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Abstract

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This paper investigates situations where a sizeable sub-set of consumers prefer an inferior (dominated) offer made by an established brand to a superior (dominating) offer made by a less-established brand. Established brands are those for which consumers hold more confident beliefs concerning overall quality. Through a series of eight experiments, we test the hypothesis that the preference for a dominated established brand is linked to ambiguity aversion, a seemingly unrelated pattern of choice behavior between monetary gambles. We first show a correlation between ambiguity aversion and the preference for dominated established brands. We then demonstrate that the preference for established brands is enhanced when ambiguity aversion is made more salient in unrelated preceding choices. To further study the ambiguity-reducing properties of established brands, the last experiments assign brand names to monetary gambles, and it appears that (a priori unrelated) established brand names increase the likelihood of choosing ambiguous gambles. Overall, this research argues that brand equity for longstanding brands derives (at least in part) from consumers' tendency to avoid ambiguity.

Keywords: branding; brand choice; consumer behavior; decision making under uncertainty

JEL Classification: C91,D10,D80,M31

1. Introduction

Most authors in the domain of branding postulate that brand equity emerges from the perceived benefits associated with the brand (Keller 2002). Yet, perhaps the most intriguing manifestation of the power of branding occurs when established brands that are not believed to provide superior benefits get an edge. For instance, branded over-the-counter medications are frequently preferred to cheaper generic drugs of patently identical formula. Some electronics brands known to have lost technological leadership continue to be preferred in categories where they offer inferior characteristics and higher prices. Established brands of cars (or restaurants, or professional schools) can stay on top despite their competitors' successful efforts to win quality ratings. In this research, we say that a brand is more “established” than another brand when consumers hold quality perceptions related to that brand with greater confidence.

Our main claim is that many consumers, when confronted with a choice between a dominated established brand and a dominating un-established brand, experience an aversive feeling of *ambiguity*: these consumers question the quality of their beliefs, which ultimately favors the established brand, because judgments concerning the established brands are held with greater confidence.

To illustrate, consider the following choice between two personal computers:

	OPTION A	OPTION B
BRAND	Compaq	Dell
HARD DISK SPACE	60 GB	40 GB
CPU	Pentium 4 – 2.60 GHz	Pentium 4 – 2.60 GHz
PRICE	\$400	\$450

When this choice was given to 120 consumers in a shopping mall, 49 (i.e., more than 40%) preferred Dell, the dominated but more established brand, apparently giving excessive weight to the brand name. In a second pilot test, we offered this choice without price information (which might stimulate quality inferences). The proportion that chose Dell in this pilot test was even greater (47 out of 90; 52%). Pretests indicated that Compaq and Dell brands have in the reference population the same level of familiarity and general perceived quality. A key difference, however, was that consumers declared significantly more confidence in their beliefs about Dell.

We have conducted a series of experiments in order to ascertain whether the preference for established brands in such cases is driven by ambiguity avoidance. Indeed, our experimental procedures demonstrate (and play with) a strong association between the tendency to prefer established brands on the

one hand and the tendency to prefer less ambiguous gambles (lotteries with well-defined probabilities of winning, as compared to theoretically equivalent but more ambiguous gambles featuring unspecified probabilities) on the other hand. Most noticeably, our experiments show that ambiguity avoiders in the domain of monetary gambles are significantly more likely to prefer established dominated brands to un-established dominating brands. In addition, we find that the preference for established brands is stronger when preceded by salient unrelated choices involving ambiguous gambles. Confirming the role of ambiguity aversion as a driver of brand equity, we also find that dominating un-established brands that post more reliable information improve their likelihood of being chosen. In a direct test of the ambiguity-reducing role of established brand names, we show that tagging an ambiguous monetary gamble with an established brand name has an effect similar to the assignment of precise probabilities. These findings shed new light on the ambiguity avoidance phenomenon (Becker and Brownson 1964, Einhorn and Hogarth 1985, Ellsberg 1961, Halevy 2007, Heath and Tversky 1991, Kahn and Sarin 1988).

2. Ambiguity Aversion in Gambles and in Brand Choice

In a famous critique of Savage's (1954) axiomatization of subjective expected utility, Ellsberg (1961) suggested that apart from the desirability of the possible pay-offs and the relative subjective likelihood of the events affecting them, a third dimension - the quality of one's information concerning the relative likelihood of events - plays an important role in choices under uncertainty. Ellsberg termed this *ambiguity*, "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). The existence of ambiguity avoidance had been suggested earlier by Knight (1921) who considered that the "action which follows upon an opinion depends as much upon the amount of confidence in that opinion as it does upon the favorableness of the opinion itself" (p. 227).

