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The Decoy Effect on Consumer Choice: An Experimental Analysis of the Effects of Brand,
Product Involvement and Consumer Age

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ABSTRACT

The decoy effect is a phenomenon in which, through the addition of an inferior alternative product, consumers consider a target option to be more preferable. This, in turn, increases the share of the target product. Additionally, several factors, such as brand information, product involvement, the attitude toward health risk, and consumers' age group, have shown to influence individuals' perception of value and choice. This study looks to expand on past research and analyze the impact of the presence of the decoy in cell phone and disinfecting wipes choice matrices. In addition, this study attempts to assess the moderating effects of the aforementioned factors on the decoy effect. An online fixed effects between-subjects study was designed and disseminated to a national audience. A series of cross-tabulation and logistic regression analyses found that the decoy effect was present in cell phones but not in disinfecting wipes, and that brand information and levels of product involvement moderated the effect of the decoy on choice. The results of the study suggest that both brand name and product involvement play a significant role in individuals' decision-making process. Similarly, firms who wish to enhance their market share can utilize the decoy effect, provided that their products fall within the boundaries of the decoy effect's range. Future research suggestions include expanding the product groups, evaluating the boundaries of the decoy effect, and further examining the influence of age on the decoy effect.

Keywords: Decoy effect, cell phones, disinfecting wipes, decision making, millennials, consumer behavior, behavioral economics, brand information, product involvement, COVID-19.

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Chapter 1

Introduction

Consumer Behavior and Decision Making

In order to achieve a better understanding of the impact of the decoy effect on consumers, one must first understand what drives peoples' actions and behaviors. Consumer behavior has been defined as "the mental, emotional, and physical activities that people engage in when selecting, purchasing, using, and disposing of products and services so as to satisfy needs and desires" (Wilkie, 1990, p. 14). Similarly, consumer behavior has been defined as a field of study that focuses on the goals and motivations that drive peoples' behaviors (Block et al., 2014).

At its core, consumer behavior focuses on individuals' goals (or outcomes). As such, it can be conceived as a goal-oriented activity that includes both setting and pursuing a particular outcome (Bagozzi & Dholakia, 1999). Similarly, this process of assessing, pursuing, and achieving a goal can be explained as part of the decision-making process that takes place when a person identifies a need or want, and seeks to satisfy it. This decision-making process is often referred to as the consumption process and includes six major stages: need recognition, information search, evaluation of alternatives, purchase, use, and post-use (Belz & Peattie, 2012). While there is a growing body of research that looks at each of these stages, this study looks to focus on the stages that pertain to the transactional decision-making process including: information search, evaluation of alternatives, and purchase. By focusing on these three stages, this research can help illustrate the potential significance that the decoy effect, brand

information, product involvement, attitudes toward health risks, and age group can have on individuals' purchase intentions.

Given the many factors that influence consumer decision making and behavior, Babin and Harris (2018) introduced a framework that integrates these factors, terming it the "Consumer Value Framework" (CVF). The CVF emerged from the idea that relationships between consumers and brands or products stem from consumers' preferences and can vary greatly between individuals. As such, developing a framework that incorporates different factors that impact consumer behavior can allow marketers to better understand how consumers and products interact. This framework, therefore, looks at the consumption process and related activities from a marketing perspective, while incorporating economic axioms that help provide a holistic approach to consumer behavior and decision making.

As mentioned above, the CVF considers how, under the assumption that consumers will choose products that provide the most perceived value, different factors shape consumption-related behaviors and ultimately determine the value derived from a particular activity. The components of this framework include the consumption process, internal influences such as consumer psychology and personality, external influences such as individuals' social environments and situational influences, the relationship quality between the individual and a brand, and the value an individual seeks to get from a particular behavior (Babin & Harris, 2018).

As part of the CVF, psychological and personality factors influence the way individuals perceive their surroundings that, as a result, impact their behaviors. As the field of consumer behavior and decision making developed, the concepts of consumer choice and decision making have been integral parts of the development of the field of behavioral economics. Behavioral

economics is the convergence of psychology and economics and attempts to explain consumer behaviors among different consumer segments, such as millennials, baby boomers, and Generation X through behavioral models. Behavioral models have enabled researchers to explain specific consumer behavior with a higher level of precision, compared to conventional economic theories (e.g., Kahneman, 2003; Kim et al., 2006; Teck-Hua & Zhang, 2008). For example, loss aversion is an important concept that was developed as part of prospect theory (Kahneman & Tversky, 1979). It depicts peoples' sensitivity to a possible loss, compared to an equal possible gain (Ho et al., 2006). This model helped frame how penalties can sometimes be more effective motivators than rewards (Gächter et al., 2009), as well as explain certain phenomena such as the sunk cost fallacy, endowment effect, and status quo bias (Kahneman et al., 1991; Tait & Miller, 2019). Similarly, the decoy effect (which will be discussed in depth in this paper) helped explain how, based on the choice of products presented, marketers and companies impact consumers' choice in a way that contradicts traditional economic models.

The Decoy Effect

As mentioned above, the decoy effect refers to how the presence of certain options helps sway consumer preferences towards a particular choice. Specifically, the decoy effect refers to the impact an asymmetrically dominated alternative or decoy product has on the perceived favorability of the option that dominates it, the target product (Ariely & Wallsten, 1995; Huber et al., 1982; Kim et al., 2006). A “decoy effect” occurs when a product option that more closely resembles the target than the alternative (the other product/option), yet is inferior to the target along at least one attribute dimension, is expected to shift some consumers away from the

alternative, *toward* the target. Several studies have attempted to explain the reasoning for the shift. Some explanations suggested the presence of attraction and compromise effects that, given the relative superiority a dominating product has on its decoy, make it easier for consumers to justify their choice for the superior product (Huber et al., 1982; Simonson, 1989).

The “decoy effect” was first studied by Huber et al. (1982). The authors demonstrated how introducing a decoy option violated the principle of regularity and the similarity hypothesis. Regularity asserts that adding options in a choice decision will not *increase* the likelihood that one of the existing alternatives will be chosen (Trimmer, 2013), but should instead draw consumers away from existing alternatives. It is a condition for most existing choice models and states that for any item that is part of group A, if A is a subset of B, then the probability of choosing X from A cannot be less than the probability of choosing X from B (Huber et al., 1982). In its simplest form, as demonstrated in (1), for all $x \in A \subseteq B$,

$$P(x; A) \geq P(x; B) \quad (1)$$

The similarity hypothesis (Tversky, 1972), further proposes that any effect of the new option would be on the most closely similar alternatives, not the more dissimilar ones. The decoy effect has been shown to violate both, and helps illustrate the need for better models to examine and predict consumer choice.

The decoy effect’s use

At its core, the decoy effect reflects a consumer’s internal efforts to simplify the choice tasks he or she faces. In a way, it is part of individuals’ heuristic thinking that helps them categorize items into groupings that are familiar or make sense (Kahneman, 2011; Park &

Lessig, 1981). A large body of research has demonstrated that higher complexity in choice hinders decision making and is associated with negative emotions (Ariely & Wallsten, 1995; Hedgecock & Rao, 2009; Huber et al., 1982), leading consumers to use heuristics, which simplify their choice process to where they only select a handful of attributes to examine when assessing the value of their choice (Bohner et al., 1995). By manipulating those key attributes, the decoy product sways the users in a particular direction while giving them the sense of making an informed, rational decision.

The decoy effect has been studied in a variety of contexts in order to understand its applicability to consumer decision making. In their analysis of six product types, Huber et al. (1982) hypothesize that through these observed “distortions of choice probabilities” (p. 95), corporate entities can increase the market share of their target product by shifting the perception of value seen by consumers. However, given the novelty of the phenomenon at that time, the authors argued that this effect must be studied in a field setting to examine its saliency. Similarly, Kim et al. (2006) looked at the decoy effect and its prevalence when brand information is available. With their experiment, they concluded that, while the decoy effect was present overall, it was not present when participants possessed a high level of brand knowledge (compared to their low-knowledge counterparts). As such, their research suggested that for highly knowledgeable users, the presence of a decoy (that shares the same brand as the target) can lower their motivation to choose the target due to “persuasion knowledge” that lowers the perception of value of the target brand. Persuasion knowledge is the set of facts, beliefs and notions people develop toward a particular idea or product over time that helps them sway themselves and others to make a decision about it (Friestad & Wright, 1995). Simply said, since highly knowledgeable consumers know more about a brand, they add their own acquired knowledge

and belief about its value to their choice, which can favor the brand they are knowledgeable about.

Several studies (such as Hedgcock et al., 2009; Huber et al., 1982; Kim et al., 2006; Monk et al., 2016; Simonson, 1989) have generally represented the decoy option by modifying product attributes on two dimensions, such as price and quality characteristics. In contrast, Ariely and Wallsten (1995) looked at the presence of the decoy effect when three product attributes are used. In their study, the authors examined whether participants assigned a level of subjective dominance to each product based on the relative weight of its attributes. That is, when consumers are more familiar with certain attributes, they may place greater weight on those attributes when comparing options, and otherwise ignore or demote less-familiar attributes. Ariely and Wallsten's findings support this theory, and are consistent with the literature of the decoy effect. This notion of familiarity and weighted value was further studied in Kim et al.'s (2006) research, which provided additional support to the theory behind the decoy effect. More importantly, Ariely and Wallsten's findings demonstrated how adding a third attribute can make the decoy less obvious and lead people to assign value based on their contextual environment when given no other cues. While this variation was done to control for a simple comparison between the alternatives, it illustrated the importance of creating a set of alternatives that is not too easy to differentiate based on perceived value.

Why is it used?

The decoy effect has been studied extensively in relation to consumer products (i.e., Ariely & Wallsten, 1995; Huber et al., 1982; Kim et al., 2006; Monk et al., 2016; Zhang &

Zhang, 2007). It serves as a good predictor of consumer behavior as part of the consumption process (specifically, the evaluation of available alternatives). However, it has also been found in other contexts such as employee selection (Slaughter et al., 2006), hand hygiene (Li et al., 2018), gambling (Wedell & Pettibone, 1996), apartment choices (Simonson, 1989), and political markets (Hedgcock et al., 2009). These inter-disciplinary applications demonstrate that this phenomenon is not confined just to individuals' consumption process, but is tied with individuals' decision-making process. Furthermore, the robustness of the decoy effect (as demonstrated in these studies) suggests that the decoy effect may be present in any situation where individuals are faced with a choice regardless of whether or not they are sensitive to dominance in the setting or are familiar with the attributes shown (Wedell & Pettibone, 1996). Therefore, studying the decoy effect can provide researchers with knowledge about how certain populations react to choice tasks as an extension of their decision-making process. More specifically, studying the decoy effect in different situations and with different sample populations can help expose underlying potential differences in values, attitudes, culture, or other internal and external influences that underpin the CVF through the context of choice tasks.

Therefore, the following hypothesis is developed to replicate past literature and expand on the current understanding of the decoy effect:

Hypothesis 1: The introduction of an asymmetrically dominated alternative (decoy) product has a direct positive relationship on the choice of a dominant (target) product.

Brand Information

While many studies looked at the saliency of the decoy effect in consumer choice from various angles and reasonings, few have studied the role of brand information as a moderating factor in consumer decision making. Overall, research has demonstrated that brand information, as a cue, can induce a categorical perception of the product (i.e., Aaker & Keller, 1990; Cherian & Jones, 1991; Maheswaran et al., 1992). For example, Heath and Chatterjee (1995) conducted both a meta-analysis review of the decoy effect and replicated its experiment to identify whether the decoy effect's significance changes based on the quality of the brand it is decoying. The authors found that while the decoy effect violated the principles of regularity and similarity, as suggested by past research, it demonstrated a more significant change favoring higher-quality brands than low ones. Simply said, the decoy effect was more pronounced when trying to increase the share of a high-quality brand than when trying to increase the share of a low-quality brand. Similarly, the authors found cross-population differences in image consciousness and perceptions of quality, but due to the varying differences, could not identify specific mediating factors. As a result, the authors suggested that the decoy effect may present itself differently based on the product brand or the consumer segment. However, Heath and Chatterjee's (1995) study (and many of the studies discussed in their meta-analysis) did not include actual brand names. It categorized them based on constructs that represented different product qualities.

In contrast, a study by Kim et al. (2006) conducted an experiment that evaluated the moderating impact brand information (in the form of brand names) has on the decoy effect as part of a field study. In their experiment, the authors found that the decoy effect was significant when participants chose between non-brand items, and was insignificant when real brands were present.

Following the findings of past research, a second hypothesis is developed to investigate the impact of brand information on the decoy effect:

Hypothesis 2: Product brand information will moderate the effect of the decoy on product choice, such that the presence of the brand will reduce the effect of the decoy, compared to when the brand is absent.

Product Involvement

Similar to brand information, product knowledge has also been evaluated as a potential moderator of the decoy effect. In Kim et al.'s (2006) study, findings suggested that highly-knowledgeable consumers evaluated a product based on their past experience or “persuasion knowledge” when making their choice. These findings were consistent with those of past research, furthering the discussion about product knowledge as a potential moderator of the decoy effect.

