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# Warranty and Price as Quality Signals: The effect of Signal Consistency and Unexpectedness on Product Perception

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**WARRANTY AND PRICE AS QUALITY SIGNALS: THE EFFECT OF  
SIGNAL CONSISTENCY AND UNEXPECTEDNESS ON PRODUCT  
PERCEPTION**

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May 2011

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## **ABSTRACT**

### **WARRANTY AND PRICE AS QUALITY SIGNALS: THE EFFECT OF SIGNAL CONSISTENCY AND UNEXPECTEDNESS ON PRODUCT PERCEPTION**

Sultan Alaswad Alenazi  
Old Dominion University, 2011  
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This dissertation investigates the effect of signal consistency/inconsistency and signal unexpectedness on a consumer's evaluation of a product. It consists of two studies. Study One examines the effect of signal consistency/inconsistency on product quality, where consistent signals are those of the same valence. Prior research has found that a positive cue not only was unable to improve product quality perception, but also had a negative effect on perceived quality when a positive cue was combined with a negative one. The results of Study One indicate that when signals are inconsistent, consumers engage in an attribution process to explain inconsistency. If consumers attribute inconsistency to persuasive motive, then perception of quality decreases. If no persuasive motive is perceived, then consumers tend to discount inconsistent signals and perceived product quality is not affected by those signals. Study One contributes to the literature in three ways. First, the study adds to our knowledge of multiple signals as it increases our understanding of the interaction among extrinsic cues, which is an under-researched area (Purohit and Srivastava 2001). Second, current literature provides adequate explanations of the disappearance of signals' effects on product quality perception; however, no explanation is available for the negative effect of signals on product quality perception, an effect documented by Boulding and Kirmani (1993). This study offers such explanation. Third, the study provides the first empirical examination of the effect of

extrinsic cues on the use of persuasion knowledge. Study Two examines the effect of signal unexpectedness on perceived quality. In current literature, credibility is assumed to be based only on the existence of a bond of some kind (Boulding and Kirmani 1993). Using a reputable firm or manipulating a firm's reputation was assumed by previous research to be the primary way to obtain signal credibility (Boulding and Kirmani 1993; Price and Dawar 2002; Agarwal and Teas 2001; Miyazaki, Grewal, and Goodstein 2005). Current findings, therefore, cannot be generalized to new firms that have not established a reputation of any kind. To overcome the problem of basing signals' credibility solely on a firm's reputation, Study Two examines the effect of some signals on the credibility and effectiveness of other signals. The results of Study Two indicate that when faced with a diagnostic cue with ambiguous credibility, consumers use other cues to reach a conclusion about diagnostic cue credibility. When the diagnostic cue is determined to be credible, consumers use that cue when evaluating the product. When the diagnostic cue is determined to not be credible, consumers do not use that cue in evaluating the product. Study Two contributes to the literature in two ways. First, the study provides the first empirical examination of the effect of warranty on perceived quality when warranty is unexpectedly long. Second, this study adds to the literature by building credibility, using signals other than the firm's reputation.

I dedicate this dissertation to my parents as well as my brothers, Fahad and Rasheed.

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## CHAPTER1: INTRODUCTION

Perceived product quality is one of the most important factors for consumers and marketers (Mitra, 2006). For marketers, perceived quality is a key factor in the success of any business (Forker, Vickery, and Droge, 1996). For consumers, perceived quality is a very important factor in their decision to buy different products and services (Völckner, 2004). However, product quality evaluation is not always an easy task.

This dissertation focuses on effect of signal consistency and unexpectedness on product quality evaluation of consumers. Consumers encounter the task of product quality evaluation in various ways. According to Nelson (1970, 1974), products are classified into search and experience products. Search products are products that can be evaluated before they are used. Experience products are products that cannot be evaluated unless they are used by consumers. A third class of products, suggested by Darby and Karni (1973), is credence products, which cannot be fully evaluated even after they are experienced. While all three categories of products play a significant role in consumer choice, experience products are the focus of this dissertation.

When product quality is difficult to evaluate, consumers tend to depend on certain cues to arrive at a satisfactory judgment. According to Olson (1972), product cues can be classified as intrinsic or extrinsic cues. Intrinsic cues are the physical characteristics of a product. Extrinsic cues are not part of the physical product but include elements such as price, warranty, brand name, reputation, and country of origin (Zeithmal, 1988). When consumers evaluate a product's quality, they might use intrinsic cues, extrinsic cues, or a combination of both. Research evaluating the effects of these cues on product evaluation

offers some interesting indications of consumer behavior (Rao and Monroe, 1988, Zeithaml, 1988)

Along these lines, Zeithaml (1988) found that intrinsic cues were more important if they had high predictive value, product quality was easy to evaluate, or individuals had the ability to effectively process the intrinsic cues. Conversely, extrinsic cues were more important if intrinsic cues had low predictive value, product quality was difficult to evaluate, or individuals did not have the ability to process the intrinsic cues (Zeithaml, 1988)

Additional research by Rao and Monroe (1988) examined the moderating role of consumers' product familiarity on the use of extrinsic and intrinsic cues in evaluating product quality. These researchers found the use of intrinsic cues tended to increase as familiarity increased. In addition, consumers with high or low familiarity were found to perceive a stronger relationship between price and quality than consumers with moderate familiarity. This positive effect of product familiarity on the use of intrinsic cues was also supported by other researchers (Alba and Hutchinson, 1987, Agrawal, Richardson, and Grimm, 1996)

Coupled with the research on intrinsic and extrinsic cues is the notion of product signals. Signaling Theory is commonly utilized to explain and study product signals. The basic idea behind signaling is the cost associated with sending false signals (Clark, Cornwell, and Pruitt, 2002). Of concern is that earlier studies examined the effect of a single signal on quality perception, i.e., price only or brand only (McConnell, 1968). This method has not provided an accurate assessment since, realistically, many signals may affect a single product. Additionally, the recent studies that have examined the effect of

multiple signals on perceived quality have received little attention (Price and Dawar, 2002, Agarwal and Teas, 2001)

### **GAP ADDRESSED IN STUDY ONE**

In Current literature, the effect of signal inconsistency on consumers' perception of product quality is not fully explained Boulding and Kirmani (1993) were the first researchers to notice the effect of signal inconsistency on perceived quality They found improving warranty, while warrantor had below average reputation, not only failed to have positive effect on perceived quality, but also had negative effect on perceived quality Miyazaki, Grewal, and Goodstein (2005) used consistency theory to explain the effect of improved warranty on perceived quality when reputation is below average They found that below average reputation was a negative signal that dominated product evaluation Thus, positive warranty had no effect on perceived quality when warrantor reputation was below average Miyazaki, Grewal, and Goodstein (2005) have adequately explained the failure of better warranty to improve perceived quality However, they have offered no explanation of the negative effect of positive warranty on perceived quality

### **STUDY ONE OBJECTIVES**

In order to explain how positive signals might have negative effect on perceived quality, study one examines the effect of signal consistency/inconsistency on product quality, where consistent signals are those of the same valence For example, a high price is consistent with a good country of origin or a reputed brand name (Brucls et al 2000, Chao, 1989) However, a long warranty is inconsistent with a brand name that has a low quality reputation When information pieces are inconsistent, negative information is expected to have more weight (Anderson, 1965) This increased weight of negative

information is well documented in consumers' perception of quality research (Ahluwalia, 2002; Campbell and Goodstein, 2001). However, decreased perceived quality as a result of improved warranty is not explained.

Study one proposes that the attribution process in which consumers engage when faced with inconsistent signals might explain the negative effect of signals on quality perception. In addition, persuasion knowledge, which consumers might use when they encounter a persuasion attempt, is utilized in this study to explore consumers' reaction to inconsistent signals. Therefore, the basic premise of study one is as follows: When consumers encounter consistent signals, they will tend to accept the signals and utilize all of them to make an evaluation of the product. Thus, all negative signals will lead to low quality perception and all positive signals will lead to high quality perception (Grewal, Krishnan, and Borin, 1998). When consumers encounter inconsistent signals, they will be suspicious because inconsistent signals violate consumers' expectations. This suspicion will lead them to engage in an attribution process. Persuasion knowledge (Friestad and Wright, 1994) will be used for this attribution process. If consumers attribute inconsistency to persuasive motive, perception of quality will decrease. If no persuasive motive is perceived, consumers will tend to discount inconsistent signals and perceived product quality will not be affected by those signals.