To explain the role of ambiguity in decision-making under uncertainty, it is customary to refer to the following situation (Ellsberg, 1961, p. 650). Consider two urns containing red and black balls only. One ball is to be drawn at random from one of these urns. The gamble involves a \$100 prize if the ball is red and \$0 if the ball is black. Urn I contains 100 balls, but the number of red balls in the urn is completely unknown: it could range anywhere from 0 to 100. In Urn II, in contrast, there are exactly 50 red balls and 50 black balls. When asked which urn they would prefer to use for the gamble, some people are indifferent or prefer to use Urn I, but "the majority" of respondents would prefer the ball to be drawn from Urn II, the urn with a known proportion of red and black balls. A naive interpretation of this finding

might be that people believe that red balls are more probable in Urn I, but Ellsberg suggested instead that people who prefer Urn II simply reveal a preference to avoid ambiguity. These people, between two theoretically equivalent gambles in terms of the likelihood of events, prefer a gamble that is described using less ambiguous information.

2.1. Associated Behaviors

A particularly valuable aspect of Ellsberg's original work is that he speculated on possible antecedents of the perception of ambiguity. He recognized that "ambiguity is a subjective variable, but it should be possible to identify "objectively" some situations likely to present high ambiguity, by noting situations where available information is scanty or obviously unreliable or highly conflicting; or where expressed expectations of different individuals differ widely; or where expressed confidence in estimates tends to be low" (p. 660-661). Note the hypothesis that conflicting information creates a perception of ambiguity: "ambiguity may be high (and the confidence in any particular estimates of probabilities low) even when there is ample quantity of information, when there are questions of reliability and relevance of information, and particularly where there is conflicting opinion and evidence" (p. 659).

The brand choice situation described in the introduction, where a dominated established brand competes against a dominating un-established brand, fits very well with Ellsberg's characterization of "situations likely to present high ambiguity." First, information is scanty. There could be several attributes for which information is missing. Second, the information pertaining to the less established brand may be perceived as less reliable. Third, evidence is conflicting in the sense that a more established, possibly more expensive, brand is offering inferior attributes.

Of course, we are not discussing the feasibility of representing beliefs through subjective probability distributions, which was the original concern of Ellsberg and followers. Instead, our basic contention is that *ambiguity avoidance as observed in Ellsberg's gamble choices is also driving the preference for established brands*. As argued above, consumers confronted with dominated established brands face a situation that presents high ambiguity, and we propose that ambiguity aversion and established brand preference are tightly associated. This is somewhat similar to recent work by Halevy (2007) demonstrating a tight association between attitudes towards ambiguous and compound lotteries.

Some might argue that a more intuitive psychological underpinning of the preference for established brands is risk aversion: established brands are less risky prospects and thus the preference for established brands should be correlated with revealed risk aversion. However, we argue that this intuition is flawed.

Risk aversion has to do with the distribution of outcomes around a given expected value. It might for instance be correlated with a preference for conformance quality (the preference for a brand unlikely to depart much from some pre-defined standards), but risk and ambiguity are clearly distinct concepts: consumers may or may not experience ambiguity, independently of the degree of risk implied (Sherman 1974). In Ellsberg's conception as well as in more recent conceptions (Camerer and Weber 1992, Frisch and Baron 1988), ambiguity refers to missing information resulting in lower confidence in risk judgments. If established brands involve greater confidence in beliefs without implying different expectations regarding the relative likelihood of outcomes, the choice between an established but dominated brand and a less established dominating brand should be related more to ambiguity aversion than to risk aversion. While testing this proposition would be particularly challenging, our first experiment will feature a correlation between ambiguity aversion and a preference for established brands, but there won't be any correlation with a measure of risk aversion.

HYPOTHESIS 1. Ambiguity aversion as revealed through choices among gambles is correlated with the preference for dominated established brands over dominating less established brands (independently of risk aversion).

For this relationship to hold, we obviously need a category where consumers experience some degree of discomfort towards their judgment. Kahn and Sarin (1988) already suggested that ambiguity aversion was category-dependent. In particular, we would not expect the relationship between ambiguity aversion and established brand preference to hold in frequently-purchased product categories, where consumers exhibit a high general degree of confidence in their judgments.

HYPOTHESIS 1A. The correlation between the preference for established brands and revealed ambiguity aversion holds more strongly in product categories involving less frequent purchases.

2.2. Ambiguity Salience

In order to further substantiate the theory according to which ambiguity aversion drives the preference for dominated established brands, one can examine the effect on brand choice of various levels of stimulation of ambiguity aversion. Indeed, while ambiguity aversion might be seen as a stable individual trait, we conceptualize it as a situation-determined tendency: ambiguity aversion can be enhanced or reduced,

depending on how salient ambiguity is made. According to Taylor and Fiske (1978), an information or concept is salient if it can be easily be brought to mind and produce what they call a "top of the head phenomenon."

