

Ambiguity Aversion and the Preference for Established Brands

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We propose that *ambiguity aversion*, as introduced in the literature on decision making under uncertainty, drives a preference for established brands in multiattribute choices among branded alternatives. Established brands are those for which belief in quality is held with greater confidence, even if specific attributes might be inferior to those of competing, less-established brands. In five experiments, we examine the role of ambiguity aversion in the preference for dominated, established brands. We first show a correlation between ambiguity aversion (revealed through choices among monetary lotteries) and the preference for established brands. We then show that the preference for established brands is enhanced when ambiguity aversion is made more salient in unrelated preceding lottery choices. Thus, ambiguity aversion carries across choices. In addition, ambiguity aversion and the preference for established brands are both enhanced when subjects anticipate that others will evaluate their lottery choices. Finally, ambiguous information about brand attributes tends to increase the preference for established brands.

Key words: ambiguity; brand preference; decisions under uncertainty; multiattribute choice

History: Received January 8, 2009; accepted July 3, 2009, by Peter Wakker, decision analysis. Published online in *Articles in Advance* October 16, 2009.

Introduction

An important finding in the literature on decision-making under uncertainty is the preference for gambles with known rather than unknown (ambiguous) probabilities of winning. For example, people betting on a color often prefer an urn that contains 50 red balls and 50 black balls to an urn that contains 100 balls with unknown proportions of red and black. Originally observed by Ellsberg (1961), and richly documented since (e.g., Becker and Brownson 1964, Slovic and Tversky 1974, Sarin and Weber 1993), this phenomenon, known as ambiguity aversion, has been conceptualized in various ways (by, for example, Einhorn and Hogarth 1985, Frisch and Baron 1988; see Camerer and Weber 1992 for a review), and its psychological antecedents have been extensively researched (see, for example, Curley et al. 1986, Heath and Tversky 1991, Fox and Tversky 1995, Fox and Weber 2002, Trautmann et al. 2008).

This paper extends the domain of ambiguity aversion by exploring its consequences in the context of multiattribute choice behavior. Our principal claim is

that ambiguity aversion causes consumers to systematically favor established brands, defined as brands for which quality beliefs are held with greater confidence. Specifically, we first propose that ambiguity aversion, as revealed through simple lottery choices, is correlated with the propensity to prefer products that carry established brands, even when these specific products are dominated on all other attributes. Second, we maintain that this relationship is causal: ambiguity avoidance stimulated in preceding lottery choices *carries over* and enhances the preference for established brands.

To illustrate the potential role of established brands, consider the choice between two personal computers, presented in Table 1. Of the 120 consumers in a shopping mall presented with this choice, 49 (i.e., more than 40%) preferred Dell, despite its dominated attributes. When the same alternatives were presented without price information (to avoid quality inferences), the preference for Dell was even greater (47 out of 90, or 52%). Remarkably, pretests showed that Compaq and Dell brands had the same level of

Table 1 A Choice Between Two Personal Computers

	Option A	Option B
Brand	Compaq	Dell
Disk space	60 GB	40 GB
CPU	Pentium 4	Pentium 4
	2.60 GHz	2.60 GHz
Price (\$)	400	450

familiarity and overall quality evaluation in the reference population. But consumers reported significantly higher confidence in their belief in the quality of Dell, which—in our terminology—meant that Dell was a more established brand. We control for a variety of alternative explanations by employing a restrictive concept of what it means to be a more established brand: specifically, we compare two brands that differ in terms neither of familiarity nor perceived quality. The only difference is the degree of confidence associated with the quality judgment.

Our experiments demonstrate a strong association between ambiguity avoidance in lottery choices and established brand preference in product choices (Experiments 1A and 1B). We find this preference for established brands to be stronger when preceded by more salient choice tasks involving ambiguous lotteries (Experiment 2). We further confirm the role of ambiguity aversion as a cause of brand equity by demonstrating that preference for established brands increases when choice accountability boosts ambiguity avoidance in lottery choices that precede brand choices (Experiment 3). Experiment 4 directly tests the ambiguity-reducing role of established brand names in the presence of ambiguous attributes.