## **GAP ADDRESSED IN STUDY TWO**

Signal credibility is essential for signal effectiveness. In recent literature, credibility is assumed to be based only on the existence of a bond of some kind (Boulding and Kirmani, 1993). Using a reputable firm or manipulating a firm's reputation was assumed by previous research to be the primary way to obtain signal credibility

(Boulding and Kirmani, 1993, Price and Dawar, 2002, Agarwal and Teas, 2001, Miyazaki, Grewal, and Goodstein, 2005) Current findings, therefore, cannot be generalized to new firms that have not established a reputation of any kind. In addition, consumers' response to the different signals of firms, about which consumers have no knowledge, cannot be explored using signaling theory. These two examples highlight the limitation of basing credibility solely on a firm's reputation. Purohit and Srivastava (2001) classified signals into high and low scopes. While high scope signals are those signals that require a long period of time to change, low scope signals are those signals that do not require a long period of time to change. Although current research has adequate explanation of multiple cues' interaction when cues are of different scopes, no explanation is available for multiple cues' interaction when cues are of same scopes.

## **STUDY TWO OBJECTIVES**

To overcome the problem of basing signals credibility solely on a firm's reputation, study two examines the effect of one signal's characteristics on the credibility of other signals. Specifically, study two examines the effect of some signals on the credibility and effectiveness of other signals. Cue utilization theory (Richardson, 1994, Cox, 1967, Olson 1972) will be used to provide the theoretical background for the current study.

Study two will extend cue utilization theory by exploring the effect of cues on the credibility of other cues. When faced with a diagnostic cue with ambiguous credibility, consumers might use other cues to reach a conclusion about diagnostic cue credibility. If the cue is determined to be credible, the diagnostic cue will be used in evaluating the

product. If the cue is determined not to be credible, the cue will not be used in product evaluation.

The dissertation is divided into five chapters. The second chapter reviews relevant literature. Chapter three is devoted to study one, which examines the effect of consistency/inconsistency of signals on product evaluation. Chapter four is devoted to study two, which examines the effect of unexpected signals on product evaluation and chapter five presents conclusion.



## **CAPTER 2: LITERATURE REVIEW**

Multiple signal studies have used two theories in examining the effect of different cues on perceived quality; signaling theory and cue utilization theories. This chapter provides a brief review of signaling theory and cue utilization theory along with a review of multiple signal studies, which utilize these theories.

### **SIGNALING THEORY**

Signaling theory relates to the information asymmetry between two parties of a transaction (Spence, 1973). When one party has less information than the other party, they may use the information provided regarding one aspect of a transaction to infer information about another aspect of the transaction (Kirmani & Rao, 2000). Since the well-informed party knows about such inference, this party will provide easy-to-process information in order to signal information that is more difficult to process. One example of using such signaling is using price to provide information about another aspect of an offer, such as when price information is used to signal product quality.

The effectiveness of the signal on consumers' perception depends on the cost associated with sending false signals (Clark, Cornwell, and Pruitt, 2002). When false signals are too costly, not sending a signal becomes more beneficial (Boulding and Kirmani, 1993). Studies that use signaling theory in examining the effect of extrinsic cues on perceived quality are reviewed next. Those studies are classified into price studies and warranty studies.

#### **Price Studies**

Earlier price studies have focused on the relationship between price and perceived quality. Price has been found to positively affect perceived quality. Since Levitt (1954)

indicated the relationship between price and perceived quality, numerous studies have documented this effect (Gabor and Granger, 1966; Dodds and Monroe, 1985; Zeithmal, 1988; Rao and Monroe, 1989). Specifically, Leavitt (1954) found that higher priced products lead consumers to choose a product over a lower priced product when price was the only information about the product and products were heterogeneous in quality. A similar result reported by Tull, Boring, and Gonsior (1964) using a different set of products. These researchers examined consumers' selection between high and low priced products for a set of products that were similar in quality and a set of products that were different in quality. The findings indicated that consumers tended to choose the higher priced products especially when products were heterogeneous in quality (Tull, Boring, & Gonsior, 1964).

McConnell (1968) obtained similar results in an experiment utilizing beer as a product. When price was the only cue available to consumers, this researcher found subjects rated the highest priced beer to be of the highest quality. Additionally, Lambert (1972) investigated the difference between consumers who chose high priced products and those who chose low priced products. It was found that high priced buyers had more confidence in price as an indicator of quality. In addition, they perceived different priced products to be heterogonous in quality.

While many researchers have found price to be a significant predictor of quality, not all researchers agree. Gerstner (1985) has argued that the relationship between price and perceived quality is weak and other researchers have found no significant relationship between price and perceived quality (Szybillo and Jacoby, 1974).

More recent studies have focused on the effect of price on quality in settings where price is one of multiple signals of quality. Other signals include warranties (Boulding and Kirmani, 1993, Price and Dawar, 2002), advertising (Kirmani, 1997) brand name (Erdem and Swait, 1998), and country of origin (Thorelli, Lim, and Ye, 1988, Chao, 1993, Teas and Agarwal, 2000, Pecotich and Ward, 2007)

Multiple signals studies can be classified into two groups. The first group focused on how other available cues might affect the price-perceived quality relationship (Dodds and Monroe, 1985, Rao and Monroe, 1988, Alpert, Wilson, and Elliott, 1993). The second group of studies focused on how price and other extrinsic cues might affect perceived quality as well as perceived value (Dodds, Monroe, and Grewal, 1991, Teas and Agarwal, 2000, Agarwal and Teas, 2001, Chen, Chang, and Chang, 2005,

In terms of the effect of other extrinsic cues on price perceived quality relationship, findings are mixed. Some researchers found price to have more positive effect on perceived quality when other information such as brand name was provided (Dodds and Monroe, 1985, Alpert, Wilson, and Elliott, 1993). In contrast, other researchers found price to have less effect on perceived quality when other information is available (Rao and Monroe, 1988)

Second group of price studies examined the effect of price and other extrinsic cues on perceived quality as well as perceived value. Understanding the importance of these factors on consumer perception of quality, Dodds, Monroe, and Grewal (1991) developed a model in which they examined the effect of price, brand name, and store name on perceived quality, perceived value, and willingness to buy. They found price positively affected perceived quality and negatively affected perceived value and

willingness to buy. The study also found a price effect on quality, value, and willingness to buy to remain only when brand name was absent. Additional findings suggest that the effect of price on perceived quality is highest when price was the only available information. Brand name effect, however, was higher when other cues were available.

Teas and Agarwal (2000) expanded Dodds, Monroe, and Grewal (1991) model by testing the mediating effect of perceived quality and perceived sacrifices on the relationship between extrinsic cues and perceived value. They also added country of origin as another cue. They found price to positively affect perceived quality and perceived sacrifices. Brand name was found to positively affect perceived quality when the store name level was low. When the store name level was high, the brand name effect on perceived quality was insignificant. The findings also indicated that store name positively affected perceived quality when brand name was low. When the brand name level was high, the effect of store name on perceived quality was insignificant. In addition, country of origin had a positive main effect on perceived quality. This study provided support for the mediating effect of perceived quality and perceived sacrifice on the relationship between extrinsic cues and perceived value.

Adding to these factors, Chen, Chang, and Chang (2005) examined the effect of price and brand name on service quality, perceived risk, and consumer value in the Taiwanese banking sector. These researchers found price and brand name to positively affect perception of service quality. In addition, they found price to increase value through decreasing perceived risk, while brand increased consumer perception of value through increased perceived quality.

Second group of signaling theory studies investigated the effects of warranty on perceived quality. These studies are reviewed next.

### **Warranty Studies**

Warranty effect on product perception can be direct or indirect. A direct effect takes the form of improved perceived quality, while an indirect effect takes the form of reduced risk (Erevelles, Roy, and Yip, 2001).