However, little research has looked at the moderating potential of product *involvement* on the decoy effect. When comparing product knowledge to product involvement, a study by Park and Moon (2003) found that there is a strong correlation between product knowledge and product involvement in utilitarian products, and a weak correlation between product knowledge and involvement in hedonic products. These findings imply that, for hedonic products, highly involved consumers perceive their past experience as gained subjective knowledge, as opposed to highly-involved consumers of utilitarian products, who tend to “really know what they think they know” (p. 988). Similarly, a study by Bei and Widdows (1999) found that product involvement helped participants make a better product decision when their involvement was

complementary to their level of product knowledge. In other words, when experts (high product knowledge) were uninformed, they were able to make better decisions based on their objective knowledge, and when novices (low product knowledge) were involved, they were able to make better decisions based on their experiences or subjective knowledge.

While (primarily subjective) product knowledge is commonly studied in the contexts of information processing and consumer behaviors, past research found that its correlation with objective knowledge is relatively low (Klerck & Sweeney, 2007) and, therefore, is prone to internal weaknesses. Product involvement, on the other hand, speaks to consumers' familiarity with products and is independent of consumers' confidence in their (subjective) product knowledge (Park & Moon, 2003). As such, product involvement provides insight into consumers' information processing while mitigating the potential weaknesses of product knowledge. Therefore, product involvement will be used for this study.

The studies described above illustrate the importance of considering brand information as part consumer decision making, as well as the close relationship between product involvement and product knowledge. Given the small body of research that considers both constructs in its evaluation of the decoy effect, it is important to evaluate the moderating powers of both product involvement and brand information.

This line of research, therefore, serves as an extension of past research conducted on the decoy effect and will help bridge the gap currently present with the academic understanding of this phenomenon and its effects of different consumer segments, particularly the relationship of product involvement and the decoy effect. As such, a third hypothesis is developed:

Hypothesis 3: Product involvement will moderate the effect of the decoy on product choice, such that consumers with higher product involvement will be less affected by the decoy product in terms of final product choice.

Durable vs. Consumable Products

Past research has demonstrated the saliency of the decoy effect in a variety of durable consumer products. This choice of products has been attributed to the perceived risk associated with making such choices (Heath & Chatterjee, 1995), as well as users' tendency to search for more cues and information when choosing from durable alternatives than from non-durable alternatives. Similarly, Heath and Chatterjee's (1995) study examined whether the magnitude of the decoy effect is higher in durable than in non-durable goods. While the research found a significant effect on the basis of product-quality, a main effect based on product type was not supported. Given these findings, and in line with past research, one of the products chosen for this study is durable. Similarly, in order to assess a true saliency of the decoy effect across consumer populations, the product tested needed to be one that is widely available and generally regarded as popular or desirable. Given the ubiquitous nature of cell phones in today's consumer environment, a "smart" cell phone was selected as a product for this study.

According to Pew Research Center (2019), 96% of Americans currently own a cell phone, of which 81% own a smartphone. Similarly, a recent report by Statista (Holst, 2020) suggested there are more than 260 million smartphones users in the United States, as of 2020. Given the popularity of cell phones as a whole, and smartphones in particular among the

American consumer market, it serves as a good example for a durable good that consumers are likely to have purchased in recent times or intend to purchase in the future.

COVID-19

In addition to exploring the decoy effect in durable consumer goods and the influence of brand information and product involvement on different consumers' perception of value, this study looks to help advance the knowledge about the impacts of Coronavirus Disease 2019 (COVID-19) on consumers' lives. As the global pandemic travelled across the globe, behavioral change was observed in consumer purchasing behavior, leading to an increased demand for homecare, cleaning, and hygiene products (Rosenberg, 2020; Terlep, 2020). While it is unclear how strong or lasting these changes in behaviors are, it is valuable to utilize this opportunity to investigate how a defining event, such as a global pandemic, may impact peoples' perception of value. Therefore, this study looks to investigate if people's attitude toward the pandemic has a significant effect on their perception of value in the context of a decoy effect within disinfecting wipes.

COVID-19 was first recognized in December of 2019 when a rising number of cases of pneumonia of unknown cause broke out in Wuhan City, Hubei Province of China (World Health Organization, 2020). As COVID-19 spread to more regions, travel restrictions were implemented and several mitigation strategies, such as isolation, "shelter-in-place" and "stay-at-home" orders, and vaccine development, were initiated (Fauci et al., 2020; Financial Industry Regulatory Authority, 2020). Given the high transmission rate of the disease, the Centers for Disease Control and Prevention published guidelines for individuals to follow to help mitigate the risk of

contracting the disease (Centers for Disease Control and Prevention, 2020). Two of those recommendations included cleaning and disinfecting frequently touched surfaces daily and maintaining personal hygiene.

As the disease spread, more governments and municipalities enacted stay-at-home orders that attempted to slow the spread of the virus (Financial Industry Regulatory Authority, 2020). As a result, a growing number of consumers were not able to commute to work or school. This, in turn, created a heightened demand for household cleaning and hygiene products. Toilet paper, for example, has experienced a demand much greater than its supply chains' ability to restock the product. As a result, shortages were observed across the United States and other countries (Fisher, 2020). Similarly, demand for disinfecting products such as wipes and spray has remained consistently high since the pandemic erupted. Companies, such as Clorox Co. and Procter & Gamble Co. have seen their products' sales soar in the last few months, while their production efforts are still trailing behind demand (Garcia, 2020; Naidu, 2020).

The COVID-19 pandemic, therefore, has contributed to peoples' perception of scarcity and feeling of instability or insecurity. The perception of scarcity is strongly linked to panic-buying behaviors if the scarcity is related to one's perceived necessities (such as toilet paper and disinfecting wipes). As a result, people exhibited a heightened desire to purchase products that are associated with their survival, which can explain the sudden increase in demand for toilet paper and disinfecting wipes (Arafat et al., 2020).

Panic buying, combined with supply disruption, has contributed to the heightened demand for these types of product. Given the novelty of this disease, studying its impact on consumer behavior and decision making can help expand researchers' collective understanding of consumer behaviors at times of crisis, as well as develop new and improved models to explain

and predict how such events may impact the demand for different product categories. As such, this study extends its research on the decoy effect to products that are associated with consumers' response to COVID-19 by examining the significance of the decoy effect in disinfecting wipes (which also offers a non-durable product contrast to the cell phone), and whether individuals' attitudes toward the health risk of COVID-19 moderate the strength or significance of the decoy effect.

Therefore, hypotheses 1 through 3 will be examined for both cell phones and disinfecting wipes. In addition, the following hypothesis is developed, with the expectation that it will apply primarily to disinfecting wipes, and not cell phones:

Hypothesis 4: Attitudes toward health risk associated with COVID-19 will moderate the effect of the decoy on product choice, such that consumers with higher feeling of risk towards COVID-19 will exhibit a stronger shift in choice due to the presence of a decoy product than those with lower feeling of risk toward COVID-19.

Millennials

The millennial consumer segment has been defined, on paper, as the generation born between the late 1970s-early 1980s, and the late 1990s-early 2000s (Dimock, 2019; Kilian et al., 2012; Moreno et al., 2017). Despite the generation's many names (Millennials, Generation Y, Echo Boom, Dot.Com Generation), most studies refer to the same consumer segment (Dimock, 2019; Kilian et al., 2012; Moreno et al., 2017). Therefore, the term 'millennials' will be used for this study. Similarly, Pew Research Center's work attempted to identify similarities and differences between segments. In its research, Pew Research Center identified millennials as the

generation born between 1981 and 1996 (Dimock, 2019). While there is no consensus as to the exact cutoff dates for this generation, Pew Research Center's assessment will be used for this study.

Much like their parents' generation (baby boomers, or those born between 1946 and 1964), millennials have grown to become the one of the most significant consumer segments in the United States in recent years, and officially became the largest generation in 2019 (Dimock, 2019; Fry, 2020). While older generations learned to use technological products and tools as adults, millennials are the first truly native technology users, having grown up in a world filled with computers, mobile phones, satellite TV, smartphones, tablets, and social media (Kilian et al., 2012; Kotler & Armstrong, 2018).

This inherent connection with technology has influenced millennials' consumption. According to Eastman et al., (2014), millennials are "special, sheltered, confident, team-oriented, conventional, pressured, and achieving" (p. 456). Similarly, Eastman et al. found millennials to be status conscious and more resistant to commercially-oriented advertising. In addition, several researchers (Kotler & Armstrong, 2018; Moreno et al., 2017) noted that millennials tend to be frugal, practical, and likely to seek experiences that help them develop their own brand experiences. While frugality can be explained by the segment's higher student debt and slow entry to the labor force (Bialik & Fry, 2019; Taylor et al., 2012), research found that status consumption is more pronounced in millennials given the segment's strong social ties to its cohort and its preferences to peer-based feedback over that of traditional media or company sources (Eastman et al., 2013; Eastman et al., 2014; Moreno et al., 2017).

In essence, millennials' purchasing behavior has been identified as unique from other consumer groups (Eastman et al., 2013; Eastman et al., 2014; Moreno et al., 2017; Nichols et al.,

2015). Several political, economic, and social factors (such as the 9/11 terrorist attacks, wars in Afghanistan and Iraq, the 2009 economic recession, and the internet boom) influenced this generation during its formative years (Dimock, 2019; Kilian et al., 2012). These factors helped cultivate a segment that is experience-seeking, that values corporate social responsibility, but is more involved with materialistic and status-seeking behaviors (Eastman et al., 2013).

While multiple studies examined the impact of the decoy effect on consumer purchase intentions (i.e., Ariely & Wallsten, 1995; Huber et al., 1982; Kim et al., 2006; Monk et al., 2016; Wedell & Pettibone, 1996) and several others looked at the moderating factors impacting millennials' purchasing behaviors (i.e., Eastman et al., 2014; Moreno et al., 2017), few studies have examined the applicability of behavioral economic models on the millennial consumer segment. This gap in academic knowledge, combined with the growing practical implications of studying the millennial consumer segment, illustrates the importance of extending current lines of research and evaluating the applicability of economic and behavioral models to millennials. This study, therefore, looks to study the prevalence of the decoy effect on millennials' purchase decision as an extension of the growing body of literature pertaining to this consumer segment. Simply said, this study looks to identify whether millennials are sufficiently cost-sensitive consumers that they do not experience the decoy effect as much as other consumer segments. As such a fifth hypothesis is developed:

Hypothesis 5: Millennial consumers experience the effect of the decoy product on choice less frequently than do other consumer segments.

Together, these hypotheses form the basis of this study's empirical analysis. This paper now turns to describe the approach used to conduct that analysis.

Chapter 2

Methods

Study Design

A fixed effects between-subjects model design was used to investigate the influence of brand information, product involvement, attitude toward health risk, and consumer segment on the size of the decoy effect across two product groups. The variables in this study were:

1. The presence (or absence) of a decoy product;
2. The presence (or absence) of brand information (in the form of brand name);
3. The self-reported level of product involvement as it relates to cell phones and, separately, disinfecting wipes;
4. The self-reported attitude toward the health risk associated with COVID-19; and,
5. The age of participants (divided based on the millennial consumer segment age range).

Data for this study were collected through an online survey.

Participants

Overall, 1,038 survey responses were collected from participants 18 years or older using Qualtrics, an online survey platform. The survey was shared on Reddit's r/SampleSize community-board, as well as social media platforms. Out of the total responses, 828 responses were complete and usable. Of the 210 discarded responses, 207 were missing items and 3 responses did not formally consent to the study. In order to distinguish between millennial participants and non-millennial participants, a binary variable was created to code those who were born between 1981 and 1996 as millennials. Those who did not fall within that range were coded as non-millennials, following Dimock's (2019) suggested age range for that segment.

Overall, 35.6% ($n = 293$) of participants were millennials, and 64.4% ($n = 531$) were not.

Additional demographic data is presented in Table 1 and Figure 1.

Table 1. *Participants' Demographic Information*

	<i>N</i>	Percent
Gender Identity		
Female	626	75.8%
Male	174	21.1%
Other	13	1.6%
Prefer not to answer	13	1.6%
Age Group		
Millennial	293	35.6%
Non-millennial	531	64.4%
Education Level		
Less than High School	2	0.2%
High School Graduate	45	5.4%
Some College	115	13.9%
Associate Degree	50	6.1%
Bachelor's Degree	326	39.5%
Master's Degree	211	25.5%
Doctoral Degree	30	3.6%
Professional Degree (JD, MD)	47	5.7%
	<i>M</i>	<i>SD</i>
Year of Birth	1979.18	14.58

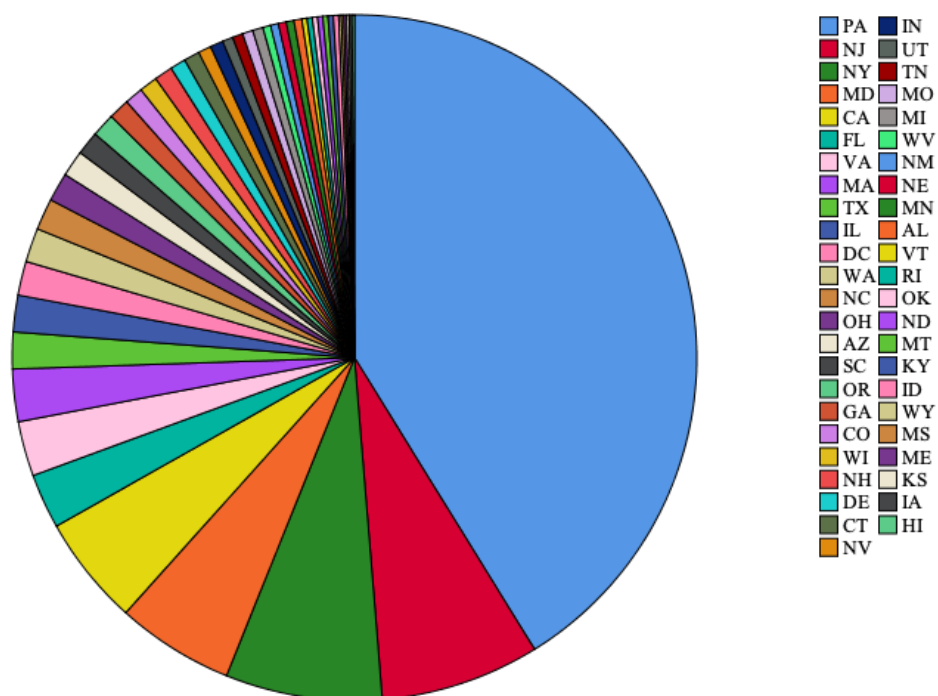
Study Variables

Dependent variables. The dependent (or outcome) variable in the study was participant choice, which was assessed through the selection of either a target, alternative, or decoy product in a choice set (one set for cell phones and another for disinfecting wipes). Statistical analyses were conducted on the binary representation of whether participants chose the target product.

