

1-1-2013

Choice Blindness in Consumer Decision-Making

Jessica Schanzer

Connecticut College, jschanzer91@gmail.com

Follow this and additional works at: <http://digitalcommons.conncoll.edu/psychhp>

Recommended Citation

Schanzer, Jessica, "Choice Blindness in Consumer Decision-Making" (2013). *Psychology Honors Papers*. Paper 31.
<http://digitalcommons.conncoll.edu/psychhp/31>

This Honors Paper is brought to you for free and open access by the Psychology Department at Digital Commons @ Connecticut College. It has been accepted for inclusion in Psychology Honors Papers by an authorized administrator of Digital Commons @ Connecticut College. For more information, please contact bpancier@conncoll.edu.

The views expressed in this paper are solely those of the author.

Choice Blindness in Consumer Decision-Making

A thesis presented by

Jessica Schanzer

to the Department of Psychology

in partial fulfillment of the requirements

for the degree of Bachelor of Arts

Connecticut College

New London, CT

May 3, 2013

Abstract

The present experiment used the choice blindness methodology to examine introspection, self-knowledge, and the instability of preferences within the domain of consumer choice. The sample consisted of 60 participants between the ages of 18 and 23. Participants completed a consumer goods questionnaire that contained the choice blindness manipulation of either the price or the other attributes of the laptop item and a demographic questionnaire. A strong choice blindness effect was established and over 70% of participants failed to detect the manipulation of the laptop item. Participants were also significantly more likely to detect the manipulation of the laptop's price than the other choice attributes. While participants who originally chose the cheaper laptop were more likely to detect the manipulation, this difference was not significant. Interestingly, out of the participants who did not detect the manipulation, many people gave verbal justification and reasoning for the choice they did not originally pick. Most of these justifications were self-contradictory, in which participants rated either the price or the other specific attribute(s) that they justified to be very important in their initial decision prior to the switch. The results demonstrated that preferences are not only constructed to make a particular choice, but are also shaped by the outcome of a decision. Practical implications for choice blindness in consumer decision-making and directions for future research are discussed.

Acknowledgments

First, I would like to thank my thesis advisor, Professor Vyse for his patient guidance, enthusiastic encouragement, and helpful critiques during this entire process. I could not have asked for a more welcoming and inspiring mentor. I consider myself very fortunate to have been his student throughout my time at Connecticut College.

Second, I would like to extend thanks to my thesis readers, Professor Devlin and Professor Nier. Both professors provided me with instrumental feedback and revisions for the final product. Their guidance in regard to APA formatting was especially valuable.

Finally, I would like to thank Petter Johansson for sparking my interest in choice blindness. I am so grateful for the opportunity to have conducted such innovative research (and a bit of magic) while studying abroad.

Table of Contents

| | |
|-------------------------|----|
| Abstract..... | 2 |
| Acknowledgments..... | 3 |
| Table of Contents..... | 4 |
| List of Tables..... | 5 |
| List of Figures..... | 6 |
| List of Appendices..... | 7 |
| Introduction..... | 8 |
| Method..... | 25 |
| Results..... | 31 |
| Discussion..... | 41 |
| References..... | 48 |
| Appendices..... | 56 |

List of Tables

| | |
|---|----|
| Table 1: <i>Distribution of Detections, Non-Detections, Non-Detecting Participants Who Offered Justification, and Non-Detecting Participants Who Gave Self-Contradictory Justification</i> | 32 |
| Table 2: <i>Means and Standard Deviations for the Rating of Price and the Mean Rating of the Other Attributes for Detection, Non-Detection, and Both Manipulation Conditions</i> | 35 |
| Table 3: <i>Means and Standard Deviations for the Rating of Price and the Mean Rating of the Other Attributes for Justification, No Justification, and Both Manipulation Conditions</i> | 38 |
| Table 4: <i>Means and Standard Deviations for the Rating of Price and the Mean Rating of the Other Attributes for Self-Contradictory Justification, No Self-Contradictory Justification, and Both Manipulation Conditions</i> | 40 |

List of Figures

Figure 1: *Placing the Duplicate Section Over the Original Choice Attributes*.....26

Figure 2: *Overall Detection Rates*.....31

Figure 3: *Detection Comparison*.....33

Figure 4: *Price Detection Comparison*.....36

List of Appendices

| | |
|---|----|
| Appendix A: <i>Informed Consent</i> | 56 |
| Appendix B: <i>Consumer Goods Questionnaire</i> | 57 |
| Appendix C: <i>Demographic Questionnaire</i> | 60 |
| Appendix D: <i>Debriefing Form</i> | 62 |
| Appendix E: <i>Non-Detecting Participant Justification and Self-Contradictory Justification</i> | |
| <i>Quotes</i> | 63 |

Choice Blindness in Consumer Decision-Making

People make countless choices in their day-to-day life: some are slow and deliberate; some are rapid and intuitive; some carry only minor significance; and others greatly impact our lives. For all the intimate familiarity we have with everyday choice and decision-making, it is difficult to examine the underlying representations of this process. Similarly, it is challenging to determine what we know about our choices from the “inside,” by reflection and introspection (Nisbett & Wilson, 1977). Decades of work on human decision-making stressing either rational or irrational aspects of choice behavior have yet to find an effective method for using introspection to study consumer choice (Krueger & Funder, 2004; Tversky & Kahneman, 1981).

Consumer choice and decision-making have been topics of extensive research in the fields of both psychology and economics. Traditionally, explanations of consumer behavior are rooted in cognitive psychology. Before people choose to buy a product, they engage in elaborate, conscious information processing (Chaiken, 1980; Petty, Cacioppo, & Schumann, 1983). Information processing may lead to certain attitudes, and these attitudes affect preferences and subsequent decision-making. Attitudes relate to any entity that people can either like or dislike. Entities may include physical objects, living beings, and/or abstract concepts. Attitudes can be based on cognitive beliefs/schemas or more on affect, such as when a product triggers an emotional response (Venkatraman & MacInness, 1985).

From a purely economic perspective, consumer choice and purchase are the result of a rational exchange: two agents meet in the market and trade goods to maximize their individual utilities. The Standard Economic Model of consumer behavior implies that the decision to buy (or not to buy) is determined by the anticipated net utility of purchasing a product or service (Deaton & Muellbaur, 1980). According to the Standard Economic Model and popular

neoclassical economics, attitudes determine preferences and that an individual's choice between products is simply his or her revealed preference. In this model, attitudes and preferences are unchanged or affected by immaterial or irrelevant factors. Attitudes and preferences also should not be incompatible with empirical observations known to the individual, including his or her own rational, conscious actions. Finally, it is assumed that there is coherence among attitudes and preferences (Wilkinson, 2008).

The idea that stable and identifiable preferences guide consumers' rational choices between alternative outcomes is well established within the field of economics (Wilkinson, 2008). However, economic theory is an idealization of how people make decisions, and research has suggested that it is not an accurate reflection of reality. For example, numerous studies have demonstrated that people fear losing money more than they desire to win (Goldberg & von Nitzsch, 2001; Tversky & Kahneman, 1979, 1991). This tendency to strongly avoid losses is termed loss aversion and is grounded in both economic and decision theory. Furthermore, Dijksterhuis, Smith, Van Baaren, and Wigboldus (2005) argue against the traditional economic view that the typical consumer is highly analytical, rational, and not greatly influenced by emotions when making decisions. Instead, they suggest that consumers are primarily driven to make choices based on "gut feelings," or unconscious processes. They contend that this lack of insight represents an absence of deliberative information processing. In other words, people sometimes cannot offer a reason why they chose one product over another because there was no thoughtful, rational, or conscious reason in the first place.

There is abundant evidence for the existence of two kinds of processing in human reasoning and decision-making. One type is automatic and fast, requiring little or no effort and no sense of voluntary control. The other is slow, deliberate, and conscious. These two systems of

the mind are now widely referred to as System 1 and System 2 respectively (Kahneman & Fredrick, 2002; Sloman, 1996; Stanovich, 1999). According to Kahneman (2011), System 1 continuously generates suggestions for System 2: impressions, intuitions, and feelings. If endorsed by System 2, these impressions and intuitions become beliefs, and impulses turn into voluntary actions. Dijksterhuis et al. propose that consumer behavior is often driven more by System 1 and salient environmental cues than by stable internal preferences. These environmental cues are thought to influence consumer decision-making outside of System 2 and conscious awareness (Chartrand, 2005).

North, Margreaves, and McKendrick (1997) found evidence to support the aforementioned view. When French music was played throughout a store, customers purchased French wines more readily, and when German music was played, German wines were bought more frequently. In this study, consumers were unaware of the music's influence in their decision-making process. An important question to ask is whether the insights provided by consumers about their preferences and decision-making are actually reliable. Consumers appear to find it relatively easy to explain why they made a certain judgment or choice. However, it is considerably more difficult to test whether the explanation provided is valid.

There has been little psychological research that explicitly explores unstable preferences and people's subsequent reflections about these inclinations. Bem's self-perception theory (1967, 1972) argues that people tend to infer their intentions from their actions, after the fact. Consequently, it is as if people are unconscious of their original intentions and can only infer them based on their actions. One implication of this theory is that people's preferences can be easily distorted, leading them to make irrational decisions.

Change Blindness

The present study and the choice blindness methodology are related to change blindness, which is described as a phenomenon where people often fail to notice dramatic changes in a visual scene following a brief interruption (Grimes, 1996; Henderson, 1997; Pashler, 1988; Rensink, O'Regan, & Clark, 1997). Over the past two decades, change blindness has greatly contributed to our understanding of attention, perception, and consciousness. Grimes (1996) discovered that viewers did not notice significant changes to photographs that were made while their glance was diverted. For example, over 50% of observers failed to notice when two cowboys sitting on a bench exchanged heads. These shocking results inspired others to examine whether similar failures could occur without eye movements. The “flicker task” is one of these paradigms (Rensink et al., 1997, p. 368). The task incorporates an original and modified scene that is alternated repeatedly, separated by a brief blank display, until participants notice the change. In the flicker task experiment, observers eventually noticed most changes but took an astonishingly long time to do so. Both of these techniques involve a common element: they impair localization of the motion signals that accompanied the change. This component suggests that attention is needed for change perception. In addition, change blindness seems to result whenever the accompanying motion signals fail to draw attention (Simons & Rensink, 2004).

Other studies found that these effects are even stronger when the changes are unexpected. For instance, when an actor in a scene was changed during a shift in camera position, most observers did not notice, even when a different person replaced the actor (Levin & Simons, 1997). In another study conducted by Simons and Levin (1998), a man holding a map approached random pedestrians and asked them for directions. About a minute later, two men with a door walked between the man and the pedestrian. The man with the map quickly switched

places with one of the men carrying the door. As the door was removed from the pedestrian's view, a new man was standing holding a map. The pedestrians most often failed to notice this change and acted as if the same man were asking them for directions. The use of naturalistic stimuli represents a departure from earlier change blindness research. This difference helped bridge the gap between simple laboratory stimuli and complex stimuli typically found in the real world.