Indirect effect of warranty as a risk reducer constituted an important stream of warranty research. In this stream of research, warranty has been investigated as a way of reducing perceived risk as it provides a consumer with insurance against problems that might cause a product to fail to perform as promised. For example, Shimp and Bearden (1982) examined how a warranty might affect perceived risk of buying a new product. They found warranties to decrease perceived financial risk; however, performance was not significantly affected by warranties. Moreover, price was not found to significantly affect risk. Another important finding was the inability of a warranty to reduce risk when a manufacturer was not perceived to be reputable.

A similar finding was reported by Lwin and Williams (2006) in their study of the effect of a warranty on perceived risk, perceived quality, and purchase intentions for online retailers. These researchers found warranty to work well in decreasing perceived risk and increasing perceived quality and purchase intention when retailer reputation was strong. However, when retailer reputation was weak, warranty did not have such an effect. In addition, the study found that the brand name's effect on perceived risk remained regardless of warranty.

The second stream of warranty research has focused on the direct effect of warranty as an extrinsic cue of quality. In a study of durable products and automobiles, Wiener (1985) examined the accuracy of warranties in terms of their ability to signal reliability. Warranty was rated by the majority of consumers as an accurate signal of reliability. Agrawal, Richardson, and Grimm (1996) examined the relationship between warranty and durable products reliability as found in Consumer Reports. The study found only a weak positive relationship between the two constructs. The relationship was also found to increase as consumer knowledge, measured by market penetration, increased. In addition, reliability warranty relationship was stronger for products in a later stage of product life cycle and in a product category that was characterized by high variation in reliability.

Thorelli, Lim, and Ye (1988) examined the effect of country of origin, warranty, and retail store image on perceived quality, attitude toward the product, and purchase intention. They found that country of origin and warranty positively affected perceived quality, attitude toward the product, and purchase intention. Findings also suggested that store image and warranty information had more impact on perceived quality than country of origin. This finding suggested that consumers were indifferent as to where a product is produced. In response to this idea, Tan and Leong (1999) studied how warranty could improve perceived quality of products manufactured in countries with less reputation than the designing country (hybrid products). The study found that better warranties positively affected perceived quality of hybrid products and negatively affected perceived risk. However, the study did not find a significant interaction effect between warranty quality and warrantor reputation.

The second theory utilized by multiple signals studies is cue utilization theory. A brief review of cue utilization theory is given below.

### **CUE UTILIZATION THEORY**

According to Cox (1967), “products consist of an array of cues that serve as surrogate indicators of quality.” The use of different cues of product quality is based on their predictive value and confidence value (Richardson, Dick and Jain, 1994). Predictive value is a cue’s ability to indicate product quality. Confidence refers to how certain consumers are able to accurately judge the cue.

Studies using cue utilization theory in the examination of the effect of different cues on perceived quality can be divided into two categories, 1) studies that compare consumers’ tendency to use intrinsic or extrinsic cues and 2) studies that examine the effect of different factors on consumers tendency to utilize intrinsic and extrinsic cues when they evaluate different products.

#### **Intrinsic and extrinsic cue comparison studies**

The first stream of research that uses cue utilization theory has compared intrinsic cues and extrinsic cues in evaluating product quality. For example, Szybillo and Jacoby (1974) examined Olson’s proposition of the greater effectiveness of intrinsic cues compared to extrinsic cues in product evaluation. Specifically, these researchers examined the effect of price, store image, and hosiery product samples on product quality perception. These researchers found that 73% of the variance in product quality perception was due to intrinsic cue, supporting the importance of this category of cues.

Sullivan and Burger (1987) examined both intrinsic and extrinsic cues in evaluating product quality. They found predictive value and confidence value interacted and affected perception of product quality for both types of cues.

Richardson, Dick, and Jain (1994) used cue utilization theory to compare the importance of intrinsic and extrinsic cues of national and grocery store brands. The findings indicated that extrinsic cues, such as brand name, were more important than intrinsic cues, such as ingredients in the case of grocery products. The authors argued that extrinsic cues result in higher confidence values, while intrinsic cues result in higher predictive values. Consumers preferred a cue with high confidence value even if it had lower predictive value to a cue high in predictive value, but low in confidence value.

#### **Factors affecting utilization of intrinsic and extrinsic cues**

The second stream of research that uses cue utilization theory has examined the effect of different factors on consumers' tendency to utilize intrinsic and extrinsic cues when they evaluate different products. Of most interest among researchers has been product familiarity, prior product knowledge, enduring involvement, price-quality schemas, country of origin, and brand name (Rao & Monroe, 1988; Rao & Sieben, 1992; Lee & Lou, 1996; Cordell, 1997). Findings tended to parallel other studies investigating the role of intrinsic and extrinsic cues on product quality.

Etgar and Malhotra (1981) examined the effect of price on product quality when other cues were available. Specifically, these researchers found price to be more important when consumers evaluated sneakers according to their durability than according to their style.



A similar finding was reported by Brucks, Zeithaml, and Naylor (2000) in their study of product type effects on the use of intrinsic and extrinsic cues. They examined use of price and brand name in consumers' evaluation of different aspects of durable products. Price and brand name were found to be more important when prestige was the evaluated aspect than any other aspect or cue.

Rao and Monroe (1988) used a cue utilization framework to examine the effect of price and intrinsic cues on perceived quality in consumers with different familiarity levels. They found consumers with high familiarity and consumers with low familiarity levels tended to depend more on price to evaluate product quality than consumers with a moderate level of familiarity. However, consumers with high familiarity tended to use price only when there was an association between price and quality, which is to say, where price has a high diagnosticity. Low familiarity consumers tended to use price to evaluate product quality regardless of price diagnosticity.

A similar finding was reported by Rao and Sieben (1992) in their investigation on the effect of prior product knowledge on price acceptability and reliance on extrinsic and intrinsic cues. They found prior knowledge decreased consumers' reliance on extrinsic cues at the beginning of product assessment and then increased reliance on those cues after continued assessment. No such effect was found on reliance on intrinsic cues.

Expanding on product familiarity research, Lee and Lou (1996) examined the effect of enduring involvement, product familiarity, and price-quality schemas on consumers' use of extrinsic cues in evaluating products. The findings indicated that product familiarity increased the use of brand name and country of origin when evaluating products. Additionally, enduring involvement increased the use of brand name

and price to evaluate products and price-quality schemas were found to be positively correlated with reliance on price to evaluate products. Obtaining similar results, Cordell (1997) found previous knowledge to be an important factor in utilizing different extrinsic cues. In this investigation, consumers with a high level of product knowledge utilized brand name more than consumers with a low level of product knowledge. Low knowledge consumers, however, utilized store name more than high knowledge consumers did. Additionally, Pecotich and Ward (2007) examined the effect of country of origin, brand name, and intrinsic cues on consumers with different levels of expertise in the evaluation of products. These researchers found novice consumers to utilize mostly country of origin to evaluate a product regardless of brand name and intrinsic cues. Experts were found to use country of origin to a lesser extent and only when it was consistent with brand name and intrinsic cues.

### **Chapter 3: Study One - The Effect of Signal Consistency/Inconsistency on Product Perception**

Imagine that you were looking for a DVD player and found one whose brand name is unknown to you. Its price is high, but it comes with a short warranty. You also found another player whose brand also is unknown to you. Its price is low, but it comes with a long warranty. Your concern was about the quality of the DVD player. Which one of the two DVD players would you consider to have better quality? This study addresses this question by examining how consistency and inconsistency of quality signals might affect perceived quality.

When consumers evaluate a product's quality, they might use intrinsic cues, extrinsic cues, or a combination of both (Zeithmal, 1988). One way to explain and study extrinsic cues effect on perceived quality is through signaling theory.

Signaling theory has been used extensively in consumer behavior literature to gain a better understanding of the effect of external cues (price, warranty, brand name, reputation, and country of origin) on perceived product quality. Earlier studies mainly have examined single signals' effect on quality perception. More recent studies have examined the effect of multiple signals on perceived quality (Price and Dawar, 2002; Agarwal and Teas, 2001). Although different signals have been studied together, the interaction effects of these signals have received less attention.