Independent variables. This study utilized the (binary) presence of a decoy product, the (binary) presence of brand information, a product involvement scale, a scale measuring attitude

toward COVID-19 health risk, and (binary) age group as possible influencers of participant choice and magnitude of the decoy effect (see Appendix C for the full survey, which includes the items used in the product involvement and attitude toward health risk scales).

Figure 1. *Participants' Location (State)*



Materials

Recruitment materials. Recruitment messages were used to find people willing to participate in the study. Messages were posted on social media outlets such as Reddit daily for a period of six weeks, and included the general purpose of the study, how to participate in the study, how long the survey would take, incentives for participating (a raffle for monetary compensation), and the lead investigator's contact information (see Appendix A).

Informed consent. An implied informed consent was included in the first page of the survey. It listed the purpose of the study, its procedures, risks and benefits of participating, and contact information of investigators. Furthermore, the consent form informed participants that their consent was voluntary and they may quit the study at any time without consequence (see Appendix B).

Data collection. An electronic survey with close-ended items was used to collect data. More specifically, Chandrashekar's (2004) Involvement with the Product scale was used to measure participants' involvement with cell phones and disinfecting wipes, separately. Additionally, Menon et al.'s (2002) Attitude Toward Health Risk scale was used to measure participants' attitude toward health risk associated with COVID-19. Further, participants' optimism score was collected using Grewal et al.'s (2004) Optimism scale as a countermeasure to the COVID-19 scale, and as a control measure to make the scale questions less obvious to the participants. In doing so, the purpose of the scale was to act as a buffer during the survey and was not used in the evaluations of the models (it was not considered as a potential moderator of the decoy effect). In addition, overall product attractiveness and attribute importance (for each of the four attributes) were measured using participant self-report on a zero-to-ten and five-point scales, respectively. Lastly, sociodemographic variables, such as age, gender, and education level, were collected to assess sample representativeness (see Appendix C for full survey).

Software/hardware. Qualtrics software was used to develop and administer the online survey. Data were analyzed using IBM SPSS and Microsoft Office Excel.

Procedures

Similar to past studies (Ariely & Wallsten, 1995; Huber et al., 1982), two product types were chosen: cell phones and disinfecting wipes. As stated in this study's background chapters, cell phones were selected for their vast acceptance and ubiquity in the marketplace. Similarly, disinfecting wipes were selected as a representative item with a lower price point compared to the cell phones. Furthermore, the increased attention this product received, due to 2019 COVID-19 pandemic, helped enhance the familiarity participants might have with this product.

In addition, in order to measure possible differences between the millennial consumer segment and other segments, the participant pool was split into two groups: those who were born between 1981 and 1996; and those who were not born during those years. This separation is based on Pew Research's analysis of the consumer segment (Dimock, 2019).

After obtaining Penn State's Institutional Review Board (IRB) approval, the survey was distributed online. Once participants entered the survey and acknowledged the informed consent form, they were randomly assigned to a control or treatment subgroups and presented with a choice task matrix for either the cell phone or the disinfecting wipes. The choice task matrix was designed based on past studies (e.g., Ariely & Wallsten, 1995; Huber et al., 1982; Kim et al., 2006; Monk et al., 2016), and adapted its structure from Ariely & Wallsten's (1995) study.

Each participant was presented with a table that included each product type (separately) and three or four attributes: brand (in some experimental conditions), price, and two other attributes (storage capacity and camera quality for the cell phone product; number of wipes and effectiveness for the disinfecting wipes product). Similarly, the values for the "target" product were based on information available on manufacturers' websites and were fixed throughout the experiment. The values for the alternative product were held constant and created by fixing

values as both a percentage of the target product's value and a reasonable number per attribute definition, such as the number of megapixels of a camera (Table 2).

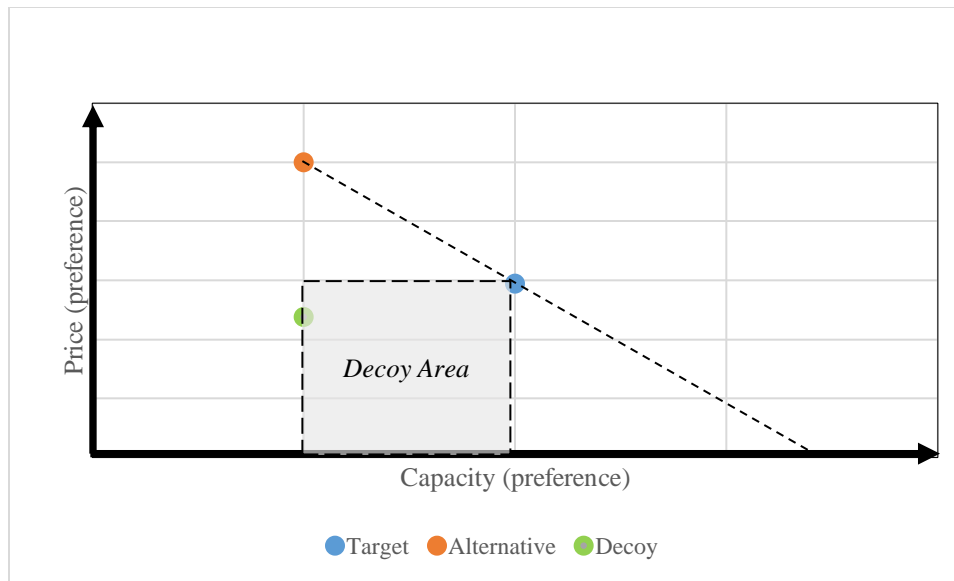
Table 2. *Choice Task Matrix for Cell Phones and Disinfecting Wipes*

Cell Phone Alternatives					
Parameter	Target	Alternative	Decoy	Option/Target	Decoy/Target
Brand	Apple	Samsung	Apple		
Price (\$)	849	499	1049	59%	124%
Capacity (GB)	256	128	128	50%	50%
Camera Quality	12 MP camera and 6.1 inch screen	10 MP camera and 6.1 inch screen	14 MP camera and 6.1 inch screen	83%	117%
Disinfecting Wipes Alternatives					
Parameter	Target	Alternative	Decoy	Option/Target	Decoy/Target
Brand	Clorox	Lysol	Clorox		
Price (\$)	8.99	4.99	9.99	56%	111%
No. of Wipes	55	35	45	64%	82%
Effectiveness	Effective against 10 common viruses and 99.9% of bacteria	Effective against 7 common viruses and 99.9% of bacteria	Effective against 12 common viruses and 99.9% of bacteria	70%	120%

The experimental decoy was set up to illustrate an asymmetrically dominated product. As suggested by Ariely & Wallsten (1995), in order to create a choice alternative that is harder to simply compare and contrast, the decoy product was designed to be inferior to the target in two dimensions (11-50%), but superior in the third (17-20%). By creating a larger variance in the attributes that favor the target than in the attribute that favors the decoy, the decoy product can be perceived as inferior to the target, but not so much that it is obvious. Furthermore, due to consumer familiarity with specific attribute values, the values for the decoy were fixed to the closest familiar value. In order to ensure comparability to past research, the dimensions were graphed according to the parameters illustrated in Huber et al. (1982) to assess theoretical fit with established research (Figure 2). To illustrate this point, the capacity on the decoy phone was

fixed to the same value as the capacity for the alternative (128 GB). In doing so, the decoy is shown to be significantly inferior to the target in capacity and price, but somewhat better in camera quality.

Figure 2. *Cell Phone Illustration of Price and Capacity Attributes*

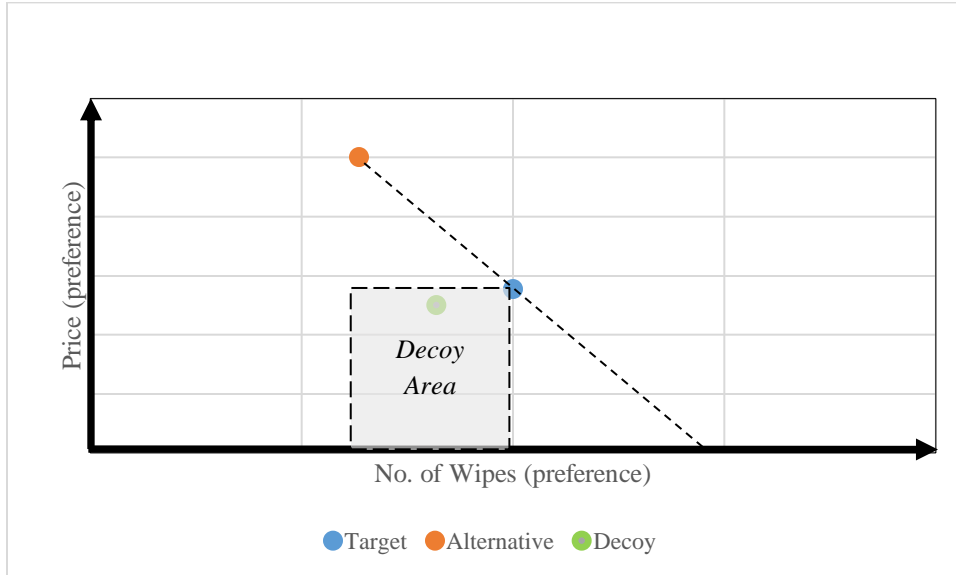


A similar distribution of values was done for the disinfecting wipes. Similar to the phone, in order to make the fictional products (alternative and decoy) appear realistic, the values of the dimensions were altered, but maintained the comparative inferiority to the target. Compared to the target, the decoy's values are inferior both in the price and volume but superior in effectiveness (Figure 3).

Lastly, another experimental variant of the choice task was created by replicating the choice task with and without a brand name associated with the products. Similar to Kim et al., (2006), the brand information was the same for the target and decoy products. This represents a practical approach a company may employ by harnessing the power of the decoy effect to increase the sales of the target product. Furthermore, since brand information has significantly influenced the choice in past research (Kwon et al., 2007; Monk et al., 2016), testing the effect of

its presence on the decoy effect is necessary and in line with the recommendations of past research.

Figure 3. *Disinfecting Wipes Illustration of Price and No. of Wipes Attributes*



Similar to Kim et al. (2006), in order to assess the effect size of the attributes on the overall choice, an overall attractiveness (zero-to-ten) and attribute importance (five-point) scales were used to investigate any weight differences that might influence the choice. In addition, a product involvement scale (Chandrashekar, 2004) was used to assess participants' previously-formed evaluations of a particular brand or product (as suggested by Kim et al., 2006).

In order to control for order effects, the study was randomized so participants would be randomly assigned to one of four versions of the survey (divided based on control and treatment groups for the brand condition, as well as control and treatment groups for the decoy product). Doing so allowed for participants to alternate between a control (or treatment) group for the brand variable and a treatment (or control) group for the decoy product. Similarly, the order in which choice tasks were presented to participants was also randomized (phone (or disinfecting wipes) task first, followed by the disinfecting wipes (or phone) task second). Furthermore, the

questions containing the items for each of the scales used were also randomized in order to control for order effects. Lastly, four attention questions were used throughout the survey (before, between, and after the choice tasks, and one after the scale questions and before the demographics) which allowed to assess whether participants paid reasonable attention to the survey questions.

