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When More Is Worse: Different Product Types And Choice Overload

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While writing this thesis, I have not witnessed any wrongdoing, nor have I personally violated any conditions of the Skidmore College Honor Code.

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Abstract

Although standard choice theory argues that consumers benefit from large assortments, choice overload theory argues that consumers instead face unexpectedly demotivating outcomes from having too many options. This investigation uses a conceptual framework to compare consumer purchasing decisions for different types of products to see whether consumers face choice overload in a similar or different fashion. Results reveal that for products such as food, electronics, and investments, consumers experience choice overload when assortments are large and when presentation of options are in a difficult-to-comprehend format. Luxury products do not seem to follow this pattern, however. Businesses and policymakers should take note of these findings and create choice formats which aim to reduce the cognitive effort consumers require to make purchasing decisions in order to reduce consumers' experience of choice overload.

Introduction

In this modern age of heavy consumerism and mass advertising, a luxury that individuals face throughout the developed world is having an ever-increasing number of options to choose from. There seems to be countless brands to evaluate, products to purchase, places to travel, career paths to take, and so on. Classical choice theory predicts that consumer satisfaction should increase with more options because consumers can evaluate options against each other to find one that maximizes their own personal wellbeing (Baumol & Ide, 1956; Ariely & Levav, 2000; Sloot et al, 2006; Diehl & Poynor, 2010) and because consumers prefer choosing from large assortments over small (Bown et al, 2003; Mogliner et al, 2008). Despite this evidence, one growing body of study in behavioural economics suggests that having an overabundance of options to choose from can actually be detrimental to an individual's wellbeing rather than beneficial. This *choice overload* hypothesis instead argues that although individuals are likely to have an initial desire for large assortment sizes (Bown et al, 2003), they are likely to face unexpectedly

demotivating outcomes from too many options (Iyengar & Lepper, 2000). This occurs because consumers expect to make an optimal decision given the abundance of choice and possible points of comparison, but ultimately end up overwhelmed contemplating between options. Therefore, rather than maximizing individual wellbeing as standard theory predicts, large assortments are likely to cause individual disutility under the choice overload hypothesis, shown through the experience of negative emotions (Iyengar & Lepper 2000; Bown et al, 2003; Haynes, 2009; Besedes et al, 2015; Reed et al, 2011; and more) and certain behavioral responses (Iyengar and Lepper, 2000; Iyengar et al, 2004; Chernev, 2003b; Dhar, 1997; and more).

Since we cannot directly observe what specific neurological processes are occurring for each individual when making a purchasing decision (the best we can do is using fMRI or EEG), we can only understand choice overload through the manipulation of inputs and observable outputs without knowing what is going on in the brain. Because of this limitation, Chernev (2015) constructed a conceptual framework where, through a meta-analysis, he isolated and generalized certain inputs which reliably moderated the impact of assortment size on choice overload. Inspired by the conceptual framework in Chernev (2015), I create a conceptual framework in **Figure 1** that describes the specifics of each antecedent as well as consider several inputs that I believe are pertinent to fully understanding topic: personality, biology & human nature, and risk. The framework can be understood as follows: Under the condition of choosing given extensive choice, the existence of one of the inputs may affect your decision process, and as a result you are likely to experience choice overload in the form of some behavioral outcome and/or feel some subjective emotion associated with your choice.

As so many products with many competing brands exist in the market, consumers today may be experiencing more choice overload than ever before. However, few researchers have investigated industry and product specific analyses of choice overload, where consumers of one product may experience choice overload from a different way than consumers of another. The present study aims to examine the question of: how do consumers of different product types experience choice overload? Perhaps certain product types consist of particular characteristics that make certain antecedents more potent than others, making consumers of these products more likely to experience choice overload. I use the conceptual framework as a tool for the purposes of this study to see how consumers of different products experience choice overload, and if there are any notable product types that consumers often experience choice overload for.

My analysis indicates that the product considered is not as important for predicting choice overload as the cognitive effort required to navigate through the decision problem (Reed et al, 2011; Diehl & Poynor, 2010). For all product types except luxury goods, two ways the experience of choice overload can predicted is by reducing the overall number of choices and by simplifying the format of the

choice set. Regardless of whether the product is a food product, a technology product, or an investment, the presentation format of options seems to be a vital factor in predicting the choice overload effect as many studies manipulate the presentation format to find choice overload effects with difficult-to-comprehend presentations. Luxury products are different where consumers do not seem to experience choice overload when purchasing given a large assortment, which I recommend businesses to exploit by aiming to offer more options. This investigation concludes with recommendations for businesses and policymakers, suggesting that they should lay out choices in a way which reduces cognitive effort on the part of the individual, which can be done by simplifying presentation formats (Gourville & Soman, 2005; Reutskaja & Hogarth, 2011), offering default options, making choice architecture sequential (Besedes et al, 2015), or through *libertarian paternalism* (Thaler & Sunstein, 2008).

An Example Of The Problem

To put the choice overload phenomenon into an example in order to better understand it, consider the following scenario: imagine you are at a grocery store and you are purchasing laundry detergent. There are countless brands and types of detergent to choose from. Unlike standard theory, which predicts that with more choice freedom you are likely to find a closer match to your purchasing goals and end up benefiting from large assortments (Baumol & Ide, 1956), choice overload theory predicts that although you will be initially attracted to this large selection of choices, you may end up feeling overwhelmed with all the choice and unexpectedly feel more dissatisfied instead (Iyengar & Lepper, 2000). We can put this example into the context of our conceptual framework as well. Given a large number of detergents to choose from, the existence of one of these inputs may lead you to experience choice overload. Suppose that you seldom purchase laundry detergent, so you have uncertain prior preferences coming into the decision. In the face of a choice set including a vast number of options, you may struggle to settle on an option, and subsequently experience choice overload through some behavioural outcome such as choice deferral (not choosing a detergent). Because you have no preferences going into the decision process, you must put more cognitive effort when deciding, but because of the abundance of options, making no choice becomes more satisfying than making a choice due to the amount of cognitive effort saved.

Literature Review

Themes In The Literature

Optimal Number Of Options

One overarching debate in studies of choice overload was the question of whether the choice overload hypothesis is more accurate than a more-choice-is-better hypothesis. Choice overload

researchers address this debate by attempting to find the optimal number of options that a choice set should contain. By knowing how many options is excessive enough to produce the choice overload effect, we can consistently predict whether an individual would experience choice overload, which provides evidence for the choice overload hypothesis as compared to the more-is-better model. However, although the set of options must be large enough to produce a choice overload effect, in the literature there is no consensus for an optimal assortment size. This debate began after pioneering studies conducted by Iyengar and Lepper (2000) first tested for the effects of choice overload in experiments involving jams, chocolates, and essay papers, contradicting the status quo that choices are always better. Iyengar & Lepper (2000) wrote that choice overload exists when a choice set is a "reasonable large, but not ecologically unusual, number of options", but did not specify an exact number. Since this pioneering study, an influx of choice overload studies have been conducted in order to find an optimal number of choices. Studies regarding Medicaid choices show that sets which contain sixteen or more options can be described as extensive (Tanius et al 2009; Wood et al 2011), while other studies regarding gift boxes find that satisfaction is greatest when the number of options is "medium sized", around 9 options (Reutskaja & Hogarth, 2011). These varying results indicates the need for our study, as it may be that the optimal number of options depends on the product considered.

Meta-Analytic Research

To see whether or not choice overload dominates over a more-choice-is-better model, Scheibehenne (2010) conducted a meta-analysis by looking at experimental evidence from the literature and used an empirical framework to conclude that there was "virtually zero" instance of choice overload prevailing over a more-choice-is-better model. The instance of choice overload was measured using a method called Cohen's d, which measures the difference between two assortments, with a positive d indicating a positive choice overload effect (Cohen, 1977). Through Cohen's d, the experimenters subsequently use a meta-regression model to examine whether certain antecedents of choice overload increase the prevalence of choice overload or decrease it, and found no significant results. This led them to conclude that no sufficient conditions could be identified that would lead to a reliable occurrence of choice overload (Schiebehenne, 2010). This analysis presented more uncertainty about the question regarding which model is more accurate. However, the meta-analysis only reviewed experimental evidence that used dependent variables of self-perceived satisfaction and/or choice deferral to measure choice overload, which may explain the inconclusive results.

Chernev (2015) conducted a later meta-analysis using a different empirical model which aimed to create a conceptual framework that tried to discern when large assortments leads to choice overload, and concluded that the factors of decision uncertainty, uncertain preferences, choice set uncertainty, and

effort-minimizing were factors which precede choice overload. This framework provided a good guideline for distinguishing the different inputs and outputs of the choice overload effect that future studies could use, since we cannot understand what exact neurological processes are occurring when the mind is evaluating choices. The study also utilized Cohen's d to identify incidence of choice overload (Cohen, 1977), and finds that all four factors have significant impact on choice overload. The meta-analysis also found that the consequences of choice overload are also good measures of capturing the effects of larger assortment size leading to choice overload. This added more scope to the debate, as it gave weight to the choice overload argument over the more-choice-is-better argument.

Standard Theory

While much has been discussed on whether a less-is-more model prevails, standard choice theory cannot be disregarded. One reason from the more-choice-is-better argument is that large assortments allow consumers to find a closer match to their purchasing goals through comparison between products (Baumol & Ide, 1956). This allows for consumers to experience overall more satisfaction through the ability to choose the right option (Botti & Iyengar, 2004). Additionally, large assortments receive higher initial attractiveness because they allow for greater freedom of choice (Kahn et al, 1987), which is dubbed the "Lure Of Choice" in choice overload theory (Bown et al, 2003).

Evidently, there is a bifurcation between the two theories of large assortments. Therefore, the question of knowing the optimal number of options is a question of paramount importance for businesses and policymakers, as they must know how many options is the right amount for their particular product, and can these choices be conveyed to satisfy the consumer?

Choice Overload In Popular Culture: Decisions, Happiness, And Paternalism

The idea of choice overload was first coined by American futurist and businessman Alvin Toffler in his book "Future Shock", where he writes that the advantages of having diverse choices may be offset by difficult decision processes (Toffler, 1970). This assessment, coupled with the recent explosion of interest in behavioral economics, led to this topic becoming more apparent in the public eye.