The fact that change blindness occurs under naturalistic conditions strongly supports the view that this phenomenon is a general failure to retain and/or compare information from moment to moment (Simons & Rensink, 2004). Another noteworthy finding established by recent change blindness research is that attention is necessary to recognize a change.

Modifications to semantically central items are detected faster than changes elsewhere, even when the changes are of equal physical salience (Kelley, Chun, & Chua, 2003). This suggests that objects that selectively receive attention are more likely to be encoded and compared. Selective attention and faster change detection imply earlier attention to the changed item. For example, social drug users are more likely to detect alterations to drug paraphernalia in images than are non-drug users and American football experts are better at spotting meaningful changes to football scenes than are novices (Jones, Jones, Smith, & Copley, 2003; Werner & Thies, 2000). The full potential of change blindness as a tool for studying the human mind is far from realized because it has only been used to examine perceptual aspects of cognition.

According to Johansson and Lars (2008), aside from change blindness, there has been surprisingly little research investigating our ability to detect changes in items that are of particular importance to us – i.e., when changes in the visual environment have effects in relation to our intentions and actions. As Rensink (2002) has stated:

The study of change detection has evolved over many years, proceeding through phases that have emphasized different types of stimuli and different types of tasks. *All studies, however, rely on the same basic design.* An observer is initially shown a particular stimulus...and the response of the observer is then measured. (p. 251)

Other striking examples of our unawareness come from research on people's inability to reflect upon the reasoning behind their own judgments and behaviors. As reported by Nisbett and Wilson (1977), people lack introspective access to higher cognitive processes that drive our choices, evaluations, and behaviors. Therefore, our own introspective reports are often false. In one experiment, the participants were instructed to choose between pairs of panty hose. Though the pairs were identical, the participants displayed a strong right hand bias, choosing the pair on the right more often than any other pair. When asked why they picked a specific pair, the participants reported that they based their choice on the superior quality of the chosen pair. Nisbett and Wilson (1977) claim that we do not justify our responses based on memories of the cognitive processes involved in decision-making. Instead they suggest that we justify responses based on the theoretical knowledge of how influential certain factors *would have been* in driving our behavior.

Common sense implies that we know when actions are our own because we have caused them; we are informed of what we do by our conscious will. This phenomenon leads us to believe that our activities are caused by consciousness. Recent cognitive, social, and neuropsychological studies have argued that the subjective experiences of our conscious will are fundamentally misguided. Furthermore, our conscious will has been thought to be an illusion created by the brain (Gazzaniga, 1998; Roth, 2003; Wegner, 2002, 2003). This "illusion claim" is based on the finding that neuronal activity leading to a consciously willed action occurs before

the conscious decision to engage in that action (Libet, 1985). People are typically not aware of this discrepancy because the mind retrospectively fabricates a coherent story that is accessible to subjective experience (van Duijn & Bem, 2005). Thus, introspection is asserted to provide us only with access to an illusory causal path from thought to action (Wegner, 2003). Relatedly, Brasil-Neto et al. (1992) used focal magnetic stimulation of the motor cortex to elicit a finger movement. Despite this, participants still reported that they had decided themselves to move that finger. As demonstrated by this evidence, there is doubt over how much rational, introspective access people actually have to their thoughts, processes, and actions that affect decision-making.

Choice Blindness

Without somehow being able to challenge people's responses, it is very difficult to objectively demonstrate that people lack introspective access into their own cognitive processes. In a series of studies, Johansson and his colleagues modified the basic design of change blindness experiments to incorporate introspection and additional non-perceptual elements of cognition. The result is a research tool called "choice blindness," a newly discovered phenomenon within the field of experimental psychology that expands on previous change blindness research to assess the relationship between introspection and self-knowledge (Johansson, Hall, Sikström, & Olsson, 2005). Specifically, choice blindness examines to what extent people are able to detect when the outcome of a choice is inconsistent with their previous intention and goals; this is a capacity taken for granted in many established theories of decision-making (Ridderinkhof, van den Wildenberg, Segalowitz, & Carter, 2004).

Choice blindness is inspired by close-up card trick techniques that permit the experimenter to secretly manipulate the relationship between choice and outcome. When participants give a verbal explanation for choices they did not make in choice blindness

experiments, it is possible to highlight the malleability of preferences. It has been suggested that choice blindness is concerned with the brain's representation at the moment of the selection as well as any process that compares this depiction with the other after the choice has been made (Johansson, Hall, Sikström, Tärning, & Lind, 2006). The choice blindness paradigm differs from change blindness because it involves a mismatch between the intended choice and the choice with which individuals were actually presented.

In a study performed by Johansson et al. (2005), two pictures of female faces were presented and the experimenters asked participants to choose the face they found more attractive. The chosen image was then handed to the researcher and participants were asked why they chose that picture. However, on some trials the picture was covertly switched and the participants were given the one that they did not choose. Less than 30% of these swaps were detected across all conditions. Most people not only failed to notice the switch, but they often gave several explanations for the choice that they did not actually make. The effect of the manipulation on participants' attitudes toward the manipulated stimulus was also examined. This aspect of the study demonstrated that exposure to, and reasoning about, mismatched outcomes can generate substantial preference change. In the subsequent choice, participants came to prefer the manipulated faces. Therefore, the choice blindness phenomenon demonstrates that preferences can be easily distorted, leading people to make irrational decisions.

In order to investigate whether the choice blindness phenomenon existed outside a laboratory and in a more naturalistic setting, Hall, Johansson, Tärning, Sikström, and Deutgen (2010) set up a table at a local supermarket and invited passers by to participate in a blind taste test comparing either the taste of two jams or the fragrance of two teas. Johansson and his colleagues created two sets of jars with two compartments/lids at both ends, which enabled them

to secretly switch the contents of the jars. Once again a choice blindness effect was found. All the tastes (as evaluated by independent raters) were significantly different. The most striking finding was that individuals still failed to detect the switch between dramatic taste differences, such as a swap between grapefruit and cinnamon-apple. Furthermore, participants readily provided coherent and convincing explanations for the choices they actually did not make. Thus, choice blindness methodology is relevant within the domain of consumer choice. It is also important to note that choice blindness is not restricted to evaluations of faces or to the representations of visual patterns in general.

Choice blindness has additionally been found for preferences and decisions that are perceived to be fundamentally stable. Hall, Johansson, and Strandberg (2012) asked participants to express their attitudes and opinions about moral dilemmas that were receiving attention in the media. Participants were asked to express whether they agreed or disagreed with various moral statements in a survey. Using the choice blindness methodology, some of the statements that participants agreed or disagreed with were reversed. They found that over 50% of participants endorsed a statement that they did not originally make with the same fervor as was true of the non-manipulated statements. These results demonstrate that even our moral attitudes are malleable and relatively unstable. A recent choice blindness study has reported similar findings for self-ratings of personality traits, which are assumed to be stable as well (Johansson, Tentori, Harris, Hall, & Chater, in preparation).

Not only do participants in choice blindness research appear to demonstrate preference change by endorsing a decision they did not make, it has also been demonstrated to affect future decision-making. Hall, Johansson, Tärning, Sikström, and Chater (in preparation) repeated Johansson et al.'s (2005) original choice blindness task and added a second round of choosing

between the same pairs of faces following a delay. The authors found that participants who received no manipulation in the first round displayed a 93% consistency between their first and second round choices. Participants who received the manipulation in the first round displayed a 53% consistency between first and second round choices. This preference change was also apparent outside of pair-wise comparisons. The rejected faces (that participants were led to believe were their preferred choices) were actually rated higher when compared to the originally chosen faces. This discrepancy suggests that the choice blindness effect caused enduring changes in preference.

These studies have demonstrated that choice blindness is a robust, replicable, and dramatic effect. The choice blindness methodology is ideal for examining consumer behavior, as it explores the malleability of preference formation and covers numerous aspects of decision-making, including unconscious processes.

The Unconscious Consumer and Preference Formation

Consumer behavior and factors that drive consumer choice are growing topics of interest within the field of social psychology. It has been argued that non-conscious processes often drive consumer behavior (Dijksterhuis et al., 2005). It is crucial to explore the unique ways in which consumers' decisions are influenced outside of conscious awareness in order to target products and services more effectively. Dijksterhuis et al. (2005) describe conscious awareness in regard to consumer decision-making by suggesting a simple dichotomy: consumers are either aware of why they made the choices they made or not. It has also been suggested that there are different types of awareness, varying with respect to the particular stage of the decision-making process of which the consumer is either aware or unaware (Chartrand, 2005). Researchers need to clearly

define the different types of awareness, most notably for the implications of what consumers can control when making a decision.

Research has been conducted that explicitly focuses on non-conscious influences on consumer choice. Chartrand (2005) used unconscious behavior as a general framework of analysis and argued that mental processes that occur outside conscious awareness often influence consumer behavior. The experimenter identified three types of awareness: the environmental features that trigger an automatic process, the automatic process itself, and the outcome of that automatic process. If individuals are unaware of one or more of these stages, they are making a non-conscious decision. Chartrand also used the phrase, “introspectively blank” when describing non-conscious processes prior to choice. This phrasing better captures the lack of awareness on the part of the consumer: a choice is made, but when asked why they made a choice, consumers are often at a loss for an explanation. The choice blindness methodology can be used to build a more comprehensive understanding of non-conscious processes, specifically using introspection to study the outcome of the automatic processes that influence consumer decision-making and behavior. Choice blindness is a particularly interesting method for this purpose, as it touches upon implicit and explicit processes and also taps into multiple aspects of decision-making (Johansson et al., 2005).

Many psychologists argue that preference is not a well-formulated and enduring state. Instead, they contend that we construct our preferences in the moment and as needed (Kahneman & Snell, 1992; Payne, Bettman, & Johnson, 1993; Shafir, Simonson, & Tversky, 1993; Slovic, 1995). Ariely and Norton (2008) suggest that most decisions are made in the moment on the basis of situational factors. They claim that most people tend to underestimate these situational influences and attribute their decisions to stable, internal preference. Situational factors can be

arbitrary and unrelated to the decision-making process. For instance, Ariely, Loewenstein, and Prelec (2003) found that recalling one's social security number prior to a decision-making process acted as an anchor for how much a person was willing to bid in an auction for a bottle of wine. After recalling these digits, individuals with a higher social security number were willing to pay significantly more for a bottle of wine than those with lower social security numbers.

Additionally, Ariely and Norton (2008) suggest that past memories of decision-making can also affect current preference formation and situational factors. According to the authors, we are likely to make decisions consistent with what and how we remember we acted in past situations. In this way decisions can influence preference formation, as well as reflecting our preferences. Ariely and Norton's theory is supported by Hall et al.'s (in preparation) choice blindness study, in which participants made decisions consistent with what they were led to believe they chose beforehand in a similar situation. This "copying" behavior is thought to be more than merely a heuristic (i.e., a cognitive shortcut) to make decisions quickly with minimal cognitive involvement (Chater, Johansson, & Hall, 2011).