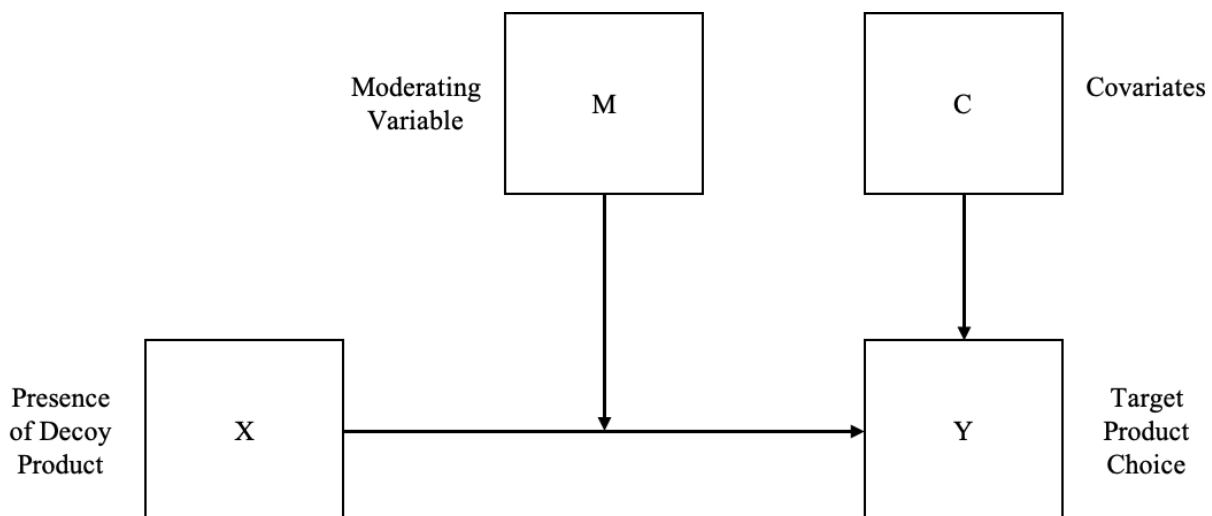
While this study built on many of the mechanics demonstrated in past research (for example, Kim et al.'s (2006) study), it extended its analysis by conducting the study for a U.S. consumer base and by using common consumer products that are both ubiquitous and have importance to everyday life. Additionally, this study furthered the analysis of past research by investigating the combined effects of a decoy product, brand information, product involvement, attitude toward health risk, and age group, and allowing for their computed effects to be considered after controlling for each of their effects. Similarly, while Kim et al. evaluated participants' overall preference of a product on a continuous scale, this study evaluated participants' final choice using a discrete choice option while providing additional dimensions on which the products were evaluated. In doing so, this study employed the practices established in past research, and expanded upon them to enhance the current understanding of the decoy effect and consumer decision making as a whole.

Chapter 3

Results

Two sets of results were presented for each hypothesis except Hypothesis 1. In the first set, each hypothesis was evaluated using contingency tables for each condition to examine the impact of the decoy product on participant choice distribution. This served as a direct evaluation of whether the decoy effect was present either in the whole sample or in the sub-samples contrasted in the hypothesis. In the second set, binary logistic regressions were used. In contrast to earlier studies, which used continuous variables to capture choice (Ariely & Wallsten, 1995), this study focused on actual choice. As such, the dependent variable was binary (e.g., choosing the target product or not) and standard ANOVA analysis did not fit. Therefore, a binary logistic regression model was used. Specifically, Haye's (2018) PROCESS macro was used to run a binary logistic regression analysis which tested for interaction effects between the independent variables and evaluated them as moderators of the decoy effect. The model used for the analysis can be seen in its conceptual form in Figure 4.

Figure 4. *Conceptual Moderation Model*



Hypothesis 1: The introduction of an asymmetrically dominated alternative (decoy) product has a direct positive relationship on the choice of a dominant (target) product.

Cell phones. When evaluating preferences between target and alternative cell phone products (control), 50.0% ($n = 206$) of participants chose the target, and 50.0% ($n = 206$) chose the alternative. However, when a decoy product was added (treatment), 58.8% ($n = 244$) of participants chose the target, 35.9% ($n = 149$) chose the alternative, and 5.3% ($n = 22$) chose the decoy. Pearson Chi-Square test between the control and treatment groups was statistically significant, $\chi^2(1, N = 827) = 6.45, p = .011$. This indicated that the presence of the decoy product significantly increased the proportion of participants that chose the target product from the control to the treatment group. Under the principle of regularity, the addition of a decoy product should not have increased the likelihood of choosing any of the original alternatives (target and alternative products). Therefore, this experiment violated regularity (Table 3) and established the presence of a “decoy effect” for cell phones, and *supported* hypothesis 1 for cell phones.

Table 3. *Frequencies for Cell Phones Choice Matrix*

Group	Target	Δ	Alternative	Δ	Decoy
Control (no decoy) $N = 412$	49.9%	...	50.1%	...	...
Treatment (decoy) $N = 415$	58.8%	17.8%	35.9%	-28.3%	5.3%

Note. Δ represents the percentage change in share of product from control to treatment groups.

Disinfecting wipes. When replicating the experiment for disinfecting wipes instead of cell phones, 82.2% ($n = 341$) of participants chose the target product, and 17.8% ($n = 74$) chose the alternative in the control group (no decoy). When a decoy product was added (treatment), 72.5% ($n = 298$) of participants chose the target, 10.5% ($n = 43$) chose the alternative, and 17.0% ($n = 70$) chose the decoy product. Pearson Chi-Square test between the two groups was

statistically significant, $\chi^2(1, N = 826) = 11.01, p = .001$, which supported the notion that the decoy's presence significantly impacted the choice between disinfecting wipes products.

However, proportionally between the control and treatment groups, specifically the *reduction* in the target's share once a decoy was added, these results suggested that there was no decoy effect where the target gained market share, and regularity was not violated (Table 4). Therefore, hypothesis 1 was *not supported* for disinfecting wipes.

Table 4. *Frequencies for Disinfecting Wipes Choice Matrix*

Group	Target	Δ	Alternative	Δ	Decoy
Control (no decoy) <i>N</i> = 415	82.2%	...	17.8%	...	...
Treatment (decoy) <i>N</i> = 411	72.5%	-11.8%	10.5%	-41.0%	17.0%

Note. Δ represents the percentage change in share of product from control to treatment groups.

Hypothesis 2: Product brand information will moderate the effect of the decoy on product choice, such that the presence of the brand will reduce the effect of the decoy, compared to when the brand is absent.

Cell phones. When evaluating the impact of brand on the decoy effect, distributions of product choice for both no-brand (control) and brand (treatment) conditions were calculated.

In the no-brand control group, 34.8% (*n* = 70) and 65.2% (*n* = 131) of participants chose the target and alternative products, respectively. When a decoy product was added, 55.0% (*n* = 115) of participants chose the target, 42.6% (*n* = 89) of participants chose the alternative, and 2.4% (*n* = 5) chose the decoy product. Pearson Chi-Square between the groups was statistically significant, $\chi^2(1, N = 410) = 16.88, p < .001$. In addition, the increase in the proportion of participants that chose the target product suggested that regularity was violated, thus *supporting* the presence of a decoy effect for non-branded cell phones.

In the brand control group, 64.5% ($n = 136$) and 35.5% ($n = 75$) of participants chose the target and alternative products, respectively. When the decoy product was added, 62.6% ($n = 129$), 29.1% ($n = 60$), and 8.3% ($n = 17$) of participants chose the target, alternative, and decoy products, respectively. However, Pearson Chi-Square between the groups was not statistically significant and the reduction in the proportion of participants who chose the target suggested that regularity was not violated (Table 5) and that a decoy effect was *not present* for branded cell phones.

Table 5. *Frequencies for Cell Phone Choice Matrix - Brand Information*

Condition	Group	Target	Δ	Alternative	Δ	Decoy
No Brand	Control (no decoy) $N = 201$	34.8%	...	65.2%	...	...
	Treatment (decoy) $N = 209$	55.0%	58.0%	42.6%	-34.7%	2.4%
Brand	Control (no decoy) $N = 211$	64.5%	...	35.5%	...	...
	Treatment (decoy) $N = 206$	62.6%	-2.9%	29.1%	-18.0%	8.3%

Note. Δ represents the percentage change in share of product from control to treatment groups.

A binary logistic regression analysis was conducted to more comprehensively evaluate whether the presence and absence of brand information moderated the impact of the decoy on participant choice in cell phones. Overall, the model offered meaningful insight, with a statistically significant fit indicator, $\chi^2(1, N = 813) = 9.46, p = .002$. Similarly, the *Nagelkerke R-squared* using maximum likelihood estimations indicated that approximately 12.76% of variance in the binary outcome variable of choosing the target cell phone product was accounted for by the independent variables included in the model. The results of the binary logistic analysis (Table 6) suggested that the presence of brand information influenced the effect of the presence of a

decoy product on choice of the target phone or its alternatives. Specifically, the presence of brand information reduced the impact of the decoy on product choice significantly, suggesting that the “decoy effect” detected for cell phones was smaller in the presence of brand information. Therefore, hypothesis 2 was *supported* for cell phones.

Table 6. *Logistic Regression Analysis of Cell Phone Choice and Brand*

Variable	<i>B</i>	<i>SE</i>	<i>z-score</i>	<i>p-value</i>	95% <i>CI for Odds Ratio</i>	
					<i>Lower</i>	<i>Upper</i>
Constant	-2.37	.44	-5.33	< .001	-3.24	-1.5
Decoy	.88	.21	4.19	< .001	.48	1.30
Brand	1.24	.21	5.82	< .001	.82	1.66
Decoy X Brand	-.91	.30	-3.07	.002	-1.49	-.33
PI	.36	.07	5.12	< .001	.22	.50
COVID	.01	.06	.06	.954	-.12	.13
Millennial	-.28	.16	-1.78	.076	-.58	.03

Disinfecting wipes. When evaluating the impact of brand on the decoy effect, distributions for both a no-brand (control) and brand (treatment) conditions were calculated.

In the no-brand control group, 88.0% ($n = 184$) and 12.0% ($n = 25$) of participants chose the target and alternative products, respectively. When a decoy product was added, 73.5% ($n = 147$) of participants chose the target, 7.0% ($n = 14$) of participants chose the alternative, and 19.5% ($n = 39$) chose the decoy product. Pearson Chi-Square between the groups was statistically significant, $\chi^2(1, N = 409) = 14.00, p < .001$. In addition, the decrease in the proportion of participants who chose the target product suggested that regularity was not violated, in other words, no decoy effect was found.

In the brand control group, 76.2% ($n = 157$) and 23.8% ($n = 49$) of participants chose the target and alternative products, respectively. When the decoy product was added, 71.6% ($n =$

151), 13.7% ($n = 29$), and 14.7% ($n = 31$) of participants chose the target, alternative, and decoy products, respectively. However, Pearson Chi-Square between the groups was not statistically significant and the reduction in the proportion of participants that chose the target suggested that regularity was not violated (Table 7), which further suggested that there was no decoy effect present.

Table 7. *Frequencies for Disinfecting Wipes Choice Matrix - Brand Information*

Condition	Group	Target	Δ	Alternative	Δ	Decoy
No Brand	Control (no decoy) $N = 201$	88.0%	...	12.0%	...	...
	Treatment (decoy) $N = 209$	73.5%	-16.5%	7.0%	-41.7%	14.7%
Brand	Control (no decoy) $N = 211$	76.2%	...	23.8%	...	...
	Treatment (decoy) $N = 206$	71.6%	-6.0%	13.7%	-42.4%	14.7%

Note. Δ represents the percentage change in share of product from control to treatment groups.

As with cell phones, a binary logistic regression analysis was conducted for disinfecting wipes to evaluate whether the presence and absence of brand information moderated the impact of the decoy on participant choice. The overall model with the two variables (presence/absence of brand and presence/absence of a decoy) was significant, $\chi^2(1, N = 813) = 4.41, p = .036$. Similarly, the *Nagelkerke R-squared* using maximum likelihood estimations indicated that approximately 4.80% of variance in the binary outcome variable of choosing the target disinfecting wipes product was accounted for by the independent variable. The results of the binary logistic analysis (Table 8) suggested that the presence of brand information moderated the effect of the decoy on product choice. Specifically, the interaction effect between the brand and decoy variables in the disinfecting wipes products was statistically significant and suggested that

the presence of brand information offered a countervailing effect on the negative relationship between the presence of a decoy product and the likelihood of selecting the target product. That is, in the presence of brand information, the presence of the decoy product reduced the target product's share by a lesser amount compared to when brand information was not provided.

While no “decoy effect” was detected with disinfecting wipes, the presence of brand information *did* reduce the impact of a decoy on the selection of the target product, thus providing *support* for hypothesis 2.

Table 8. *Logistic Regression Analysis of Disinfecting Wipes Choice and Brand*

Variable	<i>B</i>	<i>SE</i>	<i>z-score</i>	<i>p-value</i>	95% <i>CI</i> for Odds Ratio	
					<i>Lower</i>	<i>Upper</i>
Constant	1.22	.44	2.74	.006	.35	2.08
Decoy	-1.00	.27	-3.72	< .001	-1.52	-.47
Brand	-.81	.27	-2.99	.003	-1.34	-.28
Decoy X Brand	.73	.35	2.08	.037	.04	1.42
PI	.03	.06	.47	.636	-.09	.15
COVID	.11	.07	1.58	.115	-.03	.24
Millennial	.24	.18	1.30	.195	-.12	.60

Hypothesis 3: Product involvement will moderate the effect of the decoy on product choice, such that consumers with higher product involvement will be less affected by the decoy product in terms of final product choice.

Cell phones. To evaluate the impact of product involvement (PI) on the magnitude of the decoy effect, a median split variable was created to compare participants who scored higher on the product involvement scale (= High PI) and those who scored lower on it (= Low PI). Similarly, distributions for both groups were calculated.

In the Low PI control group, 42.3% ($n = 99$) and 57.7% ($n = 135$) of participants chose the target and alternative products, respectively. When a decoy product was added, 55.4% ($n = 129$) of participants chose the target, 40.3% ($n = 94$) of participants chose the alternative, and 4.3% ($n = 10$) chose the decoy product. Pearson Chi-Square between the groups was statistically significant, $\chi^2(1, N = 467) = 7.97, p = .005$. In addition, the increase in proportion of participants who chose the target product suggested that regularity was violated, indicating the presence of the decoy effect.