The ideas of choice overload are apparent in well-known psychology and wellness books. One prominent researcher on choice overload is Barry Schwartz, who was interested in the relationship between happiness and choice, and through his research he later became a distinguished speaker and author. His research led him to conclude that individuals would be more satisfied if they had fewer choices to choose from (Schwartz et al, 2002). In his 2005 book, called "The Paradox of Choice", he writes that the society we live in today is so overloaded with choice (with "choice" referring to both

consumer and life choices) that it is very easy for individuals to feel stressed and unhappy considering all the decisions they constantly face every day. Not only do we face greater choice with consumer purchasing decisions, but even for dating, identity, religion, appearance, work, and education (Schwartz, 2005). As a result, the message he leaves readers is that in this world of ever-expanding choices, in order to feel happier individuals should attempt to: adopt voluntary constraints on their freedom of choice, lower their expectations with the results of decisions, and ignore social comparison. By taking these steps, Schwartz believes that this aggregated societal experience of choice overload problem can be less burdensome.

Another book in popular culture that looks to resolve the issues presented in choice overload theory is "Nudge", written behavioral economists Richard Thaler and Cass Sunstein (Thaler & Sunstein, 2008). In their book, they suggest policymakers should adopt *libertarian paternalism*, a strategy to reduce the cognitive effort consumers use in a decision without reducing the number of options by making choice structures in a way so that consumers are guided to selecting satisfactory options. In other words, they advise policymakers to "nudge" consumers into making the right decision considering choice overload. With this strategy, consumers will also not feel forced into selecting certain options either. In other words, they are able to experience the increased satisfaction from selecting from large assortments (the "lure of choice") without suffering from the consequences of choice overload. These solutions are meant to reduce the level of cognitive effort individuals put into a decision, a theme which will be repeated in this present paper.

Conceptual Framework of Choice Overload

Antecedents Of Choice Overload

Number of Options

The number of options is the dominant factor that choice overload studies use, hence it's superior position in the conceptual framework. Studies that focus on manipulating the number of options and the experience of choice overload consistently find significant effects, while many studies aim to find an optimal number of options (Iyengar & Lepper, 2000; Iyengar et al, 2002; Mogliner et al, 2008; Sela et al, 2009; and more). Many studies incorporate 2x2 models in choice overload studies, where they manipulate the number of options and another antecedent to find positive or negative choice overload effects. For instance, choosing in a large assortment with time pressure is correlated with greater option dissatisfaction, whereas making a decision given a small number of options and time pressure is correlated with greater satisfaction (Haynes, 2009).

Preference Uncertainty

Preference uncertainty in this context refers to how much knowledge individuals have of the benefits and trade-offs with a decision. Intuitively, if an individual has strong preferences prior to the decision task, then the decision process becomes easy and the individual will simply choose their prior preference and happily avoid choice overload. Individuals who have prior preferences or a degree of expertise regarding the choice set are predicted to have a lower likelihood of experiencing choice overload because they know along what attributes to evaluate between to make a good decision (Chernev, 2003; Chernev, 2003b; Mogliner et al, 2008; Oppewal & Koelemeijer, 2005).

Researchers find that individuals who have prior preferences coming into a decision under extensive choice do not experience choice overload compared to those who do not have prior preferences, and instead are more satisfied with extensive choice as there is greater likelihood they can match their preferences (Chernev, 2003a; Chernev, 2003b; Diehl & Poynor, 2010). Because of this factor, some studies attempt to control for individual prior preferences when designing certain choice overload studies by questioning consumers on whether they have prior preferences for certain studied products (Mogliner et al, 2008).

Similarly, the degree of expertise that consumers have regarding their purchasing decisions determines whether they experience choice overload. This is because expert consumers form preferences based on their superior knowledge, and therefore make decisions without suffering choice overload because they can better discern between different options than non-experts to fulfil their preferences. Evidence for the inverse relationship between consumer expertise and choice overload can be found through studies which find that individuals with expert knowledge have greater satisfaction with large assortments rather than small assortments (Chernev, 2003a; Chernev, 2003b; Oppewal & Koelemeijer, 2005; Mogliner et al, 2008).

Decision Difficulty

Decision difficulty refers to external factors that are independent of the decision task which create a situation where the decision process is made difficult. The factors that contribute to decision difficulty observed in the literature include time constraints and presentation formats, where it is predicted that more restrictive time constraints and difficult-to-comprehend presentation formats lead to choice overload effects.

Time constraints impact decision difficulty as they create pressure on the decision-maker to make decisions before they have had a chance to evaluate options. Studies show that individuals making

decisions from large assortments under time pressure experience dissatisfaction with outcomes, as compared to those who make decisions from less time pressure (Haynes, 2009). Interestingly (but unrelated to the present study), individuals are found to enjoy making decisions under limited time rather than extensive time, and this counterintuitive result is hypothesized to be because limited time means that individuals do not have enough time to get attached to any options (Iyengar & Lepper, 2000; Haynes, 2009).

Presentation format is another factor that can make a decision difficult and lead to choice overload. Choice overload is observed less if the presentation of options is in an easily comprehendible manner. The ordering of assortments may impact the difficulty of a decision, where research has shown that consumers reduce search costs and feel more satisfied when assortments are presented in an organized manner as opposed to lists (Diehl, 2005; Mogilner, 2008). Besedes et al (2015) showed that through "sequential, tournament-style choice architecture" the choice overload effect can even be fully eradicated without needing to minimize the number of options, stressing the importance of reducing decision difficulty so consumers can make better decisions devoid of choice overload.

Choice set complexity

The complexity of a choice set can be understood as how difficult it is to discern the different options in the choice set. One potential explanation for suffering choice overload is that options in the choice set are described to be too similar to that of others, causing consumers to struggle to spot differences between different options. The two components of choice set complexity are the existence of dominant options and the alignability of different attributes.

The degree of which dominant options exist in the choice set determine the likelihood of experiencing choice overload given extensive choice. The existence of an option that is clearly superior to others will lead to that option will be chosen, regardless of the number of options (Dhar, 1997). Consumers are less likely to experience choice overload effects if there is a dominant option in the choice set than if options are more or less similar, as they will simply select the dominant option and attain a great payoff. Because of this phenomenon, many choice overload studies attempt to control for dominant options by making all choices similarly valued (Iyengar & Lepper, 2000; Schiebehenne, 2010).

Research also shows the extent of how alignable attributes are may also result in effects of choice overload. For instance, different cereals can be considered more alignable than different investment options, as it is easier to compare (or "align") the differences between attributes describing products. Alignability can be judged based on two components: 1) Relative attribute importance: whether consumers weight certain attributes more than others, or 2) Attribute correlation: whether attributes are

similar or different from each other (Fasolo et al, 2009). Consumers are likely to experience choice overload if individuals are unable to align attributes describing different choices, as consumers cannot discern the differences between choices if choices are unalignable (Gourville & Soman, 2005). The more non-alignable the attributes of different products are in a choice set, the more likely a consumer will experience choice overload.

Decision Goal

The purchasing goals consumers have also play an important role in determining whether an individual experiences choice overload. Decision goal reflects the extent of which consumers are willing to expend cognitive effort to make a decision, and this is manifested through the consumers decision intent and their individual personality traits.

One component of decision goal is the decision intent consumers have in purchasing a product. In other words, does the individual intend on simply browsing for a product, or do they intend on buying it? As most of choice overload theory is based off the inability to make a decision due to overriding influences from multiple sources, decision intent is an important factor to consider as large assortment sizes will not lead to choice overload effects if the individual simply intends to browse through options as they were likely to defer choice anyway (Chernev & Hamilton, 2009).

Related to decision intent, another component of the decision goal antecedent is the personality of the individual and their willingness to expend cognitive effort. Specifically, research in this field argues that all individuals lie on a maximizer-satisficer continuum when it comes to making decisions under extensive options. Maximizers are individuals who want to attain the greatest possible outcome for themselves and are willing to expend considerable cognitive effort to attain this, while satisficers are individuals who are satisfied with an outcome that they consider "good enough" for their purposes and will stop searching upon finding this outcome in order to not expend any more cognitive effort (Simon, 1955; Schwartz et al, 2002). Researchers in this field argue that all individuals lie on a spectrum for the tendency to maximize/satisfice, and the extent of which an individual is a maximizer determines the likelihood of experiencing choice overload. This makes intuitive sense as maximizers are willing to expend significant effort to evaluate between a large number of options to find an optimal choice, unlike satisficers who would not evaluate from such large assortments (Schwartz, 2002). But this argument can also be explained through the maximizer's tendency to have greater expectations with their chosen choice, and as a result experience choice overload as often their choice does not meet their heightened expectations (Schwartz, 2002; Iyengar et al, 2002; Parker, 2007; Reed et al, 2011).

Other Antecedents

The following are some other potential antecedents of choice overload. These inputs potentially may also play a significant role in our understanding of choice overload, but because limited evidence is available for these antecedents, they will not be discussed in this paper thereafter. I would implore future studies to examine the effects of these antecedents in their studies as only through a holistic approach can we fully understand choice overload.

Risk

One idea that is seldom discussed in the literature is the concept of risk. If there are high consequences associated with a decision, it may affect the experience of choice overload. For instance, an individual with a high income may be less sensitive to risk and consequently be more likely to use satisficing heuristics to make decisions, where a "good enough" choice is selected. Indeed, studies show that while individuals are more satisfied when selecting a choice that affects for themselves from a small assortments, when selecting choices that affect others', they are more satisfied when selecting from a large assortment, and this is attributed to be because choosing for someone else is less risky than choosing for yourself, so you are more satisfied given more freedom of choice (Polman, 2012). These results show that the potential consequences involved in a decision from a large assortment may play a factor in whether you experience choice overload or not.