Seemingly trivial but salient concepts or attributes receive disproportionate weight in people's judgments and choices (Taylor and Fiske 1978, Taylor and Thompson 1982). Some authors draw a distinction between salience and accessibility, but in our conceptualization, salience encompasses accessibility determined by situational factors. In particular, according to Forster and Liberman (2007), accessibility is "a temporary state that is produced by prior processing of stimulus and thus activates knowledge" (p. 202), and thus it is included in the notion of salience, defined as properties of a stimulus that cause a perceiver to give unequal attention to the stimulus (Higgins 1996). Making a concept salient in this sense could cause this concept to be used in subsequent decisions even if this concept is not so relevant for these subsequent decisions (see Wyer 2007 for a discussion on the determinants and effects of knowledge accessibility on subsequent decisions).

Although individual differences in terms of ambiguity avoidance are undeniable, Fox and Tversky (1995) and later Fox and Weber (2002) already identified certain contextual factors -such as comparison opportunities- that made ambiguity more or less salient. There is ample evidence in both psychology (Higgins and Lurie 1983, Sherman, Ahlm, Berman, and Lynn 1978) and in marketing (Muthukrishnan and Kardes 2001) that concepts and beliefs activated in one context can influence subsequent decisions in a different context as long as these inputs are salient. In particular, support for the assertion that ambiguity salience will play a key role in brand choice can be based on the work of Sherman, Mackie, and Driscoll (1990) on priming the dimensions of evaluation. In their choice between two candidates one of whom was described high on foreign policy and low on economic matters and the other was described the opposite way, subjects were influenced by priming. Specifically, those who were primed with the dimension of economic matters weighted this dimension higher in their choice. Likewise, if ambiguity is made salient, ambiguity aversion may become a major criterion by which the choice between an established dominated brand and a less established dominating brand will be made.

HYPOTHESIS 2. Making ambiguity salient through preceding tasks will cause a greater likelihood of choosing an established dominated brand over a dominating less established brand.

This hypothesis is tested in experiments 2 and 3 via different manipulations of the salience of ambiguity.

2.3. Procedural Knowledge Activation

In recent years, there has been increased research on the activation of procedural knowledge. Typically, researchers examine the carry-over effect of an action on performing other actions in a second experimental stage (see Forster and Liberman 2007 for a review). Likewise, research on "processing shift" suggests that procedures and cognitive processes that are activated in the course of one task remain active and are transferred to another task even when these two tasks are unrelated (Schooler 2002). Furthermore, recent research in psychology (Gollwitzer 1990) and in marketing (Dhar, Huber, and Khan 2007; Xu and Wyer 2007) created different "mindsets" in people and studied the effect of this manipulation on carryover effects. A common finding across these diverse areas of research is that activating procedural knowledge does facilitate the carryover effects. This finding could be applied to reduce the preference for the dominated established brand. For example, if consumers are repeatedly induced to make choices on the basis of attributes (rather than brands), then the established brand name (or the ambiguity surrounding the less established brand) will receive a lesser weight in subsequent brand choice decisions. The following hypothesis is tested in experiment 4:

HYPOTHESIS 3. Activating the procedural knowledge of choosing on the basis of product attributes reduces the likelihood of choosing a dominated established brand in a subsequent choice.

Finally, if ambiguity aversion contributes to the established brand's advantage, an additional -but more straightforward- approach to reducing the power of established brands emerges from improving the characteristics of information described by Ellsberg (1961):

HYPOTHESIS 4. Improving the unanimity and reliability of brand information will reduce the preference for dominated established brands over dominating less established brand.

This hypothesis is tested in experiment 5.

2.4. Established Brands as Ambiguity Reducers

A more direct evidence for the ambiguity reduction role of established brands can be obtained by assigning brand names to gambles. If our arguments so far are valid, assigning an established versus less established brand name should not matter for an unambiguous lottery, whereas established brand names will constitute an advantage for ambiguous lotteries. The following hypothesis may have less tangible implications for branding (except for investment products obviously), but it strengthens the causal relationship between ambiguity aversion and established brand preference.

HYPOTHESIS 5. The assignment of an established brand name to an ambiguous gamble makes it more likely to be chosen, as compared to the assignment of the same established brand name to an equivalent but unambiguous gamble.

This hypothesis is tested in experiment 6.

3. Experiments

The propositions concerning ambiguity aversion and the preference for established brands were tested in a series of experiments. The brands and levels of attributes were chosen via a series of pretests. In all pretests, subjects participated in exchange for course credit.