In the High PI control group, 59.2% ($n = 103$) and 40.8% ($n = 71$) of participants chose the target and alternative products, respectively. When the decoy product was added, 63.6% ($n = 112$), 29.5% ($n = 52$), and 6.8% ($n = 12$) of participants chose the target, alternative, and decoy products, respectively. However, Pearson Chi-Square between the groups was not statistically significant. In addition, the increase in proportion of participants who chose the target product in the treatment group suggested that regularity was violated (Table 9) and indicated that a decoy effect was present (although only for the sample of participants given the lack of significance).

Table 9. *Frequencies for Cell Phone Choice Matrix - Product Involvement*

Condition	Group	Target	Δ	Alternative	Δ	Decoy
Low PI	Control (no decoy) $N = 234$	34.8%	...	65.2%	...	...
	Treatment (decoy) $N = 233$	55.0%	58.0%	42.6%	-34.7%	2.4%
High PI	Control (no decoy) $N = 174$	59.2%	...	40.8%	...	...
	Treatment (decoy) $N = 176$	63.6%	7.4%	29.5%	-27.7%	6.8%

Note. Δ represents the percentage change in share of product from control to treatment groups.

Additionally, a binary logistic regression analysis was conducted to evaluate whether participants' level of product involvement moderated the impact of the decoy on participant choice in cell phones. Unlike its binary representation, the PI variable was used in the binary logistic regression analysis as a continuous-scale variable. Overall, the model with the two variables (level of product involvement and presence/absence of a decoy) was significant, $\chi^2(1, N = 813) = 4.58, p = .032$. Similarly, the *Nagelkerke R-squared* using maximum likelihood estimations indicated that approximately 12.03% of variance in the binary outcome variable of choosing the target cell phone product was accounted for by the independent variable. The results of the binary logistic analysis (Table 10) showed that there was a decoy effect, such that presence of the decoy product increased the likelihood of choosing the target product, and, further, that higher levels of product involvement partially reduced this effect. Correspondingly, lower levels of product involvement increased the impact of the presence of a decoy product on the market share of the target cell phone. Simply said, these findings suggested that participants with higher levels of product involvement were less likely to have the decoy product influence their selection of the target product than participants with lower levels of product involvement. Therefore, hypothesis 3 was *supported* for cell phones as product involvement moderated the relationship between the decoy product and choice. Also, given that there was a decoy effect detected with cell phones, these results suggested that the decoy effect *itself* was moderated by product involvement.

Disinfecting wipes. As with cell phones, in order to evaluate the impact of product involvement (PI) on the magnitude of the decoy effect, a median split variable was created to compare participants who scored higher on the product involvement scale (= High PI) and those who scored lower on it (= Low PI). Similarly, distributions for both groups were calculated.

Table 10. *Logistic Regression Analysis of Cell Phone Choice and Product Involvement*

Variable	<i>B</i>	<i>SE</i>	<i>z-score</i>	<i>p-value</i>	95% <i>CI for Odds Ratio</i>	
					<i>Lower</i>	<i>Upper</i>
Constant	-2.85	.56	-5.06	< .001	-3.96	-1.75
Decoy	1.86	.69	2.70	.007	.51	3.20
PI	.52	.10	5.05	< .001	.32	.72
Decoy X PI	-.29	.14	-2.13	.033	-.56	-.02
Brand	.78	.15	5.25	< .001	.49	1.07
COVID	-.01	.06	-.11	.916	-.13	.12
Millennial	-.28	.15	-1.80	.072	-.58	.02

In the Low PI control group, 77.5% ($n = 176$) and 22.5% ($n = 51$) of participants chose the target and alternative products, respectively. When a decoy product was added, 75.2% ($n = 173$) of participants chose the target, 13.5% ($n = 31$) of participants chose the alternative, and 11.3% ($n = 26$) chose the decoy product. Pearson Chi-Square between the groups was not statistically significant, and the decrease in proportion of participants who chose the target product suggested that regularity was not violated for the sample of participants (and, therefore, a decoy effect was not present).

In the High PI control group, 87.5% ($n = 161$) and 12.5% ($n = 23$) of participants chose the target and alternative products, respectively. When the decoy product was added, 68.8% ($n = 121$), 6.8% ($n = 12$), and 24.4% ($n = 43$) of participants chose the target, alternative, and decoy products, respectively. Unlike in the Low PI condition, Pearson Chi-Square between the groups in the High PI condition was statistically significant, $\chi^2(1, N = 360) = 18.63, p < .001$. However, the decrease in proportion of participants who chose the target product in the treatment group suggested that regularity was not violated (Table 11), and thus no decoy effect was detected.

Table 11. *Frequencies for Disinfecting Wipes Choice Matrix - Product Involvement*

Condition	Group	Target	Δ	Alternative	Δ	Decoy
Low PI	Control (no decoy) <i>N</i> = 227	77.5%	...	22.5%	...	...
	Treatment (decoy) <i>N</i> = 230	75.2%	-3.0%	13.5%	-40.0%	11.3%
High PI	Control (no decoy) <i>N</i> = 184	87.5%	...	12.5%	...	...
	Treatment (decoy) <i>N</i> = 176	68.8%	-21.4%	6.8%	-45.6%	24.4%

Note. Δ represents the percentage change in share of product from control to treatment groups.

Further, a binary logistic regression analysis was conducted to evaluate whether participants' level of product involvement influenced the impact of the decoy on participant choice in disinfecting wipes. As with the cell phone condition, the PI variable used for this analysis was continuous (and not binary). Overall, the model with the two variables (level of product involvement and presence/absence of a decoy) was statistically significant, $\chi^2(1, N = 813) = 12.73, p < .001$. Similarly, the *Nagelkerke R-squared* using maximum likelihood estimations indicated that approximately 6.30% of variance in the binary outcome variable of choosing the target cell phone product was accounted for by the independent variable. The results of the binary logistic analysis (Table 12) suggested that participants with higher levels of product involvement were less likely to have their selection of the target product influenced by the presence of a decoy product than participants with lower levels of product involvement when the decoy product was present. Therefore, while there was no decoy effect detected, a moderation effect was observed and hypothesis 3 was *supported* for disinfecting wipes.

Table 12. *Logistic Regression Analysis of Disinfecting Wipes Choice and Product Involvement*

Variable	<i>B</i>	<i>SE</i>	<i>z-score</i>	<i>p-value</i>	95% <i>CI for Odds Ratio</i>	
					<i>Lower</i>	<i>Upper</i>
Constant	-.07	.49	-.13	.892	-1.04	.90
Decoy	1.35	.57	2.37	.018	.23	2.47
PI	.25	.08	2.96	.003	.08	.42
Decoy X PI	-.42	.12	-3.54	< .001	-.64	-.18
Brand	-.35	.17	-2.04	.041	-.69	-.01
COVID	.11	.07	1.59	.111	-.03	.25
Millennial	.23	.19	1.25	.211	-.13	.60

Hypothesis 4: Attitudes toward health risk associated with COVID-19 will moderate the effect of the decoy on product choice, such that consumers with higher feeling of risk toward COVID-19 will exhibit a stronger shift in choice due to the presence of a decoy product than those with lower feeling of risk toward COVID-19.

Cell phones. In order to assess the impact of individuals' attitude toward COVID-19 health risk on the magnitude of the decoy effect, a median split variable was created to compare participants who scored higher on the Attitude Toward Health Risk scale (= High COVID) and those who scored lower on it (= Low COVID). Similarly, distributions for both groups were calculated.

In the Low COVID control group, 45.0% ($n = 76$) and 55.0% ($n = 93$) of participants chose the target and alternative products, respectively. When a decoy product was added, 59.5% ($n = 113$) of participants chose the target, 35.8% ($n = 68$) of participants chose the alternative, and 4.7% ($n = 9$) chose the decoy product. Pearson Chi-Square between the groups was statistically significant, $\chi^2(1, N = 359) = 18.96, p < .001$. In addition, the increase in proportion

of participants who chose the target product suggested that regularity was violated, indicating a decoy effect in this group.

In the High COVID control group, 53.3% ($n = 129$) and 46.7% ($n = 113$) of participants chose the target and alternative products, respectively. When the decoy product was added, 57.8% ($n = 129$), 36.3% ($n = 81$), and 5.8% ($n = 13$) of participants chose the target, alternative, and decoy products, respectively. As with the Low COVID condition, Pearson Chi-Square between the groups was statistically significant, $\chi^2(1, N = 465) = 17.53, p < .001$. In addition, the increase in proportion of participants who chose the target product in the treatment group suggested that regularity was once again violated, and a decoy effect was present (Table 13).

Table 13. *Frequencies for Cell Phone Choice Matrix - COVID-19*

Condition	Group	Target	Δ	Alternative	Δ	Decoy
Low COVID	Control (no decoy) $N = 169$	53.3%	...	46.7%	...	...
	Treatment (decoy) $N = 190$	57.8%	8.4%	36.3%	-22.3%	5.8%
High COVID	Control (no decoy) $N = 242$	45.0%	...	55.0%	...	...
	Treatment (decoy) $N = 223$	59.5%	32.2%	35.8%	-34.9%	4.7%

Note. Δ represents the percentage change in share of product from control to treatment groups.

Next, a binary logistic regression analysis was conducted to evaluate whether participants' levels of concern toward health risk of COVID-19 influence the impact of the decoy on participant choice in cell phones. As with the PI variable, the continuous-scale version of the COVID-19 variable was used for the regression analysis. Overall, the model with the two variables (level of concern toward COVID-19 and presence/absence of a decoy) was not statistically significant, $\chi^2(1, N = 813) = 1.74, p = .186$. Similarly, the *Nagelkerke R-squared*

using maximum likelihood estimations indicated that only approximately 11.61% of variance in the binary outcome variable of choosing the target cell phone product was accounted for by the independent variable. The results of the binary logistic analysis (Table 14) suggested that there was no interaction effect between the decoy and Attitudes Toward Health Risk (COVID-19) variables to warrant any conclusions. Thus, hypothesis 4 was *not supported* for cell phones.

Table 14. *Logistic Regression Analysis of Cell Phone Choice and COVID-19*

Variable	<i>B</i>	<i>SE</i>	<i>z-score</i>	<i>p-value</i>	95% <i>CI for Odds Ratio</i>	
					<i>Lower</i>	<i>Upper</i>
Constant	-2.52	.53	-4.74	< .001	-3.56	-1.48
Decoy	1.25	.64	1.95	.050	-.01	2.50
COVID	.07	.09	.87	.38	-.09	.24
Decoy X COVID	-.16	.12	-1.32	.19	-.39	.08
Brand	.79	.15	5.33	< .001	.50	1.08
PI	.37	.07	5.19	< .001	.23	.51
Millennial	-.27	.15	-1.73	.083	-.57	.03

Disinfecting wipes. Using the same median split variable to measure participants' attitudes toward COVID-19 health risk, the following distributions were calculated.

In the Low COVID control group, 82.1% ($n = 156$) and 17.9% ($n = 34$) of participants chose the target and alternative products, respectively. When a decoy product was added, 71.2% ($n = 121$) of participants chose the target, 14.1% ($n = 24$) of participants chose the alternative, and 14.7% ($n = 25$) chose the decoy product. Pearson Chi-Square between the groups was statistically significant, $\chi^2(1, N = 360) = 6.04, p = .014$. However, the decrease in proportion of participants who chose the target product suggested that regularity was not violated, and therefore, no decoy effect was present.

In the High COVID control group, 82.1% ($n = 183$) and 17.9% ($n = 40$) of participants chose the target and alternative products, respectively. When the decoy product was added, 73.3% ($n = 176$), 12.7% ($n = 19$), and 18.8% ($n = 45$) of participants chose the target, alternative, and decoy products, respectively. As with the Low COVID condition, Pearson Chi-Square between the groups was statistically significant, $\chi^2(1, N = 463) = 5.06, p = .025$. In addition, the decrease in proportion of participants who chose the target product in the treatment group suggested that regularity was not violated and there was no decoy effect (Table 15).

Table 15. *Frequencies for Disinfecting Wipes Choice Matrix - COVID-19*

Condition	Group	Target	Δ	Alternative	Δ	Decoy
Low COVID	Control (no decoy) $N = 190$	82.1%	...	17.9%	...	...
	Treatment (decoy) $N = 170$	71.2%	-13.3%	14.1%	-21.2%	14.7%
High COVID	Control (no decoy) $N = 223$	82.1%	...	17.9%	...	...
	Treatment (decoy) $N = 240$	73.3%	-10.7%	7.9%	-55.9%	18.8%

Note. Δ represents the percentage change in share of product from control to treatment groups.

Additionally, a binary logistic regression analysis was conducted to evaluate whether participants' levels of concern toward health risk of COVID-19 moderated the impact of the decoy on participant choice in disinfecting wipes. Overall, the model with the two variables (level of concern toward COVID-19 and presence/absence of a decoy) was not statistically significant, $\chi^2(1, N = 813) = .10, p = .756$. Similarly, the Nagelkerke R -squared using maximum likelihood estimations indicated that only approximately 4.02% of variance in the binary outcome variable of choosing the target disinfecting wipes product was accounted for by the independent variable. The results of the binary logistic analysis (Table 16) suggested that there

was no interaction effect between them, which indicated that participants' expressed levels of risk toward COVID-19 did not moderate the effect of the decoy on their choice of the target product. As such, hypothesis 4 was *not supported* for disinfecting wipes.