These findings add to the literature on brand equity (Wernerfelt 1988, Erdem and Swait 1998, Keller 1998) by introducing the subjective confidence that surrounds brand beliefs as a key component of brand equity, distinct from brand awareness or quality beliefs. By implication, brand equity is contextual, sensitive to individual ambiguity attitudes as well as the ambiguity background of brand choice.

Ambiguity Aversion in Lotteries and Brand Choice

In his famous critique of Savage's (1954) axiomatization of subjective expected utility, Ellsberg (1961) suggested that, apart from the desirability of possible payoffs and relative likelihood of the events that affect them, choices under uncertainty are also determined by ambiguity, characterized as "a quality depending on the amount, type, reliability, and 'unanimity' of information, and giving rise to one's degree of 'confidence' in an estimate of relative likelihoods" (p. 657; see also Knight 1921). Frisch and Baron (1988)

conceptualized ambiguity as "the subjective experience of missing information relevant" to a decision (p. 152) and argued that "ambiguity effects are framing effects" (p. 155; see also Fox and Tversky 1995), implying that people sometimes use the ambiguity aversion heuristic in contexts that do not require it.

If a subjective experience of missing information emerges from the choice between urns described with precise probabilities and ambiguous probabilities, a similar experience should be prompted by a choice between two brands that vary in terms of subjective confidence surrounding the quality judgments. We suggest that such experience motivates both ambiguity avoidance in lottery choice and preference for established brands. Indeed, both less ambiguous lotteries and more established brands should stimulate a state of subjective competence (Heath and Tversky 1991), and derive a comparative advantage as a result.

Thus, our first hypothesis:

HYPOTHESIS 1A (H1A). *Ambiguity aversion as revealed through choices among lotteries is correlated with preference for dominated established brands over dominating less-established brands.*

Subjective competence in categories of frequently purchased products has multiple possible sources including brands and the product category in general. When competence is sourced in product category, choice will be based on (nonbrand) attributes. Because these two sources of subjective competence will yield different choices, H1A might not hold for frequently purchased categories.

It might be argued that because established brands tend to involve less-risky consumption outcomes as well as perceptions of confidence and subjective competence, preference for established brands is really an effect of risk aversion. Risk aversion is typically revealed by a preference for a sure over a probabilistic option, or by a preference for a highly likely smaller, over a less likely larger, outcome when these options offer the same expected value. We argue that our effect is independent of risk aversion.

HYPOTHESIS 1B (H1B). *The association of ambiguity aversion and preference for established brands is independent of risk aversion.*

Ambiguity Aversion Carry Over

We further claim that the ambiguity attitude observed in lottery choices is a *cause* of the bias in favor of established brands in multiattribute trade-offs. We assess causality by showing that (1) the salience of ambiguity in preceding lottery choices should affect the preference for established brands, and (2) factors (such as accountability) that make ambiguity aversion more likely in preceding tasks should boost subsequent preference for established brands.

Research has shown salient concepts or attributes to receive disproportionate weight in people's judgments and choices (Taylor and Fiske 1978, Taylor and Thompson 1982). Making a concept salient could cause it to be used even in decisions to which it is irrelevant (Muthukrishnan and Kardes 2001, Briley and Wyer 2003, Wathieu et al. 2004, Förster and Liberman 2007). Similarly, making ambiguity aversion salient in lottery choices might make it a major determinant in the choice between an established dominated and less-established dominating brand.