This study, therefore, aims to fill this gap by examining the effect of signals consistency/inconsistency on product quality. This study will deepen our understanding

of how extrinsic cues might interact and how such interaction might affect perceived quality

### **THEORETICAL BACKGROUND**

Consistent and inconsistent signals have been studied to some extent in current literature (Boulding and Kirmani, 1993, Miyazaki, Grewal, and Goodstein, 2005) Consistent signals are those of the same valence For example, high price is consistent with a good country of origin However, a long warranty is inconsistent with a brand name that has a low quality reputation When information pieces are inconsistent, negative information is expected to have more weight (Anderson, 1965) This increased weight of negative information is well documented in consumers' perception of quality research (Ahluwalia, 2002, Campbell and Goodstein, 2001) For example, Boulding and Kirmani (1993) found that a warranty of good quality positively affected perceived quality only when the firm offering the warranty had a good reputation When a firm's reputation was below average, the warranty not only had no positive effect on perceived quality, but it had negative effect on perceived quality

Miyazaki, Grewal, and Goodstein (2005) offered an explanation based on consistency theory They argued that inconsistency of signals leads to the dominance of negative signals in evaluating the product However, their important finding explained only the failure of a better warranty to improve perceived quality when the offering firm did not have a good reputation, as reputation had more weight in evaluation of the product However, a decrease in evaluation as a result of improved warranty cannot be explained by consistency theory

### **Signaling Theory**

As discussed in chapter two, signaling theory relates to the information asymmetry between two parties of a transaction (Spence, 1973). When one party has less information than the other party, they may use the information provided regarding one aspect of a transaction to infer information about another aspect of the transaction (Kirmani & Rao, 2000). The effectiveness of the signal on consumers' perception depends on the cost associated with sending false signals (Clark, Cornwell, and Pruitt, 2002). When false signals are too costly, not sending a signal becomes more beneficial. The other assumption of signaling is that it is used to differentiate one seller from the other. For example, when sending a signal is to convey information about a better deal, only sellers that have the ability to deliver asserted value will send such signals (Boulding and Kirmani, 1993).

### **Attribution Theory**

Attribution theory actually is a set of different theories and frameworks that are related to an individual's tendency to infer a cause for different events (Heider, 1958; Mizerski, 1978). Thus, attribution, in turn, affects subsequent perception, judgment, attitudes, and behavior. More importantly, attribution process affects perception of the behavior agent's credibility. In other words, attribution theory is concerned with how people infer the cause of events and behavior and how that inferred cause might affect individuals' perceptions and behaviors. Causes that underlie behavior usually are more important than the behavior itself (Kelley, 1973). Additionally, attribution can be internal or external. Internal attribution refers to behavior that is perceived to be caused by an individual disposition, while external behavior is attributed to external causes when the

situation factors are perceived to be the cause the individual's behavior (Rumsey, 2006). When an external explanation of a behavior exists, the internal explanation is discounted (Kelley, 1973).

### **Persuasion Knowledge Model**

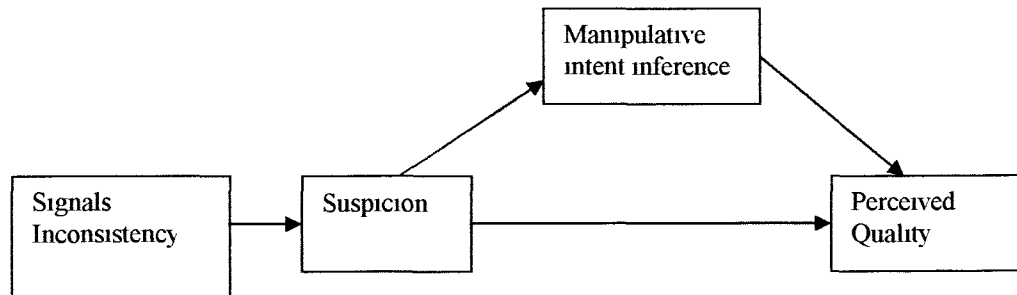
The Persuasion Knowledge Model (PKM) (Friestad and Wright, 1994) has been proposed to explain individuals' behavior and their ability to cope with influence attempts. Persuasion knowledge is a set of implicit theories used by individuals in their perception of the influencer's motive, the appropriateness of the influence technique, and the ways which the individuals might cope with the influence attempt (Campbell and Kirmani, 2000). The basic argument with the PKM is that when individuals are faced with an influence attempt, they tend to access those theories through persuasion knowledge to help them make inferences about the underlying motive of the influencing agent. When there is an ulterior motive that can explain the reasons behind an agent's influence attempt, the influencing agent will be perceived negatively by the influence target. In an important step that advanced the model, Campbell and Kirmani (2000) proposed two moderators of the effect of persuasion knowledge on the perception of the influencing agent. They suggested and empirically supported the moderating effect of the interaction of ulterior motive accessibility and cognitive capacity on the use of persuasion knowledge to perceive the influencing agent. The authors defined accessibility as a state of suspicion that arises as a result of an ulterior motive. Their findings indicated that when an ulterior motive was highly accessible, both cognitively busy and unbusy targets used persuasion knowledge and perceived the influencing agent negatively. When an ulterior motive was not highly accessible, however, only cognitively unbusy targets used

persuasion knowledge and perceived the influencing agent negatively. The authors indicated that this negative perception of an influencing agent includes the perception that an influencing agent is less sincere.

## **HYPOTHESES**

Figure 1 shows the proposed model of the effect of signals' inconsistency on consumers' perception of product quality. The basic premise of this model is as follows: When consumers encounter inconsistent signals, they will be suspicious. This suspicion will lead consumers to engage in an attribution process in order to reach an explanation for inconsistency. In other words, when signals are inconsistent, consumers will have a higher level of suspicion, as inconsistency of signals violates consumers' expectations. For example, a long warranty with a low price or a short warranty with a high price will lead consumers to have a higher level of suspicion. This idea is based on the notion that unexpected behavior leads people to question the motivation of that behavior (Folkes, 1988, Hilton, Fein, and Miller, 1993). The persuasion knowledge, which is accessed when a consumer needs to figure out the reason behind some behavior, will be used for this attribution process. If consumers attribute inconsistency to a manipulative motive, perception of quality will decrease. If no manipulative motive is perceived, consumers will tend to discount inconsistent signals and perceived product quality will not be affected by those signals. Therefore,

H1: High levels of price will lead to an increase in suspicion when warranty is short, while it would lead to decrease in suspicion when warranty is long. In other words, there will be a two-way interaction effect of price and warranty on suspicion.



**Figure 1**

**Effect of Signals' Inconsistency on Consumers' Perception of Product Quality**

Campbell and Kirmani (2000) argued that access of persuasion knowledge is a state of suspicion, which leads to a negative perception of influence agent. In a similar way, we expect increased suspicion, which is similar to access of persuasion knowledge to have negative effect on perceived quality. Therefore,

H2 Suspicion will negatively affect perceived quality

However, suspicion effect on perceived quality is expected to depend on inferred motive. Suspicion will lead consumers to engage in highly sophisticated attributions about the motive of the firm. Fein (1996) determined that suspicion led to sophisticated attribution. In this attribution process, persuasion knowledge was used to come to a conclusion about inconsistency. This was particularly the case when signals were inconsistent, as the interpretation of signals depended on the inferred motive of the firm.



If consumers infer a manipulative intent to be behind inconsistency, the perceived quality will be negatively affected. This argument was supported by Keller et al. (1997), who found that perceived quality was affected negatively when the quality claims were perceived to be a persuasion tactic. Therefore,

H3: Suspicion effect on perceived quality will be mediated by inferred manipulative intent.

## **THE STUDY**

### **Experimental Design**

The study utilized a 2 (price: high vs. low) x 2 (warranty: long vs. short) between subjects design. Data was collected by Issues and Answers Research Agency from their online consumer panel. Two hundred and nine consumers were recruited to participate in the study. Fifty-five percent of participants were female. Thirty-eight percent of participants were between the ages of 18 and 44 years, forty-two percent were between the ages of 45 and 59 years, and twenty percent were over 60.