When discussing theories of decision-making, a common belief is that people are able to identify mismatches between intentions and outcomes, adjust their behavior when dealing with an error, and adapt to changing situations. Thus, intentions and their outcomes form a "tight loop" (Ridderinkhof, van den Wildenberg, Segalowitz, & Carter, 2004). Festinger (1957) claimed that we actively attempt to make choices that are consistent with our previous decisions to decrease the effects of cognitive dissonance. This classic phenomenon can be defined as a psychologically uncomfortable state that results from choosing to act in a way that is inconsistent with our previous attitudes and behaviors. After a decision is made, a new cognitive element representing the decision may appear. One could assume that an individual is no longer in

conflict after making a choice because he or she has committed to one alternative. However, Festinger (1957) explained that the decision maker might also experience dissonance at this point because the cognitive element representing the choice is dissonant with the cognitive elements characterizing the negative aspects of the chosen alternative and the cognitive elements that embody the positive aspects of the alternative that is declined. In accordance with Festinger's theory, Brehm (1956) found that after a choice between items is made, we come to prefer the chosen item more and prefer the rejected item even less. In order to develop an adaptive decision-making behavior, an individual must be able to control and compare the outcomes of his or her choices with the intentions and goals that have previously been established (Ridderinkhof et al., 2004; Ullsperger & von Cramon, 2004).

Although there is evidence suggesting that after making a decision people will justify their decisions by making the chosen alternative more attractive and the rejected alternative less attractive (Festinger, 1964), there is relatively little support of this phenomenon in a more naturalistic setting. Frenkel and Doob (1976) conducted two experiments in the context of two general elections, using voters as subjects. Participants were interviewed either immediately before they committed themselves to a decision by voting or immediately after they had voted. In both elections, voters were more likely to believe that their candidate was the best and had a higher chance of winning after they had voted as opposed to before they voted. Similarly, Lawler, Kuleck, Rhode, and Sorensen (1975) examined the job choice and post-decision attitudes and behavior of accounting students. Results collected after the job choice decision was made showed that the selected firms increased in attractiveness after choice and the rejected firms decreased in desirability. Following one year of employment, participants rated all firms lower in attractiveness than they had before they applied for jobs. Frenkel and Doob (1976) and

Lawler et al. (1975) have established that post-decision cognitive dissonance in a real-world setting is a reliable effect. Conventional laboratory studies of decision-making typically have subjects decide between two novel objects about which they do not have well-anchored attitudes.

It is now widely accepted that consumers often construct their preferences and make choices at the moment when they need to decide. This pattern makes them susceptible to a wide range of influences (Simonson, 2005). Thus, contrary to the classical economic view of people's utility functions, it is no longer assumed that preferences are stable and well defined. The issue is that people are oblivious to what extent these situational factors affect their behavior.

Mismatches between intention and outcome are certainly conceivable in real-world decision-making. Perhaps you are out to dinner with a friend and he or she decides to order the tiramisu for dessert. However, there was a mix-up in the kitchen and he or she receives the bread pudding instead. One of three scenarios may possibly follow: your friend does not react, eats the dish as if he or she had ordered it, and goes on about how he or she made such a great decision to order the bread pudding. Your friend may recognize the error and decide to eat the bread pudding without making a fuss. Or, your friend may confront the waiter immediately saying there had been a mistake. The choice blindness methodology was designed specifically to examine the result of manipulating the relationship between choice and outcome as well as the instability of preference formation.

The Present Study

One of the most applicable aspects of choice blindness research to real world decision-making involves individual preference formation and change. As observed in previous experiments, once participants have confirmed and argued for the opposite of their choice, they have established a modification of their original preference. Therefore, choice blindness

demonstrates how fluid and malleable consumer preferences can be. Consumer choice is an ideal domain to test the choice blindness paradigm. This experiment used choice blindness methodology to examine introspection and self-knowledge in the domain of consumer choice. Most decision-making theories are based on the fact that people are able to notice when their intentions and the consequences of their choices do not correlate. Even so, it is difficult to identify the internal processes involved in these decisions by means of reflection and introspection.

The idea that people have stable and identifiable preferences that guide their choices between alternative outcomes is one of the fundamental aspects of economic theory. Neoclassical economic theory, rational choice theory, and expected utility theory all share this assumption (Wilkinson, 2008). Within these theories, methodologies have been established for identifying stable and rational preferences of consumers. The present study connected the choice blindness methodology to various facets of economic theory.

The choice blindness paradigm was used to investigate the stability of consumer views and preferences. The experiment itself examined the outcome of manipulating specific quantifiable attributes of consumer goods. The experimenter secretly manipulated either the price or the other quantifiable attributes (i.e., for a laptop computer: the display size, resolution, memory, hard drive, and battery life) after a choice between two similar items was made. This study differed from previous choice blindness research because specific attributes that led to the choice were the focus of manipulation, rather than the choice itself.

Participants were first asked to make hypothetical choices between three pairs of consumer goods: laptop computers, cars, and televisions. The price and the other quantifiable choice attributes (i.e., for laptops: display, resolution, memory, hard drive, and battery life) were

displayed, allowing the participants to decide between pairs of items. After participants indicated their choices between the goods, they rated on a scale of 1 to 5 how important they thought each attribute was in making their decision. The experimenter then collected the first three pages of the study and presented a brief demographic questionnaire. A manipulation was introduced as participants answered the demographic questions. While participants filled out the demographic questionnaire, the researcher retrieved a duplicate section (ready with repositionable spray glue) from her notebook. This page was placed over the original and contained the manipulation: either switching the price or the other choice attributes of the laptop item. Participants' choices between the two items and their ratings of the attributes remained the same.

After completing the demographic portion, the researcher assessed the detection rate of the laptop item by asking a series of questions. The consumer goods questionnaire was presented to participants in the same order. For each pair of consumer goods, the experimenter asked participants why they chose a particular item over the other. While participants responded, the researcher took notes and paid particular attention to their reaction to the altered laptop item. The primary focus of this segment was to observe whether or not participants detected the manipulation of either the price of the laptop or the other quantifiable choice attributes, and what reasons they gave for their choice.

H1: First, it was hypothesized that a significant choice blindness effect would be established in this experiment. In previous choice blindness research, 70% of participants have failed to notice changes in two items and have demonstrated distorted preferences (Johansson et al., 2005).

H2: Second, it was hypothesized that participants who had the price of the laptop item manipulated would be significantly more likely to detect the switch than would participants who

had the other choice attributes of the laptop manipulated. For a consumer, the price of an item is an extremely salient value. “Price salience” has been demonstrated to be a key factor that influences perceptions of consumer goods and subsequent decision-making (Kim & Kachersky, 2006).

H3: Third, it was hypothesized that participants who originally chose the cheaper laptop would be more likely to detect the manipulation than would participants who initially picked the more expensive laptop. The concept of loss aversion is grounded in both economic and decision theory. This idea refers to people’s tendency to strongly prefer avoiding losses to acquiring gains (Tversky & Kahneman, 1979). A comparison between gains and losses lies at the heart of loss aversion. Research on loss aversion in a consumer marketing setting has suggested that monetary losses are psychologically twice as powerful as gains (Dawes, 2004).

Consumer research is a growing field that often has more tangible implications than traditional research within the social sciences. Every business strives to understand the thoughts and feelings of its target consumers. Consumer insights are typically collected via questionnaires that examine people’s preferences and views concerning existing and newly innovated products. The results gained from these market research efforts are used to help understand and predict the choices of consumers. These insights are further used to redesign and develop desirable products that will be presumably chosen over competing items for purchase.

Connecting choice blindness methodology to the domain of consumer choice has important real-world implications. Consumers hold firm opinions about marketing and branding (Grunert, 2003). As such, they think and reflect about how these opinions may contribute to their decisions. With this information in mind, one can neither reject the validity of traditional forms of consumer surveys relying on introspection nor the approaches of sensory evaluation in making

successful products. Choice blindness is a potentially useful technique to apply to the field of consumer marketing, because it combines implicit and explicit behavior and covers numerous aspects of decision-making. Understanding the factors that determine the formation of preferences and which options consumers will choose is critical for the development of an effective marketing strategy.

Using choice blindness to study consumer decision-making and introspection will further develop this methodology for applications beyond the laboratory. The goal of this experiment was to reinforce the finding that consumer preferences are not well anchored and can be manipulated. The choice blindness methodology was also used to examine introspection and self-knowledge within the domain of consumer choice. Finally, establishing a significant choice blindness effect in this experiment would put substantial pressure on several aspects of economic theory, in particular expected utility models and rational choice theory.

Method

Research Design

A between-subjects design was used in this experiment. Participants were randomly assigned to one of the two experimental conditions: the price manipulation or the other quantifiable choice attributes manipulation. Whether or not the participant detected the switch was recorded as the primary dependent measure.

Participants

The sample consisted of 60 participants between the ages of 18 and 23 with a mean age of 20.02. Forty-three women and 17 men took part in the study. Thirty participants had the price of the laptop item manipulated, while the remaining 30 had the other choice attributes of the laptop switched. Each introductory psychology course participant was offered class credit for his

or her participation in the study. Additional student participants were obtained by recruiting in Shain Library. In all cases it was stressed that participation was voluntary. At the end of each trial, all participants were debriefed and informed of the aims of the experiment.

Materials

Consumer goods. The author-designed consumer goods questionnaire consisted of three pages. The pages listed the pairs of consumer goods: laptops, cars, and televisions, with each pair on a separate page. Identical pictures represented the pairs of items. They were presented side by side at the top of each page and the participant chose either item A or B by filling in a check box. The price and other quantifiable choice attributes were listed in a separate box under each item. The thick outlines allowed the researcher to manipulate the price or choice attributes by covering the original box with a duplicate section that was lightly adhered with repositionable spray glue (see Figure 1). The ratings of each choice attribute were listed at the bottom of each page and were displayed on a scale of 1 to 5.

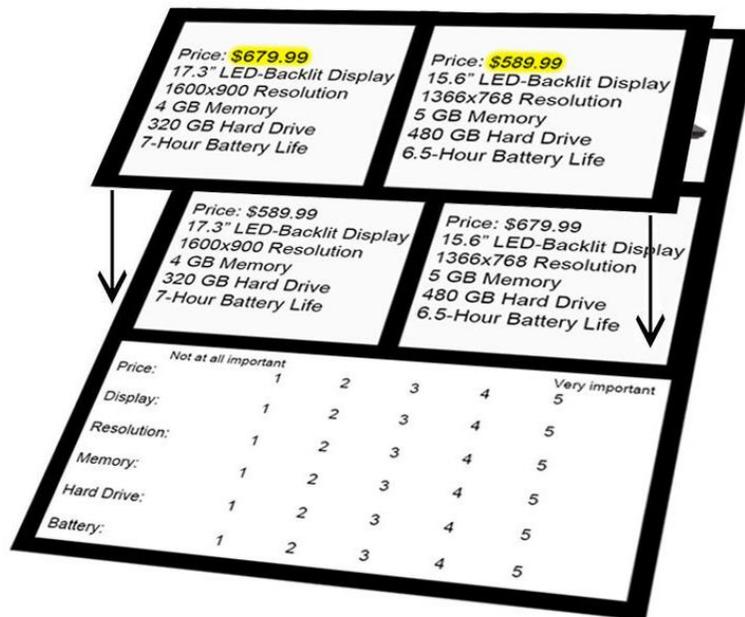


Figure 1. Placing the duplicate section over the original choice attributes, manipulated prices are highlighted.