HYPOTHESIS 2 (H2). *Making ambiguity salient in preceding lottery choices engenders a greater likelihood that dominated established brands will be chosen over dominating less-established brands.*

If preference for an established brand is driven by ambiguity aversion, cultivating conditions under which ambiguity aversion is most likely to occur should increase that preference. Curley et al. (1986), testing "other-evaluation" and "self-evaluation" as psychological sources of ambiguity, found ambiguity avoidance to be greater when evaluation of the decision by others was anticipated, but no effect on ambiguity avoidance when future self-evaluation was anticipated. Similar results were reported recently by Trautmann et al. (2008), who concluded that ambiguity aversion is triggered by fear of negative evaluation. Thus, preference for established brands, if it is driven by ambiguity aversion, should increase when the preceding lottery choice is made under an "other-evaluation" condition.

HYPOTHESIS 3 (H3). *Relative to a lottery choice with no evaluation (or "self-evaluation"), a lottery choice involving ambiguity with "other-evaluation" will lead to greater preference for established brands in a subsequent choice task.*

Established Brands as Ambiguity Reducers

More direct evidence of the ambiguity reduction role of established brands is observed in situations in which information about attributes is more or less ambiguous. Based on our arguments thus far, ambiguity avoidance will be stimulated and established brands will be more persuasive if information about attributes for some alternative is comparatively more ambiguous. For example, the probability that a product will need repair within the first year might be expressed in an unambiguous (5%) or ambiguous (2%–8%) manner. The latter, especially when compared with the former, might heighten ambiguity aversion and enhance preference for the established brand. If corroborated, the following hypothesis further strengthens the causal relationship between ambiguity aversion and established brand preference.

HYPOTHESIS 4 (H4). *Preference for established brands will be stronger when information about attributes is presented in a more ambiguous manner.*

Experiments

Experimental stimuli were refined via a series of pretests (detailed in the appendix). We identified in eight product categories an established brand and a less-established brand that differed in terms of confidence in belief in quality, but not in terms of quality and familiarity ratings. These pretests confirmed that, consistent with Fox and Tversky's (1995) comparative ignorance hypothesis, the difference between brands in terms of confidence was observed in comparative but not in separate evaluations.

Experiment 1A

This experiment tested the correlation between ambiguity aversion and preference for a dominated but established brand, independent of risk aversion. The 148 students who participated in this experiment for monetary compensation first chose (or expressed indifference to a choice) between a sure option (\$50) and a lottery that involved a higher expected value (\$150 with 0.5 probability and \$0 with 0.5 probability). Subjects who chose the sure option were termed "risk avoiders." Next, participants performed 15 minutes of irrelevant activities and then chose between two lotteries of equal expected value, one with a higher probability of winning a smaller amount (0.75 probability of winning \$100), the other with a lower probability of winning a larger amount (0.5 probability of winning \$150). Choosing the first lottery also indicated risk avoidance. Following another 15 minutes of unrelated tasks, subjects chose (or expressed indifference to a choice) between a lottery with known probability (\$150 with 0.5 probability) and an ambiguous lottery (\$150 with unknown probability). Subjects who selected the first lottery were identified as "ambiguity avoiders." All these lotteries employed modified versions of Ellsberg's (1961) colored ball urn story.

Thirty minutes later, subjects were given a series of brand choices in eight product categories: DVD players, televisions, cameras, gel pens, instant noodles, rice, sports shoes, and computers. The story they were told was that a marketing research company wanted to estimate the market share of leading brands in various product categories. Each choice involved an established brand (e.g., Sony) dominated in terms of some key attributes, and a less-established brand (e.g., Toshiba) with dominating attributes. For technology products, for which information was provided on four attributes and price, the established brand was dominated in terms of three nonprice attributes and priced higher than the less-established brand. The two brands did not differ in terms of the fourth nonprice attribute. In other product categories, for which information was provided on two attributes and price, the less-established brand dominated on all

Table 2 Experiment 1: Preference for the Dominated Established Brand Given Preferences Under Uncertainty

