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Decision researchers have long been interested in behaviors that deviate from rational choice. Of these, the compromise effect has received considerable attention, with it repeatedly shown that the probability of choosing an item increases when that item is a middling, as opposed to extreme, alternative in a choice set. The term extremeness avoidance has been used to describe the reason underlying this phenomenon. In this research, we argue that extremeness avoidance behavior depends on assortment type, with consumers displaying extremeness avoidance for alignable assortments, but systematically and predictably displaying *extremeness seeking* for non-alignable assortments. Across three studies, we show the extremeness seeking effect, contrast it with extremeness avoidance, and explore its underlying cause.

Consider the following. A consumer wishes to purchase a particular model of new car, say a Ford Explorer, and travels to a nearby dealership that he trusts. There he finds three models. The first is a low-priced, base model Ford Explorer. The second is a high-priced, fully-loaded model. The third is a mid-priced Sport model that offers some, but not all, of the options available in the fully-loaded model, such as four-wheel drive and a roof-rack. Which of these three alternatives is our car buyer most likely to choose?

Now imagine that, prior to making his decision, the car buyer is told that there are two additional mid-priced models available, both of which again offer some, but not all, of the features available in the fully-loaded model. One is an Entertainment model, which offers a high-quality stereo system and a rear-seat DVD entertainment system. The other is a Luxury model which offers leather interior, heated seats, and a sun-roof. How might the existence of these two additional models change the car buyer's decision? More broadly, how will the number and type of alternatives available to this buyer impact his decision of which car to purchase? That is the question we address in this paper.

The compromise effect, defined as the tendency for an alternative to gain market share when it becomes the intermediate or middling option in a choice set (Simonson 1989), suggests one obvious answer. Research has shown that, when faced with a range of non-dominated alternatives that vary on several attributes, such as price and quality, consumers tend to opt for an intermediate or compromise alternative instead of an extreme alternative (Simonson 1989; Simonson and Tversky 1992; Tversky and Simonson 1993; Wernerfelt 1995). Simonson and Tversky (1992) identify this as an instance of extremeness aversion, arguing that any alternative will be relatively less attractive, and therefore less likely to be chosen, if it is an extreme alternative within a choice set than if it is an intermediate alternative. Thus, increasing the

number of intermediate models of Ford Explorer from one to three should *decrease* the probability of our hypothetical buyer choosing one of the extreme models—either the basic or the fully-loaded model—and *increase* their probability of choosing one of the intermediates.

The rational choice principle of regularity (Luce 1959) provides additional guidance. Regularity dictates that the probability of choosing an alternative from a choice set should never increase with the addition of another alternative to that choice set. In particular, if $\{A_1, A_2, A_5\}$ represents the three Ford Explorers available in the first part of our scenario, with A_1 being the base model and A_5 being the fully-loaded model, and if $\{A_1, A_2, A_3, A_4, A_5\}$ represents the five Ford Explorers available in the second part of our scenario, regularity dictates that the probability of choosing either the basic model, A_1, or the fully-loaded model, A_5, should never increase as we expand the choice set from $\{A_1, A_2, A_5\}$ to $\{A_1, A_2, A_3, A_4, A_5\}$.

In contrast to both extremeness aversion and regularity, however, we argue that in the case of an increasing non-alignable assortment, consumers will display what we call extremeness seeking—i.e., they will increasingly opt for the extremes. As recent research has defined it, a non-alignable assortment is one in which the alternatives vary along multiple, non-compensatory dimensions, such that one alternative may possess one set of desirable features, while a second alternative may possess a second set of desirable features (Gourville and Soman 2005). Restaurant entrees, college majors, exotic jams that vary in flavor, and vacations that vary in the cities visited would be examples of non-alignable assortments. These assortments involve tradeoffs between features, such that obtaining one desirable feature often entails giving up another desirable feature. Thus, if a person orders salmon, they forego lamb and if a college student studies fine art, they do not study electrical engineering. In our Ford Explorer example,

if our car buyer opts for the Sport model, they obtain a roof rack and four wheel drive, but sacrifice the leather interior and the sun roof available in the Luxury model.

When faced with such an assortment, we propose that consumers will gravitate toward the extreme alternatives as the size of that assortment increases. In particular, given a within-brand assortment that includes a basic alternative, a fully-loaded alternative, and one or more intermediate alternatives, consumers will increasingly opt for the extreme alternatives—either the basic or fully-loaded—as the number of intermediate alternatives increases. This is what we mean by extremeness seeking.

The remainder of this paper is in five parts. First, we review the extant literature on the compromise effect and extremeness aversion. Second, we highlight the potential role of assortment type on the compromise effect. Third, we develop our argument for extremeness seeking in the face of a non-alignable assortment. Fourth, we present three studies that show the extremeness seeking effect, contrast it with extremeness avoidance, and explore its underlying cause. Finally, we discuss the implications of our work.

THE COMPROMISE EFFECT AND EXTREMENESS AVERSION

Decision theorists, consumer psychologists, and marketing practitioners have long been interested in how the make-up of an assortment impacts consumer choice (Payne, Bettman, and Johnson 1992). One of the best known and most researched violations of rational consumer choice has been termed the compromise effect, whereby the share of an alternative is enhanced when it becomes an intermediate or middling option in a choice set and diminished when it becomes an extreme option (Kivetz, Netzer, and Srinivasan 2004; Simonson 1989; Simonson and Tversky 1992).

The Compromise Effect

Consider a set of alternatives—*x*, *y*, and *z*—that vary on two dimensions, such as price and quality, with *x* having high price and quality, *y* having middling price and quality, and *z* having low price and quality. In the most straightforward demonstrations of the compromise effect, the likelihood of choosing Alternative *y* increases when the size of the choice set increases from {*x, y*} to {*x, y, z*}.

In one experiment, for example, Simonson (1989) presented some subjects with two apartments that varied in their general condition and distance from campus, with Apartment *x* being of high quality and 11 miles from campus and Apartment *y* being of medium quality and 6 miles from campus. He presented other students with three apartments—Apartment *x*, Apartment *y*, and a third apartment, *z*, that was low in quality and 1 mile from campus. As per the compromise effect, he found that students presented with {*x, y*} chose Apartment *y* 50% of the time, while students presented with {*x, y, z*} chose Apartment *y* 66% of the time.

This and similar findings are interesting at several levels. First, they violate regularity, which argues that the likelihood of choosing an alternative from a given choice set should never increase with the addition of another alternative to that set (Huber, Payne, and Puto 1982; Luce 1959; Tversky 1972). In other words, the likelihood of choosing Apartment *y* should not have increased as the choice set expanded from {*x, y*} to {*x, y, z*}.