Demographics and online shopping. An author-designed demographic questionnaire with a survey about online shopping was presented after the participant made a choice between the pairs of consumer goods. This portion of the study contained demographic items and questions regarding participants' use of online shopping websites. The online shopping questionnaire was designed to preserve the deception aspect of choice blindness, as participants were told that the study focused on consumer decision-making and online shopping.

Notebook. A notebook was used to record participants' verbal responses after each session was completed.

Procedure

Participants were tested individually because of the use of deception in this study. In order to obtain participants, students were recruited from the introductory psychology courses at Connecticut College. Permission was obtained to introduce the study in-person and a sign-up sheet was passed around at the beginning of class. Students wrote down their email if they were interested in participating. Potential participants were contacted via email and an appointment was scheduled to meet with them individually in the college library. Additional volunteer participants were obtained by recruiting in the library at a table in the foyer. In all scenarios the experiment was advertised as research regarding consumer decision-making and online shopping. This description was crucial to preserve the deception required for the choice blindness methodology. In all cases it was stressed that participation was voluntary and that individuals could withdraw from the study without penalty at any time. The procedure was executed identically for all participants. Participants signed and returned an informed consent sheet prior to receiving the experimental materials (see Appendix A).

Participants first received the consumer goods questionnaire and were asked to make hypothetical choices between three pairs of items: laptops, cars, and televisions (see Appendix B). They checked the box of the item they preferred. In order to insure internal validity, the three pairs of items were counterbalanced by alternating the order in which they were presented to different participants. The price and the other quantifiable choice attributes (i.e., for laptops: display, resolution, memory, hard drive, and battery life) allowed the participant to decide between the two items. After participants indicated their choice between the two items, they rated on a scale of 1 to 5 how important they thought each attribute was in making their decision. The experimenter then collected the first three pages of the study and a brief demographic questionnaire was presented that included questions focusing on online shopping (see Appendix C). The demographic questionnaire was always administered at the end in order to preserve the participants' original impression that the study was testing consumer decision-making and online shopping alone.

The manipulation was introduced as participants worked on the demographic questionnaire. While the participants were filling out the questionnaire, the researcher kept a duplicate section (ready with repositionable spray glue) in a small notebook. This page contained the manipulation: either switching the price or the other choice attributes of the laptop item. Thirty people had the price manipulated (i.e., laptop A now had laptop B's price), whereas another 30 had the other choice attributes (i.e., laptop A now had laptop B's display, resolution, memory, hard drive, and battery life) switched. The experimenter secretly placed this duplicate section over the original page while the participant focused on completing the demographic questionnaire. Participants' choice between the two items and their ratings of the other attributes remained the same.

After completing the demographic portion, the researcher assessed the detection rate of the laptop item by asking a series of questions. The consumer goods questionnaire was presented to the participant in the order that it was given. For each pair of consumer goods, the experimenter asked participants why they chose a particular item over the other: “Why did you choose laptop A over laptop B?” The experimenter then asked specifically why certain choice attributes were important in their decision between the two items. For example, “I noticed that you rated hard drive space a 5, why was it important in your decision?”

While the participant responded, the researcher took notes and paid particular attention to the participant’s reaction to the altered laptop item. The primary focus of this segment was to observe whether or not participants detected the manipulation of either the price of the laptop or the other quantifiable choice attributes, and to record the reasons given for the choice.

A distinction was made between “concurrent” and “retrospective” detections. A trial was classified as a concurrent detection if a participant clearly noticed the switch. Examples of concurrent detections were if participants explicitly reported that the items had been switched, that something was wrong with their choice, or if they displayed verbal signs of confusion and/or surprise. When a concurrent detection occurred, the following steps were disregarded and the experimenter immediately debriefed the participant and explained the goals of the study.

Retrospective detections occurred when participants claimed that they noticed the manipulation later on, but decided not to say anything during the experiment. For participants that did not show any concurrent signs of detection, a series of increasingly specific questions were asked to make sure their responses were not misclassified as non-detected in a post-test interview:

1. “What did you think about the experiment?”

2. “Did you find anything strange about the experiment?”
3. “Did you notice anything strange about the materials presented in the experiment?”

At this point, if a participant did not mention noticing the manipulation or report anything strange, then he or she was classified as exhibiting choice blindness. These participants had their non-detection recorded. The manipulation was always revealed to participants, regardless of whether or not they immediately detected the switch of the laptop item. The experimenter removed the laptop’s duplicate section, debriefed the participant, and explained the study and the use of deception as follows:

“This experiment is actually examining choice blindness in consumer decision-making. Choice blindness is a research tool in which the experimenter secretly manipulates the relationship between choice and outcome. The choice blindness methodology requires the use of deception. As you can see, I switched the price (or the other attributes) of the laptop item. When I asked you why you chose one laptop over the other and why certain attributes were important in your decision, I was testing whether or not you detected the manipulation. I am interested in using choice blindness to study consumer preferences and the relationship between intention, choice, and introspection. Please let me know if you have any additional questions or concerns about the experiment or the use of deception. If you would like your data to be excluded in future analyses, feel free to contact me. Because of the deception in this experiment, please refrain from telling other students about the true aims of this study. Thank you for your participation.”

Participants were also given a debriefing form (see Appendix D).

Results

The first hypothesis that a significant choice blindness effect would be established in this experiment was supported. Overall, 43 participants (71.7%) failed to detect the manipulation of the laptop item. Out of the 17 people (28.3%) who did notice the switch, there were 14 concurrent detections and 3 retrospective detections (see Figure 2). Concurrent and retrospective detections were grouped together for the statistical analysis. The complete distribution of detections, non-detections, non-detecting participants who offered justification, and non-detecting participants who gave self-contradictory justification is presented in Table 1. None of the participants noticed the physical manipulation.

Overall, 12 (27.9%) of the women detected the manipulation compared to 5 (29.4%) of the men. This difference was not significant, $\chi^2(1, N = 60) = 0.01, p = .91$.

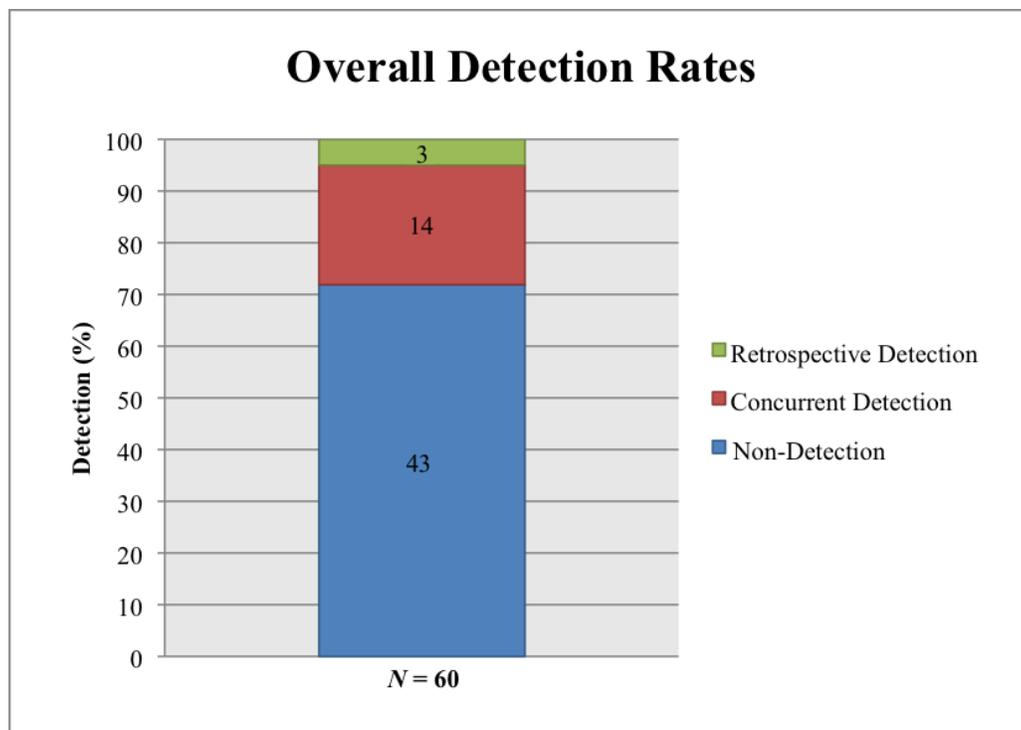


Figure 2. Overall distribution of retrospective detections, concurrent detections, and non-detections.

Table 1

Distribution of Detections, Non-Detections, Non-Detecting Participants Who Offered Justification, and Non-Detecting Participants Who Gave Self-Contradictory Justification

| Manipulation Condition | Detections | Non-Detections | Non-Detecting Justifications | Non-Detecting Self-Contradictory Justifications ^a |
|--------------------------------------|------------|----------------|------------------------------|--|
| Price (<i>n</i> = 30) | 12 | 18 | 9 | 8 |
| Other Attributes (<i>n</i> = 30) | 5 | 25 | 9 | 7 |
| Total | 17 | 43 | 18 | 15 |

^aThese participants initially rated the switched dimension (price or other attributes) to be very important (4 or 5), but when questioned later, gave a self-contradictory justification.

The second hypothesis that participants who had the price of the laptop item manipulated would be significantly more likely to detect the switch than would participants who had the other choice attributes of the laptop manipulated was also supported. Of the 30 participants who had the price switched, 12 (40%) detected the manipulation. Among the 30 participants who had the other attributes of the laptop switched, only 5 (16.7%) noticed the change (see Figure 3). This difference in detection rates was significant, $\chi^2(1, N = 60) = 4.02, p = .04$.