Biology, Neuroscience, and Human Nature

Studies on biology, neuroscience, and human nature also shed light on the reasoning behind why we experience choice overload. One hypothesis for our tendency to prefer large assortments over small ones from biology is that organisms evolved to prefer situations that involve more alternatives because they would have promoted greater chances of survival eg. staying in areas with more options for food (Catania, 1975). On the other hand, other studies in biology conclude that choice overload is difficult to examine in nature because the number of options rarely exceed ecologically unusual amounts, and there is not enough evidence or data to confirm any biological basis for choice overload (Hutchinson, 2005). Studies in psychology and neuroscience echo this conclusion, as findings in this field argue that our cognitive system is severely limited in the amount of information it can contain, and overload occurs when our cognitive system is confronted with excessive simultaneous processing. One finding that evidences this is that human working memory capacity can only consist of 7±2 "items" (Miller, 1956). We can only think about 5-9 "items" at any given time, with these items being very broad and arbitrary units (for example: if you are asked to remember 30 random words you would struggle, but if you employ the "chunking" method and re-arrange the words into 5-9 sentences you would better recall all 30 words). Any additional items would lead to an overload of our cognitive system as it is unable to process and

evaluate so many options at once. This evidence suggests that it may be possible that choice overload is simply a result of our limited cognitive capacity.

There is also compelling evidence for choice overload in studies of human nature. One radical idea on this came from the influential social psychologist Erich Fromm, who argues that it is in human nature to prefer to give up freedom rather than live a life of endless decisions. (Fromm, 1941). This idea stemmed from his experiences in the rise of Nazi Germany where he recognized that the German people were so unopposed and willing to submit their freedom to an authoritarian regime that severely limited it. He writes in "Escape From Freedom", "We have been compelled to recognize that millions in Germany were as eager to surrender their freedom as their fathers were to fight for it; that instead of wanting freedom, they sought for ways to escape from it" (Fromm, 1941). Fromm argues that the events in Nazi Germany show evidence that it is inherently human to prefer to sacrifice one's own freedom (by living under an authoritarian regime) and have a fixed role in society than having to live a life of endless decisions. The reasoning behind this surprising conclusion is that living with unfreedom means you are given purpose in life and a role in society, and this is preferable to living a life where you must find your own purpose. If we observe this idea of human nature in the lens of our conceptual framework, because individuals in a free society are always making decisions from a large amount of options and constantly facing choice overload, it makes intuitive sense that they would prefer to give up their freedom as they are simply exhibiting the behavioral outcome of choice deferral in the conceptual framework, albeit on a societal scale.

Behavioral Outcomes

Subjective State

Satisfaction and regret have been identified as subjective states' individuals may experience to indicate the experience of choice overload. Studies frequently use self-reported emotions as dependent variables to measure choice overload, with satisfaction being the more commonly observed.

These subjective states demonstrate the experience of choice overload because they show unexpectedly demotivating outcomes when choosing from large assortments. This opposes the standard theory which predicts that greater choice allows consumers to find more satisfactory options (Baumol & Ide, 1956). The subjective state measured in experiments are often self-reported on a scale (Haynes, 2009; Mogliner et al, 2008), or by indirect measures of emotion eg. preferring selected option over cash payout of equivalent value (Iyengar & Lepper, 2000). Because of this subjectivity and this inability to empirically examine satisfaction, regret, and confidence, this makes studies in choice overload all somewhat limited as there is no way to truly measure the degree of, for example, the degree of

satisfaction an individual feels. Despite these limitations, the subjective state given extensive choice is incredibly powerful because they demonstrate a describable indication of choice overload.

Behavioral Action

Behavioral actions refer to the observable behavioral responses that indicate individuals are experiencing choice overload. These behavioral measures of choice overload are observed in a wide range of choice overload studies.

The most frequently measured behavioral action in choice overload studies is choice deferral, which is when making a decision under extensive choice, the individual prefers to not make a decision. Given extensive choice, the individual believes gains from avoiding the considerable cognitive effort and time involved in making a decision is greater than the gains from the outcomes of the decision. They would rather make no decision than effortfully decide (Iyengar & Lepper, 2000). This makes intuitive sense, as if more cognitive effort is needed in order to evaluate through options, then it is likely the individual would prefer to defer the choice and spend no effort in making a decision.

Option selection refers to whether a specific targeted option was selected or not. Experimenters studying this indicator of choice overload manipulate the experiment so that certain options should be selected if consumers are aiming to maximize their individual wellbeing. Some options are manipulated to be logically better than others, and researchers assess choice overload through whether or not individuals choose a better quality option given various assortment sizes (Ariely & Levav, 2000; Gourville & Soman, 2005; Sela et al, 2009). Individuals are expected to be able to discern better quality products than worse quality ones but given certain antecedents of choice overload it may be the case that individuals end up making poorer quality decisions because of the difficulty evaluating between products. Other studies examine option selection for whether individuals have certain biases for certain products. For example, individuals tend to have a bias to select options placed in the centre of their visual field (Reutskaja & Hogarth, 2011). Individuals making inferior decisions given certain biases indicate the experience of choice overload.

Assortment choice refers to the preference of a certain assortment set over another. Some studies are designed so that participants must make a choice on an assortment set to choose from, large vs small, and afterwards asked if they would switch their assortment choice. As people are initially attracted to large choice sets through the “lure of choice” (Bown et al, 2003), wishing to switch to a smaller assortment would indicate choice overload as the larger choice set resulted in more dissatisfaction for the participant. For example, individuals who display maximizing traits tend to choose smaller choice sets than larger ones in order to not feel overwhelmed with choice (Iyengar et al, 2002).

Product Types Considered

The four product types I observe in this study are all products that typical consumers would often encounter, and often have alternatives so that consumers must decide given assorted options. These products are also frequently observed in the literature, and include: consumer non-durables, consumer durables, investments, and luxuries. Of course, the products that fall under these different categories are not definitive and the choice overload effects may only apply to goods that exemplify the category extremely well. Rather, the analysis presented in this study would discuss how choice overload would affect typical prototypes for that category. Future studies should look at the choice overload effect with more specificity in contrast to the broad categorization that is observed in this study.

The following analysis will be describe the attributes pertaining to different product types, and also show my hypotheses on how the conceptual framework applies for different products.

Consumer non-durables

Consumer non-durables are manufactured products which tend to be packaged, relatively cheap, quickly consumed, have many alternatives, and are perishable. The main products in this category include food products, while some other products within this category include tobacco products, home essentials, apparel, and stationery – in other words, products found in your typical grocery store. Often there are excessive amounts of choice for all products in this category, with Schwartz (2005) writing that in his local supermarket, there are: 285 varieties of cookies with 21 options of chocolate chip cookies, 230 varieties of soups with 29 options of chicken soup, 275 varieties of cereal with 24 oatmeal options. Evidently, consumers purchasing their groceries experience decisions under choice on a frequent basis.

H1: Individuals are likely to experience choice overload when purchasing these products in the presence of a) Large assortments, b) Difficult-to-comprehend presentation formats, c) Alignable attributes, and d) uncertain preferences.

Based off findings from Iyengar & Lepper (2000), a large assortment should produce the experience of choice overload. Specifically, for typical consumer non-durable products like jams and chocolates, people are initially attracted to the prospect of picking from a large assortment, but eventually end up experiencing choice overload (Bown et al, 2003).

I predict that the presentation of products in an assortment for these ‘typical grocery store’ type of goods is likely to result in choice overload. Because of how these products are usually displayed in purchasing scenarios (different products on different aisles, different brands on different shelves, etc.), I predict that the presentation format of these products helps reduce the potential for choice overload

(Mogliner et al 2009). In addition, many of these products have an enormous number of substitutes, which may also cause consumers to experience choice overload. This is because consumers are unable to discern differences between the products and therefore have difficulty evaluating between choices (Gourville & Soman, 2005). Lastly, because of how frequently these products are purchased, people tend to form preferences for these products with experience (Schwartz, 2005). With uncertain prior preferences, consumers are likely to experience choice overload (Chernev, 2003a).

Consumer Durables

This basket of goods typically contains common consumer electronics such as mobile phones, refrigerators, and cameras. These products are technologies which are used to make consumers' lives easier, but often come at a high price, so making a mistake has large ramifications. And because technology changes so much, we cannot rely on habits to purchase these goods as new models are constantly released and replace older models (Schwartz, 2005).

H2: Similar to that of consumer non-durables, individuals are likely to experience choice overload when purchasing these products in the presence of a) Large assortments, b) Difficult-to-comprehend presentation formats, c) Alignable attributes, and d) uncertain preferences.

Some consumers may have more defined preferences through brand loyalty to certain companies (eg. Apple vs Android, people tend to stay with their preferred operating system), while others may have more expert knowledge and define their preferences based off their expertise. I predict that for these products, consumers with uncertain preferences are more likely to experience choice overload. However, as most consumers do not have defined preferences since technology changes at such a rapid rate, I also predict that for these products, the extent of which consumers can compare options is fundamental for consumers to not experience choice overload. This is because non-expert consumers are likely to know little about these technological products as they often require some expertise to understand, and as a result, require the choice set be comparable and in a comprehendible manner in order to not suffer from choice overload. For instance, given extensive choice, non-expert consumers are unlikely to understand the differences between different laundry machines and require discernibility of options to make a decision and avoid choice overload.

Investments

In the context of this study, the category of investments involves significant decisions which involve experiencing immediate costs in order to gain some potential future payoff. These purchasing decisions often require extensive knowledge as to know what kind of product you need as well as the

potential trade-offs and benefits of the decision, because they require a high immediate cost where the future payoff is uncertain. With this being said, investment products may include a variety of different products, including investment plans, financial investments, insurance, real estate. The investment products that are examined in this study include retirement insurance, health insurance, and medical treatment plans, as these are the only available studies observed from the literature.

Of course, many of these products cannot be considered physical products, but the exemplars in this category of investment products should follow the proposition of high immediate costs with potential future benefits. They typically have large and drastic consequences on an individuals' financial and/or personal wellbeing in the short-term for the individual to experience some greater future benefit. For instance, with insurance, individuals must make a significant purchasing decision where they require significant immediate costs (tying themselves to an insurance contract) to receive some potential future benefit (insurance benefits if the insured circumstance is realized/psychological benefit of knowing they are insured).

H3: Individuals are likely to experience choice overload when purchasing these products in the presence of a) large assortments, b) uncertain preferences, c) difficult-to-comprehend presentation format, d) alignable attributes, and e) exhibit satisficer traits.

Because of the necessary understanding and knowledge required to make investment decisions, I expect that preference uncertainty to have a large influence for these kinds of products. Specifically, there would be a large quantity of individuals who have expert knowledge regarding their purchase, as the purchase of investments requires a large immediate cost with an uncertain future benefit, requiring investors to evaluate all options before making decision as there may be dire consequences if the wrong decision is made.