### **Procedure**

Participants were presented with one of four laptop computer ads with manipulations for price and warranty. The 2X2 study had two levels of price (low:\$389.99, high:1099.99) and two levels of warranty (short: three month limited, long: five-year full) manipulations. Participants then answered dependent variable measures and manipulation check questions.

### **Measures**

Perceived quality was measured using a four-item scale. The first two items were adapted from Dodds, Monroe, and Grewal (1991) and the last two from Purohit and

Srivastava (2001). The items were “This product should be of” (very poor to very high quality), “This product would seem to be durable” (strongly disagree to strongly agree), “My overall impressions of the new Convex computer model is” (very bad to very good), and “Compared to other computers, the quality of the Convex computer is” (much lower than average to much higher than average). Suspicion was measured using a one-item scale adjusted from Kleef, Dreu, and Carsten (2006). The item was “When I read the scenario, I was suspicious” (strongly disagree to strongly agree). Manipulative intent was measured using a one-item scale adjusted from Campbell (1999). The item was, “The firm intends to take advantage of customers” (strongly disagree to strongly agree).

### **Manipulation Checks**

Price manipulation was checked using one item adapted from Miyazak et al. (2005). The item was “Compared to other computers manufacturers, the warranty offered by Convex is” (lower than average to higher than average). Consumer perception of warranty length manipulation was checked using a one-item scale adjusted from Purohit and Srivastava (2001). The item was “Compared to other computers, Convex warranty is” (shorter than average to longer than average).

### **Pretest**

One hundred and twenty-nine undergraduate students enrolled in an introductory marketing course participated in this pretest, which aimed to check price and warranty manipulation. Price manipulation was successful. One-way ANOVA revealed that participants perceived the \$1,099.99 price to be higher than the \$389.99 price (mean for high price=4.76, mean for low price=2.98,  $F_{(1,128)} = 36.06$ ,  $p < 0.001$ ). The warranty length was perceived as intended. Participant perceived the three-month and five-year

warranties to be short and long, respectively (mean 3-month warranty=2.60, mean 5-year warranty=4.78,  $F_{(1,128)}=52.50$ ,  $p<0.001$ )

## Results

### *Manipulation check*

Two-way ANOVA revealed that price and warranty manipulations were successful. Participants in high price condition perceived price to be higher than did participants in low price condition (M high =5.22, M low =3.13,  $F_{(1,205)}=139.50$ ,  $P<0.001$ )

Participants in long warranty condition perceived warranty to be longer than did participants in short warranty condition (M long =5.58, M short =3.46,  $F_{(1,205)}=100.60$ ,  $P<0.001$ )

### *Hypotheses Testing*

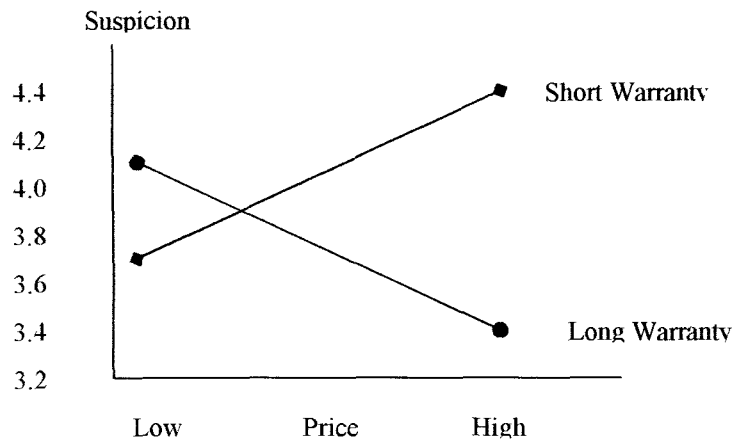
A two-way ANOVA showed that the interaction between price and warranty had significant effect on suspicion ( $F_{(1,205)}=11.18$ ,  $P<0.01$ ). See Table 1 for cell means. As predicted by H1, price increased suspicion when the warranty was short (M high price = 4.43, M low price = 3.69,  $F_{(1,205)}=5.91$ ,  $P<0.05$ ). However, price decreased suspicion when the warranty was long (M high price = 3.37, M low price = 4.46,  $F_{(1,205)}=5.26$ ,  $P<0.05$ ). Interaction analysis result is shown in figure 2.

**Table 1**  
**Study One: Suspicion Cell Means and Standard Deviations**

		Warranty	
		Long	Short
Price	High	3.47 (1.49)	4.43 (1.81)
	Low	4.06 (1.58)	3.69 (1.21)

Note: Standard deviations are in parentheses.

H2 predicted that suspicion will have negative effect on perceived quality. As predicted, a regression of perceived quality on suspicion showed that suspicion had a negative effect on perceived quality (suspicion coefficient =  $-0.259$ ,  $t = -3.85$ )  $P < .001$ ).



**Figure 2**  
**Interaction Effect of Price and Warranty on Suspicion**

To test the hypothesized mediating effect of manipulative intent on the relationship between suspicion and perceived quality, four regression models were run. The first model had perceived quality as the dependent variable and suspicion as the independent variable; the second had perceived quality as the dependent variable and manipulative intent as the independent variable; the third had manipulative intent as the dependent variable and suspicion as the independent variable; and the fourth had perceived quality as the dependent variable and suspicion and manipulative intent as the independent variables. The results of the four regression models suggested that manipulative intent fully mediated the relationship between suspicion and perceived quality. See table 2 for mediation analysis results. The first model showed that suspicion was negatively related to perceived quality ( $b$  suspicion =  $-.167$ ,  $P < .001$ ). The second model showed that manipulative intent was negatively related to perceived quality ( $b$  inferred persuasive motive =  $-.309$ ,  $P < .001$ ). The third model showed that suspicion was

positively related to manipulative intent ( $b_{\text{suspicion}} = .412, P < .001$ ), and the fourth model showed that suspicion effect on perceived quality became insignificant when manipulative intent was added ( $b_{\text{suspicion}} = -.049, P \text{ ns}$ ,  $b_{\text{inferred persuasive motive}} = -.285, P < .001$ , Sobel  $Z = 6.198, P < .0001$ ). Thus, H3 is supported.

**Table 2**  
**Study One: Analysis of Manipulative Intent as a Mediator of Suspicion Effect on Perceived Quality**

Variable	Manipulative			Perceived Quality			Perceived Quality		
	b	t-value	P	b	t-value	P	b	t-value	P
Suspicion	.412	7.22	.0001	.167	3.85	.0001	.049	1.09	.27
Manipulative Intent							.285	5.84	.0001

## DISCUSSION

In this study, we examined the effect of signals' inconsistency on perceived quality. Prior research has found a positive cue not only was unable to improve product quality perception, but also had a negative effect on perceived quality when a positive cue was combined with a negative one. In an attempt to explain such negative effect, we examined the effect of price and warranty inconsistency on consumers' attribution of

inconsistency on perceived quality. Our results indicated that consumers became suspicious when warranty and price were inconsistent. This suspicion led consumers to engage in an attribution process to explain inconsistency. When consumers attributed inconsistency to manipulative intent, perceived product was negatively affected. When consumers did not attribute inconsistency to manipulative intent, perceived product was not affected.

### **THEORETICAL CONTRIBUTION**

Study one contributes to literature in several ways. First, the study adds to our knowledge of multiple signals as it increases our understanding of the interaction among extrinsic cues, which is an under-researched area (Purohit & Srivastava, 2001). Second, current literature provides adequate explanations of the disappearance of signals' effects on product quality perception; however, no explanation is available for the negative effect of signals on product quality perception, an effect documented by Boulding and Kirmani (1993). This study offers such explanation. Third, the study provides the first empirical examination of the effect of extrinsic cues on the use of persuasion knowledge. The results indicate that extrinsic cues' inconsistency leads consumers to use their persuasion knowledge as they become suspicious and seek to find an explanation for inconsistency. This is an important contribution to persuasion knowledge literature, since little is known about the possible effect of extrinsic cues on use of persuasion knowledge.