Second, this effect appears to be sizeable and robust. Across studies, Simonson (1989) found that an alternative gained an average of 17.5 share points by being a middling alternative within a choice set, while subsequent research has shown similar effects for calculators, cameras, investment portfolios, mouthwashes, personal computers, audio speakers, and rain ponchos (Benartzi and Thaler 2002; Dhar and Simonson 2003; Kivetz et al. 2004; Prelec, Wernerfelt, and

Zettelmeyer 1997; Tversky and Simonson 1992). Further, Kivetz et al. (2004) have recently shown the compromise effect for larger, more complex choices sets.

Finally, the compromise effect has readily understandable implications for managers. For instance, Williams-Sonoma was able to increase the sale of its $275 bread machine by introducing a $400 bread machine, while Xerox was able to boost sales of one of its high-priced copiers after introducing an even higher-priced model (Pearlstein 2002).

Explaining the Compromise Effect

While the compromise effect appears to be robust and large, three distinct causal explanations for the effect have been proposed. In his seminal paper, Simonson (1989) presented an ease-of-justification argument, arguing that decision makers find it easier to justify a middling option than an extreme option to themselves and to others. As he states, "if a decision maker is uncertain which of the two attributes is more important, a selection of a compromise alternative that can be seen as combining both attributes might be easiest to justify" (p. 161). He reasoned that the compromise effect would be stronger among individuals who expected having to justify their choices to others and among individuals who were more uncertain of their preferences. He found some support for both of these hypotheses.

Simonson and Tversky (1992) developed a more elaborate explanation for the compromise effect that hinged on loss aversion. Using the term extremeness aversion, they argued that consumers evaluate the advantages and disadvantages of an alternative relative to other alternatives in the choice set, with the disadvantages looming larger than the advantages. If we again consider a set of two-dimensional alternatives $\{x, y, z\}$, where $x > y > z$ on one dimension and $x < y < z$ on the other dimension, loss aversion implies that y will be preferred to x and z

because it has only small disadvantages relative to *x* and *z*, whereas both *x* and *z* have large disadvantages relative to each other.

Finally, Wernerfelt (1995) offers a different explanation based on consumer inference. He argues, "decision makers who do not know their absolute but only their relative tastes can infer … the correct choice from market offerings, based on the assumption that these reflect the distribution of needs of the population" (p. 628). Thus, a person who knows they have middling tastes may infer that the middle option of a choice set will best meet their needs.

While differing in their details, all of these explanations are rooted in "reason-based choice" (Shafir, Simonson, and Tversky 1993). Whether one is seeking to justify their choice, minimize the disadvantages of that choice, or infer the best choice from a given choice set, a decision maker is looking for reasons to choose one option over another in the face of uncertainty over their absolute preferences. In the extant research, the result has been the increased attractiveness of an intermediate alternative, especially when an individual expected to have to justify their choice to others.

ALIGNABLE AND NON-ALIGNABLE ASSORTMENTS

Notwithstanding the seeming robustness of the compromise effect, recent research suggests the impact of an assortment on choice may be systematically influenced by the *type* of assortment involved. In particular, to help explain why consumers sometimes defer choice (Dhar 1997; Iyengar and Lepper 2000; Tversky and Shafir 1992) or defect from a brand that offers too much choice, Gourville and Soman (2005) differentiate between alignable and non-alignable assortments.

Assortment Alignability

Gourville and Soman define an alignable assortment as a set of brand variants that differ along one or more compensatory attributes, such as price, quality, and size, such that each variant has a specific quantity of those attributes. Examples of alignable assortments include Levi's 501 jeans that vary in waist size, bottles of Bayer aspirin that vary in price and tablet count, and apartments that vary is quality and distance from campus. Importantly, such assortments require incremental tradeoffs within attributes.

A non-alignable assortment, by contrast, entails a set of brand variants that vary along one or more discrete, non-compensatory attributes, such that one alternative may possess one set of desirable features, while a second alternative may possess a different set of desirable features. As previously noted, different models of the Ford Explorer might constitute a non-alignable assortment, as would restaurant entrees and college majors. Unlike alignable assortments, non-alignable assortments require tradeoffs across attributes, such that choosing one alternative delivers a set of features that might not be available in another alternative.

The Impact of Non-Alignability on Consumer Choice

Employing this construct, Gourville and Soman (2005) considered instances where an increasing product assortment was detrimental to consumer choice (e.g., Boatwright and Nunes 2001; Schwartz 2004). In cases where choice deferral is an option, for instance, research has shown that adding a second attractive alternative to what had been a one alternative choice set serves to increase the likelihood of choice deferral (Dhar 1997; Tversky and Shafir 1992). The same has been shown for choice sets that increase in size from four to 16 alternatives (Chernev 2003) and from six to 24 alternatives (Iyengar and Lepper 2000).

Gourville and Soman attribute many of these negative effects to non-alignability. Specifically, they argue that the potential for regret and the difficulty in choosing will be far greater in the case of an increasing non-alignable assortment than an increasing alignable assortment. First consider an alignable assortment. As depicted in Figure 1, alternatives within an alignable assortment vary along a one or more attributes that are continuous and compensatory in nature, allowing for a low-risk, within-attribute tradeoff between alternatives. Choosing between bottles of aspirin that vary in tablet count and price, for instance, entails tradeoff that are incremental in nature, serving to minimize the choice difficulty and the potential for regret.

But alternatives within a non-alignable assortment vary along one or more attributes that are neither continuous nor compensatory. Rather, choosing from within a non-alignable assortment often requires a consumer to make "all or nothing" tradeoffs across discrete attributes. Thus, to get one option, you often must give up another, as shown in Figure 1. As a result, Gourville and Soman argue that the choice difficulty and the potential for decision regret are significantly greater in the case of an increasing non-alignable assortment than in the case of an increasing alignable assortment.

In a series of studies, Gourville and Soman demonstrated the impact of these contrasting types of assortments on consumer choice. For instance, in one between-brand choice task, they presented subjects with a single alternative of microwave oven from Brand A and anywhere from one to five alternatives from Brand B. Across subjects, if the Brand B alternatives formed an alignable assortment, the probability of choosing a Brand B alternative increased from 53% to 73% as the size of its assortment increased from one to five. But, if the Brand B alternatives formed a non-alignable assortment, that probability dropped from 53% to 40%.