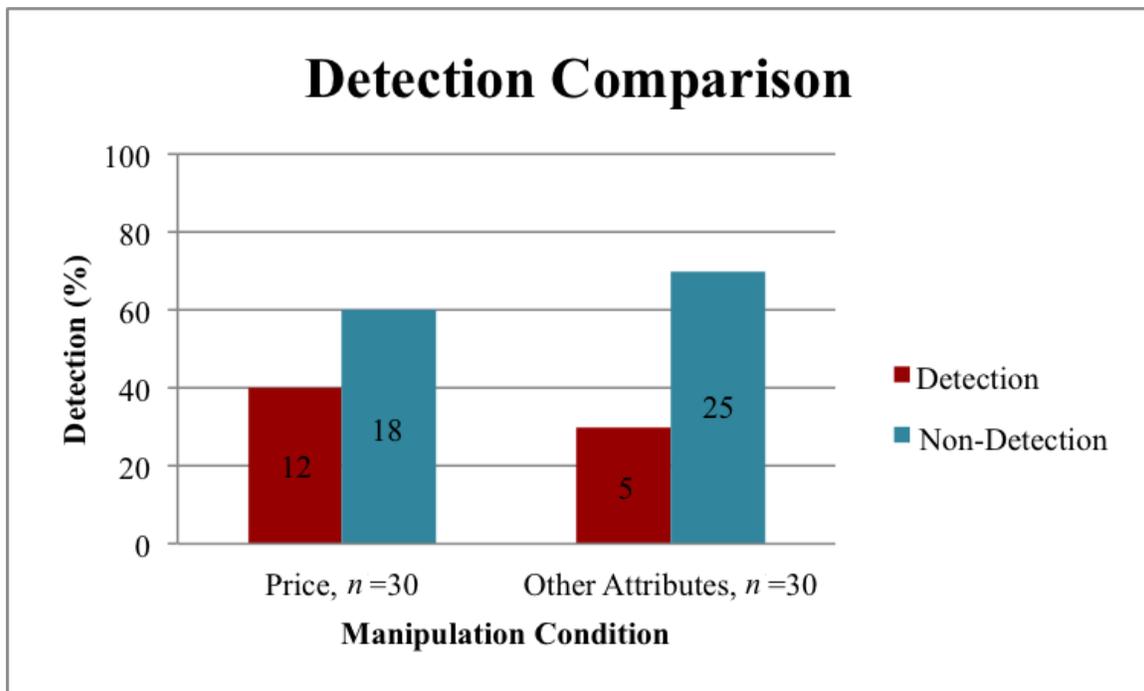


Figure 3. Comparison of participants' detection of price and the other attributes.

To examine the effects of detection vs. non-detection and manipulation condition on the ratings of price or the other attributes, a 2 (detection vs. non-detection) x 2 (price vs. other attributes manipulation) multivariate analysis of variance was conducted on the participants' ratings of price and their mean rating of the other attributes. Neither of the main effects of detection (Wilks's Lambda = 0.93; $F(2, 55) = 2.07, p = .14$) or manipulation condition (Wilks's Lambda = 0.98; $F(2, 55) = 0.47, p = .63$) was significant. The interaction of detection x manipulation condition was also not significant (Wilks's Lambda = 0.99; $F(2, 55) = 0.18, p = .83$). Means and standard deviations for the rating of price and the mean rating of the other attributes for detection, non-detection, and both manipulation conditions are presented in Table 2.

Table 2

Means and Standard Deviations for the Rating of Price and the Mean Rating of the Other Attributes for Detection, Non-Detection, and Both Manipulation Conditions

| Manipulation Condition | Price Rating | | Mean Other Attribute Rating | |
|------------------------|--------------|---------------|-----------------------------|---------------|
| | Detection | Non-Detection | Detection | Non-Detection |
| Price | | | | |
| <i>M</i> | 4.25 | 3.61 | 3.63 | 3.73 |
| <i>SD</i> | 0.97 | 1.14 | 0.45 | 0.54 |
| <i>n</i> | 12 | 18 | 12 | 18 |
| Other Attributes | | | | |
| <i>M</i> | 4.40 | 4.04 | 3.56 | 3.81 |
| <i>SD</i> | 0.55 | 0.89 | 0.77 | 0.56 |
| <i>n</i> | 5 | 25 | 5 | 25 |

The third hypothesis that participants who originally chose the cheaper laptop would be more likely to detect the manipulation than would participants who initially picked the more expensive laptop was not supported. Out of the 18 people who originally chose the cheaper laptop, 7 (38.9%) detected the manipulation. Out of the 12 participants who initially picked the more expensive laptop, 3 (25%) noticed the switch (see Figure 4). However, this disparity was not significant, $\chi^2(1, N = 30) = 0.63, p = .43$.

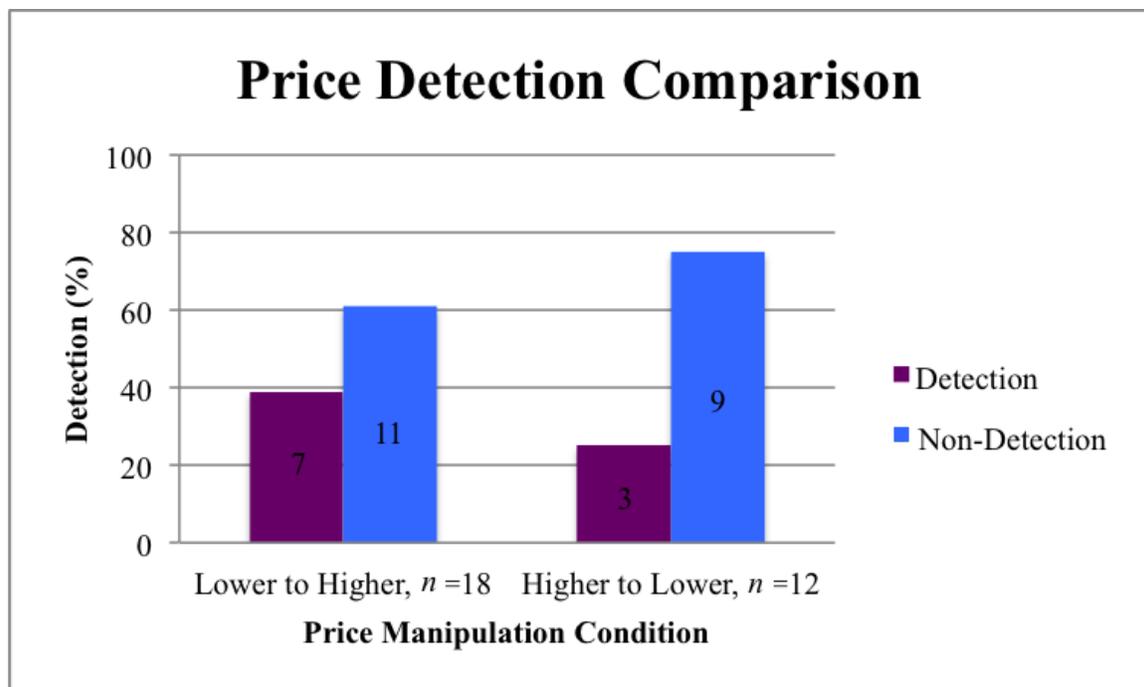


Figure 4. Comparison of participants' detection of the manipulation of price from lower to higher and higher to lower.

Out of the 43 participants who did not detect the manipulation, 18 people gave verbal justifications for the choice they did not originally pick. These participants represent 30% of the total sample. Out of these 18 people who provided justification, 9 (50%) had the price manipulated and the remaining 9 (50%) had the other attributes of the laptop switched. These 18 participants had their verbal justifications recorded and organized into six categories (see Appendix E).

To examine the effects of participants who provided justification vs. people who did not justify and manipulation condition on the ratings of price or the other attributes, a 2 (justification vs. no justification) x 2 (price vs. other attributes manipulation) multivariate analysis of variance was conducted on the participants' ratings of price and their mean rating of the other attributes. Neither of the main effects of justification (Wilks's Lambda = 0.99; $F(2, 55) = 0.12, p = .89$) or manipulation condition (Wilks's Lambda = 0.99; $F(2, 55) = 0.15, p = .86$) was significant. The interaction of justification x manipulation condition was also not significant (Wilks's Lambda = 0.98; $F(2, 55) = 0.42, p = .66$). Means and standard deviations for the rating of price and the mean rating of the other attributes for justification, no justification, and both manipulation conditions are presented in Table 3.

Table 3

Means and Standard Deviations for the Rating of Price and the Mean Rating of the Other Attributes for Justification, No Justification, and Both Manipulation Conditions

| Manipulation Condition | Price Rating | | Mean Other Attribute Rating | |
|------------------------|---------------|------------------|-----------------------------|------------------|
| | Justification | No Justification | Justification | No Justification |
| Price | | | | |
| <i>M</i> | 4.14 | 3.78 | 3.68 | 3.70 |
| <i>SD</i> | 1.07 | 1.12 | 0.53 | 0.50 |
| <i>n</i> | 7 | 23 | 7 | 23 |
| Other Attributes | | | | |
| <i>M</i> | 4.00 | 4.16 | 3.71 | 3.80 |
| <i>SD</i> | 0.77 | 0.90 | 0.65 | 0.57 |
| <i>n</i> | 11 | 19 | 11 | 19 |

Out of the 18 people who did not detect and provided verbal justification, 15 participants gave self-contradictory justifications. These people rated either the price or the other specific attribute(s) that they justified to be very important (4 or 5) in their initial decision prior to the manipulation. Of these 15 participants, 6 people (40%) gave self-contradictory justification for price, whereas 9 (60%) provided self-contradictory justification for one or more of the other attributes. This difference was not significant, $\chi^2(1, N = 15) = 0.80, p = .37$.

To examine the effects of participants who provided self-contradictory justification vs. people who did not give self-contradictory statements and manipulation condition on the ratings of price or the other attributes, a 2 (self-contradictory justification vs. no self-contradictory justification) x 2 (price vs. other attributes manipulation) multivariate analysis of variance was conducted on the participants' ratings of price and their mean rating of the other attributes. Neither of the main effects of self-contradictory justification (Wilks's Lambda = 0.96; $F(2, 55) = 1.28, p = .29$) or manipulation condition (Wilks's Lambda = 1.00; $F(2, 55) = 0.01, p = .98$) was significant. The interaction of self-contradictory justification x manipulation condition was also not significant (Wilks's Lambda = 0.95; $F(2, 55) = 1.55, p = .22$). Means and standard deviations for the rating of price and the mean rating of the other attributes for self-contradictory justification, no self-contradictory justification, and both manipulation conditions are presented in Table 4.

Table 4

Means and Standard Deviations for the Rating of Price and the Mean Rating of the Other Attributes for Self-Contradictory Justification, No Self-Contradictory Justification, and Both Manipulation Conditions

| Manipulation Condition | Price Rating | | Mean Other Attribute Rating | |
|------------------------|------------------|-------------------|-----------------------------|-------------------|
| | SCJ ^a | NSCJ ^b | SCJ ^a | NSCJ ^b |
| Price | | | | |
| <i>M</i> | 4.50 | 3.71 | 3.67 | 3.70 |
| <i>SD</i> | 0.55 | 1.16 | 0.57 | 0.49 |
| <i>n</i> | 6 | 24 | 6 | 24 |
| Other Attributes | | | | |
| <i>M</i> | 4.00 | 4.14 | 3.53 | 3.87 |
| <i>SD</i> | 0.71 | 0.91 | 0.52 | 0.60 |
| <i>n</i> | 9 | 21 | 9 | 21 |

^aSelf-contradictory justification

^bNo self-contradictory justification

Discussion

Choice blindness is a relatively new tool within the field of experimental psychology and there has been little research connecting this phenomenon and consumer decision-making. The goal of the present study was to examine introspection and self-knowledge in the domain of consumer choice using choice blindness methodology. The experiment itself examined the outcome of manipulating the price and other specific quantifiable attributes of consumer goods. This study was the first of its kind because the specific attributes that led to the participant's choice were the focus of manipulation, rather than the choice itself.