### **MANAGERIAL IMPLICATIONS**

Our results have important implications for practitioners. First, our results provide managers with a new way to achieve improvement of product quality perception: namely, combining a long warranty with a consistent positive cue such as a high price. For

example, when a longer warranty is offered, price should be increased to keep signals consistent. Second, the results show managers the negative effect of signals' inconsistency on perceived quality; therefore, when a manager cannot improve one signal, he or she might be not willing to improve another signal if this improvement leads to inconsistency, which has negative effects on perceived quality. For example, if the market is very competitive such that signaling product quality through high price is not a good choice, managers should not offer a very long warranty, as that warranty might have the opposite effect on perceived quality.

### **LIMITATIONS AND FUTURE RESEARCH**

Our results should be interpreted with caution as the study has some limitations. First, the study used only one product in examining its prediction. Other products need to be examined in order to generalize the results. Second, this study examined only two extrinsic cues. Future research might examine other extrinsic cues on persuasion knowledge use. Kirmani and Rao (2000) classified signals as sale-independent signals, whose cost is incurred if the product is bought or not, and sale-contingent signals, whose cost is incurred only if the product is bought. Advertising expenditure is an example of the first, while low introductory price is an example of the latter. Examining the effect of inconsistency of sale-independent signals and sale-contingent signals might constitute a promising avenue for future research. Future research also might examine the effect of individual difference on the relationship between signals' inconsistency and perceived quality. According to regulatory focus theory (Crowe & Higgins 1997), promotion focused people are driven by growth and development needs, while prevention focused people are driven by security needs. In persuasion knowledge research, Kirmani and Zhu



(2007) suggested that prevention focused consumers were more reactive to persuasion tactics than promotion focused consumers were because the former were more sensitive to negative information. Future research can examine the effect of consumers' regulatory focus on manipulative intent inference as a result of signals' inconsistency. Another factor that might be examined by future research is prior product knowledge. Prior product knowledge has been found to affect the relationship between signals and perceived quality (Cordell, 1997; Rao and Monroe, 1988; Rao and Sieben, 1992). Future research might examine the moderating role of prior product knowledge on the relationship between signals' inconsistency and the product's perceived quality.

## **CHAPTER 4: STUDY TWO - THE EFFECT OF SIGNALS**

### **UNEXPECTEDNESS ON PRODUCT PERCEPTION**

According to cue utilization theory, a product consists of extrinsic and intrinsic cues. When evaluating a product's quality, consumers use these two types of cues (Olson, 1972). Using each type of cues differs from consumer to consumer and from product to product (Szybillo and Jacoby, 1972; Etgar and Malhotra, 1981; Liefeld et al., 1995; Brady, Bourdeau, and Heskell, 2005).

Studies concerning signaling product quality have focused on either comparing the use of intrinsic and extrinsic cues or on the importance of different extrinsic cues in evaluating product quality (Zeithmal, 1988; Richardson, Dick and Jain, 1994; Mitra, 1995). However, no study has examined how the characteristics of one signal might affect the effectiveness of other signals. The current study aims at filling this void through examining the effect of some signals on the credibility and effectiveness of other signals. Cue utilization theory (Richardson, 1994; Cox, 1967; Olson 1972) will be used to provide the theoretical background for the current study.

This study will extend cue utilization theory by exploring the effect of some cues on the diagnosticity of other cues. When faced with a diagnostic cue that has ambiguous credibility, consumers might use other cues to infer diagnostic cue credibility. If the cue is determined to be credible, the diagnostic cue will be used in evaluating the product. The current study is organized as follows. The first section states the theoretical framework and hypotheses, and the second section discusses the research methodology and results.

## **THEORETICAL FRAMEWORK**

Purohit and Srivastava (2001) classified cues into high scope cues and low scope cues. High scope cues are those that take a relatively long time to build or change. Thus, high scope cues, such as a firm's reputation, are intrinsically credible. This credibility makes high scope cues usable, as they are diagnostic. Low scope cues, on the other hand, are cues that need to be supported by other high scope cues because of the low scope cue's lesser credibility. Examples of low scope cues are price and advertising. Our study extends this cue utilization framework by suggesting an interaction between two cues with different diagnosticity on perceived quality. In current literature, diagnosticity is a necessary result of credibility. However, we argue that credibility does not always imply diagnosticity, so that credible cues may or may not be diagnostic. As an example, a reputed brand of car tires is a credible signal of the quality of tires, but it is not a diagnostic cue of the overall quality of the car.

### **Cue Utilization Theory**

As discussed in chapter two, "products consist of an array of cues that serve as surrogate indicators of quality" (Cox, 1967). The use of different cues of product quality is based on their predictive value and confidence value (Richardson, Dick and Jain, 1994). Predictive value is a cue's ability to indicate product quality. Confidence refers to how certain consumers are able to accurately judge the cue. Cox (1967) found that consumers depended more on high confidence value and low predictive value cues than low confidence value and high predictive value cues. Based on diagnosticity, we classify cues into primary and secondary. We define a primary cue as "a cue that has a high predictive value." Warranty is an example of a primary cue of product quality. On the

other hand, we define a secondary cue as “a cue that has a low predictive value.” A DVD drive brand is a good example of a secondary cue of laptop computer quality.

### **Unexpectedness, Suspicion, and Attribution**

Fein (1996) defines suspicion as “a dynamic state in which the individual actively entertains multiple, plausibly rival hypotheses about the motives or genuineness of a person's behavior.” When people are suspicious they tend not to accept behavior at face value (Fein, 1996). Hilton, Fein, and Miller (1990) compared inferences made by subjects who read about a contextually constrained behavior and subjects who read about possibly ulterior-motivated behavior. Subjects in an ulterior motive condition tended to consider behavior to a lesser extent than subjects in a constrained condition. This result indicated that suspicion makes people not take behavior at face value.

Fein (1996) further examined competing hypotheses concerning the effect of suspicion on individuals' consequent thinking. The first hypothesis suggested that suspicion leads individuals to engage in conservative processing. The second hypothesis, however, suggested that suspicion leads individuals to engage in a sophisticated attribution process. In Fein's (1996) first experiment, all participants read a vignette about a student who wrote an argument supporting a topic. Participants were divided into three groups where Group 1 learned that the student had no choice but to write the supporting argument, Group 2 learned that the student had a free-choice to write a supporting or opposing argument, and Group 3 learned that the student might have an ulterior motive to write a supporting argument. The findings indicated that participants who were suspicious about the possibility of an ulterior motive generated more attribution thoughts than did participants in the other two conditions. Among factors that

might trigger suspicion is unexpected behavior (Berlyne, 1960; Schachter and Singer, 1979; 1962 Folkes, 1988).

## **HYPOTHESES**

When faced with unexpected behavior, people tend to engage in an attribution process to find out the reason behind unexpected behavior (Folkes, 1988; Hiron, Fein, and Miller, 1993). Lau and Russell (1980) examined written attributions after an expected and unexpected win and loss of a sports team. These researchers found no difference between win and loss in terms of triggering explanation attempts. However, unexpected outcomes elicited more explanation attempts and more attribution than did expected outcomes. Furthermore, Pyszczynski and Greenberg (1981) examined the extent of attribution individuals engage in after observing unexpected and expected responses of a confederate to the experimenter's request. They found subjects engaged more in an attribution search after observing an unexpected response of a confederate to the experimenter request compared to when they observed an expected response.