EXTREMENESS SEEKING

When we reviewed the compromise effect (and extremeness aversion) through the lens of assortment alignability, we found that this well known effect had almost exclusively been demonstrated using alignable assortments, such as calculators that varied in reliability and number of functions (Simonson 1989) and portable grills that varied in cooking area and weight (Simonson and Tversky 1992).[1] As such, in the face of preference uncertainty and/or loss aversion, choosing an intermediate alternative allows a person to obtain some quantity of each of the relevant features, just as Simonson argues (Simonson 1989; Simonson and Tversky 1992; Tversky and Simonson 1993).

The same cannot be said for a non-alignable assortment. Rather, choosing an intermediate alternative from a non-alignable assortment, such as from among our five Ford Explorers, forces a person to forego some features to obtain other features. In the face of preference uncertainty, we would expect these between-attribute tradeoffs to greatly increase the conflict inherent in the choice task, particularly through the anticipation of potential regret.

Therefore, in contrast to an alignable assortment, we expect consumers to reduce the conflict inherent in non-alignable assortments by adopting an "all or nothing" choice strategy. Specifically, as the size of the non-alignable assortment grows, we predict consumers will increasingly choose either the basic variant (e.g., "I can't decide what features to get, so I'll get none") or the "fully-loaded" variant (e.g., "I can't decide what features to get, so I'll get them all"). The result is extremeness seeking. Specifically, we expect to find extremeness seeking in the case of a non-alignable assortment, but extremeness aversion in the case of an alignable assortment, as reflected in the following two hypotheses:

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[1] We say "almost exclusively" to be conservative. We note, however, that we have not found an instance of the compromise effect or extremeness aversion using non-alignable assortments.

H1: In a within-brand choice task, the likelihood of choosing an extreme alternative from within a *non-alignable* assortment will *increase* with assortment size.

H2: In a within-brand choice task, the likelihood of choosing an extreme alternative from within an *alignable* assortment will *decrease* with assortment size.

Further, just as Simonson (1989) suggested that "ease of justification" in the face of preference uncertainty was responsible for the compromise effect, we argue that "ease of justification" in the face of preference uncertainty also drives the extremeness seeking effect. Thus, we borrow from his justification manipulation and argue that extremeness seeking will grow stronger when individuals anticipate having to justify their choice from a non-alignable assortment. Specifically, we propose:

H3: In the case of a non-alignable assortment, the extremeness seeking effect should be more pronounced if individuals anticipate having to justify their choice of alternative to others.

We now present three studies to test these three hypotheses.

STUDY 1

The purpose of our first study was to assess the impact of an increasing non-alignable assortment on consumer choice. In particular, we sought to demonstrate the existence of extremeness seeking.

Method

Subjects   Subjects for this study were 280 adults who were approached in a Colorado shopping mall and were asked to fill out a brief survey. Approximately 50% of those approached agreed to fill out the survey. They were unpaid.

Design and procedure   The surveys used in this study asked subjects to *"Imagine that you are planning to buy a laptop computer. At the store, you find the following alternatives:"* Subjects were then presented with a set of options, all of which were identified as Toshiba-brand laptop computers. Finally, subjects were asked to indicate which model of laptop they would choose from among the alternatives presented.

In greater detail, each subject was presented with one of seven choice sets, with 40 subjects per choice set. All seven choice sets contained a "basic" and a "fully-loaded" Toshiba laptop. The basic model was priced at $2,000, had a 12.1 inch display screen, and had a 133 MHz Intel processor. The fully-loaded model was priced at $2,600, had the same display and processor as the basic model, but also had a CD-Rom, a 56.6 kbps modem, and an external mouse.[2]

Where the seven choice sets varied was in the number and the features of the intermediate models that also were offered. Each of these intermediate alternatives cost $2200, had the same display and processor as the basic model, and had one additional feature—either a CD-Rom, a 56.6 kbps modem, or an external mouse. As shown in Table 1, in addition to the basic and fully-

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[2]   This study was run in 1998. The prices and features of all laptops used in this study were taken from manufacturer literature and various trade press available just prior to the running of the study.

loaded laptops, Choice Sets 1, 2, and 3 each offered one of these intermediate models, resulting in an assortment size of three in each case. Choice Sets 4, 5, and 6 each offered two of these intermediate models, resulting in an assortment size of four in each case. And Choice Set 7 offered all three of these intermediate models, resulting in an assortment size of five.

Table 1 about here

Results and Discussion

As previously outlined, both extremeness aversion and regularity would predict that the increase from a smaller choice set, $\{A_1, A_2, A_5\}$, to a larger choice set, $\{A_1, A_2, A_3, A_4, A_5\}$, through the gradual addition of additional intermediate alternatives, should decrease one's likelihood of choosing one of the two extreme alternatives.

In contrast, we anticipated the choice of the two extreme models of laptop computer would increase with an increase in the non-alignable assortment size (H1). As shown in Figure 2, that is what we found. Across the choice sets of Assortment Size = 3, subjects chose either the basic model or the fully-loaded model 40.9% of the time (i.e., in 49 of 120 cases). Across the choice sets of Assortment Size = 4, this figure rose to 61.7% (74 of 120). And in the choice set of Assortment Size = 5, this figure rose still further to 82.5% (33 of 40). A series of paired comparisons revealed each of these probabilities to be significantly different from the others, with the probability of choosing an extreme alternative being significantly greater when the Assortment Size was five than four ($\chi^2(1) = 5.88$, $p < .02$), and when the Assortment Size was four than three ($\chi^2(1) = 10.42$, $p < .005$).

Figure 2 about here

Importantly, these probabilities reflect an increase in choice for both the basic model and the fully-loaded model. As the Assortment Size increased from three alternatives to five alternatives, the choice share for the basic model increased from 19.2% to 37.5% ($\chi^2(1) = 5.57$, $p < .02$), while the choice share for the fully-loaded model increased from 21.7% to 45.0% ($\chi^2(1) = 8.19$, $p < .005$), approximately doubling in each case. Thus, the extremeness seeking we see in this study reflects a choice migration toward *both* the low-end and high-end alternatives, and not a polarization of choice toward one extreme, as is sometimes observed in the extremeness aversion research (Simonson and Tversky 1992).

Overall, these results support the existence of extremeness seeking in response to an increasing non-alignable assortment (H1). As the number of non-alignable, intermediate alternatives increases from one to two to three, there was a clear increase in the probability of choosing an extreme alternative. This initial study has several shortcomings, however. First, while we have demonstrated an instance of extremeness seeking, we have not actually linked it to attribute non-alignability. We address this in Study 2. Second, we have provided no evidence as to the underlying behavioral mechanism driving the effect. We address this in Study 3.