On top of this, because investment products typically do not exist in some physical form but rather as a contract, the only way to know about investments is to read about them verbally. People may have difficulty discerning between different options as the verbal presentation formats require much cognitive effort to process information and evaluate between options (Townsend & Kahn, 2014). The presentation format as well as the alignability of options are highly important in determining whether individuals experience choice overload when purchasing investment products, because the differences between investment products are often more difficult to discern from each other.

Additionally, maximizers should feel opposite effects of choice overload, as their tendency to find the most satisfying outcome will lead them to make more satisfactory investment decisions. Counter to the standard theory, because investments require prior knowledge to make satisfactory decisions, I

predict maximizers do not feel choice overload effects for investment decisions because of their willingness to expend vast cognitive effort to make a decision.

Luxuries

Luxury goods in the context of this study can be considered products that are for maximizing individual pleasure. These products are unnecessary for maintaining an individual's living standard, nor are they products which will lead to future benefits for the individual. Instead, these are goods that are for entertainment, designed to bring immediate pleasure to individuals, which do not belong in any of the other categories. Examples of these kinds of products include vacations, entertainment, jewellery, and flowers.

H4: Individuals are likely to experience choice overload when purchasing these products in the presence of a) large assortments, b) uncertain preferences, and c) decision intent to buy

Because of the hedonic use value of luxury goods, I predict that the larger the assortment size, the more likely individuals experience choice overload. Additionally, due to the infrequency of purchase for these goods as a result of their high price, I predict that having more uncertain preferences, as well as the goal to purchase rather than browse, would lead to greater choice overload effects (Koelemeijer & Oppewal, 2005).

Methods

Data Collection

The data used in this paper were collected through an extensive review of journal articles in the literature. These papers analyzed are published in a range of economics, psychology, and marketing journals. Studies were selected based on if they considered independent variables and dependent variables present in the conceptual framework presented in **Figure 1**, and if they a product that could be placed in one of the four identified categories.

The products that are examined in this study include non-durable consumer products (eg. Processed food & drink, household essentials, perishable goods), durable consumer products (eg. Phones, computers), investments (eg. Stocks, insurance), and luxuries (eg. Vacations, gifts), four categories of products which are observed in empirical research of choice overload. In total, 37 cases from 21 studies based in 15 research papers were analysed in this study. 18 products were examined, ranging from chocolates to flowers to medical insurance.

Procedure

This study aims to see how consumers for different products experience choice overload. Effects of antecedents of choice overload on different products will be tested using the evidence from the literature as data. The data used for this paper can be found **Table 1**, and the analysis of these findings for the purposes of this research paper can be found in the **Results** section.

It is important to note that there are so many products existing in the market, and because we do not have evidence for all of them, these categories are very broad and should only be representative of typical 'exemplars' of that product (for example, an exemplar for a durable consumer product could be jam).

The table can be understood as follows: *Authors* includes the collaborators involved in the research. *Study* refers to the number of the study in the corresponding paper. *Product* refers to the specific product examined in the study, while *type of product* refers to the product category – consumer non-durable, consumer durable, investment, and luxuries – that the product is placed under. *Min choice* refers to the smallest choice set used in the experiment, while *max choice* refers to the largest number of choices participants can possibly choose from. *Antecedent* refers to which input the study in question looked at: decision difficulty, preference uncertainty, choice set complexity, or decision goal. *Independent variable* is the specific variable that was manipulated. *Dependent variable* is how choice overload was measured in the study, with these being either a subjective feeling (eg. dissatisfaction) or a behavioral outcome (eg. choice deferral). *Choice overload* describes whether the study found a positive or negative effect of choice overload, with "Yes" meaning that there was evidence for choice overload. *Cohen's d* is a statistical method of calculating choice overload, with a positive effect meaning that there was evidence for choice overload. This will be explained further below. *Additional notes* include important messages regarding either the methods or the findings of the experiment in order to provide a better understanding of the study.

Some of the data found have an estimation for *Cohen's d* (Cohen, 1977), which is a popular measure in behavioral studies for effect sizes of behavioral outcomes, with a positive figure evidencing choice overload (Schiebehenne, 2010; Chernev, 2015). The higher the figure is, the greater the choice overload effect was felt. The calculation is simply an additional tool to evidence the presence/absence of choice overload. There are several reasons as for why not every study contains a Cohen's d calculation. Firstly, the Cohen's d measurements come from the calculations made in Chernev (2015), so only studies that are also observed in his meta-analysis will contain a Cohen's d measure. Secondly, because the measure of Cohen's d can only be done with studies which employ some sort of scale (eg. How satisfied

were you? Rate from 1-7), it is not available for every single study. Lastly, I am also unable to compute the Cohen's d number for studies that Chernev (2015) omits because there is no ability for me to access the original data that different researchers used.

Results

Consumer Non-Durables

The number of options has been a reliable predictor for consumer's experiencing choice overload in many studies using these types of products. Iyengar & Lepper (2000) designed the first major experiments on choice overload using jams and chocolates. In their now-famous jams experiment, they set up a two tables on two different days at a busy mall, with one having 6 different jams to test-taste and another with 24. They found that although more people stopped at the table with 30 jams, a larger proportion of people made a purchasing decision in the table with 6. This brought the authors to the conclusion that more choices are not necessarily better from a business perspective as consumers are more likely to purchase with fewer choices because of what we now know as choice overload (Cohen d: 0.77). Their third experiment in this paper involved Godiva chocolates. Participants were instructed to select a chocolate amongst an assortment of either 6 or 30. Individuals who chose from the smaller assortment were more likely to make a choice, as well as more likely to be satisfied with their choice, with this satisfaction indicated by a preference to prefer their selected chocolate over some monetary compensation of the same value (Cohen d: 0.88). The authors conclude that these findings are as a result of their higher expectations and need for evaluation in larger choice sets than smaller ones indicating that consumers may be better off with fewer choices. Other studies which use cheap food-products also find similar effects dissatisfaction when presented with increased choice (Mogliner et al, 2008; Reutskaja & Hogarth, 2011).

Another predictor for consumer's experiencing choice overload for these types of products is through the format of which assortments are presented. In an experiment consisting of coffee choices by Mogliner et al, (2008), organized presentation formats was found to be beneficial for consumers to not experience choice overload. Specifically, the presence of more categories, regardless of whether they help consumers make a decision or not, correlates with the satisfaction consumers felt (which they dub "the mere categorization effect"). They found this through an experimental design where they manipulated the two independent variables, different categories and assortment size of coffees, to see the effect on the dependent variable of satisfaction. Their findings show evidence for a reversal of the choice overload effect because even when options increase, simply by having more categories will consumers be more

satisfied with their decisions. The opposite effect was also found, where the presence of no categories correlated with lower satisfaction with decisions.

Similarly, Reutskaja & Hogarth (2011) conducted a study involving different chocolates which also finds evidence for organized presentation formats being correlated with lower choice overload. This study was unique relative to other choice overload studies as it incorporates eye-tracking technologies to identify the search dynamics of consumer choice. The experimental design was that different presentation formats would appear on a screen with varying option sizes of 3, 9, and 16 chocolates, with participants having to choose one. The dependent variable here was whether consumers picked a more valuable choice, with value of choices determined through a series of questions participants were asked to answer before the experiment pertaining to how highly they rated their liking of different popular snacks. Through the eye-tracking technologies, they find that under extensive choice, participants tend to have shorter evaluations of each option and take longer to make a choice. But interestingly they also found that participants tended to gaze at and have bias towards options in the centre of their visual field rather than the periphery options, and that 9 options organized in a 3x3 column had the highest frequency of selecting the most valued chocolate.

Townsend & Kahn (2014) also find evidence for how the assortment is organized being related to the experience of choice overload. Through an experiment using crackers which had independent variables of assortment size and visual/verbal presentation formats and a dependent variable of choice deferral, they find that participants preferred to choose from assortments with visual presentation formats, but more often experience choice overload when choosing from large visual assortments rather than verbal assortments. They find that through eye-tracking, this occurs because the natural gestalt processing of visual stimuli is much faster than verbal but often more error-prone, particularly for large assortments. They call this the "visual-preference heuristic", as individuals tend to prefer visual assortments over verbal ones due to ease of processing. This gives evidence that simpler presentation formats may lead to less choice overload, because even though visual assortments are easier to process than verbal ones, you are more likely to experience choice overload from a visual assortment than that of a verbal one (Cohen's d: 0.37 vs -0.32).

The existence of prior preferences may also predict whether consumers will experience choice overload when purchasing these products. Returning to Mogliner et al (2008), they conducted an experiment using coffees and magazines where consumers were separated based on whether they were "preference matchers" (expert consumers who find an option that matches their preferences) or "preference constructors" (consumers who develop their tastes during the decision process). The authors found that in general "preference matchers" were more satisfied and "preference constructors" were less

satisfied given extensive options (Cohen's d: 1.21). This shows that having less defined prior preferences correlate with lower satisfaction than those with prior preferences. Intriguingly, however, with the introduction of categories, "preference constructors" become increasingly satisfied with their decisions while "preference matchers" maintain a similar level of satisfaction as compared to no categories. This finding indicates that the mere presence of categories may be immensely useful for reducing the choice overload effect for consumers with no prior preferences.

Discussion

The findings from these studies give evidence for H1a, that larger assortments is a good predictor of choice overload for these products, and H1c, that having prior preferences is also a good predictor for choice overload. There is much evidence for H1b as well, with the only evidence against being that visual assortments may not be as effective as verbal assortments when assortments are excessively large.

Businesses should take note of these findings, as by offering more choices they risk their consumers experiencing choice overload which may affect their profit margins. Aside from reducing options, I advise businesses to pay special attention to the presentation format of their large selections, as findings suggest that for food products the "mere categorization effect" coupled with our preference for visual rather than verbal descriptions plays a large role in the option selected by consumers (Mogliner et al, 2008; Townsend & Kahn, 2014). More categories, even if they are irrelevant to helping consumers land at an option, can make consumers less likely to experience choice overload through the "mere categorization effect", which businesses can exploit to boost sales. This makes sense in the framework of cognitive psychology, as individuals are able to learn and distinguish features between different categories very easily (with categories that have more diverse features being more easily distinguished) (Collins & Quillian, 1969), and therefore by increasing the number of categories, less cognitive effort is required meaning more ability for the individual to not suffer choice overload.