Lottery choice (payoff; prob.)	(\$50; 1) vs. (\$150; 0.5)		(\$100; 0.75) vs. (\$150; 0.5)		(\$150; 0.5) vs. (\$150; unknown)	
	Sure option (<i>n</i> = 90)	Risky option and indifference (<i>n</i> = 58)	High probability (<i>n</i> = 98)	High payoff and indifference (<i>n</i> = 50)	Known probability (<i>n</i> = 70)	Ambiguous option and indifference (<i>n</i> = 78)
Proportion of subjects choosing the (dominated) established brand:						
Camera	0.45	0.48	0.52	0.42	0.61	0.37
DVD player	0.35	0.47	0.43	0.34	0.50	0.31
TV	0.47	0.53	0.52	0.44	0.64	0.36
Computer	0.33	0.40	0.38	0.32	0.50	0.23
Gel pen	0.30	0.33	0.30	0.34	0.37	0.26
Sports shoes	0.60	0.62	0.57	0.68	0.66	0.56
Rice	0.47	0.43	0.47	0.42	0.51	0.40
Noodle	0.51	0.43	0.51	0.42	0.54	0.42

Note. Bold values highlight categories and types of lottery choice for which the preference for established brand was significantly associated (as measured by chi-squares) with preference among lotteries.

attributes.¹ Immediately after choosing, subjects’ perceived knowledge of the two brands was measured on a nine-point scale (as a manipulation check).

Results. The manipulation check confirmed that subjects perceived themselves to be more knowledgeable about the established than about the less-established brand in each product category (*F*-values >4.9 and *p*-values <0.05). Based on their lottery choices, 70 of the 148 subjects (47.3%) were classified as ambiguity avoiders, 63 (42.6%) as ambiguity seeking, and 15 (10.1%) as indifferent. The product choice patterns of the indifferent subjects being similar to those of the ambiguity seekers, we combined these two groups.²

Table 2 presents the share of the dominated established brand in each product category and its association with ambiguity and risk avoidance. In general (except in the sports shoes categories), a majority of subjects chose the dominating, less-established brand.³ In the categories of DVD players, cameras, TVs, and computers, there was a significant association between choosing the established brand and ambiguity aversion, as predicted by H1A. In these categories, 50% to 64% of ambiguity avoiders chose the established brand, the corresponding proportions for

other subjects being 23% to 37%. We did not observe a specific pattern of choice for ambiguity avoiders in the frequently purchased categories of rice, gel pens, and noodles. In these categories, however, because of high frequency of purchase and use, consumers can be expected to have developed over time a high sense of subjective competence about both brands despite any perceived difference in confidence. Therefore, the weight accorded to the brands relative to the attribute levels was only marginally related to ambiguity aversion. In the more “image-projecting” product category of sports shoes, a vast majority, irrespective of their lottery choices, chose the established brand. Table 2 also reveals that the established brand preference is unrelated to risk avoidance in preceding lottery choices.

H1B proposes an association between ambiguity aversion and established brand preference independent of risk aversion. To test this hypothesis, we aggregated data for the four categories in which an association was found and compared a number of conditional probabilities. Conditional on risk aversion (preference for a sure outcome), the proportion of ambiguity avoiders who chose the established brand was 75/124 (0.60), whereas the proportion of non-ambiguity avoiders who chose the established brand was only 34/108 (0.31; Wald chi-square = 18.89, *p* < 0.001). Similarly, among subjects who did not favor the sure outcome, the proportion of ambiguity avoiders who chose the established brand was 83/156 (0.53), whereas the proportion of non-ambiguity avoiders who chose the established brand was only 65/204 (0.32; Wald-chi square = 16.34, *p* < 0.001). We obtained similar results using our second measure of risk aversion.

¹ Similar results were obtained in a separate experiment (*n* = 94) in which a technology product (MP3 players) and nontechnology product (gel pens) were both described in terms of two nonprice attributes.

² Excluding those indifferent to the choice between the lotteries did not change the results.

³ See the e-companion for Wald chi-square analyses for all of these experiments. An electronic companion to this paper is available as part of the online version that can be found at <http://mansci.journal.informs.org/>.