STUDY 2

What is the exact role of attribute alignability in within-brand choice? If our argument is correct and one's choice of an alternative is influenced by attribute alignability, we would expect to see extremeness seeking in the case of an increasing non-alignable assortment (H1), but extremeness aversion in the case of an increasing alignable assortment (H2). Study 2 was designed to test this premise.

Method

    <u>Subjects</u>   Subjects for Study 2 were 540 individuals awaiting flights at the airport in Manchester, NH. They were asked to fill out a brief survey and were given a box of chocolates for their efforts. Approximately 80% of those approached agreed to fill out the survey.

    <u>Design and procedure</u>   The surveys used in this study were similar to those used in Study 1. These surveys read: "*Imagine you are planning to buy a laptop computer. At a store that you trust, you find the following choices. Please review these choices and indicate which one you would purchase.*"

    The choice sets subsequently presented to subjects were manipulated in a 3 (Assortment Size) x 2 (Assortment Type) full-factorial, between-subjects design, with 90 subjects per condition. The first factor, Assortment Size, varied whether subjects saw three, four, or five alternatives. The second factor, Assortment Type, varied whether the assortment presented was non-alignable or alignable.

    In the Non-alignable Assortment conditions, subjects saw Toshiba laptops that varied in price and features, as shown in Table 2. As in Study 1, all subjects in the Non-alignable conditions saw a "basic" and a "fully-loaded" Toshiba laptop. The basic laptop had a 14-inch display, an 866 MHz processor, a 56.6 Kbps modem, and a price of $1,200. The "fully-loaded" laptop had all of the features of the basic version, plus an external mouse, a CD-ROM, and a zip drive, for a total price of $1,800. [3]

Table 2 about here

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[3] This study was run in early 2001. Again, the prices and features of all laptops used in this study were taken from manufacturer literature and various trade press available just prior to the running of the study.

Subjects in the Non-alignable conditions also saw either one, two, or three intermediate alternatives. Specifically, in addition to the basic and fully loaded laptops, subjects in the three-alternative conditions saw one intermediate alternative, subjects in the four-alternative conditions saw two intermediate alternatives, and subjects in the five-alternative condition saw three intermediate alternatives. Each of these intermediate alternatives possessed one of the special features available in the fully-loaded laptop (i.e., an external mouse, a CD-Rom, or a zip drive), but not the other two, making these assortments non-alignable.

The structure of the Alignable Assortments was similar to that of the Non-alignable Assortments, but with alternatives varying on "processor speed" instead of "features." Specifically, all subjects in the Alignable conditions saw a basic laptop and a high-end laptop. The basic laptop had a 14-inch display, a 56.6 Kbps modem, a 700 MHz processor, and was priced at $1,100. The high-end laptop had the same display and modem, but had a 1.4 GHz processor and a price tag of $1,800.

In addition, subjects in the Alignable conditions also saw one, two, or three intermediate alternatives that had the same display and model as the basic and high-end laptops, but which varied in processor speed and price. Thus, in addition to the 700 MHz and 1.4 GHz machines, subjects in the three-alternative conditions saw either a 866 MHz laptop priced at $1,200, a 1.0 GHz laptop priced at $1,400, or a 1.2 GHz laptop priced as $1,600. Subjects in the four-alternative conditions saw the 700 MHz and 1.4 GHz machines plus two of these intermediate alternatives. And subjects in the five-alternative condition saw the 700 MHz and 1.4 GHz machines plus all three of these intermediate alternatives. Thus, each of these alignable choice sets could be characterized as offering a basic version (the 700 MHz laptop), a high-end version (the 1.4 GHz machine), and either one, two, or three intermediate versions.

Results and Discussion

Our goal in this study was to contrast the behaviors of subjects facing a non-alignable assortment with those facing an alignable assortment. We expected extremeness seeking with an increasing non-alignable assortment (H1), but extremeness aversion with an increasing alignable assortment (H2).

As shown in Figure 3, both expectations were confirmed. When the Toshiba laptops formed a Non-Alignable assortment, varying in unique product features, the combined share of the basic laptop and the fully-loaded laptop increased from 48.9% to 61.1% to 66.7% as the number of intermediate alternatives increased from one to two to three.

But when the Toshiba laptops formed an Alignable assortment, varying in processor speed and price, the addition of intermediate alternatives drew share from the two extremes. In particular, the combined share of the basic laptop and high-end laptop declined from 54.4% to 41.1% to 26.7% as the number of intermediate alternatives increased from one to two to three.

Figure 3 about here

We analyzed these data using a logistic regression with the log odds of choosing an extreme choice as the dependent variable and with contrast codes for Assortment Size and Assortment Type as the independent variables. This regression showed no main effect for Assortment Size ($\chi^2(2) = 1.22$, $p > 0.50$), a significant main effect for Assortment Type ($\chi^2(1) = 19.12$, $p < 0.001$), and a significant Assortment Size by Assortment Type interaction ($\chi^2(2) = 20.41$, $p < 0.001$). Therefore, it appears that extremeness seeking is at work with the Non-alignable assortment, but extremeness aversion is at work with the Alignable assortment. Subsequent contrasts revealed this to be the case. As assortment size increased from three to

five, the probability of choosing an extreme alternative increased significantly when that assortment was non-alignable ($\chi^2(1) = 6.03$, $p < .02$), but decreased significantly when that assortment was alignable ($\chi^2(1) = 15.66$, $p < .001$). Thus, both H1 and H2 were confirmed.

Additionally, the pattern of choice in the case of the Non-alignable assortment is consistent with that found in Study 1. Namely, as the non-alignable assortment increased from three to four to five alternatives, these was a noticeable (but, in this case, non-significant) increase both in the percentage of subjects choosing the basic laptop (from 18.9% to 26.7%) and the percentage of subjects choosing the fully-loaded laptop (from 30.0% to 40.0%).

We draw several conclusions from this second study. First, we again found extremeness seeking in the face of a non-alignable assortment, suggesting that our results are somewhat robust. Second, we found a significant Assortment Type by Assortment Size interaction, supporting the role of assortment type in consumer choice. When our increasing assortment was alignable, with alternatives varying on the linear measure of a laptop's processor speed, we found extremeness aversion. The same holds true in the extant literature, where extremeness aversion has been demonstrated using assortments that (in retrospect) are almost exclusively alignable. However, when our increasing assortment was non-alignable, with alternatives varying on unique features, we found extremeness seeking. As we added additional intermediate alternatives, we found subjects increasingly opting for either the basic or the fully-loaded alternative.