The primary hypothesis that a significant choice blindness effect would be established in this study was supported. It was demonstrated that the vast majority of the sample (71.7%) was unable to detect a manipulation of either the price or other quantifiable attributes of the laptop item. The 28.3% overall detection rate is similar to the detection rate in previous choice blindness studies, which is around 30% (Johansson et al., 2005).

It could be argued that the overall detection rate might have been higher if the decision were of greater importance to the participants. In previous change blindness experiments, people were more likely to notice when the changes concerned features that were of central interest and/or when participants were particularly knowledgeable about the changed features (Rensink, 2002; Triesch, Ballard, Hayhoe, & Sullivan, 2003). In the present study, over 70% of participants were blind to the mismatch between the intended and the actual outcome of their choice. For example, while a participant may have intended to choose the less expensive laptop (a central-interest, non-peripheral stimuli), he or she failed to realize that he or she ended up with the other laptop's higher price. The overall detection rate of the present experiment has once again established that choice blindness is a robust, replicable, and dramatic effect. If people have full,

conscious, and accurate access to their decision-making processes, it would be expected that the rate of non-detection would be much lower.

The strongest evidence that many participants were indeed blind to the mismatch between choice and outcome was found in participants' verbal justifications. Following the completion of the demographic questionnaire, participants were asked why they chose a particular item over the other and why certain attributes were important in their decision. Out of the 43 participants who revealed no signs of detection, 18 gave verbal reasoning and justification for aspects of the laptop that they did not originally choose (see Table 1 and Appendix E). These people represent 30% of the total sample. In addition, 15 of these non-detecting participants provided self-contradictory justifications. These people offered a justification that contradicted attribute ratings that they judged to be very important (4 or 5) in their initial decision prior to the manipulation. Participants who offered self-contradictory justification represent 25% of the total sample.

There are a number of possible explanations for why participants did not recognize the manipulation and in some cases, coherently justified contradictory aspects of their choice. Dijksterhuis et al. (2005) suggest that unconscious cognitive processes drive consumers. Participants in the present study may not have been consciously aware of their initial judgments or the reasoning for their judgments. Therefore, it would not have been possible for people to describe their conscious cognitive strategy without a strategy in the first place. These justifications and self-contradictory justifications may have represented confabulations based on post hoc reasoning, in which case participants were simply not careful enough when making their decisions. In addition, the need for consistency may have contributed to people's justifications and self-contradictory justifications. Participants could have modified their

preference accordingly with what opinions they believed to have previously expressed in order to reduce the effects of cognitive dissonance (Festinger, 1957).

Though the aforementioned explanations are compelling, they cannot fully explain the results of the current experiment. The rating aspect of the consumer goods questionnaire prompted participants to give careful consideration to all aspects of the items before making their choice. This approach made it highly unlikely that people made their judgments impulsively, or without consciously reflecting on the attributes. Another possible explanation can be related to Nisbett and Wilson's (1977) theory. People may have used higher cognitive processes to make their decisions, but did not have access to the memory of these processes when they were later asked why they chose a particular laptop over the other. Instead, participants used theoretical knowledge of why such attributes should be important in their decision, based on salient cues from their ratings, to justify their choice. The relatively low detection rate (28.3%) also suggests that participants did not have access to the memories of their choice mere minutes after making it. This pattern indicates that the memories of the choice must have degraded fairly rapidly after they were recorded on the questionnaire.

The second hypothesis that participants were significantly more likely to detect the switch of the laptop's price as opposed to its other attributes was also supported. Past research has emphasized the importance of price as a stimulus dimension in understanding an individual's information processing and choice behavior (Garner & Felfoldy, 1970; Rapaport & Wallsten, 1972). Price plays a multi-dimensional role in influencing purchase decisions and consumers view and use this feature in different ways, often re-adjusting its role in their choice behavior (Park, Lessig, & Merrill, 1982). This finding is also in accordance with the concept of price salience, where the price of an item is considered a pivotal determinant of people's perceptions

of consumer goods and subsequent decision-making (Kim & Kachersky, 2006). Yet, research investigating what exactly makes a price salient has produced few conclusive findings.

The order in which the laptop's attributes were listed in this study may have had an effect on how they were perceived by participants. A stimulus is considered salient to the extent that it visually stands out relative to the other stimuli. When people perform a general visual search on a page they often follow a pattern that has a great influence on the visual hierarchy. People tend to exhibit a top down viewing preference; for that reason, items located at the top of a page will have priority in the visual hierarchy over other items on the page (Djamasbi, Siegel, & Tullis, 2011). In regard to the present experiment, participants may have attached a disproportionately high weight to the price of the laptop because it was listed first. This position could have made the price visually salient and also more detectable compared to the other attributes.

The third hypothesis that participants who originally chose the cheaper laptop would be more likely to detect the manipulation than would people who initially chose the more expensive laptop was not supported. More people in the price manipulation condition initially chose the cheaper laptop, which may have affected the results. Out of the 18 people who originally chose the cheaper laptop, 7 (38.9%) detected the manipulation. Out of the 12 participants who initially picked the more expensive laptop, only 3 (25%) noticed the switch. This difference was not significant. A more equal distribution of people in each price choice category and more participants overall may have generated sufficient power to produce a significant difference.

There were several limitations to the current research. Only one type of consumer good was manipulated in this experiment: the laptop. It is therefore difficult to generalize the finding that consumer preferences are malleable to all other consumer products. People's opinions and preferences may be more impressionable for certain types of consumer products. In expanding

the categories, future choice blindness research might use a similar paradigm for non-technological everyday consumer goods (i.e., food or cosmetics) and examine whether there are any variations in malleability across different product types.

Another major limitation of this study was the fact that the price and other attributes of the laptop item were not counterbalanced. Participants were more likely to detect the manipulation of price as opposed to the other attributes. The price was listed first; for that reason, people may have attached a disproportionately high weight to it. Future research on choice blindness in consumer decision-making should randomize the order in which price and other attributes are listed.

The reliance on a student sample was an additional limitation. The participant pool in the present study yielded disproportionate distributions among age, racial and ethnic backgrounds, and gender. Because of the restricted sample, there may be issues regarding the extent to which the results are generalizable to the American consumer population as a whole.

The honesty of participants is also an important factor to consider. People may have noticed the manipulation but refrained from verbalizing their detection to the experimenter. This issue can be addressed by examining the implicit measures included in the study and the context of the verbal reports. Participants were well acquainted with the focus of the choice blindness manipulation, the laptop. In reviewing the information collected by the demographic questionnaire, all 60 participants reported owning a laptop computer. When the true nature of the experiment was revealed to the participants that did not detect the switch, people often expressed astonishment and even disbelief. The experimenter had no reason to believe that this reaction was anything but genuine and it would be extremely difficult to assess if participants were pretending that they did not notice the manipulation.

Consumer research is a growing field with tangible implications for real world decision-making. The choice blindness methodology goes beyond typical consumer research and focuses on people's motivations and desires. Previous choice blindness studies in conjunction with this experiment establish some counterintuitive evidence about the vagueness of people's preferences and lack of self-knowledge as consumers. This study demonstrated that participants' exposure to mismatched outcomes generated significant preference change. This finding puts substantial pressure on several aspects of economic theory including expected utility models and rational choice theory. If the majority of participants were willing to accept and even endorse the opposite of what they intended just minutes earlier, then a choice's consequence cannot just be an underlying preference. Therefore, it can be inferred that preferences are not only constructed to make a particular choice, but are also shaped by the outcome of a decision.

Every business strives to understand the thoughts and feelings of its target consumers. The current research questioned the prevailing assumption that consumers' opinions and product preferences are stable pieces of information. The fact that over 70% of participants were blind to the mismatch between the intended and actual outcome of their choice suggests that people's preferences and opinions of products are malleable and unstable. Furthermore, the justifications and self-contradictory justifications offered by participants who did not detect the manipulation imply that consumers do not have introspective access into the cognitive processes responsible for their preference formation. It may also be true that participants did not have a thoughtful cognitive strategy in the first place. Choice could have been a behavioral event, and the verbal responses both on the initial attribute ratings and in any later justifications were simply subsequent to the behavior.

In this experiment, a simple manipulation changed the majority of participants' preferences. This flexibility is a potential problem for businesses and market research firms that use unstable consumer insights to help understand and predict consumer behavior. The malleability of consumer preference may help explain the observation that what people say does not always predict what they will do (Glasman & Albarracín, 2006). This phenomenon has also been recognized to occur in consumer settings (Chandon, Morwitz, & Reinartz, 2004; Simonson, 2005). If consumer preference is not stable and is subject to change, then it is not surprising that people's spoken preference may not predict future purchasing behavior.

Other than demonstrating that consumer preferences can be manipulated, the current study highlights the problem of asking consumers about their opinions. The reasoning behind product opinions may not be introspectively or consciously available. Choice blindness is a useful technique to apply to the fields of consumer marketing and market research, as it combines implicit and explicit behavior and covers numerous aspects of decision-making. Understanding the underlying factors that determine the formation of preferences and which options consumers will choose is critical for the development of an effective marketing strategy. This experiment has shown that consumer preference is far from static; for that reason, it is necessary to explore what specific factors contribute to maintaining and strengthening product preference. The choice blindness methodology may help to provide a solution to the current debate of whether conscious or unconscious influence is stronger in consumer preference formation.