Additionally, because of the preference to view items through visual means rather than verbal, businesses to attempt to organize their selections in a way that consumers can evaluate options visually rather than verbally to lure more consumers. For example, grocery stores with mobile apps could present fewer options ($n<9$) in an organized, visual manner. This way, consumers are less likely to experience the overchoice effect as they feel like they expend less cognitive effort in order to find a satisfactory outcome (Reutskaja & Hogarth, 2011; Mogliner et al, 2008). Similar to the "mere categorization effect", a cognitive effort explanation is also available for why we prefer visual to verbal information, as we process visual information faster than verbal through a process named "parallel processing", where human beings are typically able to process visual information faster and more accurately than other

sensory information due to the activity of two pathways working simultaneously in our mind: the "what" (ventral) pathway and the "where" (dorsal) pathway (Goodale & Miller, 2004).

The fact that we experience choice overload by having a bias to select options in the centre of a visual field rather than the peripheries has important implications for businesses that sell these products (Townsend & Kahn, 2014). Because of the typical organized layout food products are found in, such as in grocery stores and vending machines, businesses may consider investing in keeping their products in the centre columns in order to maximize sales. This would be through an exploitation of the choice overload effect, as people may refrain from putting cognitive effort into a decision, and rather select the product that is constantly in their visual field.

Lastly, the findings from Reutskaja & Hogarth (2011) also give us insight into the question of finding an optimal number of options. Perhaps for food products, 9 options could be the optimal number of options, with a 3x3 presentation format the most effective way to display options so that consumers avoid choice overload. But because of insufficient evidence, future studies should examine if this finding can be replicated.

Consumer Durables

The number of options was shown to be a good predictor of choice overload for experiments which used consumer durables. Diehl & Poynor (2010) conducted a study where they manipulated assortment sizes of camcorders and asked participants to reflect upon their purchasing experience by assessing their satisfaction with their choice. The experiment was designed as such: participants were asked to hypothetically choose a camcorder for a co-worker out of a selection of 8 or 32 choices, with the co-worker's preferences (which is a control for prior preferences) and the different camera specs laid out for the participant, with certain camera considered better choices than others. Afterwards participants were asked questions relating to their satisfaction. The authors' find that there is a negative correlation between assortment size and satisfaction, as well as for assortment size and quality of selection. Consumers choose worse quality camcorders and also feel more dissatisfied with more choices, which the authors attribute to a phenomenon they call "expectation-disconfirmation", where consumers go into large choice sets with expecting to find a desirable option given numerous options but instead face disconfirmation of these high expectations as the decision process gets too difficult.

Similar results of the number of options leading to choice overload are found in papers discussing option justification. Sela et al (2009) conducted their study on printers and mp3 players, where they manipulated the number of options to see whether people would more likely select options that they could better justify. If a significant number of people select an option based on it being is easier to justify, rather

than being based on improving individual satisfaction, there is an indication of the choice overload effect as consumers chose an option which brings them adverse outcomes. And that is exactly what the researchers found. The dependent variable in this study was the option selected, with printers considered an "utilitarian good" as it had benefits for many people (the participants were office workers), while mp3 players considered "hedonic goods" as they solely increased personal satisfaction. In this context, utilitarian goods are easier to justify because of their communal benefit (Ariely & Levav, 2000), leading them to predict that larger assortments would lead to more people to select a printer over an mp3 player. They found that in large printer assortments, more people purchased the easily justifiable printers as opposed to mp3 players, which the authors attribute to the better justification of this option. This evidences choice overload, as the presence of more options leads individuals to experience choice overload by selecting a choice they can justify rather than a choice which they may truly prefer.

The complexity of presentation and the non-alignability of attributes in choice tasks are found to be good predictors of individuals experiencing choice overload for these types of products. Gourville & Soman (2005) looked to examine the effect of non-alignable attributes on assortment choice, and primarily used consumer durable products in this study. In their first experiment, participants were presented with 1 vs 5 microwave ovens to choose from, with the descriptions in the extensive choice condition being either easily comparable or difficult to compare. They found that as choice increases, the more non-alignable attributes are the more likely participants chose a "non-target" brand. This provides evidence for choice overload, as the larger assortment coupled with non-alignable descriptions was correlated with consumers' choosing something that the researchers did not intend. Their second experiment in their paper, this time involving digital cameras, examines whether manipulation of the presentation of options can lead participants to more frequently select the target option. Specifically, consumers were separated into either a "simplified" choice set, where options were presented solely based on their differences, or a "full profile" choice set, where consumers had the full list of specs of the respective cameras. They found that those in the "full profile" set chose the target choice less frequently given more choices and those in the "simplified" set chose the target more frequently given more choice, leading the authors to suggest that more options coupled with incomprehensible presentation formats cause consumers to be cognitively challenged to process all relevant information and therefore experience choice overload through poorer quality decisions. This is shown in **Figure 2** below (which should also show you an example of a simplified presentation format as compared to a target).

Discussion

Based off the findings in Sela et al (2009) and Diehl & Poynor (2010), there is evidence for larger assortments leading to a choice overload effect in the form of dissatisfaction and the selection of more

inferior products, providing evidence for hypothesis H2a. Businesses could use these findings for marketing purposes. Since consumers tend to choose options that they can justify rather than ones that they may truly be satisfied with, adding more "utilitarian" elements to their products to exploit this effect of choice overload. We already see some producers of technological goods do these sorts of promotions already, eg. Apple's policy of recycling old iPhones. As this industry is oligopolistic for most products and numerous options from various companies are available to consumers, making their product to stand out in a way where the purchase of which is easily justified can be a way that businesses can take advantage of this choice overload effect. And because consumers are likely to experience choice overload in the presence of a large assortment, they may use a heuristic to make a purchasing decision (eg. "I don't know what phone to buy – lets purchase an iPhone because I know they recycle phones so I can get some money back and protect the environment). By making the decision easier to justify, consumers may be coerced to select the more utilitarian product given extensive choice and therefore experience choice overload by choosing a product based off its utilitarian qualities rather than the individual satisfaction it would bring to them.

The findings of Gourville & Soman (2005) indicate that individuals will drift further away from a "target" choice given more options and more non-alignable attributes describing the options, suggesting evidence for hypotheses H2b and H2c. Specifically, their findings indicate that individuals more often choose the target brand with a simple presentation format as compared to a complex one. This suggests that in order to not experience choice overload, businesses should present options to consumers in a way where the differences between attributes are compared in a simplistic manner, similar to that of the experimental task shown in **Figure 2**. The implications of this for businesses trying to promote sales is important, as businesses may benefit from having simple to comprehendible comparisons between products in order for consumers to not experience choice overload and select their "target" product over other choices. This makes sense for these kinds of products, as they are comparable on many different attributes which everyday consumers may not fully understand, so simpler and more alignable choice sets reduce the cognitive effort for consumers when evaluating between electronic products. However, one limitation of this study in it's use to our study is the fact that it only compares with a limited number of alternatives. It would be interesting to see if this study could be replicated with a larger assortment.

Investments

The number of options presented is seen as a predictor of consumers experiencing choice overload for investment products such as insurance. A unique natural field experiment was conducted by Iyengar et al (2004), where they looked at how more choices offered in the real world affect employee 401(k) participation rates. Prior to the study, the authors found that from 1998-2001, average 401(k) plans

had boosted available investment options by 21%, while participation dropped from 71% to 68.2% (Mottola & Utkus, 2003), indicating an aggregated choice overload effect of choice deferral. Iyengar et al (2004) used this as a basis for their research. Specifically, they looked at the investment management company Vanguard Group, who had data on the individual level for employee participation and the number of funds they were offered. Although there were not as many individuals who were offered options that exceeded >20 options, they find that there is a clear negative relationship between the number of funds offered and participation in the 401(k) plan, indicating choice overload through choice deferral. Their findings can be found on **Figure 3**, where there is a near 75% participation rate for 2 options offered, but this falls to around 70% with 20 options. This study evidently differs from that of other choice overload experiments as it is one of the few studies that use actual field data to find evidence for the choice overload hypothesis.

Studies examining Medicare Plan D also find a positive choice overload effect when consumers are presented with more options. Medicare Plan D is an insurance plan where the insurance company subsidizes consumers for prescription drugs. As there are approximately 50 variations of this plan, studies pertaining to this product examine whether more options of Medicare Plan D correspond with consumers making better 'quality' decisions (Tanius et al, 2009; Hanoch et al, 2009; Hanoch et al, 2011). Specifically, participants were asked to answer questions indicating cognitive ability (eg. crystallized intelligence, processing speed, working memory capacity) and personality, and subsequently had to do tasks assessing different Medicare Plan D plans, with certain choices being better than others for the given task (One example of a question is: Given a friend's desire to minimize total annual costs, which drug plan should you recommend?). What all three of these studies found was that the choice overload effect is pertinent with more options, where participants made poorer decisions given more options. However, personality did not seem to have any significant correlation with quality of decision.

Finally, another study that examined investment products was that of Reed et al (2011). This study was unique in such that the participants were autism patient caretakers, while the decision task was to evaluate between caretaking plans. This plan is different from other investment purchasing experiments as the participants in this study all had expert knowledge and were making a purchasing decision with someone else's interest in mind; this means prior preferences and the decision goal were controlled for. Specifically, the experimental task aimed to see how many options were needed in a large assortment (with the number of options being calculated with the formula $2+n^2$) for participants to switch to a small assortment containing only two choices. Additionally, another independent variable that they aimed to measure this assortment switching effect for was whether individuals were maximizers or satisficers, with these personality traits being found through prior personality tests. They find that as number of options

increases from 3 choices to 6, almost half of the participants switch from the large assortment condition to the small assortment condition (86% vs 48%), and this trend of assortment switching continues as more options are added. Additionally, they find that maximizers were more likely to take longer to switch from a large assortment to a small one, which they attribute to the maximizer's tendency to seek out the best possible outcome for themselves despite the high costs of search.