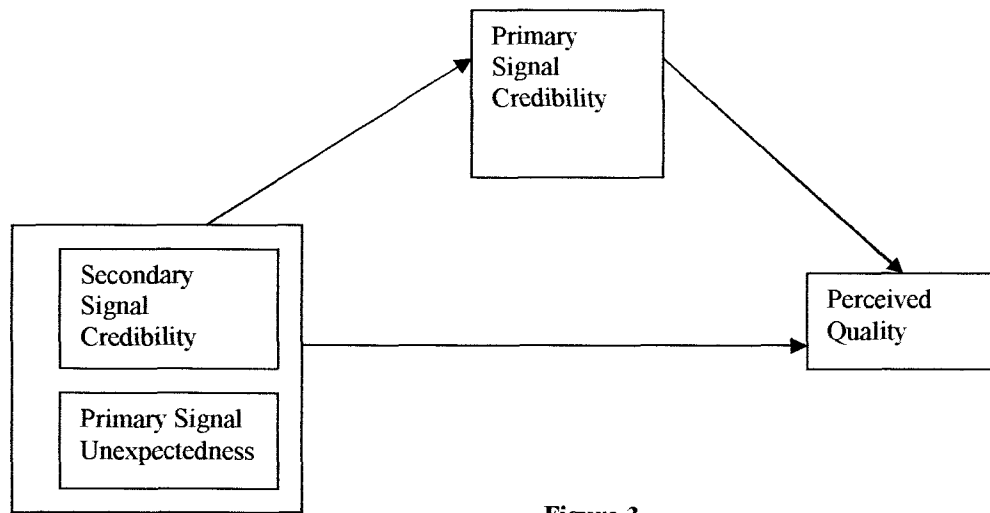
More supporting evidence was found by Wong and Weiner (1981), who examined students' attribution after hypothetical expected and unexpected success and failure in mid-term exams. It was found that unexpected events and failure triggered more attribution searches than success and expected events. Hastie (1984) compared unexpected to expected events, and how they might elicit causal reasoning, finding that unexpected events led subjects to engage in more causal reasoning than expected events. In addition, unexpected events produced more elaboration. In summary, people tend to engage in a sophisticated attribution process when they face unexpected events.

In a similar way, we argue that an unexpected warranty will lead consumers to engage in a sophisticated attribution process in which they use other less diagnostic information to come to a conclusion about the behavior agent. One explanation of people engagement in an attribution process is the increased level of suspicion that results from facing unexpected behavior. An unexpected event or behavior leads people to have a high level of suspicion because unexpected behavior brings with it different plausible explanations for the behavior (Wong and Weiner, 1981). Fein (1996) found suspicion to lead people to engage in a sophisticated attribution process.

Hilton, Fein, and Miller (1990) examined how people attributed the behavior of a man who gave a gift to a rich widow woman. The observed behavior was the man giving the woman some flowers. In their experiment, some subjects observed the man returning extra change to a grocery cashier prior to the man giving the flowers. Subjects who observed the grocery change event attributed the giving of flowers to the man's love for the woman. Subjects who did not receive the grocery cashier's event information tended to hold their inferences, meaning the flower giving behavior was discounted.

In a similar way, we argue that when an unexpected primary cue such as an unexpected warranty is offered, a secondary, less diagnostic cue such as a DVD drive brand will have a greater effect on product quality evaluation. Therefore,

H1: When a warranty is unexpected, perceived quality will be higher when DVD brand name is of high quality than when DVD brand name is of low quality; whereas, when warranty is expected, perceived quality will be the same, regardless of DVD brand name. There will be a two-way interaction between warranty unexpectedness and DVD brand.



**Figure 3**

**Effect of Signal's Unexpectedness on Perceived Quality**

Since a DVD drive brand is a credible signal, but it is not highly diagnostic for the overall laptop computer quality evaluation, the effect of a DVD drive brand will be obtained through affecting the credibility of the less credible diagnostic information. Thus, a high quality DVD drive will increase the credibility of an unexpectedly long warranty. Therefore,

H2: The effect of the DVD drive brand name on perceived product quality will be mediated by warranty credibility.

## **THE STUDY**

### **Experimental design**

The study utilized a 2 (1-year vs 7-year warranty) x 2 (unknown DVD drive brand vs known DVD drive brand) between subjects design. Data was collected by Issues and Answers Research Agency from their online consumer panel. Two hundred and sixty nine consumers were recruited to participate in the study. Forty-eight percent of participants were female. Forty-two percent of participants were between the ages of 18 and 44 years, thirty-four percent were between the ages of 45 and 59 years, and twenty-four percent were over 60.

### **Measures**

Perceived quality was measured using a four-item scale. The first two items were adapted from Dodds, Monroe, and Grewal (1991). The last two items were adapted from Purohit and Srivastava (2001). The items were “This product should be of” (very poor to very high quality), “This product seems to be durable” (strongly disagree to strongly agree), “My overall impression of the new Convex computer model is” (very bad to very good), and “Compared to other computers, the quality of the Convex computer is” (much lower than average to much higher than average). Warranty credibility was measured using a two-item scale adapted from Smith and Vogt (1995). The items were “How truthful do you think the warranty is” (not at all truthful to completely truthful) and “Overall, how credible do you think the warranty is” (not at all credible to completely credible).



### **Manipulation checks**

Warranty unexpectedness manipulation was checked using a three-item scale adjusted from Hoon and Low (2000). The items were “The warranty length offered by Convex is” (expectedly long to unexpectedly long), “The warranty length offered by Convex is” (ordinary to unique), and “The length the warranty offered by Convex is of” (a common length to an uncommon length). DVD drive brand manipulation was checked using two items adjusted from Purohit and Srivastava (2001). The items were “DVD drive is of a high quality” (strongly disagree to strongly agree) and “Compared to other brands available in the market, quality of DVD drive is much better than average” (strongly disagree to strongly agree).

### **Pretest**

#### *Warranty Manipulation*

Subjects were 30 undergraduate students enrolled in an introductory course of marketing. The results indicated that a warranty unexpectedness manipulation was successful and significant. Specifically, the 7-year warranty was perceived to be more unexpected than the 1-year warranty, (1-year=2.9, 7-year warranty=6.2,  $F_{(1,28)}$ ,  $p < 0.001$ )

#### *Brand Quality Manipulation*

Subjects were 128 undergraduate students enrolled in introductory course of marketing. Brand quality manipulation was successful. Sony was rated to be of a higher quality than Zeus (mean overall quality of Sony = 5.5, mean overall quality of Zeus = 3.1,  $P < 0.001$ )

## Results

### *Manipulation check*

Two-way ANOVA revealed that warranty unexpectedness and DVD brand manipulations were successful. Participants with unexpected warranty condition perceived their warranty to be unexpectedly longer than did participants with an expected warranty condition ( $M_{\text{unexpected}} = 4.97$ ,  $M_{\text{expected}} = 3.83$ ,  $F_{(1,265)} = 54.28$ ,  $P < 0.001$ ).

Participants in Sony DVD drive condition perceived the DVD drive to be of higher quality than did participants in Zeus DVD drive condition ( $M_{\text{Sony}} = 4.87$ ,  $M_{\text{Zeus}} = 4.31$ ,  $F_{(1,265)} = 23.06$ ,  $P < 0.001$ ).

### *Hypotheses Testing*

A two-way ANOVA showed that the interaction between warranty unexpectedness and DVD drive brand had significant effect on perceived laptop quality ( $F_{(1,265)} = 7.69$ ,  $P < .01$ ). See cells means in table 3. When warranty was unexpected, perceived laptop quality was higher when the DVD drive was Sony (high quality DVD), than when the DVD drive was Zeus (low quality DVD), ( $M_{\text{Sony}} = 5.43$ ,  $M_{\text{Zeus}} = 4.67$ ,  $F_{(1,265)} = 20.85$ ,  $P < 0.001$ ). However, when warranty was expected, perceived laptop quality was not affected by DVD drive brand ( $M_{\text{Sony}} = 4.73$ ,  $M_{\text{Zeus}} = 4.63$ ,  $F_{(1,265)} = 3.50$ ,  $P = ns$ ). Interaction analysis result is shown in figure 4. Therefore, H1 is supported.