Table 16. *Logistic Regression Analysis for Disinfecting Wipes Choice and COVID-19*

Variable	<i>B</i>	<i>SE</i>	<i>z-score</i>	<i>p-value</i>	95% <i>CI for Odds Ratio</i>	
					<i>Lower</i>	<i>Upper</i>
Constant	.83	.57	1.45	.146	-.29	1.94
Decoy	-.37	.70	-.53	.593	-1.74	.99
COVID	.13	.10	1.22	.221	-.08	.33
Decoy X COVID	-.04	.13	-.32	.756	-.30	.22
Brand	-.38	.17	-2.24	.025	-.72	-.05
PI	.04	.06	.61	.540	-.08	.16
Millennial	.24	.18	1.29	.196	-.12	.60

Hypothesis 5: Millennial consumers experience the effect of the decoy product on choice less frequently than do other consumer segments.

Cell phones. Using Dimock's (2019) suggested age range for millennials, a variable was created to indicate whether participants fit within the age range (= millennial) or were born outside of it (= non-millennial). Using this dichotomous variable, the following distributions were observed.

In the millennial control group, 44.4% ($n = 64$) and 55.6% ($n = 80$) of participants chose the target and alternative products, respectively. When a decoy product was added, 53.4% ($n = 79$) of participants chose the target, 43.2% ($n = 64$) of participants chose the alternative, and 3.4% ($n = 5$) chose the decoy product. Pearson Chi-Square between the groups was not statistically significant, $\chi^2(1, N = 292) = 2.33, p = .127$. Thus, while the increase in proportion of

participants who chose the target product suggested that regularity was violated, there was not sufficient evidence to conclude the presence of a decoy effect for the population of millennials.

In the non-millennial control group, 53.4% ($n = 142$) and 46.6% ($n = 124$) of participants chose the target and alternative products, respectively. When the decoy product was added, 61.5% ($n = 163$), 32.1% ($n = 85$), and 6.4% ($n = 17$) of participants chose the target, alternative, and decoy products, respectively. As with the millennial condition, Pearson Chi-Square between the groups was not statistically significant, $\chi^2(1, N = 531) = 3.59, p = .058$. Thus, for non-millennials, the increase in proportion of participants who chose the target product in the treatment group suggested that regularity was violated, but at a 95% confidence level, this difference was not significant. Therefore, for both age-related segments, there was insufficient statistical significance to allow a conclusion of violation of regularity and hence the presence of a decoy effect in this contrast (Table 17).

Table 17. *Frequencies for Cell Phone Choice Matrix - Millennials*

Condition	Group	Target	Δ	Alternative	Δ	Decoy
Millennial	Control (no decoy) $N = 144$	44.4%	...	55.6%	...	...
	Treatment (decoy) $N = 148$	53.4%	20.3%	43.2%	-22.3%	3.4%
Non-millennial	Control (no decoy) $N = 266$	53.4%	...	46.6%	...	...
	Treatment (decoy) $N = 265$	61.5%	15.2%	32.1%	-31.1%	6.4%

Note. Δ represents the percentage change in share of product from control to treatment groups.

A binary logistic regression analysis was conducted to evaluate whether participants' age (either part of the millennial age group or not) moderated the impact of the decoy on participant choice in cell phones. Overall, the model with the two variables (millennial/non-millennial and

presence/absence of a decoy) was not statistically significant, $\chi^2(1, N = 813) = .08, p = .771$.

Similarly, the *Nagelkerke R-squared* using maximum likelihood estimations indicated that only approximately 11.36% of variance in the binary outcome variable of choosing the target cell phone product was accounted for by the independent variable. The results of the binary logistic analysis (Table 18) suggested that there was no interaction effect between them, and there was no evidence to suggest that participants' age (as represented by the millennial consumer segment) moderated the effect of a decoy on choice of the target cell phone. Therefore, hypothesis 5 was *not supported* for cell phones.

Table 18. *Logistic Regression Analysis of Cell Phone Choice and Millennials*

Variable	<i>B</i>	<i>SE</i>	<i>z-score</i>	<i>p-value</i>	95% <i>CI for Odds Ratio</i>	
					<i>Lower</i>	<i>Upper</i>
Constant	-2.11	.43	-4.86	< .001	-2.96	-1.26
Decoy	.40	.18	2.16	.030	.04	.76
Millennial	-.32	.22	-1.46	.145	-.75	.11
Decoy X Millennial	.09	.31	.29	.771	-.51	.69
Brand	.78	.15	5.30	< .001	.49	1.07
PI	.37	.07	5.22	< .001	.23	.51
COVID	-.01	.06	-.04	.964	-.12	.12

Disinfecting wipes. Using the same variable as with the cell phone choice task to distinguish between millennial and non-millennial participants, the following distributions were observed.

In the millennial control group, 81.8% ($n = 121$) and 18.2% ($n = 27$) of participants chose the target and alternative products, respectively. When a decoy product was added, 78.6% ($n = 114$) of participants chose the target, 8.3% ($n = 12$) of participants chose the alternative, and 13.1% ($n = 19$) chose the decoy product. Pearson Chi-Square between the groups was not

statistically significant, $\chi^2(1, N = 293) = .45, p = .501$. In addition, the decrease in proportion of participants who chose the target product suggested that regularity was not violated, and a decoy effect was not present.

In the non-millennial control group, 82.6% ($n = 219$) and 17.4% ($n = 46$) of participants chose the target and alternative products, respectively. When the decoy product was added, 68.9% ($n = 182$), 11.7% ($n = 31$), and 19.3% ($n = 51$) of participants chose the target, alternative, and decoy products, respectively. Unlike with the millennial condition, Pearson Chi-Square between the groups was statistically significant, $\chi^2(1, N = 529) = 13.58, p < .001$. However, the decrease in proportion of participants who chose the target product in the treatment group suggested that regularity was not violated (Table 19), hence no decoy effect was detected.

Table 19. *Frequencies for Disinfecting Wipes Choice Matrix - Millennials*

Condition	Group	Target	Δ	Alternative	Δ	Decoy
Millennial	Control (no decoy) $N = 148$	81.8%	...	18.2%	...	...
	Treatment (decoy) $N = 145$	78.6%	-3.9%	8.3%	-54.4%	13.1%
Non-millennial	Control (no decoy) $N = 265$	82.6%	...	17.4%	...	...
	Treatment (decoy) $N = 264$	68.9%	-16.6%	11.7%	-32.8%	19.3%

Note. Δ represents the percentage change in share of product from control to treatment groups.

A binary logistic regression analysis was conducted to evaluate whether participants' age (either part of the millennial age group or not) moderated the impact of the decoy on participant choice in disinfecting wipes. Overall, the model with the two variables (millennial/non-millennial and presence/absence of a decoy) was not statistically significant, $\chi^2(1, N = 813) = 2.16, p = .142$. Similarly, the *Nagelkerke R-squared* using maximum likelihood estimations

indicated that only approximately 4.40% of variance in the binary outcome variable of choosing the target disinfecting wipes product was accounted for by the independent variable. The results of the binary logistic analysis (Table 20) suggested that there was no interaction effect between them, and, as with the cell phones, there was no evidence to suggest that participants' age moderated the effect of the decoy on consumer choice. Therefore, hypothesis 5 was *not supported* for disinfecting wipes.

Table 20. *Logistic Regression Analysis of Disinfecting Wipes Choice and Millennials*

Variable	<i>B</i>	<i>SE</i>	<i>z-score</i>	<i>p-value</i>	95% <i>CI for Odds Ratio</i>	
					<i>Lower</i>	<i>Upper</i>
Constant	1.04	.42	2.45	.014	.21	1.87
Decoy	-.76	.21	-3.59	< .001	-1.18	-.34
Millennial	-.06	.27	-.22	.824	-.59	.47
Decoy X Millennial	.53	.36	1.47	.141	-.18	1.25
Brand	-.38	.17	-2.22	.026	-.72	-.04
PI	.04	.06	.61	.543	-.08	.16
COVID	.11	.07	1.53	.125	-.03	.24

Chapter 4 Discussion

Review of Hypotheses

The hypotheses examined in this study looked to evaluate the presence of the decoy effect and the moderating effect of brand information, product involvement, attitude toward COVID-19 health risk, and age for both cell phone and disinfecting wipes products. The following tables provide a summary of the hypotheses and their findings (Table 21) and the distribution of participant choice across the various conditions (Table 22).

Table 21. *Hypothesis Summary*

Hypothesis	Description	Product	Result
1	Presence of Decoy Effect	Cell Phones	Hypothesis Supported
		Disinfecting Wipes	Hypothesis Not Supported
2	Brand Information Moderation Effect	Cell Phones	Hypothesis Supported
		Disinfecting Wipes	Hypothesis Supported
3	Product Involvement Moderation Effect	Cell Phones	Hypothesis Supported
		Disinfecting Wipes	Hypothesis Supported
4	Risk of COVID-19 Moderation Effect	Cell Phones	Hypothesis Not Supported
		Disinfecting Wipes	Hypothesis Not Supported
5	Age Group (Millennial) Moderation Effect	Cell Phones	Hypothesis Not Supported
		Disinfecting Wipes	Hypothesis Not Supported

Overall Findings Regarding the Decoy Effect

One purpose of this study was to investigate whether the decoy effect is present in cell phone and disinfecting wipes choice matrices. Additionally, the study set out to investigate the influence of several constructs on the decoy effect. Lastly, the study looked to examine whether millennials experience the decoy effect differently than other consumer segments. The results of the study suggest that:

1. A decoy effect is present for cell phones but not disinfecting wipes;
2. Brand moderates the impact of the decoy on choice of cell phones and disinfecting wipes;
3. Product involvement moderates the impact of the decoy on choice of cell phones and disinfecting wipes;
4. Participants' attitude toward COVID-19's risk does not moderate the impact of the decoy on choice of cell phones or disinfecting wipes, and;
5. Being a millennial does not moderate the impact of the decoy on choice of cell phones or disinfecting wipes.

Table 22. *Participants' Choice Distribution Across Conditions*

Condition	Decoy Product Present	Cell Phones			Disinfecting Wipes		
		Target	Alternative	Decoy	Target	Alternative	Decoy
Total*	No	49.9%	50.1%	...	82.2%	17.8%	...
	Yes	58.8%	35.9%	5.3%	72.5%	10.5%	17.0%
Brand Present	No	64.5%	35.5%	...	76.2%	23.8%	...
	Yes	62.6%	29.1%	8.3%	71.6%	13.7%	14.7%
Brand Not Present*	No	34.8%	65.2%	...	88.0%	12.0%	...
	Yes	55.0%	42.6%	2.4%	73.5%	7.0%	19.5%
PI High	No	59.2%	40.8%	...	87.5%	12.5%	...
	Yes	63.6%	29.5%	6.8%	68.8%	6.8%	24.4%
PI Low*	No	42.3%	57.7%	...	77.5%	22.5%	...
	Yes	55.4%	40.3%	4.3%	75.2%	13.5%	11.3%
COVID High*	No	53.3%	46.7%	...	82.1%	17.9%	...
	Yes	57.8%	36.3%	5.8%	73.3%	7.9%	18.8%
COVID Low*	No	45.0%	55.0%	...	82.1%	17.9%	...
	Yes	59.5%	35.8%	4.7%	71.2%	14.1%	14.7%
Millennial	No	44.4%	55.6%	...	81.8%	18.2%	...
	Yes	53.4%	43.2%	3.4%	78.6%	8.3%	13.1%
Not Millennial	No	53.4%	46.6%	...	82.6%	17.4%	...
	Yes	61.5%	32.1%	6.4%	68.9%	11.7%	19.3%

Note. No significant decoy effect detected for disinfecting wipes across conditions.

*Decoy effect detected for cell phones at 95% confidence level.

While not all hypotheses were not supported, they raise interesting observations regarding the impact of a decoy product on consumer decision making. Brand information, for example, has its own effect on consumers' perception of products. As observed in the

experiment, the presence of brand information increased the likelihood of selecting the target cell phone. At the same time, the presence of a decoy also increased the likelihood of participants choosing the target product. However, when both were present, the brand information reduced the effect of the decoy on participants' choice. This result comes in the context of using actual brand names, in contrast to earlier studies that used only suggestions of brand connections between product options, and thus extends this earlier work (Heath & Chatterjee, 1995).

Similar to brand information, the moderating role of product involvement demonstrated how important participants' awareness and familiarity with the product is to their decision making. While past research looked at the role of product knowledge as a moderator of the decoy effect, this experiment looked at participants' involvement with the product groups as a moderator in order to avoid the common weaknesses of subjective measures of product knowledge. Similarly, product involvement has a significant effect on product choice independently of brand-specific characteristics. As such, the results show that product involvement represents a broader familiarity with the product category and may not be related to consumer confidence or subjective knowledge. The results of the study also suggest that product managers should identify product involvement levels among their desired market groups. If these levels are high, a decoy strategy might not be best suited, while it is more suited for markets with lower product involvement levels. These findings align with Bei and Widdows' (1999) conclusions that product involvement generally is expected to help a consumer make better decisions.