Discussion

The findings from experiments using investment products show strong evidence for the hypothesis H3a, that increasing number of options leads to choice overload effects, with all the aforementioned studies indicating that individuals experience choice overload with more options (Iyengar et al, 2004; Tanius et al, 2009; Hanoch et al, 2009; Hanoch et al, 2011; Reed et al, 2011). Policymakers and investment providers should take these findings into consideration, especially if they care about increasing participation in their respective investment plans. However, despite results showing more frequent and better decisions being made with fewer choices, providers also need to ensure that they provide enough plans for the full spectrum of individual needs to be covered. Therefore, the idea of the *optimal number of options* is important for providers of insurance and investment products to consider.

One way policymakers and insurance providers may be able to reduce consumers experiencing choice overload for these products is similar to that of other products – they can attempt to reduce the cognitive effort needed to make a good decision. One way to do this is to use an easy-to-comprehend presentation format where products are compared on alignability. Although no studies to date examine how the presentation format impacts choice overload for investment products (and therefore we must reject this hypothesis), having a comparable presentation format could lead to consumers experiencing less choice overload. In fact, this is one basis of which Thaler & Sunstein (2008) would argue that policymakers should change in order to reduce the choice overload effect. They would advise policymakers to adopt a *libertarian paternalistic* approach to nudge consumers in the direction of making better decisions, especially for purchasing decisions of investment funds and Medicaid. A libertarian paternalistic approach is one where policymakers adjust the choice structure so that it guides individuals into making the right decisions without making them feel forced into making certain decisions, thereby giving individuals the sense of freedom of choice. This way, consumers can feel the positive feelings of choosing from a large assortment (the lure of choice) while also not feeling the effects of choice overload. One example provided to reduce choice overload effects for 401(k) plans specifically was to introduce default options (Iyengar et al, 2004).

The findings show inconclusive evidence for the hypothesis H3c, that maximizers are more likely than satisficers to experience a reversal of the choice overload effect because of their tendency to expend cognitive effort to formulate better decisions being beneficial for products like these which require extensive knowledge. Studies using Medicaid Part D as a product have no significant choice overload effects between both maximizers and satisficers, (Tanius et al, 2009; Hanoch et al, 2009; Hanoch et al, 2011), while Reed et al (2011) shows choice overload effects for maximizers more than satisficers in the form of later assortment switching. Perhaps individual personality is not an issue for purchasing Medicaid Part D but could be more of an issue for purchasing other investment products. Additionally, the procedure in Reed et al (2011) required participants to make a decision for another person rather than themselves which differs from the other studies, which may have influenced the decision making techniques individuals exhibited. More research is evidently needed to understand the effect of personality on choice overload for different types of investment products.

Luxuries

Koelemeijer & Oppewal (2005) use flowers as a product in their experiment. The procedure was participants were displayed different flower bouquets in a florist, and had to select an option. Subsequently, they were asked questions relating to their decision, and some were also asked if they would switch their assortments and purchase flowers from a competing store offering fewer options. They hypothesized the following: 1. Increases in assortment size lead to consumers being increasingly satisfied, albeit at an decreasing rate, 2. Variety on a dominant option increases satisfaction more than a non-dominant option, and 3. The stronger prior preferences are, the higher satisfaction is. These hypotheses all argue against choice overload, and what they find is that they are unable to not reject any of their hypotheses. For 1, they found that increases in assortment size lead to more satisfaction but not with the diminishing returns that they hypothesized, indicating a reversal of the choice overload effect where more choices had a strong positive correlation with satisfaction. For 2, they found that variety on a dominant option did not lead to any significant changes in satisfaction and therefore reject their hypothesis. This indicates choice overload, because the greater the variety a dominant option displays equates to that option being less dominant and having fewer dominant options with no increase in satisfaction is exactly what choice overload theory would predict. For 3, they found that strong prior preferences for certain flowers had no effect on the participant's subsequent satisfaction, indicating a reversal of choice overload. And for 4, they found that highly preferable alternative options had no effect on subsequent decision satisfaction, meaning that the consumer's decision intent is not a good predictor of choice overload for this task. Overall, they found very little evidence for choice overload, with the only choice overload effect being fewer dominant options have no significant effect on choice satisfaction.

Park & Jang (2012) also look at the existence of prior preferences on consumer purchasing decisions. They look at vacation packages, where the experimental task is that participants must choose a vacation package from a choice set (1, 3, 10, 20, and 30 options). Participants were all college students planning on going on spring break, and based on prior testing, one destination that they found participants had affinity for was Orlando, Florida, and one destination they found participants to be unsure about was Acapulco, Mexico. The researchers separated participants into these two groups to see whether prior preferences played a role in the experience of choice overload. The dependent variables the researchers used in this study to measure choice overload was self-reported regret and choice deferral. What they found was in counter to their hypotheses: those in the "Orlando" strong preferences condition did not defer choice more, nor did they self-report regretting their selection more. However, they do find positive increasing choice deferral if the number of alternatives is greater than 22. They conclude that a more-choice-is-better model can be applied in the tourism industry up to the optimal 22 choices. More than 22 choices leads to consumers experiencing choice overload.

Haynes (2009) conducted research measuring consumer satisfaction for decisions in an assortment of various prizes all worth approximately $100. The independent variables manipulated were the number of options (10 vs 3) and time to make a decision (10min vs 2min), and measured self-reported satisfaction to measure the incidence of a choice overload effect. These prizes were various and consisted of eg. tickets to a concert, a skydiving lesson, day trips. The findings showed that individuals were least satisfied and most regretful with their choice when having extensive choice and limited time (Cohen d: 0.48 (Chernev, 2015)), while most satisfied when having limited choice and extensive time, as per expectations of choice overload theory. However, they found that although satisfaction followed the expectation indicated by choice overload theory, there were no significant choice overload effects for self-reported regret when options increased and time decreased (Cohen d: -0.04 (Chernev, 2015)). Interestingly, individuals thought the decision task was more enjoyable when facing limited time rather than extensive time, and this counterintuitive result echoes a finding by that of Iyengar & Lepper (2000), where task enjoyment does not seem to be dampened by having fewer time to make a choice. Haynes (2009) attributes this finding to the fact that individuals did not have enough time to get attached to any of the presented options, and concludes that people seem to not mind making choices under time pressure, but time pressure coupled with having extensive choice causes people to experience choice overload effects in the form of dissatisfaction, perhaps due to cognitive overload from two stressing factors.

Discussion

The results from the studies that examine luxury products have ambiguous results for the number of options being a predictor of choice overload. Park & Jang (2012) find that more choice correlates with

greater satisfaction while Haynes (2009) finds that more choice correlates with lower satisfaction. Because of this, we cannot accept hypothesis H4a, as there is insufficient evidence to be able to not reject it. Having prior preferences does not indicate not experiencing choice overload either, indicating we cannot accept hypothesis H4c (Park & Jang, 2012; Koelemeijer & Oppewal (2005).

Findings from these papers imply to businesses that sell luxury products that they should not worry about consumers experiencing choice overload, as very little evidence suggests that purchasers may experience it when buying luxuries, although the results are relatively inconclusive. One reason why this is is because of the vast categorization of what pertains to be a luxury good. Unlike that of the other categories, whose goods are all relatively similar as they share deep features which connect them (eg. consumer non-durables are typically food products which are perishable and require a low element of risk to purchase), this categorization of "luxury" goods is too broad, which may explain the differing results. For instance, it is really difficult to compare the purchasing decisions for vacation packages and for that of flowers; they are too different. Park & Jang (2012) categorize tourism in the "services industry" rather than as a luxury. Future studies should examine how specific industries are affected, rather than this broad term luxuries. Of course, it also may be that consumer's decision strategies for purchasing luxury products may actually be different than that of other products, causing them to not experience choice overload. Future studies should examine categorization in more depth, as this study was not able to because of the lack of available studies and the lack of a better way to categorize these different products.

General Discussion

Product Types And Choice Overload

Overall, it seems that all consumer purchasing decisions for products other than luxuries follow similar patterns in experiencing choice overload. For consumers purchasing food, electronics, and investments, it seems the number of options is a reliable predictor for consumers' experiencing choice overload. This gives some evidence for the question of whether consumers of certain products experience choice overload in a different manner to others. However, because of the fact we cannot accept the hypothesis that antecedents lead to choice overload for luxury products, this analysis is somewhat limited. Therefore, these findings do not seem to be compelling enough to suggest that purchasers of different products will experience choice overload solely because that product warrants a certain decision-making style. Instead, there seems to be substantial evidence that reducing the cognitive effort required in order to decide is fundamental to predicting whether individuals will experience choice overload or not. This is primarily shown through reducing options (Iyengar & Lepper, 2000; Iyengar et al, 2004; Diehl & Poynor, 2010) or by simplifying presentation formats (Gourville & Soman, 2005; Mogliner et al, 2008; Reutskaja

& Hogarth, 2011; Townsend & Kahn, 2014). By reducing the cognitive effort required for making decisions, consumers will be more likely to make better purchasing decisions because they will not feel overwhelmed by the decision task.

Policy Recommendations

However, as it may be detrimental for certain businesses and policymakers to reduce the number of options (as they must provide many options to ensure the capture of many consumers), it may be in their best interest in focusing on the presentation format instead. Specifically, they can increase the number of categories (Mogliner et al, 2008), align products through attribute differences (Gourville & Soman, 2005), provide reasons for justifying certain option selections (Sela et al, 2008), and offer a *libertarian paternalistic* approach to making choices (Thaler & Sunstein, 2009). I would like to emphasise this libertarian paternalistic approach, because this strategy appears to be an optimal way for reducing cognitive effort on the part of the consumer without reducing choices to create a reversal of the choice overload effect (Thaler & Sunstein, 2009).

For example, one way policymakers implement libertarian strategies is by providing default options: by providing default options, consumers may feel greater incentive to select the default in an effort to be rid of cognitive effort in the decision, with the default being a typically a better quality choice anyway. Consumers have the liberty to switch from the default, but with this approach, a large number of options is maintained while consumers do not feel choice overload as a result of the less cognitive effort expended. This approach has special significance for insurance and investment products, as these are the types of products that governments want their citizens to consume as they bring positive externalities of consumption such as increased ability to participate in the workforce as a result of better health from medical insurance. And in real life, it appears to work too: When applying for a driver's license, states such as Illinois have an opt-in policy for organ donations where the default option for being an organ donor is "yes". There is a 60% donor signup rate as a result of using default options, as compared to the national average of 38% (Thaler, 2009). Of course, the default option may not be the best option for everybody, but governments can reduce the cognitive effort placed on consumers by introducing libertarian paternalistic policies such as nudging consumers into selecting default options.