STUDY 3

While Studies 1 and 2 lend support to the existence of extremeness seeking, they do so within the limited context of laptop computers. They also provide little evidence as to why extremeness seeking exists. Therefore, Study 3 had two primary purposes. First, to test the robustness of extremeness seeking, we presented subjects with four product categories as opposed to the single category used in Studies 1 and 2.

Second, to test our argument that preference uncertainty is driving extremeness seeking, we employed a manipulation similar to that used to demonstrate the role of preference uncertainty in the compromise effect. As Simonson (1989) argued in explaining the compromise effect, when faced with preference uncertainty, individuals seek reasons to justify their choices. In the context of assortments we now understand to be alignable, he argued that it was easier for subjects to justify to themselves and to others their choice of an intermediate alternative, thereby magnifying the compromise effect. In the case of a non-alignable assortment, we anticipate that subjects will find it easier to justify to themselves and to others their choice of an extreme alternative, thereby magnifying extremeness seeking. Therefore, in choice tasks similar in structure to those in Studies 1 and 2, we told half the subjects that we might contact them later and ask them to explain their choices. If preference uncertainty is driving the extremeness seeking, this manipulation should increase the size of that effect.

Method

Subjects   Subjects for this third study were 280 undergraduate students at a major northeast university who were participating in a set of workshops on basic concepts in business. As part of a workshop on marketing research, they were asked to fill out a multi-page

questionnaire that asked them for their preferences among alternatives in four different product categories. These subjects were unpaid.

Design and procedure   The surveys used in this study were similar to those used in the first two studies. In each of four product categories, subjects were presented with a scenario explaining that they were interested in buying from within that category and that they had several options to choose from. For instance, in the product category "Cable Television," subjects saw, *"Imagine that you have recently moved into an off-campus college apartment. To get any sort of television reception in your apartment building, you need to get cable service. The one company that services your apartment building offers the following plans. Please review these plans and think about which you would sign up for."*

In this particular scenario, subjects were then presented with either three or five cable television plans that formed a non-alignable assortment. Note that, given our primary focus was on process, we focused solely on non-alignable assortments in this third study.

Within this basic structure, we manipulated the surveys in a 4 (Product Category) x 2 (Assortment Size) x 2 (Justification) design. The first factor, Product Category, was a within-subjects factor, with each subject seeing a choice scenario from each of the following four product categories:

- Cable Television Service—with alternatives varying in the types of premium channels.
- Digital Cameras—with alternatives varying in the types of lenses.
- Wireless Telephone Service—with alternatives varying in types of downloadable games.
- Italian Vacations—with alternatives varying in the cities visited.

These product categories were chosen for their likely appeal to college undergraduates, thereby increasing the degree to which the subjects would find the choice tasks engaging and meaningful.

The second and third factors, Assortment Size and Justification, were between-subjects factors, with a given subject seeing a single Assortment Size and a single Justification condition for all four product categories. The second factor, Assortment Size, manipulated the number of alternatives presented in each product category. A given subject saw either three alternatives or five alternatives, with the three alternative choice set consisting of one basic, one intermediate, and one fully-loaded alternative, and the five alternative choice set consisting of one basic, three intermediate, and one fully-loaded alternative.[4] Importantly, the basic and fully-loaded alternatives were held constant across the three and five alternative choice sets. Thus, one of the three-alternative choice sets for Cable Television consisted of:

- Basic Service Only - all available non-premium channels - $20 per month
- Basic Service plus one premium movie channel - $30 per month
- Basic Service plus one premium movie, music, and comedy channel - $45 per month

whereas the five alternative choice set for Cable Television consisted of:

- Basic Service Only - all available non-premium channels - $20 per month
- Basic Service plus one premium movie channel - $30 per month
- Basic Service plus one premium music channel - $30 per month
- Basic Service plus one premium comedy channel - $30 per month
- Basic Service plus one premium movie, music, and comedy channel - $45 per month

The choice sets used across all four product categories are shown in Table 3.

Table 3 about here

For the third factor, Justification, half of all subjects were informed in the written instructions that we might contact them later and ask them to explain their choices. The other half of the subjects were not informed of this possibility.

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[4]   This three versus five alternative design was true for three of the four product categories. In the fourth product category, Italian Vacations, subjects saw either three or four alternatives. However, for simplicity of exposition, we

Results and Discussion

We were interested in two things in this study. First, can we replicate extremeness beyond the single product category used in Studies 1 and 2? Second, do we find evidence that preference uncertainty is driving this phenomenon? In particular, if preference uncertainty is driving extremeness seeking, the expectation of having to explain or justify a choice from a non-alignable assortment should magnify the effect.

Robustness   To test for robustness, our first analysis involved a simple comparison of choices in each product category across the 2 (Assortment Size) x 2 (Justification) conditions. These results are shown in Table 4.

Table 4 about here

As can be seen, a consistent pattern of choice emerged across the four product categories. In the No Justification condition, we see a systematic increase in the percentage of subjects choosing one of the two extreme alternatives as assortment size increased. When these data were pooled across the four categories, 34.3% of subjects in the Assortment Size = 3 condition chose an extreme alternative, but 52.0% of subjects in the Assortment Size = 5 condition chose an extreme alternative ($\chi^2(1) = 15.72$, $p < 0.001$), in clear support of extremeness seeking. [5]

The same holds true in the Justification condition. Again pooling across the four categories, 37.7% of subjects in the Assortment Size = 3 condition chose an extreme alternative, but 70.3% of subjects in the Assortment Size = 5 condition chose an extreme alternative ($\chi^2(1) = 51.31$, $p < 0.001$). [6]

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talk about the design as if all four product categories employed this three versus five alternative design.

[5] At a product category level, the increase in extreme choice was significant at $p < .05$ for Cable Television and Italian Vacations, and marginally significant at $p < .10$ for Digital Cameras and Wireless Telephone.

[6] At a product category level, the increase in extreme choice was significant at $p < .005$ for each product category.

And, as in Studies 1 and 2, this attraction to the extremes is due to a share increase for both the basic and the fully-loaded alternative. Across the four product categories, as the choice sets increased from three to five alternatives, the percentage of subjects choosing the basic alternative increased from 18.3% to 29.7% ($\chi^2(1) = 18.31$, $p < .001$), while the percentage of subjects choosing the fully-loaded alternative increased from 17.7% to 31.4% ($\chi^2(1) = 26.60$, $p < .001$).

Therefore, it appears that extremeness seeking in the face of increasing non-alignable assortments is a robust phenomenon. In addition to finding evidence of extremeness seeking in the laptop product category in Studies 1 and 2, we now find evidence of extremeness seeking in the case of cable television service, digital cameras, wireless service, and foreign vacations.