When testing for the decoy effect in disinfecting wipes, all conditions yielded results that did not violate regularity (there was no "decoy effect" present). However, while there was no *increase* in the target product's market share, there was a significant reallocation of shares once

the decoy product was present. Specifically, while the target product lost a modest share, the alternative (e.g., competitor's) product was significantly negatively impacted by the introduction of a decoy product. For example, the target disinfecting wipes product's share in hypothesis 1 *decreased* by 9.7% when the decoy product was added. Assuming the target and decoy products share the same brand (as designed for hypothesis 2), when the decoy product was added, the overall share of the brand (both the target and decoy products) actually *increased* by 7.3% from 82.2% to 89.5% (Table 22), at the expense of the original alternative option, suggesting that the presence of a decoy provided the brand with a greater market share than before. However, since the decoy is an inferior product to the target by definition, this market share expansion potentially comes at the price of profit cannibalization (depending on whether the inferiority is both in product attributes and in internal cost). The market share expansion and profit cannibalization, while not confirmed, are meaningful for their managerial and strategic implications, particularly as they relate to desired profit margin and market share.

Difference Between Cell Phones and Disinfecting Wipes

In this study, the experiment considered one durable product and one non-durable product and found that the decoy effect is not present for the non-durable product. However, the study demonstrated how each of the constructs used (brand, product involvement, attitude toward health risk, age group) can have their own individual effects on the expected behavior or choice, independent of product type. In general, the constructs' effects are in line with research assumptions and expectations.

The presence of brand information, in the case of the cell phones, significantly increased the likelihood of the target product being chosen, while brand information significantly reduced it in the case of disinfecting wipes. Given the higher price-point of the cell phones compared to the disinfecting wipes, it is expected that brand may speak more directly to its indication of value, consumer loyalty, or status consumption (Aaker, 1996; Eastman et al., 2014; Rao & Monroe, 1989).

Similarly, product involvement had significant positive direct effects on the choice of the target product for both product types, suggesting that it adequately measures one's familiarity with the options provided. The contrast of low involvement and high involvement participants, particularly for the case of cell phones, in terms of the presence of a decoy effect also aligns with prior research (Bei and Widdows, 1999) that suggested that low involvement can lead to inferior decisions.

This study is the first to consider how the COVID-19 pandemic may impact consumer decision making, particularly with respect to the power of a decoy product. Thus, there are no prior studies conducted on how concern toward COVID-19 may impact the effects of the decoy. Its anticipated effects, in this study, were principally on the health-related product (disinfecting wipes). However, given its statistically insignificant moderating effect on the relationship between a decoy product and the product choice, additional research and perhaps additional time during and beyond the timeline of the pandemic completion may be needed to delve into these considerations.

That said, while participants' attitude toward health risks associated with COVID-19 did not yield a statistically significant moderating effect, the data do suggest that, in the disinfecting wipes experiment, participants who scored higher on the COVID-19 scale differ significantly on

how they evaluated the product alternatives. Specifically, referring to the five-point scale by which participants rated the importance of each product attribute, participants scoring higher on the COVID-19 scale rated the “effectiveness” of the product, on average, as statistically more important than did those who scored lower on the scale ($p = .001$) This behavior is understandable and may indicate how certain attributes were weighed by those participants.

In fact, when comparing how participants weighed the three or four attributes presented to them for each product, there was a significantly greater emphasis given to brand, then price, then storage capacity and camera quality for cell phones, while, for disinfecting wipes, effectiveness rated significantly more important than volume of wipes, which was more important than price and then brand. This reverse order of importance given to the products’ attributes suggests that cell phones and disinfecting wipes are indeed distinct products in this analysis (Table 23).

Millennial Consumers

The lack of moderation effect of the participants’ millennial or non-millennial status suggested, under the conditions of this study, that participants’ age did not play a significant role in their decision making. This confirms rational choice theory and raises questions regarding how prior studies have assessed the influence of age. While many studies argue that millennials are different in their behaviors and preferences than other consumer segments, there are inconsistencies regarding the types of consumer behaviors that may be unique to this subpopulation. This study, therefore, provides evidence to suggest that millennial consumer behavior may be more similar to that of other segments with regards to its susceptibility to the

decoy effect. Furthermore, the participants' millennial consumer segment status did not moderate the effect of the decoy raises additional questions regarding the delineation between consumer segments and how those constructs have been defined.

Table 23. *Average Rating per Product and Attribute*

Cell Phone Products							
Product Attractiveness			Attribute Importance				<i>p-value</i>
Target	Alternative	Decoy	Brand	Price	Capacity	Quality	
7.09	6.12	...	...	...	...	...	< .001
7.23 ^a	...	5.10 ^a	...	...	...	...	< .001
...	5.86 ^a	5.05 ^a	...	...	...	...	< .001
...	...	...	3.75 ^a	3.73 ^a	...	...	.810
...	...	...	3.76 ^a	...	3.62 ^a	...	.044
...	...	...	3.76 ^a	...	...	3.33 ^a	< .001
...	...	...	...	3.83	3.58	...	< .001
...	...	...	...	3.83	...	3.18	< .001
...	...	...	...	...	3.59	3.18	< .001
Disinfecting Wipes Products							
Product Attractiveness			Attribute Importance				<i>p-value</i>
Target	Alternative	Decoy	Brand	Price	Volume	Effectiveness	
7.78	5.80	...	...	...	...	...	< .001
7.84 ^a	...	6.37 ^a	...	...	...	...	< .001
...	5.46 ^a	6.36 ^a	...	...	...	...	< .001
...	...	...	2.23 ^a	3.46 ^a	...	...	< .001
...	...	...	2.24 ^a	...	3.56 ^a	...	< .001
...	...	...	2.24 ^a	...	...	4.05 ^a	< .001
...	...	...	...	3.39	3.51	...	.002
...	...	...	...	3.38	...	4.04	< .001
...	...	...	...	...	3.50	4.04	< .001

^aSample was halved due to variable's presence (e.g., when brand information or decoy product were present)

Boundary Conditions

While this study focused on the presence of the decoy effect, the results found that such an effect is present, but not for all products. This might be attributed to the varying significance or importance that price or other product-related constructs have on decision making. Similarly, it is unclear if there are other factors in play that are not related to the products (such as one's self identity or sense of agency) that may be influencing consumer decisions and whether or not those factors are relevant to one product group, but not another.

Similarly, the lack of decoy effect in the disinfecting wipes products may suggest that this product falls beyond the boundaries of the phenomenon. Simply said, the decoy effect may not apply to disinfecting wipes, while it does apply to cell phones. The fact that the decoy effect was present in certain product groups, and not others (as seen in past research) may indicate such boundaries do exist for this phenomenon and would require further examination to assess whether such a pattern exists in other consumer goods and services.

Other Considerations

It is important to note that this study required a product choice to be made in order to assess the prevalence of the decoy effect. Therefore, the results discussed apply to cell phones and disinfecting wipes of a particular quality (as illustrated in the attributes of the products), and not necessarily to other products. This confirms the results of past research that examined refrigerators (Kim et al., 2006), cars, beer, restaurants, lotteries, film, TV sets (Huber et al., 1982), and other products.

In contrast to previous research, this study asked participants to commit to a choice by selecting the product they would likely purchase. In doing so, this study differs from methods used in the past which have often asked for a distributive approach to indicating preferences, rather than a determinant commitment to one final choice. For example, Ariely and Wallsten (1995) asked participants to distribute 100 points across three product options and those ‘shares’ served as the study’s dependent variable (indicator of choice). In this study, participants were asked to go to the next step and commit to a single preferred choice which may provide a better representation of the decision-making task itself.

Similarly, the timing of this study is not to be taken for granted. This study, by design, evaluated U.S.-based participants’ choice during a pandemic. While the focus of the study was not to evaluate the impact of the pandemic itself on choice, elements of the study (the inclusion of disinfecting wipes and attitudes toward COVID-19 health risk) drew their importance from the timing of the study. In addition, the impacts of the pandemic, while not controlled for completely, could have played a role on participant choice. Economic pressures, for example, might have contributed to the presence (or absence) of a decoy effect, and the risk of getting sick might have impacted participant attitude about the importance of product attributes and overall attractiveness.

Managerial Implications

As mentioned earlier, one of the direct implications this study has to product management is the notion that both brand and product involvement are important elements of the strategy and usefulness of using the decoy effect. Specifically, the fact that brand information had a strong

effect on consumer choice, as well as a significant impact on the decoy effect, highlights the importance of brand equity as it relates to organizational strategy. Similarly, the results of the study illustrate how product involvement can influence choice, which in turn, provides insight into the relevance of the decoy effect to certain product categories. As such, organizations that can recognize how consumers respond to brands and engage in product categories can better position their products such that they can promote their strategy more effectively.

Additionally, the presence of the decoy product, in the context of this study, reduced the market share of the alternative product disproportionately to the reduction in the share of the target product (even when a decoy *effect* was not detected). Organizations might consider incorporating such choice architecture as part of a strategy to increase overall market share (assuming the alternative product represents a competitor product). These strategies can be beneficial for organizations in markets where increasing competition can hinder competitive advantage and overall market share. However, as indicated earlier in the discussion, this market share expansion could result in profit cannibalization. Therefore, incorporating decoy products into corporations' marketing strategy may be best suited when the objective is to increase sales volume, while it may not be as beneficial to organizations that are focused on increasing or maintaining their profitability. However, if the costs of producing the decoy product are similar to those of producing the target product, then such choice architecture can achieve both market share expansion and increased profits.

Lastly, the decoy effect, as observed in the experiment, did not just increase the absolute share of the target product, it also reduced the relative attractiveness of the alternative product (as seen in Table 23). This shift in choice, both in the target and alternative products, can allow organizations to not only increase their market share and profitability, but also increase their

competitive advantage by lowering consumers' preferences toward competitor products. Simply said, firms can use decoy choices to make competitor products look worse, and as a result, improve their perceived product differentiation.

Consumer Persuasion Implications

This study demonstrates how consumers are susceptible to the “decoy effect” in certain products (such as cell phones), but not others (such as disinfecting wipes). This difference might speak to the type of product being evaluated by consumers, such that the considerations which influenced participants' choice differ. Specifically, the fact that cell phones have been viewed as status products (or those with hedonic value) may suggest that products of similar (hedonic) nature are also susceptible to effects driven by choice architecture. Contrarily, products that are viewed as functional (or with utilitarian value) may not be associated with similar motivations, and therefore, not experience such decoy effects (Eastman et al., 2014). While the use of a decoy is a strategic decision taken by a firm, the potential welfare effects on consumers should not be ignored. This study suggests, at least, that the decoy effect would be less likely in products falling into the “necessity” category.

On another note, the relevance of the decoy effect to higher-cost items (as seen in the cell phone products) may indicate that consumers become more dependent on their experiences when making “harder” decisions, which can expose them to rational shortcomings (as demonstrated in studies assessing product knowledge and product involvement (e.g., Klerck & Sweeney, 2007)). While competitive forces may lead a firm to take advantage of this pattern, longer-term product satisfaction and brand loyalty may need to be considered as well.

This study expanded from prior research in offering participants four characteristics by which to evaluate their product options, thus moving closer to a more realistic set of product criteria to use when making a choice. It is clear from the results that the presence of a decoy product has noticeable effects on consumers' preferences, both in products where brand is important and in products where utility is important (tested in this study in the form of effectiveness). These findings suggest that consumers evaluate products in a comparative nature, such that an addition of an attribute or a product to the choice matrix requires consumers to adjust their reasoning and re-evaluate their decision for selecting a product. This study, therefore, provides consumers with an example of the mechanisms behind this shift in preference, and offers consumers insight into their own decision making.

Finally, the fact that this study, as well as others, has demonstrated the decoy effect in various products illustrates consumers' use of heuristics in their decision making. While it is not intentionally manipulative, recognizing the power of heuristics allows organizations to elicit desired behaviors from consumers, all while consumers perceive their actions as independent of external influences. Understanding that such influence exists, both theoretically and practically, provides consumers with a greater understanding of the benefits and limitations of such constructs. Similarly, it helps consumers develop their critical understanding of the methods used by corporations to promote products in the marketplace.

Limitations and Future Research

This study was designed to assess the decoy effect on a selection of products, as well as the influences of several constructs on consumer choice. In doing so, several decisions were

made regarding its design. First, the study focused on two product groups: cell phones and disinfecting wipes. Second, the study was used to assess the consumer behavior of a U.S.-based consumer population. Third, as with past research, the structure of the decoy product was designed such that the target and decoy products shared the same brand. However, unlike past research, this study asked participants to commit to discrete choices when comparing the products. Fourth, the choice matrix was designed to include three or four attributes of the product, which participants used to evaluate and make their choices. As such, future research could look at multiple avenues to expand this line of research.

For example, future research may consider expanding the product groups used to evaluate the presence of the decoy effect. Doing so would expand the understanding of the decoy effect and its relevance to consumer products. Furthermore, such investigations may provide insight into the boundaries of the decoy effect and the product categories which are most (or least) affected by it. This can be achieved by further defining the boundaries with respect to product type and incorporating them into the design of the choice matrix. For example, since the decoy effect was not observed in the disinfecting wipes product group, future research may focus on such a product category, where traditional factors that influence consumers' perception of quality, such as brand and price, are less relevant.

In addition, research may consider expanding the sample population to that of a global presence or different geographic location. Doing so can not only assess the propensity of the decoy effect on other consumer segments, but also highlight possible boundaries of the decoy effect on the basis of geography or cultural differences, both in the effect's presence and in the way different populations rate importance of attributes.