Pretest 1: Identifying Pairs of “more established” and “less established” brands. Seventy-two subjects participated in this pretest. Subjects were asked to rate their familiarity with several brands in fourteen product categories. They also judged the overall quality of these brands and expressed their confidence in these judgments. All three measures were obtained on one-to-nine scales. Based on subjects’ responses, we selected an “established” and a “non-established” brand in each product category. We purposefully ensured that there was no significant difference between the two selected brands in terms of subjects’ familiarity. There was also no significant difference (never more than 1 point on a one-to-nine scale) between the two brands in terms of the quality ratings provided by the subjects. However, the two brands differed significantly in terms of confidence in the quality ratings. Specifically, we selected for the next pretests only those twelve categories in which a pair of brands could be isolated that exhibited a difference in confidence, but no difference in perceived quality. This approach based on confidence ratings is consistent with Ellsberg’s view according to which factors that enhance confidence

in judgment also reduce perceived ambiguity in the decision context (see also Einhorn and Hogarth 1978).

Pretest 2: Selecting categories in which there is an overwhelming preference for the “established brand” when everything else is equal. Sixty-eight subjects participated in this pretest. In each of the 12 categories retained after the first pretest, subjects were to choose between an established brand and a less established brand (as determined in pretest 1). The two brand names were given together with four key attributes or features, including price. In fact, the two brands were described as possessing exactly the same features and attribute levels. We retained only those ten categories in which at least 75% chose the “established” brand (see Appendix A for the pairs of established – less established brands in these ten product categories). In addition, we asked subjects whether they had personally shopped for these products. We found that except in the category of hi-fi music system, in all other categories at least 70% of the subjects had the shopping experience.

Pretest 3: Identifying dominating attributes structures. Subjects received information about the attributes of two options in each category. These two options were given neutral labels such as “A” and “B” rather than real-world brand names. One option possessed higher levels of 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 subjects. The stimuli were then constructed for the main experiments by pairing established brands with dominated attributes and non-established brands with dominating attributes.

Experiment 1

This purpose of this experiment was to test the correlation between ambiguity aversion and preference for a dominated but established brand. In addition, this experiment was designed to rule out risk aversion (instead of ambiguity aversion) as an alternative explanation of the preference for established brands. This experiment also allowed us to identify product categories in which ambiguity aversion was not significantly correlated with a preference for established brands (consistent with hypothesis 1A).

Method. One hundred and forty-eight students of a marketing course participated in this experiment against monetary compensation. Subjects first chose between a sure option (\$ 50) and a risky gamble that had a higher expected value than the sure amount (\$150 with 0.5 probability and \$0 with 0.5 probability). Those who chose the former, sure option were termed “risk avoiders.” After 15 minutes of irrelevant activities, the next task was a choice between two risky gambles – one with a higher probability of

winning a smaller amount (.75 probability of winning \$100) and the other with a lower probability of winning a higher amount (.5 probability of winning \$150). Both gambles had the same expected value. Here, those who chose the first gamble were termed the “probability segment” and those who chose the second gamble were called the “pay-off segment.” Once again, subjects did several irrelevant tasks for the next 15 minutes before choosing between a risky gamble (\$150 with .5 probability) and an “ambiguous gamble” that had a pay-off of \$150 but the probability of winning was not known (for both these gambles, we used Ellsberg’s colored balls cover story). The order of these three gamble choices was counterbalanced.

Almost thirty minutes later, subjects were given a series of brand choices. They were told that this study was conducted for a marketing research company that had the objective of estimating market shares of leading brands in several product categories. They chose between a “dominated” (in terms of some key attributes) established brand and a “dominating” less established brand (for example, Sony was an established brand of DVD players, while Toshiba was less established). Subjects made such choices in eight product categories – DVD players, televisions, cameras, gel pens, instant noodles, rice, sport shoes, and computers. In each of these categories, the less established brand was described to be 20% cheaper than the established brand.

Results. In this experiment, based on their lottery choices, 47.3% of subjects (70/148) were classified as ambiguity avoiders and the rest as ambiguity neutral. We correlated choice for the brands with the choice for the gambles. Table 1A presents the share of the established brand in each product category and its association with each of the gamble choices. Choice of established versus less established brand is not correlated with risk avoidance; nor is it correlated with preference for higher probability versus higher pay-off. In general (except in the sport shoes categories), a majority of subjects chose the dominating less established brand. The associations (chi-squares) between the preference for (dominated) established brands and risk aversion or ambiguity avoidance are given in Table 1B. In the four categories of DVD players, cameras, TVs, and computers there was a significant association between the choice of the established brand and the behavior of ambiguity avoidance. In these categories 50 to 64% of ambiguity avoiders chose the established brand, while the corresponding proportions for ambiguity neutrals was 23 to 37%. For example, in the category of computers, 50% of the ambiguity avoiders (35/70) chose the established brand (Dell); however, among the ambiguity neutrals, only 23% (18/78) chose Dell (Chi-square = 11.63, $p < .01$; see tables 1C and 1D). In the more “image-projecting” product category of sports shoes, a vast majority, irrespective of their gamble choices, chose the established brand. Further, in the frequently purchased categories of rice, gel pens, and noodles, we did not obtain the differential patterns of choice between ambiguity seekers and avoiders.