<u>Causal Analysis</u>   To determine whether preference uncertainty is driving this effect, we further analyzed subjects' choice data using a logistic regression with the log odds of choosing an extreme choice as the dependent variable and with contrast codes for Assortment Size and Justification as the independent variables. Pooling across the four product categories, this regression showed a significant main effect for Assortment Size ($\chi^2(1) = 66.42$, $p < .001$), a significant main effect for Justification ($\chi^2(1) = 12.30$, $p < 0.001$), and a significant Assortment Size by Justification interaction ($\chi^2(1) = 5.83$, $p < 0.02$).

Interpreting these results, the significant main effect for Assortment Size suggests that extremeness seeking is overwhelmingly evident in both the No Justification and Justification conditions. Similarly, the significant main effect for Justification suggests that the expectation of having to explain or justify their choices increased the likelihood of a subject choosing an extreme alternative, regardless of whether they saw three alternatives or five alternatives. Finally, and most importantly, the significant Assortment Type by Justification interaction suggests that the difference in extremeness seeking between those who saw three alternatives and

those who saw five alternatives was far greater amongst those subjects who expected to have to explain or justify their choices. As is evident in Table 4, while extremeness seeking increased by about 18 percentage points in the No Justification condition, it increased by 32 percentage points in the Justification condition.

Thus, not only do we find robustness for extremeness seeking in the face of an increasing non-alignable assortment, but we find that this effect is indeed driven by preference uncertainty.

GENERAL DISCUSSION AND CONCLUSIONS

Summary of Research

In this research, we show that the compromise effect (Simonson 1989; Wernerfelt 1995), is moderated by the nature of the assortment from which consumers choose. We find that almost all demonstrations of the compromise effect have employed alignable assortments, where alternatives in the choice set along some set of continuous dimensions, such as the quality of a beer, the length of a warranty, and distance from campus. In contrast, we propose that for non-alignable assortments—assortments that vary along multiple, discrete dimensions—consumers will display a distinctly different form of behavior that we call extremeness seeking. In short, they will seek out the extreme options as the choice set grows in size.

We propose that extremeness seeking is driven by the same mechanism that Simonson (1989) argued is driving the compromise effect. In particular, just as he argues that preference uncertainty leads to extremeness aversion for what is, in retrospect, an alignable assortment, so we argue that preference uncertainty leads to extremeness seeking for a non-alignable assortment.

Across three studies, we found strong support for these propositions. In Study 1, when

presented with a non-alignable assortment of laptop computers that included a basic model, a fully-loaded model, and either one, two, or three intermediate models, subjects increasingly chose one of the two extreme models as the overall assortment increased in size. In particular, as the number of intermediate models increased from one to two to three, the percentage of subjects opting for an extreme alternative increased from 40.9% to 61.7% to 82.5%.

In Study 2, we more clearly linked extremeness seeking to non-alignability, simultaneously demonstrating extremeness aversion with an alignable assortment, but extremeness seeking with a non-alignable assortment.

And in Study 3, we employed a manipulation similar to that used by Simonson (1989) to demonstrate that preference uncertainty and the need to justify one's choices (to others or to one's self) at least partially explain extremeness seeking. Across four product categories, we again assembled non-alignable assortments that included a basic version, a fully-loaded or high-end version, and either one, two, or three intermediate versions. In addition, we told half of our subjects that they may be asked to explain their choices at a later point in time. In turn, while the percentage of subjects choosing an extreme alternative in the no-justification condition increased from 34.2% to 52.0% as the assortment grew in size, the percentage of subjects choosing an extreme alternative in the justification condition increased from 37.7% to 70.3%. Thus, the expectation of having to justify their choices significantly magnified the extremeness seeking effect, suggesting that preference uncertainty is at work.

Theoretical Implications

From a theoretical perspective, there are at least four main findings of significance that emerge from this research. First, while this research uncovers yet another systematic violation of the rational choice principle of regularity, it does so by identifying a behavior that is highly

inconsistent with the existing literature. In particular, it presents a type of behavior that runs counter to the compromise effect, which has been characterized as "… among the most important and robust phenomena documented in behavioral research in marketing" (Kivetz et al. 2004, p. 237).   In doing so, it identifies extremeness seeking as a sizeable and robust phenomenon that furthers our understanding of how context impacts consumer choice in seemingly non-rational ways.

Second, we note that both the compromise effect and extremeness seeking appear to be (at least partially) driven by the same underlying factor.   Specifically, in the face of preference uncertainty, it appears that it is easier to justify a middling alternative from an increasing alignable assortment, but easier to justify an extreme alternative from an increasingly non-alignable assortment. Thus, these two seemingly contradictory effects—extremeness aversion and extremeness seeking—seem to be driven by reason-based choice (Shafir, Simonson, and Tversky 1993).

Third, Wernerfelt (1995) suggests that consumers who know their relative preferences, but not their absolute preferences, may infer an optimal choice from the choice set available, based on the premise that the choice set is representative of the choices available in the marketplace. While it is evident that this argument could explain extremeness aversion, it is not clear how or whether consumer inference can explain extremeness seeking. For instance, if a person believes that she is a "basic product" type of consumer, this should hold true regardless of whether there are three or five alternatives available to her.

Finally, this research further highlights the importance of assortment type (Gourville and Soman 2005), finding that behavior can be systematically and dramatically different for non-alignable assortments than for the more familiar (and more research) alignable assortments.

Managerial Implications

From a managerial perspective, our research provides another instance where an increasingly large assortment can negatively or unexpectedly impact consumer choice. Whereas conventional wisdom would suggest that a product provider is enhancing the attractiveness of a choice set by adding alternatives to the mix, this research suggests that it may actually be polarizing the choice of consumers either toward the most basic of alternatives or toward the alternative with the most features. While getting some consumers to trade-up to the fully-loaded alternative may be desirable for a seller, it is not clear that the overall effect of polarization will be positive. Therefore, it is important for a product provider to understand when the addition of alternatives to their offering will create an alignable assortment, thereby encouraging compromise, or a non-alignable assortment, thereby creating extremeness seeking. At the very least, understanding how such additions will impact demand for specific models in a product portfolio seems essential for efficient inventory and product line management.

This research also suggests that product providers may be well served to help consumers resolve their preference uncertainty prior to making a choice. Rather than have consumers choose a basic or a fully-outfitted product because those choices are easiest to justify, a product provider might wish to turn an uncertain customer into a certain customer so as to provide that person with an alternative that best meets their eventual needs.