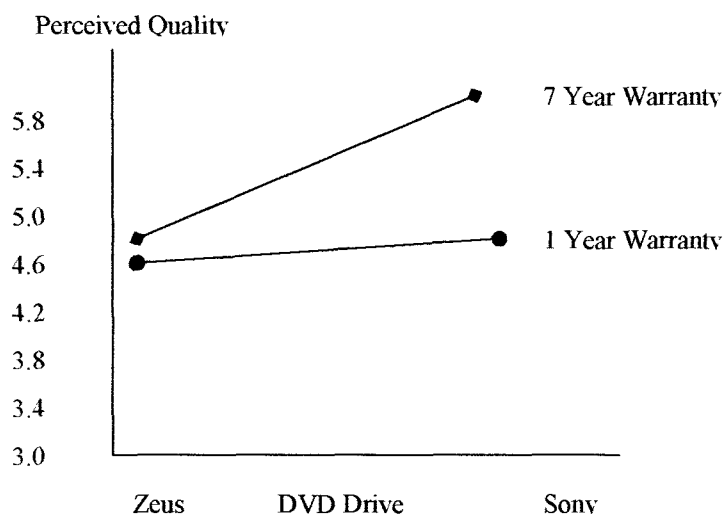
**Table 3**  
**Study Two: Perceived Quality Cell Means and Standard Deviations**

		DVD Drive	
		Sony	Zeus
Warranty	Unexpected	5.43 (.954)	4.67 (1.057)
	Expected	4.73 (1.035)	4.63 (.864)

Note: Standard deviations are in parentheses

To test the hypothesized mediating effect of warranty credibility on the relationship between DVD brand and perceived laptop quality, four regression models were run. The first model had perceived quality as the dependent variable and DVD brand as the independent variable, the second had warranty credibility as the dependent variable and DVD brand as the independent variable, the third had perceived laptop quality as the dependent variable and warranty credibility as the independent variable, and the fourth had perceived laptop quality as the dependent variable and warranty credibility and DVD brand as the independent variables. See table 4 for mediation analysis results. The results of the four regression models suggested that warranty credibility partially mediated the relationship between DVD brand and perceived laptop quality (see table 2 for mediation analysis results). The first model showed that DVD brand was positively related to perceived quality ( $b_{\text{DVD brand}} = .763, P < .001$ ). The

second model showed that DVD brand was positively related to warranty credibility (b DVD brand = .464,  $P < .05$ ).



**Figure 4**  
Interaction Effect of Warranty Unexpectedness and DVD Drive on Perceived Quality

The third model showed that warranty credibility was positively related to perceived laptop quality (b warranty credibility = .509,  $P < .001$ ), and the fourth model showed that DVD brand effect on perceived quality was significant, even when warranty credibility was added to the regression model (b DVD brand = .545,  $P < .001$ , b warranty credibility = .471,  $P < .001$ , Sobel  $Z = 2.053$ ,  $P < .05$ ). Thus, H2 is supported.

**Table 4**  
**Study Two: Analysis of Warranty Credibility as a Mediator of DVD Brand Effect on Perceived Quality**

Variable	Warranty Credibility			Perceived Quality			Perceived Quality		
	b	t-value	P	b	t-value	P	b	t-value	P
DVD brand	464	2.10	.037	763	4.39	.001	545	3.83	.001
Warranty Credibility							471	8.55	.001

## DISCUSSION

Warranty's effect on perceived quality has gained researchers' attention for a long period of time. The positive effect of warranty on perceived quality is well documented in consumer behavior literature. However, no study has examined the effect of warranty on perceived quality when a warranty is unexpectedly long. In this study, we examined the effect of signals unexpectedness on perceived quality. Our results indicated that when consumers encountered an unexpected signal such as a very long warranty, consumers tended to have a high level of suspicion because that unexpected warranty violated their expectations. This suspicion led consumers to question the credibility of the warranty. As a result, consumers started looking for other available signals to come to a conclusion about unexpected signal credibility, even if other available signals were not diagnostic of the overall product quality such as a DVD drive brand. When DVD drive brand, a less

diagnostic signal, was perceived to be of high quality, the long warranty was perceived to be credible and perceived quality was positively affected. When DVD drive brand was perceived to be of high quality, the long warranty was perceived to not be credible and perceived quality was not affected.

### **THEORETICAL CONTRIBUTION**

Study two contributes to literature in several ways. The study provides the first empirical examination of the effect of warranty on perceived quality when warranty is unexpectedly long. Purohit and Srivastava (2001) classified signals into high and low scopes. While high scope signals are those signals that require a long period in which to change, low scope signals are those signals that do not require a long period in which to change. Prior research has adequate explanation of multiple cues' interaction when cues are of different scopes (Purohit and Srivastava, 2001). Current research advances current literature by examining multiple signals when both signals are of low scope. Finally, current literature assumes a firm's reputation as the way of building signals' credibility. Our study adds to the literature by building credibility using signals other than the firm's reputation.

### **MANAGERIAL IMPLICATIONS**

Our results have important implications for managers. First, our results increase managers' understanding of the inability of positive signals to improve perceived quality when such signals are unexpected, because of the questionable credibility of unexpected signals. Second, previous research has shown the importance of a firm's reputation in signaling quality through offering long warranties (Blair and Innis, 1996; Boulding and Kirmani, 1993; Srivastava and Mitra, 1998). Since reputation is difficult to change,

managers need other tools whereby to enhance their product quality signals. Our results provide managers with such tool, as it shows how some signals might be used to enhance diagnostic signals credibility. In addition, our results show the importance of less diagnostic signals, such as a DVD brand name, on the overall perceived quality. Managers should pay more attention to product components, as those components might affect perceived quality. Finally, our results show managers how to lead customers to focus on positive less diagnostic cues through offering an unexpected positive signal.

### **LIMITATIONS AND FUTURE RESEARCH**

As with any other experimental study, our study has some limitations. Warranty is only one form of diagnostic cue that might be used to signal quality. Future research might use other forms of diagnostic cues, such as price, to examine the effect of unexpectedness on perceived quality. In addition, 'laptop computer' was the only product used to examine the study hypotheses. To extend the external validity of hypothesized relationships, future research might examine the hypotheses using different products. Additionally, future research should consider examining some factors that might moderate the effect of signal unexpectedness on perceived quality. For example, consumer skepticism can be examined as a moderator of the effect of signal unexpectedness on signal credibility and perceived quality.

## CHAPTER 5: CONCLUSION

Perceived product quality is a very important factor that affects consumers' decisions and behavior. Since sellers are aware of the importance of perceived product quality, they usually tend to use different cues to signal their product quality to consumers. Researchers have examined the effect of different signals on perceived product quality. Earlier research has focused on single cue effect on perceived quality. However, more recent research has focused on multiple signals' effect on perceived quality. The results of multiple signals research are mixed. In order to deepen our understanding of multiple signals' interactions, this dissertation examines the effect of signal inconsistency and signal unexpectedness on perceived product quality.

Study one examined the effect of signal consistency/inconsistency on product quality, where consistent signals are those of the same valence. For example, high price is consistent with a good country of origin. However, a long warranty is inconsistent with a brand name that has a low quality reputation. The results of study one indicated that inconsistent signals led consumers to be in a suspicion situation in which they tended to use their persuasion knowledge. Specifically, when a high price is combined with a short warranty or a long warranty is combined with a low price, consumers tended to have a high level of suspicion. In order to understand the reason behind price and warranty inconsistency, consumers tended to use their persuasion knowledge and make inferences about this inconsistency. When consumers inferred manipulative intent for inconsistency, perceived quality decreased. When consumers did not infer such intent, perceived quality did not change. This finding might help managers enhance their product perception using different quality signals. When one signal cannot be improved by a manager, he or she



might be not willing to improve another signal if this improvement leads to inconsistency, which might negatively affect perceived quality.

Study two addressed the effect of some signals on the credibility and effectiveness of other signals. The results of study two indicated that when faced with a diagnostic cue with ambiguous credibility, consumers used other cues to reach a conclusion about diagnostic cue credibility. When the diagnostic cue was determined to be credible, consumers used that cue in evaluating the product. When the diagnostic cue was determined to not be credible, consumers did not use that cue in evaluating the product. Specifically, a diagnostic cue with ambiguous credibility such as an unexpected warranty led consumers to use a less diagnostic cue such as DVD drive brand to evaluate the laptop computer. When DVD drive brand was perceived to be of high quality, the warranty was perceived to be credible and the computer was perceived to be of high quality. When DVD drive brand was perceived to be of low quality, warranty was perceived to not be credible and the computer quality was not affected. This finding is important for managers, as it provides them with a new tool to enhance their quality signals' credibility. If positive signal credibility is an issue, a manager might use other available cues such as a product component to improve positive signal credibility.

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