Experiment 1B

This real-incentives experiment involved 135 subjects, who first chose between the same two lotteries employed in Experiment 1A—one with known, the other with ambiguous, probability. They were told that three participants in this “lottery study” would be selected via a lucky draw to play at a later time the chosen lottery involving real monetary stakes. Then, after spending 30 minutes in tasks irrelevant to the research, subjects were told that they would participate in a second study and three participants in this “brand preference study” would be selected via a lucky draw to receive the brand they chose. Subjects then selected one of two equally priced MP3 players, a Sony (the established brand, dominated in terms of nonprice attributes) and a Toshiba (the less-established, dominating brand).

Of the 77 subjects who exhibited ambiguity aversion, 40 (51.9%) chose the dominated established brand. Of the remaining 58, only 19 (32.8%) chose the dominated established brand (Wald chi-square = 4.88, $p < 0.03$). The association between ambiguity aversion and established brand preference thus obtains even when real incentives are provided to ensure that subjects reveal their actual preferences.

Experiment 2

Whereas the literature has treated ambiguity aversion as a stable individual trait, in our conception it is a dynamic state that can be activated to influence subsequent behavior. Schwarz and Strack (1981) recommended manipulating the salience of a concept as a way to establish its causality. Following Fiske and Taylor’s (1991) finding that making a construct salient will enhance its role in proximal decisions and behavior, in Experiment 2 we manipulated the salience of ambiguity to increase the likelihood of ambiguity avoidance, and then tested the effect of this manipulation on choosing a dominated established brand over a dominating less-established brand.

We retained only the four product categories in which we had found in Experiment 1A a significant association between ambiguity aversion and preference for the established brand. Alternatives were described in terms of the same five attributes, with price held constant between the two brands in each pair. The 190 subjects who participated in exchange for course credit first chose between two lotteries, one with known, and the other with ambiguous, probability of winning. Either immediately after the lottery choice (high-salience condition) or 30 minutes after the lottery choice (during which time they engaged in irrelevant tasks; low-salience condition), subjects chose in each of four product categories between a dominated established and a dominating

Table 3 Experiment 2: Preference for the Dominated Established Brand, Conditional on Ambiguity Salience and Revealed Ambiguity Avoidance

Condition	Low ambiguity salience		High ambiguity salience	
	Ambiguity avoiders ($n = 54$)	Others ($n = 39$)	Ambiguity avoiders ($n = 59$)	Others ($n = 38$)
Proportion of subjects choosing the (dominated) established brand:				
Camera	0.50	0.31	0.76	0.29
DVD player	0.54	0.33	0.78	0.29
TV	0.48	0.28	0.78	0.32
Computer	0.52	0.33	0.75	0.26

less-established brand. A pretest ruled out the possibility that manipulating salience causes experimental demand (see the e-companion).

We predicted a salience \times ambiguity attitude interaction effect: more ambiguity avoiders would choose the dominated, established brand in the high-salience than in the low-salience condition, suggesting that increasing the salience of background ambiguity can stimulate preference for established brands. Ambiguity salience was not predicted to affect the brand choice behavior of non-ambiguity avoiders.

Results. Table 3 presents for ambiguity avoiders and other subjects in the low-salience and high-salience conditions, respectively, the shares of the established and less-established brands. In all four categories, the salience \times ambiguity attitude interaction was significant. Combining the responses in the four categories yielded a significant salience \times ambiguity attitude interaction (Wald chi-square = 15.54, $p < 0.001$). The share of the established brand for ambiguity avoiders was 50.9% (110/216) in the low-salience condition and 76.7% (181/236) in the high-salience condition (Wald chi-square = 31.5, $p < 0.001$). The share of the established brand was not affected by ambiguity salience for the other subjects (31% (49/156) in the low-salience condition and 29% (44/152) in the high-salience condition; Wald chi-square < 1 , not significant). Similar patterns were observed in each of the four product categories.