Future Research

Given that this is the first paper (that we are aware of) that explicitly identifies extremeness seeking as behavioral tendency, there is clearly need for more work in this area. For instance, while we have tested one potential explanation for extremeness seeking, other causal mechanisms may also be at work. Similarly, while we have operationalized alignability as a

dichotomous property of a product assortment, with an assortment being either purely alignable or purely non-alignable, we recognize that many real-world assortments have both alignable and non-alignable characteristics. It would be informative to investigate these hybrid conditions. Finally, while we have presented an important context where increasing an available assortment led to counter-intuitive results, this research is part of a larger body of research on the potentially detrimental effects of increasing variety on consumer choice. As such, it would be informative to study this larger body of research to understand when variety can be helpful, when it can be harmful, and what are the meta-behaviors that are driving these effects.

Table 1:

Experimental Design of Study 1

Choice Set	Assortment Size		Basic ($2,000)	Basic + CD-Rom ($2,200)	Basic + Modem ($2,200)	Basic + Ext. Mouse ($2,200)	Fully Loaded ($2,600)
					Laptop model:		
1	3	N=40	X	X			X
2	3	N=40	X		X		X
3	3	N=40	X			X	X
4	4	N=40	X	X	X		X
5	4	N=40	X		X	X	X
6	4	N=40	X	X		X	X
7	5	N=40	X	X	X	X	X

Table 2:

The Non-Alignable and Alignable Assortments Used in Study 2

Non-Alignable Assortments						
		Laptop model:				
Assortment Size		Basic ($1,200)	Basic + Mouse ($1,300)	Basic + CD-Rom ($1,400)	Basic + Zip Drive ($1,500)	Fully Loaded ($1,800)
3	N=30	X	X			X
3	N=30	X		X		X
3	N=30	X			X	X
4	N=30	X	X	X		X
4	N=30	X		X	X	X
4	N=30	X	X		X	X
5	N=90	X	X	X	X	X

Alignable Assortments						
		Laptop model:				
Assortment Size		700 MHz ($1,100)	866 MHz ($1,200)	1.0 GHz ($1,400)	1.2 GHz ($1,600)	1.4 GHz ($1,800)
3	N=30	X	X			X
3	N=30	X		X		X
3	N=30	X			X	X
4	N=30	X	X	X		X
4	N=30	X		X	X	X
4	N=30	X	X		X	X
5	N=90	X	X	X	X	X

Table 3: The Product Categories and Assortments Used in Study 3

Product Category	Alternatives [Intermediate Alternatives Marked with an Asterisk]
Cable TV Service	• Basic Service Only - all available non-premium channels - $20 per month • * Basic Service plus one premium movie channel - $30 per month • * Basic Service plus one premium music channel - $30 per month • * Basic Service plus one premium comedy channel - $30 per month • Basic Service plus one premium movie, music, and comedy channel - $45 per month
Digital Cameras	• Nikon 3000 – Single Mode Lens - $250 • * Nikon 3000 Plus – Single Mode Lens + Image Stabilization - $300 • * Nikon 3000 Panorama – Single Mode Lens + Panoramic Lens - $320 • * Nikon 3000 Zoom – Single Mode Lens + 3X Zoom - $330 • Nikon 3000 Max – Single Mode Lens + Image Stabilization, Panoramic Lens, 3X Zoom - $400
Wireless Telephone Service	• Basic Service – 500 Minutes, Long Distance Included, Nights & Weekends Free - $40 per month • * Basic Plus – Basic Service + Unlimited Sports Games - $50 per month • * Basic Plus – Basic Service + Unlimited Casino Games - $50 per month • * Basic Plus – Basic Service + Unlimited Puzzle Games - $50 per month • Premium Service – Basic Service + Unlimited Sports, Casino, and Puzzle Games - $60 per month
Italian Vacations	• Roman Holiday – 6 Days in Rome - $700 per person • * A Tale of Two Cities I – 4 Days in Rome, 3 Days in Florence - $1,000 • * A Tale of Two Cities II – 4 Days in Rome, 3 Days in Venice - $1,000 • A Taste of Italy – 3 Days in Rome, 3 Days in Florence, 3 Days in Venice - $1,400 per person

Note: In each product category, subjects in the Alternatives = 3 conditions saw the basic and fully-loaded alternatives, plus one of the intermediate alternatives. Subjects in the Alternatives = 5 conditions saw the basic and the fully-loaded alternatives, plus all of the intermediate alternatives.

Table 4:

Percentage of Subjects Choosing an Extreme Alternative in Study 3

		Product Category				
		Cable Television	Digital Cameras	Wireless Service	Italian Vacations	**Aggregated**
No Justification	Assort Size = 3	34.3%	33.3%	35.2%	34.3%	**34.3%**
	Assort Size = 5	54.3%	51.4%	51.4%	51.4%	**52.0%**
Justification	Assort Size = 3	39.0%	36.2%	36.2%	40.0%	**37.7%**
	Assort Size = 5	68.6%	71.4%	65.7%	72.9%	**70.3%**

Figure 1:

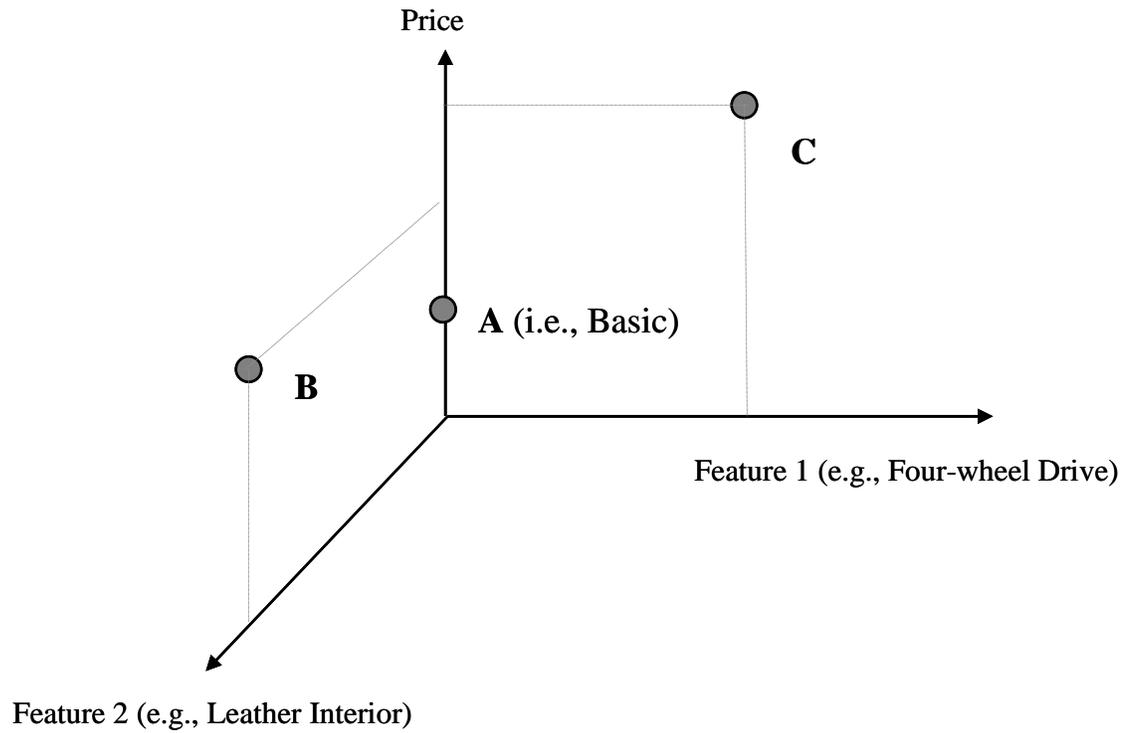The Nature of Alignable and Non-Alignable Assortments