Discussion. Consistent with hypotheses 1 and 1A, it appears that in some product categories, there is an association between preference for the established brand and the tendency to avoid ambiguity. This effect was absent in an image-projecting category and also in product categories where product replacement is frequent. It is remarkable that the tendency of risk aversion (the tendency to either choose a sure option over a risky option with higher expected value or to give greater weight to the probability of winning over the pay-off when the two options are equated in terms of expected value) was not associated with the preference for the established brands.

Although we found that ambiguity aversion and established brand preference are associated, the evidence obtained in this experiment is a correlation. It would be worthwhile to examine whether ambiguity avoidance serves as an antecedent of preference for the established brand. Therefore, in subsequent experiments, we manipulate conditions that enhance ambiguity avoidance and test their effects on preference for the established brand.

TABLE 1A
Experiment 1: Preference for the Dominated Established Brand,
Given Preferences under Uncertainty

Lottery Choice (Payoff; Prob.)	(\$50;1) vs. (\$150; .5)		(\$100;.75) vs. (\$150; .5)		(\$150;.5) vs. (\$150; unknown)	
Option Chosen	Sure Option (n = 90)	Risky Option (n = 58)	High Probability (n = 98)	High Payoff (n = 50)	Known Probability (n = 70)	Ambiguous Option (n = 78)
<i>Proportion of Subjects Choosing the (Dominated) Established Brand:</i>						
Camera	.45	.48	.52	.42	.61*	.37
DVD player	.35	.47	.43	.34	.50	.31
TV	.47	.53	.52	.44	.64	.36
Computer	.33	.40	.38	.32	.50	.23
Gel pen	.30	.33	.30	.34	.37	.26
Sports shoes	.60	.62	.57	.68	.66	.56
Rice	.47	.43	.47	.42	.51	.40
Noodle	.51	.43	.51	.42	.54	.42

* Shaded cells highlight categories and type of lottery choice for which the preference for established brand was significantly associated (as measured by chi-squares) with preference among lotteries.

TABLE 1B
Experiment 1: Association (Chi-Squares) between Risk- and Ambiguity-Aversion and Preference for Established Brands

Lottery Choice (Payoff; Prob.)	(\$50;1) vs. (\$150; .5)	(\$100;.75) vs. (\$150; .5)	(\$150;.5) vs. (\$150; unknown)
Camera	.005	1.336	8.684***
DVD player	1.779	1.083	5.691**
TV	.649	.856	11.895***
Computer	.613	.477	11.633***
Gel pen	.125	.300	2.278
Sports shoes	.063	1.638	1.340
Rice	.181	.326	2.033
Noodle	.906	1.079	2.121

** p < .05 level

*** p < .01 level

Experiment 2

Based on the way it has been discussed in economics literature (as well as in the context of experiment 1), ambiguity aversion may appear as a stable individual trait. However, in our conception, ambiguity avoidance is a dynamic state that can be readily activated to influence subsequent behavior. As making a construct salient will enhance the role of that construct in proximal decisions and behavior (Fiske and Taylor 1991), in experiments 2 and 3, we manipulate the salience of ambiguity and thus increase the likelihood of ambiguity avoidance. In addition, we test the effect of this manipulation on the likelihood to choose the established brand over a dominating, less established brand. Schwarz and Strack (1981) recommend manipulating salience of a concept as a procedure for establishing its causality.

Method. In experiment 2, we retained only those four product categories in which we found a significant correlation between ambiguity avoidance and established brand preference in experiment 1. Except that we manipulated the salience of ambiguity and made changes as explained below, the general procedure of this experiment was the same as that of experiment 1. One hundred and ninety subjects participated in exchange for course credit.

Subjects made brand choices in several categories after choosing between two gambles. Unlike in experiment 1, we did not give choices between a sure option and a risky option or between a low probability-high pay-off option and a high probability-low pay-off option. The only lottery choice was between a gamble with known probability of winning and one that involved ambiguous probability. Immediately after this task, the salience of ambiguity was manipulated. Subjects chose between a dominated established brand and a dominating less established brand in four product categories either

immediately after the gamble choice (high salience condition) or after an interval of 30 minutes during which time a series of irrelevant tasks were administered (low salience condition).

