable has a positive coefficient; this means an increase in reliability is followed by an increase in quarterly sales. I expected to find a

positive relationship between reliability and sales, since most shoppers want to avoid buying a car that will constantly be in the shop. However, the prevalence of sports cars with average or worse than average reliability ratings on the list of most satisfying cars shows that the importance of reliability to car shoppers may be overestimated by *Consumer Reports*. Many people choose a car because it is fun to drive or is fashionable, regardless of its reliability rating.

The coefficient for the most satisfying variable is high and positive; a car on the most satisfying list in *Consumer Reports* has increased quarterly sales. This result makes sense, since the cars on this list are cars that make people happy, and thus are cars that seem attractive to shoppers.

Similarly, the coefficient for the top pick variable is also high and positive. Cars on the "Top Picks" list must score well in all categories, and therefore it is expected that these will be popular cars with shoppers. Cars on this list also stand out to *Consumer Reports* readers, since it is a two-page spread with big pictures of each car.

The owner satisfaction and least satisfying variables did not prove to be significant at any level.

Overall, it appears that the auto industry should pay attention to *Consumer Reports* auto ratings. Over 5 million Americans subscribe to *Consumer Reports* and *Consumer Reports Online*, and these Americans pride themselves on being informed consumers. My experience as an informed consumer has taught me that informed consumers are much harder to please than the average consumer. Informed consumers want a certain set of features for a certain price, and they

will shop around to find a bargain. Retailers that cannot meet their demands will lose these customers.

The same is true for informed car shoppers. An informed shopper knows that he wants one of two or three models with a set of features that meets his needs, and he knows what the dealer paid for the car and what he should pay for the car. As online research becomes easier and more popular as more Americans get access to the Internet, dealerships and manufacturers will find themselves facing more and more informed car shoppers. Car manufacturers that are able to pay attention to what the auto reviewers are saying and what American consumers are saying about different brands and models, and are able to act on that feedback, will survive and grow. Manufacturers that ignore feedback or are unable to act on it will suffer. Long gone are the days when Detroit manufacturers told Americans what a car should be like.

Areas for Further Research

The current research question attempts to address a lack of research on product reviews. Product reviews, especially online product reviews, have become a very important topic as the online community has grown. This thesis only looked at one product review service; research into other services, particularly online review services, is needed to learn of the impact of these services on purchase intentions and brand reputations. Online information search should also be studied; online information search does not just include online review services, but also visits to manufacturer and retailer websites, visits

to forums and blogs, and online communication. Study in this area could help manufacturers and retailers design their websites in the best way possible.

The criticism of *Consumer Reports* auto ratings brings up another potential area of research: a formal study of the validity of *Consumer Reports'* results and study of the problems cited with *Consumer Reports'* rating and testing methods. I am not proposing this topic as a way of shutting down *Consumer Reports* – I believe that Consumers Union provides a very valuable service through the print and online editions of the magazine. However, it is necessary for Consumers Union to take criticism seriously and perhaps reevaluate its methods in order to provide the highest quality product possible.

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