A Typical Alignable Assortment
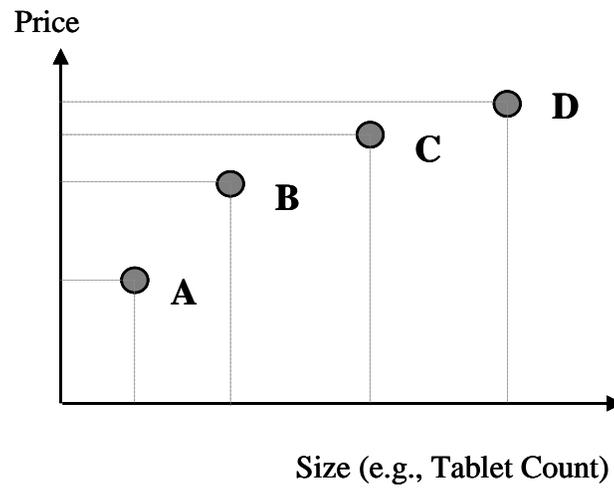
A Typical Non-Alignable Assortment

Figure 2:

The Effect of Non-Alignable Assortment Size on the Choice of an Extreme Option in Study 1
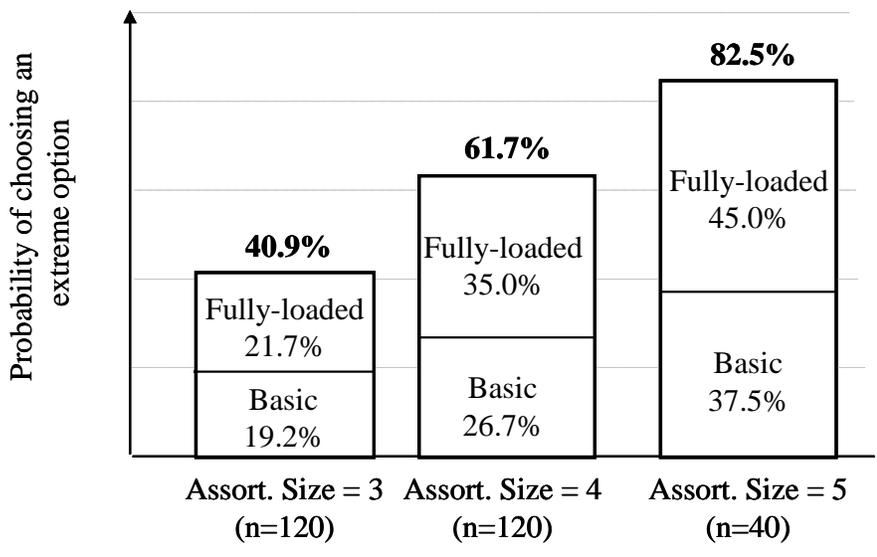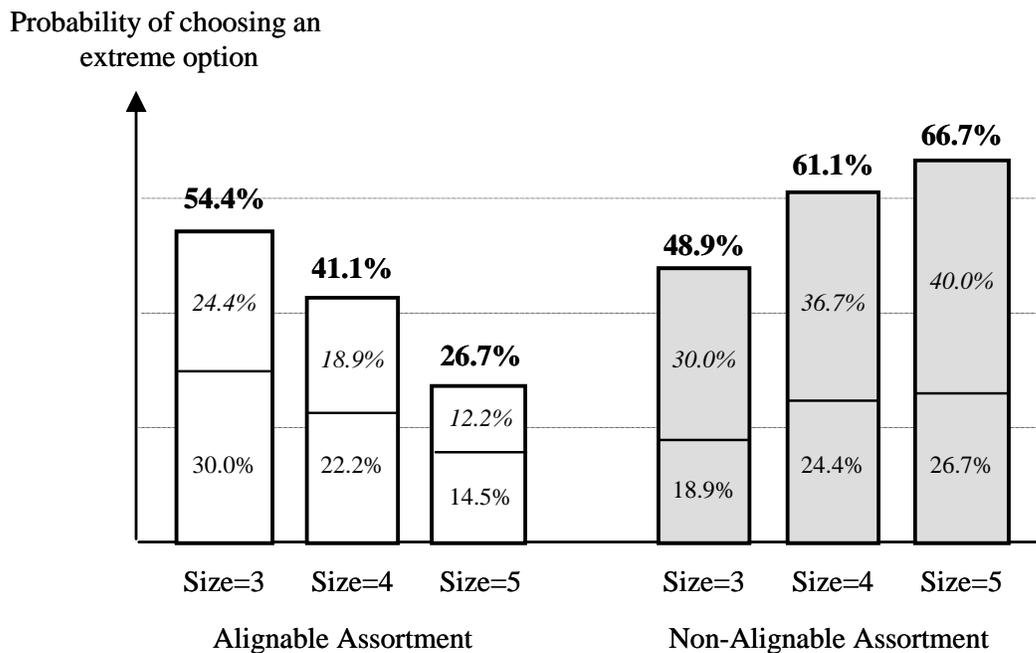
Figure 3:

The Effect of Assortment Size and Type on the Choice of an Extreme Option

Note: Percent choosing an extreme alternative shown in bold. Percent choosing the fully-loaded or high-end alternative shown in italics. Percent choosing the basic alternative shown in normal font.

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