References

- Ariely, D., Loewenstein, G., & Prelec, D. (2003). Coherent arbitrariness: Stable demand curves without stable preferences. *The Quarterly Journal of Economics*, *118*(1), 73-105. doi:10.1162/00335530360535153
- Ariely, D., & Norton, M. I. (2008). How actions create – not just reveal – preferences. *Trends in Cognitive Sciences*, *12*(1), 13-16. doi:10.1016/j.tics.2007.10.00
- Bem, D. J. (1967). Self-perception: An alternative interpretation of cognitive dissonance phenomena. *Psychological Review*, *74*, 183-200. doi:10.1037/h0024835
- Bem, D. J. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (pp. 1-62). Vol. 6. New York, NY: Academic Press.
- Brasil-Neto, J., Joaquim, P., Pascual-Leone, A., Valls-Solé, J., Cohen, L. G., & Hallett, M. (1992). Focal transcranial magnetic stimulation and response bias in a forced task. *Journal of Neurology, Neurosurgery, and Psychiatry*, *55*, 964-966. doi:10.1136/jnnp.55.10.964
- Brehm, J. W. (1956). Postdecision changes in the desirability of alternatives. *Journal of Abnormal Psychology*, *52*, 384-389. doi:10.1037/h0041006
- Chaiken, S. (1980). Heuristic versus systematic information processing and the use of source versus message cues in persuasion. *Journal of Personality and Social Psychology*, *39*, 752-766. doi:10.1037/0022-3514.39.5.752
- Chandon, P., Morwitz, V. G., & Reinartz, W. J. (2004). The short and long-term effects of measuring intent to repurchase. *Journal of Consumer Research*, *31*, 566-572. doi:10.1086/425091
- Chartrand, T. L. (2005). The role of conscious awareness in consumer behavior. *Journal*

- of Consumer Psychology*, 15, 203-210. doi:10.1207/s15327663jcp1503_4
- Chater, N., Johansson, P., & Hall, L. (2011). The non-existence of risk attitude. *Frontiers in Psychology*, 2(1), 303. doi:10.3389/fpsyg.2011.00303
- Dawes, J. (2004). Price changes and defection levels in a subscription-type market. *Journal of Services and Marketing*, 18(1), 35-44.
doi:10.1108/08876040410520690
- Deaton, A., & Muellbaur, J. (1980). *Economics and consumer behavior*. Cambridge, England: Cambridge University Press.
- Dijksterhuis, A., Smith, P. K., Van Baaren, R. B., & Wigboldus, D. H. J. (2005). The unconscious consumer: Effects of environment on consumer behavior. *Journal of Consumer Psychology*, 15, 193-202. doi:10.1207/s15327663jcp1503_3
- Djamasbi, S., Siegel, M., & Tullis, T. (2011). Visual hierarchy and viewing behavior: An eye tracking study. In J. A. Jacko (Ed.), *Human-computer interaction, part I* (pp. 331-340). Orlando, FL: Springer Berlin Heidelberg.
- Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.
- Festinger, L. (1964). *Conflict, decision, and dissonance*. Stanford, CA: Stanford University Press.
- Frenkel, O. J., & Doob, A. N. (1976). Post-decision dissonance at the polling booth. *Canadian Journal of Behavioural Science*, 8, 347-350. doi:10.1037/h0081960
- Garner, W. R., & Felfoldy, G. L. (1970). Integrality of stimulus dimensions in various types of information processing. *Cognitive Psychology*, 1, 225-241.
doi:10.1016/010-0285(70)90016-2

- Gazzaniga, M. S. (1998). *The mind's past*. Berkley, CA: University of California Press.
- Glasman, L. R., & Albarracín, D. (2006). Forming attitudes that predict future behavior: A meta-analysis of the attitude-behavior relation. *Psychological Bulletin*, *132*, 778-822. doi:10.1037/0033-2909.132.5.778
- Goldberg, J., & von Nitzsch, R. (2001). *Behavioral finance*. New York, NY: John Wiley & Sons, Inc.
- Grimes, J. (1996). On the failure to detect change in scenes across saccades. In K. Akins (Ed.), *Perception: Vol. 2 Vancouver studies in cognitive science* (pp. 89-110). New York, NY: Oxford University Press.
- Grunert, K. G. (2003). Can we understand consumers by asking them? *Marketing Research*, *15*, 46-48. doi:10/164874
- Hall, L., Johansson, P., & Strandberg, T. (2012). Lifting the veil of morality: Choice blindness and moral attitude reversals on a self-transforming survey. *PLOS ONE*, *7*: e45457. doi:10.1371/journal.pone.0045457
- Hall, L., Johansson, P., Tärning, B., Sikström, S., & Chater, N. (in preparation). Preference change and choice blindness.
- Hall, L., Johansson, P., Tärning, B., Sikström, S., & Deutgen, T. (2010). Magic at the marketplace: Choice blindness for the taste of jam and the smell of tea. *Cognition*, *117*, 54-61. doi:10.1016/j.cognition.2010.06.010
- Henderson, J. M. (1997). Transsaccadic memory and integration during real-world object perception. *Psychological Science*, *8*, 51-55. doi: 10.1111/j.14679280.1997.tb00543.x
- Johansson, P., Hall, L., Sikström, S., & Olsson, A. (2005). Failure to detect mismatches between intention and outcome in a simple decision task. *Science*, *310*(5745),

116-119. doi:10.1126/science.1111709

Johansson, P., Hall, L., Sikström, S., Tärning, B., & Lind, A. (2006). How something can be said about telling more than we can know: On choice blindness and introspection. *Consciousness and Cognition, 15*, 673-692.
doi:10.1016/j.concog.2006.09.004

Johansson, P., & Lars, H. (2008). From change blindness to choice blindness. *Psychologia, 51*, 142-155. doi:10.2117/psysoc.2008.142

Johansson, P., Tentori, K., Harris, A., Hall, L., & Chater, N. (in preparation). Choice blindness for personality traits.

Jones, B. T., Jones, B. C., Smith, H., & Copley, N. (2003). A flicker paradigm for inducing change blindness reveals alcohol and cannabis information processing biases in social users. *Addiction, 98*, 235-244.
doi:10.1046/j/1360-0443.2003.00270.x

Kahneman, D., & Fredrick, S. (2002). Representativeness revisited: Attribute substitution in intuitive judgment. In T. Gilovich, D. Griffin, & D. Kahneman (Ed.), *Heuristics and biases: The psychology of intuitive judgment* (pp. 49-81). Cambridge, England: Cambridge University Press.

Kahneman, D., & Snell, J. (1992) Predicting a changing taste: Do people know what they will like? *Journal of Behavioral Decision Making, 5*, 187-200.
doi:10.1002/bdm.3960050304

Kahneman, D. (2011). *Thinking, fast and slow*. New York, NY: Farrar, Straus and Giroux.

- Kelley, T. A., Chun, M. M., & Chua, K. P. (2003). Effects of scene inversion on change detection of targets matched for visual salience. *Journal of Vision*, 2(3), 1-5.
doi:10.1167/3.1.1
- Kim, H. M., & Kachersky, L. (2006). Dimensions of price salience: A conceptual framework for perceptions of multi-dimensional prices. *Journal of Product & Brand Management*, 15(2), 139-147. doi:10.1108/10610420610658974
- Krueger, J. I., & Funder, D. C. (2004). Towards a balanced social psychology: Causes, consequences and cure for the problem-seeking approach to social behavior and cognition. *Behavioral and Brain Sciences*, 27, 313-376.
doi:10.1017/S0140525X04000081
- Lawler, E. E., Kuleck, W. J., Rhode, J. G., & Sorensen, J. E. (1975). Job choice and post decision dissonance. *Organizational Behavior & Human Decision Processes*, 13(1), 133-145. doi:10.1016/0030-5073(75)90009-4
- Levin, D. T., & Simons, D. J. (1997). Failure to detect changes to attended objects in motion pictures. *Psychonomic Bulletin & Review*, 4, 501-506.
doi:10.1.1.132.7061
- Libet, B. (1985). Unconscious cerebral initiative and the role of conscious will in voluntary action. *The Behavioral and Brain Sciences*, 8, 529-566.
doi:10.1017/S0140525X00044903
- Nisbett, R., & Wilson, T. (1977). Telling more than we can know. *Psychological Review*, 84, 231-295. doi:10.1007/s004260000023
- North, A. C., Hargreaves, D. J., & McKendrick, J. (1997). In-store music affects product choice. *Nature*, 390(1), 132. doi:10.1038/36484

- Palsher, H. (1988). Familiarity and visual change detection. *Perception & Psychophysics*, *44*, 369-378. doi:10.3758/BF03210419
- Park, C. W., Lessig, V. P., & Merrill, J. R. (1982). The elusive role of price in brand choice behavior. In A. A. Mitchell (Ed.), *Advances in consumer research* (pp. 201-205). Ann Arbor, MI: Association for Consumer Research.
- Payne, J. W., Bettman, J. R., & Johnson, E. J. (1993). *The adaptive decision maker*. Cambridge, England: Cambridge University Press.
- Petty, R. E., Cacioppo, J. T., & Schumann, D. (1983). Central and peripheral routes to advertising effectiveness: The moderating role of involvement. *Journal of Consumer Research*, *10*, 135-146. doi:10.1086/208954
- Rapaport, A., & Wallsten, T. S. (1972). Individual decision behavior. *Annual Review of Psychology*, *23*(1), 131-179. doi:10.1146/annurev.ps.23.020172.001023
- Rensink, R. A. (2002). Change detection. *Annual Review of Psychology*, *53*, 252-277. doi:10.0084/6570/02.0245
- Rensink, R. A., O'Regan, J. K., & Clark, J. J. (1997). To see or not to see: The need for attention to perceive changes in scenes. *Psychological Science*, *8*, 368-373. doi:10.1111/j.1467-9280.1997.tb00427.x
- Ridderinkhof, K. R., van den Wildenberg, W. P. M., Segalowitz, S. J., & Carter, C. S. (2004). Neurocognitive mechanisms of cognitive control: The role of prefrontal cortex in action selection, response inhibition, performance monitoring, and reward-based learning. *Brain and Cognition*, *56*, 129-140. doi:10.1016/j.bandc.2004.09.016
- Roth, G. (2003). The interaction of cortex and basal ganglia in the control of voluntary

- actions. In S. Maasen, W. Prinz, & G. Roth (Ed.), *Voluntary action: Brains, minds, and sociality* (pp. 115-132). New York, NY: Oxford University Press.
- Shafir, E., Simonson, I., & Tversky, A. (1993). Reason-based choice. *Cognition*, *49*, 11-36. doi:0010-0277/93/506.00
- Simons, D. J., & Levin, D. T. (1998). Failure to detect changes to people in a real-world interaction. *Psychonomic Bulletin & Review*, *5*, 644-649.
doi:10.3758/BF03208840
- Simons, D. J., & Rensink, R. A. (2005). Change blindness: Past, present, and future. *Trends in Cognitive Sciences*, *9*, 16-20. doi:10.1016/j.tis.2004.11.006
- Simonson, I. (2005). In defense of consciousness: The role of conscious and unconscious inputs in consumer choice. *Journal of Consumer Psychology*, *15*, 211-217. doi:10.1207/s15327633jcp1503_5
- Slooman, S. A. (1996). The empirical case for two systems of reasoning. *Psychological Bulletin*, *119*, 3-22. doi:10.1037/0033-2909.119.1.3
- Slovic, P. (1995). The construction of preference. *American Psychologist*, *50*, 364-371. doi:10.1037/0003-066X.50.5.364
- Stanovich, K. E. (1999). *Who is rational? Studies of individual differences in reasoning*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Triesch, J., Ballard, D., Hayhoe, M., & Sullivan, B. (2003). What you see is what you need. *Journal of Vision*, *3*(1), 86-94. doi:10.1167/3.1.9
- Tversky, A., & Kahneman, D. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, *47*(2), 263-291. doi:10.2307/1914185

- Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, *211*(4481), 453-458. doi:10.1126/science.7455683
- Tversky, A., & Kahneman, D. (1991). Loss aversion in riskless choice: A reference-dependent model. *The Quarterly Journal of Economics*, *106*, 1039-1061. doi:10.1177/019251296017002004
- Ullsperger, M., & von Cramon, D. Y. (2004). Neuroimaging of performance monitoring: Error detection and beyond. *Cortex*, *40*(4-5), 593-604. doi:10.1016/S0010-9452(08)70155-2
- van Duijn, M., & Bem, S. (2005). On the alleged illusion of conscious will. *Philosophical Psychology*, *18*, 699-714. doi:10.1080/09515080500355210
- Venkatraman, M. P., & MacInnes, J. (1985). The epistemic and sensory exploratory behaviors of hedonic and cognitive consumers. In E. C. Hirschman & M. B. Holbrook (Ed.), *Advances in consumer research* (pp. 102-107). Provo, UT: Association for Consumer Research.
- Wegner, D. M. (2002). *The illusion of conscious will*. Cambridge, MA: MIT Press.
- Wegner, D. M. (2003). The mind's best trick: How we experience the conscious will. *Trends in Cognitive Science*, *7*(2), 65-69. doi:10.1016/S1364-6613(03)00002-0
- Werner, S., & Thies, B. (2000). Is 'change blindness' attenuated by domain-specific expertise? An expert-novices comparison of change detection in football images. *Visual Cognition*, *7*(1-3), 163-174. doi:10.1080/135062800394748
- Wilkinson, N. (2008). *An introduction to behavioral economics*. New York, NY: Palgrave Macmillan.