Another example of the implementation of libertarian paternalistic policies is through the manipulation choice architecture. Through sequential elimination tasks (where you separate the large assortment into small groups and go through several rounds of eliminating unfavoured options, and subsequently select from the remaining options) and sequential tournament tasks (where you separate the large assortment into small groups and go through several rounds of selecting favoured options, and

subsequently select from the chosen options) we find that by manipulating the choice architecture so that the decision task becomes a sequential one rather than a simultaneous one the choice overload effect is reduced without having to reduce the number of options (Besedes et al, 2015). By separating the large assortment into smaller, sequential style decisions, for each decision less cognitive effort is needed, allowing people to make better and more satisfactory decisions under extensive choice. Businesses and policymakers can adopt these findings to adopt strategies to sell their products in ways that minimize the cognitive effort required by offering these types of choice architecture designs. Of course, it may be difficult to implement choice architecture strategies for every product available, but one example of it in real life is with the new modern soft drink dispensers found throughout fast food chains in the US. You first select an option from a screen with the different brands of drinks (eg. Coke, Fanta, Sprite) before selecting an option from a screen that shows all the different flavours (eg. Vanilla, Orange, Lemon). By tiering options in this libertarian paternalistic fashion, consumers are guided to the decision they find optimal without feeling forced into certain options over others. The choice overload is reduced without needing to reduce the number of options.

Limitations

There are plenty of limitations to this study. Firstly, as mentioned before, because of limited data, the categorizations in this study are very broad and therefore the results in this study may not reflect complex real-life decision scenarios. As there is only so much literature which examine only a handful of products, the categorization used in this study should only be applied for very prototypical exemplars of that category (eg. chocolate for consumer non-durable, mobile phone for consumer durable, retirement saving for investment, vacation trip for luxury). Additionally, as the data from this study is solely based off the findings from other authors, we cannot test empirically for any correlation. Future studies should look at finding a way to empirically measure differences in how consumers experience choice overload for different products.

Secondly, the findings from this study may not play out in real life. Because the data in this study are from experimental studies (except Iyengar et al, 2004) in which the pool of literature is dominated by papers which focus on the theoretical understanding of choice overload rather than practical understandings, there is no way to know whether the findings in this paper would play out in real-life situations where choice scenarios are complex and often contain many hidden factors. Studies in choice overload are limited in general because there is no way to know what is truly going on in the mind (fMRI, EEG, and eye-tracking studies can only tell us so much), so we can only measure the effect of choice overload through inputs and outputs. We cannot know what goes on in the minds of every individual when making a decision, so the predictions made in this study will not hold out for all individuals even if

the decision scenarios are the same. (This is the reason why I add personality into the framework, which was omitted from Chernev (2015) due to immeasurability, as I find it comparable to the other antecedents which are also hidden and unmeasurable to some extent.) In other words, there are many other unexplored antecedents to choice overload, but there is no way we can know to what extent different antecedents affect each individual's decision making.

Thirdly, because of the subjectivity and an inability to empirically examine satisfaction and regret, there is no way to truly measure the degree of, for example, the degree of satisfaction an individual feels. Also, individuals may not know how they truly feel about certain decisions either (this concept is analogous to utility, where there is no way to measure this subjective utility gained). Therefore, another limitation is that for subjective feelings in the choice overload framework, there is no way to get a complete accurate representation of choice overload effects if satisfaction/regret is the dependent variable measuring choice overload.

Conclusion

To conclude, the results from this study indicate that all types of goods besides luxury items (eg. vacation packages) are affected by the antecedents of choice overload in some way. Specifically, based off the literature in choice overload, larger assortments and difficult-to-comprehend presentation formats are the best predictors for whether consumers will experience choice overload for consumer non-durables, consumer durable, and investment products. One common argument researchers propose for why this happens is because, under these conditions, consumers must spend extensive cognitive effort into making a decision and suffer from choice overload as a result, either through preferring to defer the decision or by selecting options that have unexpectedly demotivating outcomes. Based off these results, I propose that businesses and policymakers affiliated with selling these types of products should aim to reduce decisions by simplifying reducing the number of choices. However, as it is often not in the best interest for these bodies to reduce options available as it would limit coverage, I also suggest that they could also simply presentation formats (eg. more categories, more visuals) or use libertarian paternalistic strategies (eg. default options, sequential choice architecture) to reduce choice overload without having to reduce choices. Despite these findings future research is required to add to the body of literature, to find empirical grounds for these findings, and to find choice overload effects for different industries.

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Appendix

Figure 1: Conceptual Framework

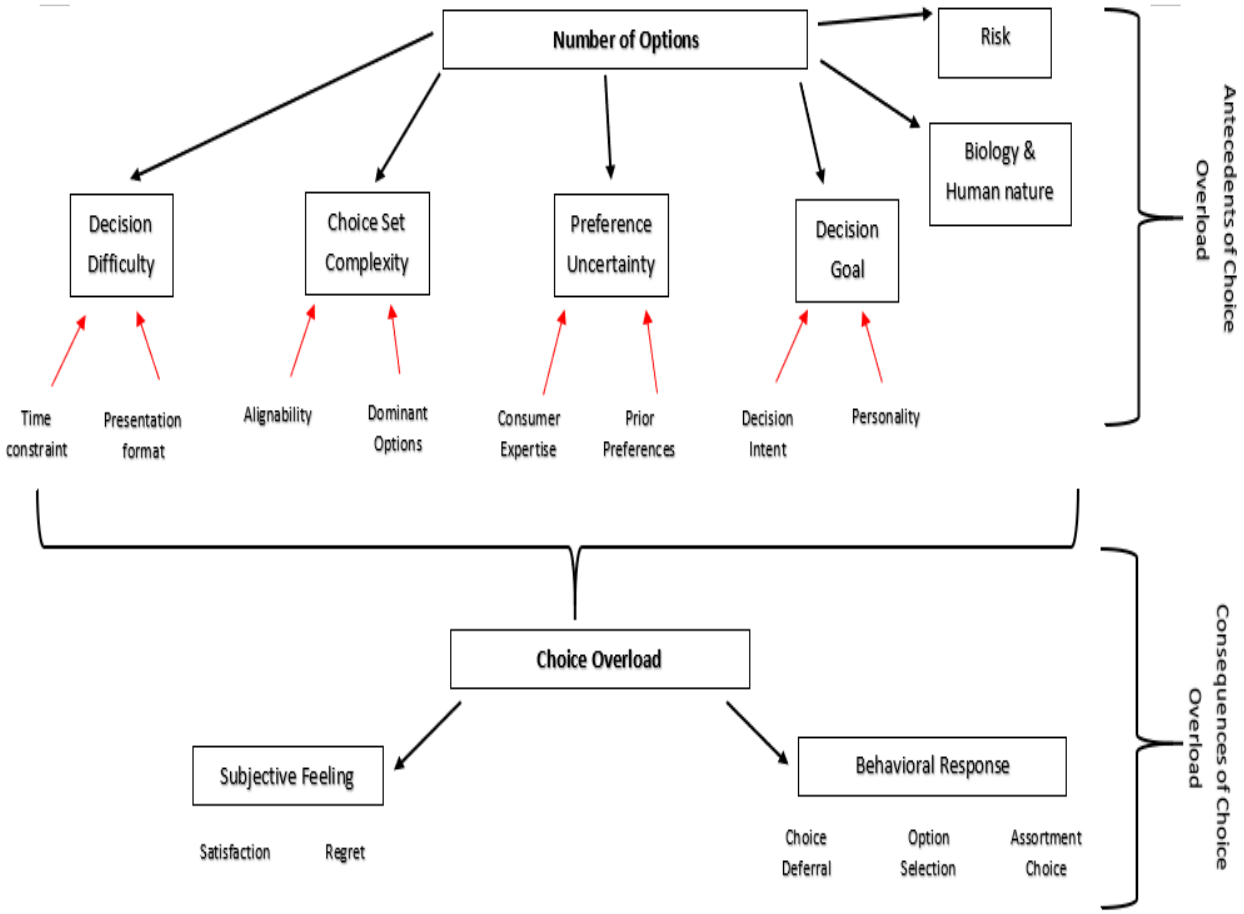

Figure 1: This is the conceptual framework of choice overload employed in this study. It adopts many elements from that of Chernev (2015) but is more specific in what entails each antecedent. An assortment combined with any one of the four antecedents of choice overload may lead individuals to the experience of choice overload, either through a subjective emotional feeling or through their observed behavior. Consumers of different products may experience choice overload differently, and this framework is used as a tool to help us understand whether this is true or not and why it may occur if true.