Experiment 3

Experiment 3 tested the hypothesis that psychological factors known to influence ambiguity avoidance in lottery choices also affect preference for established brands. One of the factors found by Curley et al. (1986) to boost ambiguity avoidance is other-evaluation (as opposed to self-evaluation).

Subjects in all three conditions were asked to choose a color (red or green) on which to bet. They would win \$100 if a chip of the chosen color was drawn from one of two boxes on display. One box contained 50 red and 50 green chips, the other box

an unknown mix of 100 green and red chips. Subjects could choose to have a chip drawn from either of the two boxes or declare indifference. Subjects in all conditions were told that one of every 20 winners would be randomly chosen to receive the \$100 prize. In the control condition, no further instruction was given. In the “other-evaluation” condition, the instruction sheet explained that, at the end of the experimental session, the box with the unknown mix would be emptied by the experimenter in front of everyone and the exact numbers of red and green chips counted and announced. In the “self-evaluation” condition, the instructions explained that at the end of the experimental session subjects could, individually in an adjacent room in which no one else would be present, empty the box with the unknown mix and count the numbers of green and red chips.

Fifteen minutes after the lottery choices (during which time they performed several tasks unrelated to the research), subjects in all three conditions chose between a dominated established brand and a dominant less-established brand in the same four categories as in Experiment 2.

Results. There were, as expected, more ambiguity avoiders in the “other-evaluation” group (39/51, or 76.4%) than in the other two groups (25/50, or 50%, in the control group and 28/52, or 53.8%, in the “self-evaluation” group). Whereas the control versus other-evaluation contrast was significant (Wald chi-square = 7.35, $p < 0.01$), the control versus self-evaluation contrast was not. As in the previous experiments, there was a significant association between ambiguity avoidance and established brand preference.

To test H3, we aggregated data across the four categories and compared the three groups in terms of the proportion of subjects who chose the dominated, established brand. The difference between the control (88/200, or 44%) and other-evaluation (132/204, or 64.7%) groups was significant (Wald chi-square = 4.29, $p < 0.04$). The self-evaluation group (99/208, or 47.6%) did not differ from the control group. This pattern of results was obtained in all four product categories (see Table 4). It appears that anticipation of

being evaluated by others increases ambiguity aversion in a way that carries over to brand preference. The increase in ambiguity aversion and preference for established brands occurred even though the anticipated evaluation by others was only implicit (subjects were only told that chips would be counted in the presence of others).

Experiment 4

The two previous experiments suggest that ambiguity avoidance and its effect on brand preference are caused by unrelated background choices between lotteries. In the present experiment, we examine how preference for established brands is enhanced when information about a subset of attributes is presented in an ambiguous manner (H4).

The 120 subjects who participated in this experiment were allocated to one control condition and two experimental conditions. In all conditions, subjects chose in each of four categories between established and less-established brands of DVD players, cameras, TVs, and computers. The order of choices was counterbalanced so as not to have any effect of its own or in interaction with any other factor.

As in the other experiments, in the control condition, products were described in terms of three nonprice attributes, and the established brand was dominated in terms of these attributes. Subjects in all experimental conditions received exactly the same information about the two brands’ three nonprice attributes, and in addition, each brand was described in terms of the likelihood that the product would require repair within the first year. In one experimental condition, the likelihood of repair for DVD players and TVs was described as “5%” (clear probability), and the likelihood of repair for cameras and computers as “2% to 8%” (ambiguous probability). In the other experimental condition, the ambiguous probability was attached to DVD players and TVs, the clear probability to cameras and computers. The purpose of this “hybrid” manipulation was to make ambiguity salient through contrast (Fox and Tversky 1995).