Similarly, future studies should consider evaluating the influence of age on the decoy effect. While this study focused on the difference between the millennial consumer segment and other segments, there is enough variability within age segments that it is difficult to discern the impact of age on the decoy effect (as is seen in the general population). Therefore, greater consideration should be given to the role of age or other consumer demographics on consumer decision making.

Future research should also examine the impact of brand information and decoy product on consumer choice when the products do not share the same brand or when the shared brand is alternated between the products. Similarly, the use of brand information in research can provide insight into its role and impact on consumer decision making. Specifically, whether brand information impacts choice regardless of the product in question, and whether a brand effect differs based on the brand itself. This study used two brands with significant individual market share, both for cell phones and disinfecting wipes. The brands' effects, therefore, might have influenced participants' choices based on their position in the choice matrix (our study used one brand for the target and decoy products, and another for the alternative product).

Furthermore, future research may also consider evaluating the impact of decoy product on the alternative, and not just the target product. In this study, the decoy product not only increased the market share and attractiveness of the target product, it also lowered the attractiveness of the alternative (at least in the cell phone product group). Looking at the effects of the decoy on the alternative option in a matrix can offer a more holistic approach to evaluating the decoy's effect on choice (as well as the "decoy effect").

Lastly, future research may expand upon the design of the choice matrix and the influence of the constructs on it. For example, future studies may consider increasing the array of

choices presented to consumers, beyond the three-to-four range used in this study, as a way to examine whether the decoy effect holds its relevance in an even more realistic arrays of choices. Similarly, future research can also consider evaluating other constructs for their impact on the decoy effect such as subjective and objective product knowledge, brand involvement, consumer loyalty, and motivations. Given the moderate effect size expressed through the PROCESS Macro in this study, evaluating these constructs will help create a more predictive model that is valuable both theoretically and practically as it illustrates the effect each of the constructs might have on consumer decision making.

Conclusions

This study aimed to examine the “decoy effect” identified in the literature as influencing the market share of different product options. The effect is considered useful to companies who wish to enhance the market share of their own, perhaps more profitable, products. The decoy effect occurs when the addition of a product to a choice matrix (the decoy product) increases the market share (or relative preference) of one of the original two choices (target product), and in doing so, violates the principle of regularity (the notion that an addition of a choice option cannot increase the share of the existing alternatives). In addition, the study explored the role that a product’s brand information (name), a consumer’s level of product involvement, one’s attitude toward health risk related to COVID-19, and one’s age-based consumer segment may have on the existence or magnitude of the decoy effect.

An experimental survey was distributed to U.S. consumers to test these relationships, with two products used as context, specifically a consumer cell phone which represents a durable

product, and household disinfecting wipes which represent a non-durable product. This contrast not only provides insight into whether the decoy effect is different based on the type of product (durable or non-durable), but by inference helps to illustrate additional product categories beyond those already studied in the literature.

The study had four primary findings. First, the results of the study showed that there is a consistent decoy effect evident for cell phones, with some exceptions for when brand information is present and when product involvement is high. By contrast, there was no decoy effect apparent in any of the analyses for disinfecting wipes. These results suggest that a boundary product may have been identified with the choice of disinfecting wipes.

Second, the moderating influences expected of the presence of brand information (name) as well as participants' levels of product involvement were detected. In contrast, neither the attitude toward health risk related to COVID-19 nor the age segment identified popularly as "millennial" consumers exhibited a moderating influence on the relationship between a decoy product and participants' final product choice.

Third, these results suggest that a firm's strategy toward choice architecture may indeed influence their overall market share. Depending on the product, utilizing the decoy effect can increase market share, but could also result in profit cannibalization. For consumers, the results of the study provide further insight into the ubiquity and potential manifestations of the decoy effect. Similarly, the study expands on the collective knowledge regarding heuristics (e.g., brand name), which can help educate consumers regarding potential fallacies and shortcoming in their decision making.

Lastly, this study provides recommendations regarding future research. The suggestions address theoretical and practical next steps, such as defining and expanding the product options,

evaluating additional moderating factors, and examining the relevance of the decoy effect on different populations. Doing so will expand the academic and professional understanding of the decoy effect and provide both firms and consumers with greater insight into human decision making.

Appendix A

Recruitment Message for Reddit's r/SampleSize

[Academic] Understanding Consumer Cell Phone Preferences (US 18+)

This online survey focuses on understanding more about consumers' preferences regarding cell phones and other household items. You will be asked to answer a series of questions about your purchasing behavior. Please be assured that your responses will be kept completely confidential.

The study should take about 3-5 minutes to complete, and you will be given a chance at winning one of three \$100 Amazon gift cards for your participation. Thank you!

The link to access the online survey:

https://pennstate.qualtrics.com/jfe/form/SV_2ITOWRShWRWqr1b

Appendix B

Informed Consent

Welcome to the Study

You are being invited to participate in a research study associated with Penn State University.

This summary explains information about this research.

- We are interested in understanding more about consumer preferences.
- You will be asked to answer a series of questions about your attitude towards common consumer goods.
- Please be assured that your responses will be kept completely confidential.
- The study should take you around 5 minutes to complete, and you will be given a chance at winning one of three \$100 Amazon gift cards for your participation

If you have questions, complaints, or concerns about the research, you should contact Adi Yom-Tov at 215-833-8051 or Julie Stanton, PhD at 610-892-1450. If you have questions regarding your rights as a research subject or concerns regarding your privacy, you may contact the Office for Research Protections at 814-865-1775.

Your participation is voluntary and you may decide to stop at any time. You do not have to answer any questions that you do not want to answer.

By clicking the button below, you acknowledge that your participation in the study is voluntary, you are 18 years of age, and that you are aware that you may choose to terminate your participation in the study at any time and for any reason.

Please note that this survey will be best displayed on a laptop or desktop computer. Some features may be less compatible for use on a mobile device.

- ☐ I consent, begin the study (1)
- ☐ I do not consent, I do not wish to participate (2)

Appendix C

Online Survey Example

The following appendix includes a sample of the survey used in this study. For simplicity, it does not include the display logic, attention questions, or different variations of the survey that were used to control for order effect. For example, Q2 in this survey includes a branded choice matrix with three cell phone products, followed by Q5 that includes a branded choice matrix of two disinfecting wipes products. Other versions of the survey included non-branded product choices (omitting the brand information from both the matrix and the subsequent rating question), and matrices that did not include a third, decoy, product. Similarly, the order in which the choice tasks questions were presented to participants (cell phone products followed by disinfecting wipes products, and vice versa) and the scale questions that followed the tasks were both randomized to control for order effects.




Q2 Please review the following phone products carefully and indicate which you would prefer if you were able to purchase one:

	Phone 1	Phone 2	Phone 3
Brand	Apple	Samsung	Apple
Price (\$)	849	499	1049
Storage Capacity (GB)	256	128	128
Camera Quality	12 MP camera and 6.1 inch screen	10 MP camera and 6.1 inch screen	14 MP camera and 6.1 screen

Of the products presented, which one are you most likely to purchase?

- ☐ Phone 1 (1)
☐ Phone 2 (2)
☐ Phone 3 (3)

Q3 On a scale from 0-10, please rate the attractiveness for each phone (0 = least attractive; 10 = most attractive)

	0 1 2 3 4 5 6 7 8 9 10
Phone 1 ()	
Phone 2 ()	
Phone 3 ()	

Q4 When making your decision, please rate the level of importance each of the following attributes had on your choice:

	Not important at all (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Brand (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Storage Capacity (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Camera Quality (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q5 Please review the following disinfecting wipes products carefully and indicate which you would prefer if you were able to purchase one:



	Product 1	Product 2
Brand	Clorox	Lysol
Price (\$)	7.99	4.99
No. of Wipes	55	35
Effectiveness	Effective against 10 common viruses and 99.9% of bacteria	Effective against 7 common viruses and 99.9% of bacteria

Of the products presented, which one are you most likely to purchase?

☐ Product 1 (1)

☐ Product 2 (2)

Q6 On a scale from 0-10, please rate the attractiveness for each product (0 = least attractive; 10 = most attractive)

	0 1 2 3 4 5 6 7 8 9 10
Product 1 ()	
Product 2 ()	

Q7 When making your decision, please rate the level of importance each of the following attributes had on your choice

	Not important at all (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
Brand (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
No. of Wipes (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Effectiveness (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[illegible]

was optimistic about the future. (10)							
The last time I did any shopping (either online or in person), I was feeling good about the future. (11)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The last time I did any shopping (either online or in person), the future seemed bright. (12)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The last time I did any shopping (either online or in person), I was skeptical about the future. (13)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q35 In which year were you born? Please enter the year in a 4-digit format. For example, if you were born in 1992, please enter 1992.

Q36 What is your gender identity?

- ☐ Male (1)
- ☐ Female (2)
- ☐ Other (3) _____
- ☐ Prefer not to answer (4)

Q37 In which state do you live? Please select from the list of 2-letter state codes.

▼ AL (1) ... WY (59)

Q38 What is the highest level of school you have completed or the highest degree you have received?

- ☐ Less than high school degree (1)
- ☐ High school graduate (high school diploma or equivalent including GED) (2)
- ☐ Some college but no degree (3)
- ☐ Associate degree in college (2-year) (4)
- ☐ Bachelor's degree in college (4-year) (5)
- ☐ Master's degree (6)
- ☐ Doctoral degree (7)
- ☐ Professional degree (JD, MD) (8)

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ACADEMIC VITA

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EDUCATION

The Pennsylvania State University, Schreyer Honors College

December 2020

Bachelor of Science in Business Marketing and Management, Minor in Psychological Science

Israel Defense Forces Infantry Commander Training School

10/2012

Certification in Military Tactics and Navigation

REASERCH EXPERIENCE

Schreyer Honors Thesis, The Pennsylvania State University

11/2019 – Present

The Decoy Effect on Consumer Choice: An Experimental Analysis of the Effects of Brand, Product Involvement and Consumer Age

- Thesis Supervisor: Dr. Julie Stanton
- Designed and disseminated online survey to national audience
- Assessed presence of behavioral heuristic on choice and its organizational and consumer implications
- Funded by the Penn State Brandywine Undergraduate Research Committee
- Manuscript in process (December 2020)

Independent Research in Behavioral Economics

05/2018 – Present

Behavioral Economic Models as Predictors of Millennial Consumer Behaviors

- Research Advisor: Dr. Joshua Marquit
- Designed study to assess fit of behavioral economic models on consumer behavior
- Interpreted and translated results from national sample and statistical modelling software
- Funded by the Penn State Brandywine Undergraduate Research Committee and the Penn State Undergraduate Research Fund
- Manuscript in process (December 2020)

Independent Research in Psychology

01/2018 – 05/2018

Framing Effects in Online Dating Profiles

- Research Advisor: Dr. Evan Bradley
- Designed and disseminated online survey to University audience
- Presented findings at University Research Symposium

HONORS AND AWARDS

- Pennsylvania State University – Dean's list *2016-Present*
- Pennsylvania State University Schreyer Honors College *2018-Present*
- Penn State Brandywine Cooper Honors Program *2016-Present*
- Even Pugh Scholar Award (Junior & Senior) *2019-Present*
- The President Sparks Award *2018-2019*
- The President's Freshman Award *2017-2018*
- Society of Distinguished Alumni Trustee Scholarship *2019-Present*
- C. W. Borgerding Scholarship *2019-2020*
- Arnold Markley Trustee Scholarship *2017-2019*
- W. W. Smith Trustee Scholarship *2017-2019*
- Bayard & Ethel Kunkle Scholarship *2016-2017*

SELECTED EXPERIENCE

Business Analyst, Mainline Metals, Inc., Bala Cynwyd, PA

09/2018 – Present

- Assist executive management in strategic and operational responsibilities
- Develop and establish processes to enhance integration across the organization
- Manage customer credit and transitional costs across internal and external facilities
- Coordinate ERP development between internal stakeholders and external vendors
- Manage transition of work from local to virtual environment, ensuring business continuity
- Develop key performance indicators and other measurements to assess risks and opportunities
- Implement and maintain organization-wide customer management platform
- Isolate and resolve operational and technological challenges across departments
- Coordinate and execute online marketing campaigns

Resident Assistant, Pennsylvania State University, Media, PA

08/2017 – 05/2018

- Directly responsible for the well-being and safety of 40 students; indirectly, 200 students
- Facilitated educational, vocational and networking events
- Assisted in the resolution of student conflicts
- Ensured students adhere to university policy and regulations

E-Commerce Product Manager, Global Test Ltd, Tel Aviv, Israel

03/2014 – 07/2015

- Managed inventory for an international company across multiple platforms
- Efficiently integrated inventory into an automated sorting and monitoring database
- Administered and supervised processes to ensure adherence to quality control requirements
- Maintained an accurate list of shipped products, and ensured shipment was as scheduled

Staff Sergeant, Givati Brigade, Israel Defense Forces

03/2011 – 03/2014

- Responsible for the command, training, logistics and combat readiness of a 25 combat soldier detachment
- Prepared and executed a plan to optimize soldier distribution among military posts
- Led a team of soldiers during military tasks and assignments
- Created an equitable schedule for all soldiers in detachment, while taking accommodations into consideration

COMPETENCIES

- Proficient in Enterprise Resource Planning and Customer Relationship Management platforms
- Practical experience with online experimental survey research, inferential and descriptive statistics, SPSS and Meta-Analysis research
- Proficient in Microsoft Office, social media and online sales platforms
- Proficient in website development software (Magento, Wordpress)
- Fluent in verbal and written English and Hebrew