Appendix A

Informed Consent

I hereby consent to participate in Jessica Schanzer's research about consumer decision-making and online shopping. I have been told that there are no known risks or discomforts related to participating in this research. I have been told that Jessica Schanzer can be contacted at jschanze@conncoll.edu. I understand that I may decline to answer any questions as I see fit, and that I may withdraw from the study without penalty at any time. I understand that all information provided will not be linked directly to specific participants. Responses are to be combined with other participants' responses and are not meant to gather information about specific individuals. I consent to publication of the results as long as the identity of all participants is protected. I consent to the written recording of all interview responses. I understand that the Connecticut College Human Subjects Institutional Review Board (IRB) has approved this research.

Concerns about any aspects of this study may be addressed to Professor Jason Nier, Chairperson of the Connecticut College IRB, at janie@conncoll.edu.

I am least 18 years of age, and I have read these explanations and assurances and voluntarily consent to participate in this research about consumer decision-making and online shopping.

Name (printed) _____

Signature _____

Date _____

Appendix B

Consumer Goods Questionnaire



Laptop A



Laptop B

Price: \$589.99
 17.3" LED-Backlit Display
 1600x900 Resolution
 4 GB Memory
 320 GB Hard Drive
 7-Hour Battery Life

Price: \$679.99
 15.6" LED-Backlit Display
 1366x768 Resolution
 5 GB Memory
 480 GB Hard Drive
 6.5-Hour Battery Life

| | Not at all important | | | | Very important |
|-------------|----------------------|---|---|---|----------------|
| Price: | 1 | 2 | 3 | 4 | 5 |
| Display: | 1 | 2 | 3 | 4 | 5 |
| Resolution: | 1 | 2 | 3 | 4 | 5 |
| Memory: | 1 | 2 | 3 | 4 | 5 |
| Hard Drive: | 1 | 2 | 3 | 4 | 5 |
| Battery: | 1 | 2 | 3 | 4 | 5 |



Car A



Car B

Price: \$18,230
 ~23 MPG
 5* Crash Test Rating
 8 Airbags
 140@6500 Horsepower
 2 Cupholders

Price: \$16,210
 ~33 MPG
 4* Crash Test Rating
 6 Airbags
 132@6000 Horsepower
 4 Cupholders

| | Not at all important | | | | Very important |
|---------------|----------------------|---|---|---|----------------|
| Price: | 1 | 2 | 3 | 4 | 5 |
| MPG: | 1 | 2 | 3 | 4 | 5 |
| Crash Rating: | 1 | 2 | 3 | 4 | 5 |
| Airbags: | 1 | 2 | 3 | 4 | 5 |
| Horsepower: | 1 | 2 | 3 | 4 | 5 |
| Cupholders: | 1 | 2 | 3 | 4 | 5 |



Television A



Television B

Price: \$479.99
 42" LCD Screen
 5" Slim Design
 1080p Display
 2 USB Ports
 2 9w Speakers

Price: \$329.99
 50" LCD Screen
 3.5" Slim Design
 720p Display
 1 USB Port
 2 8w Speakers

| | Not at all important | | | | Very important |
|------------|----------------------|---|---|---|----------------|
| Price: | 1 | 2 | 3 | 4 | 5 |
| Screen: | 1 | 2 | 3 | 4 | 5 |
| Design: | 1 | 2 | 3 | 4 | 5 |
| Display: | 1 | 2 | 3 | 4 | 5 |
| USB Ports: | 1 | 2 | 3 | 4 | 5 |
| Speakers: | 1 | 2 | 3 | 4 | 5 |

Appendix C**Demographic Questionnaire**

Gender: _____

Age: _____

Race/Ethnicity:

- a. Hispanic/Latino(a)
- b. Asian/Asian Pacific
- c. Caucasian/White
- d. Native American
- e. African American/Black
- f. Other _____

Class year:

- a. 2013
- b. 2014
- c. 2015
- d. 2016

Online Shopping Use

1. Do you own a laptop computer?
 - a. Yes
 - b. No
2. Which do you prefer? (Choose one)
 - a. Shopping online
 - b. Shopping using catalogues
 - c. Shopping in a store
3. Do you have an online shopping account?
 - a. Yes
 - b. No
4. If you answered yes, which site(s) do you use?

5. Why did you sign up for an online shopping account?

6. On average, how many hours do you spend online shopping

a. Per day? _____

b. Per week? _____

7. On average, how many times do you check your online shopping account(s) per day?

8. On average, how many times do you check your online shopping account(s) per week?

9. Do you get online shopping updates on your phone?

a. Yes

b. No

Appendix D

Debriefing Form

Thank you for participating in this experiment investigating choice blindness in consumer decision-making. Choice blindness is a research tool in which the experimenter secretly manipulates the relationship between choice and outcome. The use of deception is a necessary aspect of choice blindness. This experiment will help establish that consumer preferences are not well defined and can be manipulated. This study will also examine in the relationship between intention, choice, and introspection. **Because of the deception in this experiment, please refrain from telling other students about the true aims of this study.**

If you are interested in this topic and would like to read the literature in this area please contact Jessica Schanzer (jschanze@conncoll.edu). If you have concerns about any aspects of this study please contact Professor Jason Nier, Chairperson of the Connecticut College Institutional Review Board (janie@conncoll.edu, Ext. 5057). Listed below are three sources you may want to consult to learn more about this topic:

Hall, L., Johansson, P., Tärning, B., Sikström, S., & Deutgen, T. (2010). Magic at the marketplace: Choice blindness for the taste of jam and the smell of tea. *Cognition*, 117, 54-61. doi:10.1016/j.cognition.2010.06.010

Johansson, P., Hall, L., Sikström, S., & Olsson, A. (2005). Failure to detect mismatches between intention and outcome in a simple decision task. *Science*, 310(5745), 116-119. doi:10.1126/science.1111709

Johansson, P., & Lars, H. (2008). From change blindness to choice blindness. *Psychologia*, 51, 142-155. doi:10.2117/psysoc.2008.142

Appendix E

Non-Detecting Participant Justification and Self-Contradictory Justification Quotes

1. Participants who originally chose the cheaper laptop (A) but justified the other laptop's (B) higher price:

^aParticipant #7: "I think that if it's more expensive, it's better quality."

Rated price 4

^aParticipant #15: "The more expensive one is worth the advantages."

Rated price 4

^aParticipant #19: "I was willing to pay more for the longer battery life."

Rated price 5 and battery 5

^aParticipant #29: "Price was very important, but the extra battery was worth it."

Rated price 5 and battery 5

^aParticipant #39: "I thought the extra money would be worth the investment because I'd use it so frequently."

Rated price 4

^aParticipant #41: "Even though it cost more, it had more battery so it's worth it."

Rated price 5

2. Participants who originally chose the laptop with lower memory (A) but justified the other laptop's (B) higher memory:

Participant #2: "It has better memory and I didn't think a half hour of battery made a big difference."

Rated memory 3 and battery 4

^{a,b}Participant #38: "I like smaller computers. And it had more memory. Battery-wise I don't really care."

Rated memory 4, display 4, and battery 2

^aParticipant #42: "Display size is less important to me than memory. I don't want my computer crashing because there's not enough space or something."

Rated memory 4 and display 3

^aParticipant #48: "I wanted more memory because I do a lot of photography. The battery life was pretty similar."

Rated memory 4 and battery 3

^aParticipant #50: “I don’t need a big display or resolution. I’d rather have more memory just in case something went wrong. The battery life was fairly comparable.”

Rated memory 4, resolution 3, display 3, and battery 4

3. Participants who originally chose the laptop with the larger display (A) but justified the other laptop’s (B) smaller display:

Participant #32: “I don’t really like bigger laptops because they’re heavier.”

Rated display 3

^aParticipant #36: “I thought that the screen size was way too big. Also the difference in battery life was negligible.”

Rated display 4 and battery 3

^{a,b}Participant #38: “I like smaller computers. And it had more memory. Battery-wise I don’t really care.”

Rated display 4, memory 4, and battery 2

4. Participants who originally chose the more expensive laptop (B) but justified the other laptop’s (A) lower price:

^aParticipant #25: “I picked laptop B because it was cheaper.”

Rated price 4

^aParticipant #45: “I picked laptop B mostly for the battery and memory. And it was cheaper!”

Rated price 4, battery 5, and memory 5

Participant #47: “I chose it because of the memory and hard drive. The fact that it was less expensive was a plus.”

Rated price 2, memory 4, and hard drive 4

5. Participants who originally chose the laptop with the lower resolution (B) but justified the other laptop’s (A) higher resolution:

^aParticipant #18: “Resolution was very important to me in my decision, so I naturally picked the one with better resolution.”

Rated resolution 5

^bParticipant #22: “It’s more expensive, but I feel that makes it worth it. More battery, better resolution, etcetera.”

Rated resolution 3 and battery 5

6. Participants who originally chose the laptop with less battery life (B) but justified the other laptop’s (A) higher battery:

^bParticipant #22: “It’s more expensive, but I feel that makes it worth it. More battery, better resolution, etcetera.”

Rated battery 5 and resolution 3

^aThese 15 participants gave self-contradictory justification, meaning that they rated either the price or the other specific attribute(s) that they justified to be very important (4 or 5) in their initial decision prior to the switch.

^bParticipants #22 and #38 provided justification for two separate attributes.