Results. We aggregated the data across product categories to make comparisons between (1) the results in the presence of clear versus ambiguous probability, and (2) the results in the presence of a clear probability versus the control condition. We expected a significant effect in the former but not the latter comparison. As expected, there was, for the proportion that chose the established brand, a significant difference between the clear (68/162, or 42%) and ambiguous (100/162, or 60%; Wald chi-square = 12.5, $p < 0.001$) probabilities, but no difference between the clear probability and control condition (60/156, or 38.4%; Wald chi-square < 1; see Table 5 for the choice

Table 4 Experiment 3: Established Brand Preference in Different Conditions

	DVD	Camera	Computer	TV
Control	21/50 (42%)	22/50 (44%)	22/50 (44%)	23/50 (46%)
Other-evaluation	32/51 (63%)	34/51 (67%)	33/51 (65%)	33/51 (65%)
Self-evaluation	24/52 (46%)	26/52 (50%)	25/52 (48%)	24/52 (46%)
Control vs. other-evaluation contrast (Wald chi-square)	4.29**	5.15**	4.30**	3.53*

* $p < 0.1$; ** $p < 0.05$.

Table 5 Experiment 4: Established Brand Preference in Different Conditions

	DVD	Camera	Computer	TV
Control	14/39 (36%)	15/39 (38%)	16/39 (41%)	15/39 (38%)
Clear probability	17/40 (42%)	16/41 (39%)	17/41 (41%)	18/40 (45%)
Ambiguous probability	27/41 (66%)	23/40 (57%)	24/40 (60%)	26/41 (63%)
Clear vs. ambiguous probability contrast (Wald chi-square)	4.36**	2.74*	2.75*	2.73*

* $p < 0.1$; ** $p < 0.05$.

proportions and Wald chi-squares in each category). Thus, when attribute information is ambiguous (and contrasted with clearer information in neighboring categories), people seem to become more sensitive to the confidence with which they hold their brand beliefs and to favor more established brands.

Conclusion

Ambiguity aversion, a psychological concept researched extensively in the domain of choice under uncertainty in economics and decision theory, usually refers to the behavior of decision makers who exhibit a preference for lotteries involving known probabilities. The present research extends the domain of ambiguity research by showing that ambiguity aversion causes a preference for products that bear more established brand names, even when they feature dominated attributes. We showed ambiguity aversion in lottery choices to be associated with a preference for established brands, and verified causality by showing that increasing its salience in preceding lottery choices enhances subsequent preference for established brands in multiattribute trade-offs. We also found that ambiguous attribute descriptions stimulate consumers to prefer more established brands.

Earlier research in marketing that considered the role of branding in decision making under uncertainty mostly focused on identifying the risk-reducing value of specific characteristics of a firm and its actions (Wernerfelt 1988, Anand and Shachar 2004). Our notion of confidence in quality judgments may sound somewhat similar to the brand credibility construct proposed in the empirical work of Erdem and Swait (1998, 2004, 2007), which examined the antecedents and consequences of brand credibility. But there are several important distinctions. First, brand credibility reflects consistency and clarity in product positioning and other characteristics of a firm, whereas confidence in quality is a subjective perception of comparative knowledge held about a brand. Second, whereas Erdem and Swait (2004, 2007) propose that credibility causes variance in perceived quality between brands, we examine only situations

in which perceived quality is held constant. Third, based on our pretests, our measure of confidence in quality judgments varies only in comparative contexts. Finally, Erdem and Swait (2004) suggest that greater brand credibility leads to greater probability of a brand being included in the consideration set, and ultimately chosen, but the confidence in quality heuristics obtains only under certain background conditions favorable to ambiguity aversion. Thus, we take a different perspective that yields a twofold contribution: (1) we emphasize the role of ambiguity aversion independent of risk aversion as an arguably more intuitive and relevant cause of brand equity, and (2) we show the potency of brand equity in any particular choice instance to be highly sensitive to subtle contextual factors (such as accountability or background ambiguity). Perhaps a good example of our theory is the persistent preference for branded over-the-counter medications despite the presence of cheaper generic products of patently identical formula.