We predicted that in the high salience condition more ambiguity avoiders would choose the dominated, established brand than in the low salience condition, suggesting that preference for established brands can be stimulated by increasing background ambiguity salience. However, salience was not predicted to impact the brand choice behavior of ambiguity-neutral subjects. In other words, we predicted a salience x ambiguity attitude interaction effect.

Results. Table 2A presents the shares of the established and less established brands for ambiguity avoiders and ambiguity neutrals for the low salience and the high salience conditions respectively. In all the four categories, the salience x ambiguity attitude interaction was significant. For example, in the category of DVD players, the salience x ambiguity attitude interaction was significant (Wald chi-square = 4.18, $p < .05$). Follow-up analyses revealed that for the ambiguity avoiders, the share of the established brand was 53.7% (29/54) in the low salience condition and 78% (46/59) in the high salience condition (Wald chi-square = 7.18, $p < .01$). However, for the ambiguity neutrals, there was no difference between the salience conditions in terms of the choice proportion for the established brand [33% (13/39) in the low salience condition and 29% (11/38) in the high salience condition; Wald chi-square = 0.2, NS]. The same pattern was obtained in the other three categories (see Table 2B for the Wald chi-square values for each category).

TABLE 2A

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

Condition	Low ambiguity salience		High ambiguity salience	
Lottery Choice Behavior	Ambiguity Avoiders (n = 54)	Ambiguity Neutrals (n = 39)	Ambiguity Avoiders (n = 59)	Ambiguity Neutrals (n = 38)
<i>Proportion of Subj. Choosing the (Dominated) Established Brand:</i>				
Camera	.50	.31	.76	.29
DVD player	.54	.33	.78	.29
TV	.48	.31	.78	.34
Computer	.52	.33	.76	.29

TABLE 2B
Experiment 2: Wald Chi-Squares

	Effect of (salience x lottery preference) on brand choice	Effect of salience on brand choice for ambiguity avoiders
Camera	3.78*	8.13***
DVD player	4.18**	7.18***
TV	3.29*	10.35***
Computer	4.32**	6.14**

* $p < .1$ level

** $p < .05$ level

*** $p < .01$ level

Discussion. This experiment showed that ambiguity avoidance is not a stable trait and can be activated. By making ambiguity avoidance salient, we can influence consumer preference for a dominated, established brand (hypothesis 2). In the next experiment, we intend to employ another manipulation of salience and obtain additional evidence for this proposition.

Experiment 3

As that of experiment 2, the objective of this experiment is to test the proposition that salience of ambiguity can influence the preference for a dominated established brand. As explained below, however, salience is here manipulated via means other than delay.

Method. One hundred and fifty-six subjects were randomly assigned to one of two salience conditions. In the low salience condition, subjects made six different choices between two risky gambles, one with lower probability but higher reward and the other with higher probability and lower pay-off (for example, a choice between \$150 with a 0.6 probability of winning versus \$300 with a probability of 0.3). Subjects in the high salience condition also made six different choices between two gambles. In this case, one of the option had clear probability of winning (for example, a reward of \$100 for picking a red ball from an urn that contains thirty red balls and sixty black or yellow balls, the exact number of black or yellow balls is not known) and the other option had ambiguous probability of winning (a reward of \$100 for picking a yellow ball from the same). After these six lottery choices, subjects in both experimental conditions were given the same choices used in experiment 2, i.e., a choice between a risky and an ambiguous gamble, followed by a choice between a dominated established brand and a dominating less established brand, in the same four product categories that were used in experiment 2.

Results. The results obtained corroborate the findings of experiment 2. First, salience of ambiguity (in this case, caused by repeated choices involving ambiguous gambles) increased the occurrence of the

tendency of ambiguity avoidance in the seventh lottery choices: sixty-four percent (49/76) in the high salience condition avoided ambiguous gambles, versus forty-nine (39/80) in the low salience condition; Wald chi-square = 3.88, $p < .05$). The interaction between salience and ambiguity attitude at least approached significance ($p < .1$) in all four categories. In the DVD category for example, the interaction between salience and ambiguity attitude was significant (Wald chi-square = 4.53, $p < .05$). The tendency of ambiguity avoidance in the high salience condition was also transferred to the brand choices, increasing the share of the established brand. The proportion of ambiguity avoiders that chose the established brand was higher in the high salience condition (36/49; 73.5%) than in the low salience condition (19/39; 48.7%; Wald chi-square = 5.52, $p < .05$). Tables 3A and 3B summarize the results in all four product categories.

Discussion. We obtained further evidence for the prediction that contextual factors can heighten ambiguity avoidance. In addition, our prediction that making ambiguity avoidance salient can lead to greater preference for a dominated established brand also received support. Again, our results suggest that situational factors can enhance or decrease the tendency of ambiguity aversion. In addition, this tendency transfers to brand choice, benefiting the established brand.