Table 1: Table Of Data

Authors	Study	Product	Type of Product	Min choice	Max choice	Antecedent	Independent Variable	Dependent Variable	Choice Overload?	Cohen d?	Additional Notes
Iyengar & Lepper (2000)	1	Jams	Consumer non-durable	6	24	Number of Options	Number of Options	Choice deferral	Yes	0.77	
	3	Chocolate	Consumer non- durable	6	30	Number of Options	Number of Options	Choice deferral	Yes	0.88	
	3	Chocolate	Consumer non-durable	6	30	Number of Options	Number of Options	Satisfaction	Yes	0.88	
Iyengar et al (2004)	1	401k plans	Investment	2	60	Number of Options	Number of Options	Choice deferral	Yes	N/A	Field data rather than experimental. More deferral with more choice.
Koelemeijer & Oppewal (2005)	1	Cut flowers	Luxuries	5	12	Number of Options	Number of Options	Satisfaction	No	N/A	
	1	Cut flowers	Luxuries	5	12	Choice Set Complexity	Dominant Option	Satisfaction	Yes	N/A	Fewer dominant options, no increases in satisfaction
	1	Cut flowers	Luxuries	5	12	Preference Uncertainty	Prior Preferences	Satisfaction	No	N/A	
Gourville & Soman (2005)	1	Microwave Ovens	Consumer durable	1	5	Choice Set Complexity	Alignability	Option Selection	Yes	N/A	Unalignable attributes leads to more selection of non-target options
	2	Digital Camera	Consumer durable	1	3	Decision Difficulty	Presentation Format	Option Selection	Yes	N/A	Complex presentation formats lead to more selection of non-target options
	3	Golf Balls	Luxuries	1	2	Choice Set Complexity	Alignability	Option Selection	Yes	N/A	
Mogliner et al (2008)	1	Magazines	Consumer non-durable	3	18	Preference Uncertainty	Consumer Expertise	Satisfaction	No	N/A	Preference constructors (non-expert consumers) more satisfied with more options
	1	Magazines	Consumer non-durable	3	18	Number of Options	Number of Options	Satisfaction	No	N/A	
	2	Coffee	Consumer non-durable	5	50	Preference Uncertainty	Consumer Expertise	Satisfaction	Yes	1.21	Preference constructors less satisfied
	2	Coffee	Consumer non-durable	5	50	Decision Difficulty	Presentation Format	Satisfaction	No	N/A	More categories discerning options = more satisfaction
Sela et al (2009)	2	Printers & MP3	Consumer durable	4	12	Number of Options	Number Of Options	Option Selection	Yes	0.89	
Tanius et al (2009)	1	Medicare	Investment	6	24	Number of Options	Number of Options	Option Selection	Yes	N/A	More options led to worse quality medicaid selections
	1	Medicare	Investment	6	24	Decision Goal	Personality	Option Selection	No	N/A	
Hanoch et al (2009)	1	Medicare	Investment	3	20	Number of Options	Number of Options	Option Selection	Yes	N/A	More options led to worse quality medicaid selections
Haynes (2009)	1	Prizes worth $100	Luxuries	3	10	Decision Difficulty	Time Constraint	Satisfaction	Yes	0.48	Prizes included: Concert tickets, ferry ride, exclusive nightclub.
	1	Prizes worth $100	Luxuries	3	10	Decision Difficulty	Time Constraint	Regret	No	-0.04	
Diehl & Poynor (2010)	1	Birthday Card	Luxuries	10	100	Number of Options	Number of Options	Satisfaction	Yes	N/A	
	2	Camcorder	Consumer durable	8	32	Number of Options	Number of Options	Satisfaction	Yes	0.33	More options = more dissatisfaction
	2	Camcorder	Consumer durable	8	32	Number of Options	Number of Options	Option Selection	Yes	N/A	Worse quality decisions made with more options
	3	Computer Wallpaper	N/A	60	300	Preference Uncertainty	Prior Preferences	Satisfaction	Yes	0.54	Those with more certain preferences more satisfied
	3	Computer Wallpaper	N/A	60	300	Number of Options	Number of Options	Satisfaction	Yes	N/A	More options = more dissatisfaction
	3	Computer Wallpaper	N/A	60	300	Preference Uncertainty	Prior Preferences	Assortment choice	Yes	N/A	Those with prior preferences choose larger assortments (evidence for lure of choice)
Reutskaja & Hogarth (2011)	1	Chocolate	Consumer non-durable	3	16	Decision Difficulty	Presentation Format	Option Selection	Yes	N/A	Bias for options in center of visual space rather than periphery
	1	Chocolate	Consumer non-durable	3	16	Number of Options	Number of Options	Option Selection	Yes		
Reed et al (2011)	1	Treatment program	Investment	1	384	Decision Goal	Personality	Assortment choice	Yes	N/A	Maximizers slower to switch to low-choice assortment than satisficers

	1	Treatment program	Investment	1	384	Number of Options	Number of Options	Assortment choice	Yes	N/A	As more options are presented, more people choose smaller assortment
Hanoch et al (2011)	1	Medicare	Investment	3	20	Number of Options	Number of Options	Option Selection	Yes	N/A	
	1	Medicare	Investment	3	20	Decision Goal	Personality	Option Selection	No	N/A	
Park & Jang (2012)	1	Tourism packages	Luxuries	1	30	Preference Uncertainty	Prior Preferences	Choice Deferral	No	N/A	No relationship between familiarity & 'no choice'
	1	Tourism packages	Luxuries	1	30	Preference Uncertainty	Prior Preferences	Regret	No	N/A	Those in 'no choice' condition more regretful than choice condition
Townsend & Kahn (2014)	1	Crackers	Consumer non-durable	8	27	Decision Difficulty	Presentation Format	Choice Deferral	No	-0.32	Verbal assortment of crackers
	1	Crackers	Consumer non-durable	8	27	Decision Difficulty	Presentation Format	Choice Deferral	Yes	0.37	Visual assortment of crackers

Figure 2: Gourville & Soman (2005)

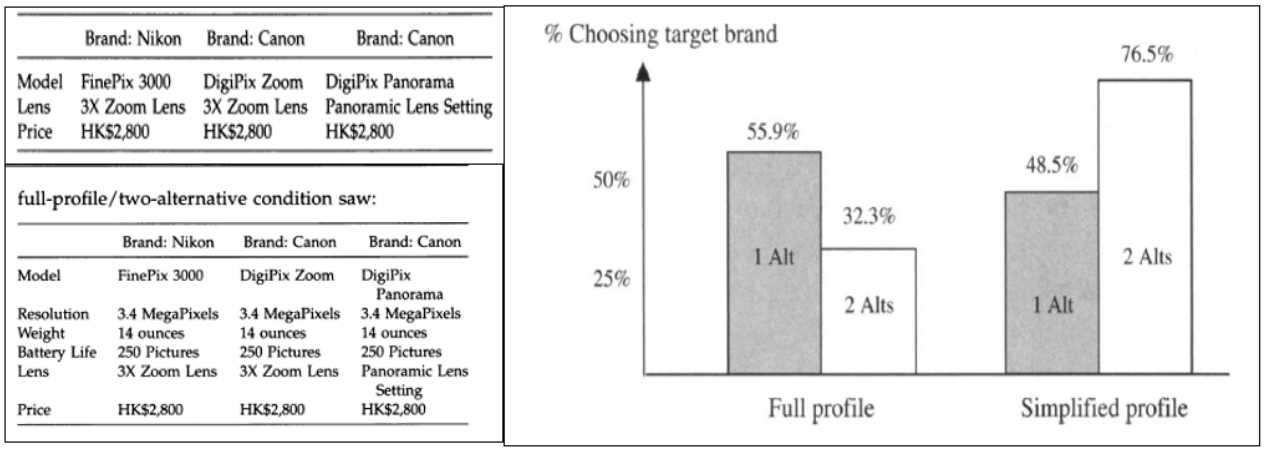

Figure 2: The experiment and results presented in Gourville & Soman (2005), study 2. Top left: Simplified profile example; Bottom left: full-profile example; Right: results. These two show the two different presentation formats, with the simplified format only comparing different cameras based on their differences. Their results (right) show that a complex presentation format coupled with more choices correlates with more choice overload as fewer consumers chose the "target" brand (55.9% vs 32.3%). On the other hand, in a simplified profile, more choices correlate with more selection of the "target" brand (48.5% vs 76.5%). This provides evidence for the choice overload for these kinds of products.

Figure 3: Iyengar et al (2004)

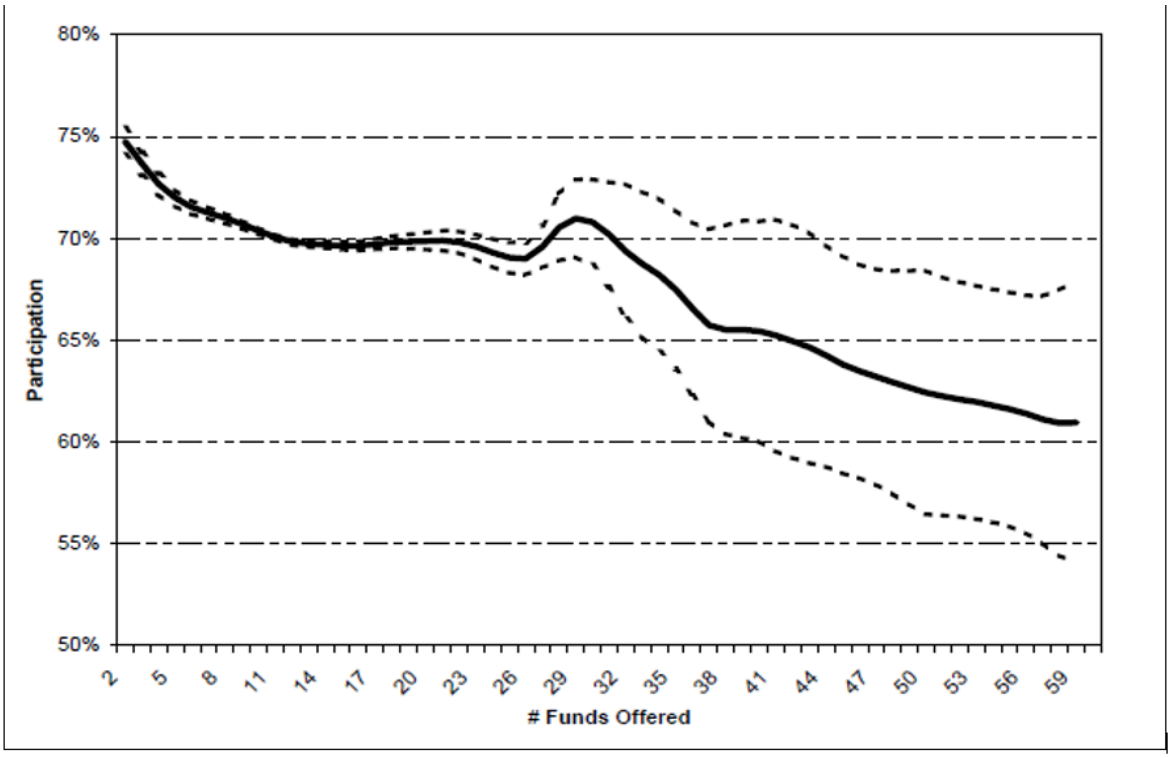

Figure 3: Iyengar et al (2004) were presented with an unique natural experiment where they studied how the number of funds offered affected 401(k) participation rates. They find that the more options offered led to less participation, indicating an aggregated choice deferral effect for 401(k) purchases.