From a decision theoretic standpoint, our work highlights the role and specificity of brand names in multiattribute decision making. We also complement the findings of Heath and Tversky (1991) by suggesting that ambiguity avoidance is not hard wired and can, under certain conditions, carry over across domains. Furthermore, whereas Fox and Weber (2002) found greater exposure to ambiguity in preceding choices to reduce ambiguity aversion in subsequent choices, we found that this effect can be reversed depending on choice contexts and consumer characteristics.

Electronic Companion

An electronic companion to this paper is available as part of the online version that can be found at <http://mansci.journal.informs.org/>.

Acknowledgments

A. V. Muthukrishnan gratefully acknowledges the support of the Hong Kong Research Grant Council (GRF Project 642209). Luc Wathieu holds the Ferrero Chair in International Marketing at ESMT. The authors thank Soo-Hong Chew for his comments and suggestions.

Appendix

Pretest 1: Identifying Pairs of Established and Less-Established Brands

Seventy-two subjects were asked to rate their familiarity with several brands in 14 product categories and judge the overall quality of these brands. They were also asked to express their confidence in their quality judgments and rate their knowledge of each brand. All measures were obtained on one-to-nine scales. Based on subjects' responses, we selected an "established" and a "less-established" brand in

each product category. We purposefully ensured that there was no significant difference, and separation by less than one point, between the two selected brands in terms of subjects' familiarity and quality ratings. But the two brands needed to differ significantly in terms of confidence in the quality ratings as well as amount of knowledge subjects perceived themselves to possess (these two measures were highly correlated, $r = 0.92$). We selected for the remaining pretests only the 12 categories in which it was possible to clearly isolate a pair of brands that exhibited differences in confidence and perceived knowledge, but no difference in familiarity and perceived quality. This approach based on confidence ratings is consistent with Ellsberg's (1961) view that the factors that enhance confidence in judgment also reduce perceived ambiguity in the decision context.

Pretest 2: Selecting Categories in Which There Is an Overwhelming Preference for the Established Brand When Everything Else Is Equal

The 68 subjects who participated in this pretest were asked to choose, in each of the 12 categories retained after the first pretest, between an established brand and a less-established brand (as determined in Pretest 1). The two brand names were given, together with the same four key attribute levels or features including price. We retained only categories in which at least 75% of subjects chose the "established" brand. The pairs of brands we obtained are shown in Table A.1.

Pretest 3: Comparative Ignorance

The subjects were asked, after making choices similar to those in Pretest 2, to record their perceived knowledge and confidence in quality judgments about the brands in a between-subjects design. In each category, the between-brand differences in perceived knowledge and confidence in quality judgments occurred when the two brands were rated side by side ($n = 33$), but not when each brand was rated independently ($n = 35$). This finding is consistent with the comparative ignorance hypothesis for ambiguity aversion proposed by Fox and Tversky (1995).

Table A.1 Pairs of Established and Less-Established Brands

Product category	Established brand	Less-established brand
DVD player	Sony	Toshiba
MP3 player ^a	Sony	Toshiba
TV	Pioneer	Panasonic
Computer	Dell	Compaq
Hi-fi music system ^b	Aiwa	Sharp
Digital camera ^c	Nikon	Fuji
Sports shoes	Adidas	Pony
Gel pen	Pentel	Zebra
Noodles	Nissin	Doll
Rice	Golden Elephant	Golden scent

^aEach experiment used either DVD players or MP3 players, but never both.

^bBecause more than 50% of subjects said that they had never shopped for a hi-fi music system, this category was not used, except to manipulate brand focus in Experiment 4.

^cSamsung was used in Experiment 1 and Fuji in the other experiments because the Samsung brand was perceived to cross many categories beyond photographic products.

Pretest 4: Identifying Dominating Attributes Structures

The 20 subjects who participated in this pretest received information about the attributes of two options in each of two categories labeled "A" and "B." One option possessed higher attribute values and thus dominated the other. We used the results of this pretest to ensure that when no brand name was given, the dominating attribute levels were chosen by 100% of the subjects. The stimuli were then constructed for the main experiments by pairing established brands with dominated attributes and nonestablished brands with dominating attributes.

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