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

Condition	Low ambiguity salience		High ambiguity salience	
Lottery Choice Behavior	Ambiguity Avoiders (n = 39)	Ambiguity Neutrals (n = 41)	Ambiguity Avoiders (n = 49)	Ambiguity Neutrals (n = 27)
<i>Proportion of Subj. Choosing the (Dominated) Established Brand:</i>				
Camera	.49	.27	.76	.28
DVD player	.49	.32	.73	.22
TV	.46	.27	.73	.26
Computer	.46	.27	.78	.22

TABLE 3B
Experiment 3: Wald Chi-Squares

	Effect of (salience x lottery preference) on brand choice	Effect of salience on brand choice for ambiguity avoiders
Camera	4.39**	6.51**
DVD player	4.53**	5.52**
TV	2.83*	6.62***
Computer	4.83**	8.81***

* $p < .1$ level

** $p < .05$ level

*** $p < .01$ level

Experiment 4

In the preceding experiments, we showed that stimulating ambiguity aversion through choices among gambles could induce a preference for established brands. This finding would be of limited interest if taken too literally, because purchases in the real world are not usually preceded by gambling choices. However, if it is true that the preference for established brand is caused by ambiguity aversion, a natural interpretation is that established brand names reduce ambiguity by tagging products of uncertain performance, much the same way that clear probabilities tag gambles. An implication of this is that several choices between non-established and established brands can also be used to stimulate ambiguity aversion, leading to further accentuation of the preference for established brands. Such hypothesis, tested in experiment 4, implies that sensitivity to established brands is stronger in an environment that makes the established-less established dichotomy more salient. Conversely, environments where brands are not the diagnostic cues for choices tend to de-sensitize consumers to the power of branding.

Method. Experiment 4 tested the notion that if consumers are put in a mindset to focus more on the attributes than on the brands, their preference for the established brand should diminish in subsequent choices. Attribute versus brand focus was the only factor manipulated in this experiment, in which eighty-five subjects participated to earn course credits.

In the brand focus condition, subjects made choices in seven different product categories – rice, gel pens, hi-fi players, TVs, sport shoes, cameras, and MP3 players in this order. Each of these choices was between an established, dominated brand and a less established, dominating brand. The seventh choice was in the category of computers between Dell and Compaq, and the attribute values presented were exactly the same as in experiment 1. In the attribute focus condition, subjects did exactly the same task as

in the brand focus condition, but, for the first six choices, the two options were described by labels such as A, B, and so on, instead of brand names. After these six choices, as in the brand focus condition, subjects were asked to choose between Dell and Compaq. The attribute values for all the seven choices were exactly the same as in the brand focus condition.

Results. We found that in the attribute focus condition, the tendency to choose the established brand was considerably reduced [21/43 (49%) in the brand focus condition versus 11/42 (26%) in the attribute focus condition; Wald chi-square = 4.53, $p < .04$). Thus, it appears that by changing consumers' focus, we could enhance or reduce their preference for the dominated, established brand.

Experiment 5A

According to Ellsberg's (1961) insights, the degree of ambiguity depends not only on the numeric probabilities; it more broadly depends on such things as the amount, type, reliability, and unanimity of the information surrounding an option. If the preference for established brands is driven by ambiguity aversion, varying one or more of these information characteristics should have an observable impact (holding expectations constant).

Method. One hundred and sixty-five subjects participated in exchange for course credits. The valence and unanimity of information provided were manipulated. This experiment had four conditions, including a control condition. In all these conditions, except for the brand name and price, no other information was given for either option. The products used in all four conditions were Sony (established brand) and Toshiba (less established brand) MP3 players. In all these conditions, Sony was described to be 15% higher in price. In the control condition, no additional information was provided, while the other three conditions received additional information in the form of fifty experts' ratings. In one of the three experimental conditions (low mean-low variance condition), subjects were told that the experts considered both brands as acceptable but not great (average rating for each brand was 3 out of 5), and expert opinion about the quality of the two brands was nearly unanimous. They were further told that 46 experts gave a rating of 3 for both brands, and of the remaining four experts, two gave a rating of 4 and two others gave a rating of 2.

In another (high mean-high variance) condition, subjects were told that the fifty experts' ratings ranged from 1 to 5. They were further told that the average ratings for the established and the less established brands were 4 and 4.3, respectively, and as there was very little agreement among the experts, the variances were high for both the brands. In the fourth (high mean- low variance) condition, subjects

were told that the average rating was 4.3 for either brand, the range for each brand was between 4 and 5, and the variance in ratings was very low for either brand. We predicted that for ambiguity to be reduced not only should the ratings be unanimous but they should also portray the less established brands in an equally positive light as the established brand.

Results. The proportion of subjects who chose the established brand were 24 out of 42 (57%), 22 out of 40 (55%), 20 out of 40 (50%), and 13 out of 43 (30%) in the control, low mean-low variance, high mean-high variance, and high mean-low variance conditions, respectively. Except for the high mean-low variance condition, none of the other conditions differed from the control condition. The contrast between high mean-low variance and high mean-high variance conditions approached significance (Wald chi-square = 3.33, $p < .07$). The contrast between high mean-low variance and the other two conditions were significant (Wald chi-square high mean-low variance versus low mean-low variance = 5.09, $p < .03$; Wald chi-square high mean-low variance versus control = 6.1, $p < .02$).

Experiment 5B

In this experiment we wanted to test the effect of information credibility on ambiguity reduction and, in turn, on preference for the established brand. Only condition 4 of Experiment 5A was retained. Within this condition, source credibility was manipulated. One half of subjects were told that the ratings were obtained from fifty Consumer Electronics experts. The other half was told that the ratings were obtained from fifty readers of a popular magazine. Eighty-five subjects participated in this experiment. The choice proportions for Sony were 12/36 (33.3%) in the high credibility condition and 21/34 (57.5%) in the low credibility condition (Wald chi-square = 5.51, $p < .02$).

Discussion. Although the results of experiments 5A and 5B may not be as surprising, they corroborate the interpretation that the preference for a dominated, established brand is driven by ambiguity aversion. Much like unanimity of experts' opinions and credibility of the information reduce the ambiguity surrounding probability judgments, it appears that the same applies to brand evaluations in ambiguous contexts.

Experiment 6A

In this experiment, we offer a direct test of the ambiguity-reducing property of established brands, by examining the effects of brand names on choices between lotteries (testing hypothesis 5).

Method. We employed a 3 (types of lottery choice) x 2 (brands) between-subjects design. Three hundred and forty-three subjects participated in this experiment in exchange for course credits. In condition 1, the choice was between a sure \$100 and 50% chance to win \$360. In the second condition, the choice was between a 40% chance to win \$450 and a 60% chance to win \$300. In condition 3 (ambiguous option condition), the choice was between 40% chance to win \$450 and a chance anywhere between 20-60% chance to win \$ 450. Thus, the latter option in condition 3 is an ambiguous option. Within each of these conditions, “brand” was manipulated. The competing options had either fictitious names such as Sure Win and Fair Game or real brand names such as Sony and Toshiba. If they had real names, in the first two conditions, the riskier of the two options (for example 40% to win \$450 in condition 2) was given the established brand name and the other option was given the less established brand name. In the third condition, the ambiguous option was given the established brand name, and the other option was given the less established brand name.

Results. As there was no difference between condition 1 (sure versus risky option) and condition 2 (two risky gambles with varying probabilities and pay-offs), we combine these two conditions and give the label unambiguous options condition (see Table 4 for choice proportions in various conditions). Data were submitted to a maximum likelihood analysis of variance via CATMOD procedure of SAS. Our prediction was that while the brand names should not matter in the unambiguous options condition, it should matter when ambiguous probabilities are involved. Choice was modeled as a function of brand (fictitious versus real) and the two types of lottery (unambiguous versus ambiguous option). The interaction between brand and lottery type was significant (Wald chi-square = 4.36, $p < .04$). While the brand name did not influence choice in the unambiguous options condition (Wald chi-square < 1), it had a significant effect on lottery choice in the ambiguous condition. Specifically, while only 26% (15 out of 58) chose the ambiguous option when the both options had fictitious brand names, 48% (27 out of 56) chose the ambiguous option when it had an established brand name and the competing option had a less established brand name (Wald chi-square = 5.97, $p < .02$).

TABLE 4
Experiment 6A: Impact of Lottery Branding on Observed Risk/Ambiguity Preferences

	Choosing Risky Option in (\$100;1) vs.(\$360; .5)	Choosing High Payoff Option in (\$300;.60) vs.(\$450;.4)	Choosing Ambiguous Option in (\$450;.4) vs. (\$450; .2 to .6)
Option Carries Fictitious Name	.48 (n = 56)	.40 (n = 60)	.26 (n = 58)
Option Carries Sony Name (vs. Toshiba)	.46 (n = 57)	.41 (n = 56)	.47 (n = 58)

Discussion. Although the results support our prediction that established brand names induces confidence and thus increases preference for an otherwise ambiguous option, the alternative explanation is that any familiar name could have increased the preference for the ambiguous option. In other words, a less established brand name could have increased the preference for the ambiguous option. Because the brand names for the options were not counterbalanced (that would have doubled the subjects requirement), we cannot rule out this alternative explanation. Experiment 6B was conducted to rule out this alternative explanation.

Experiment 6B

In this experiment, we retained lottery choice 3 (ambiguous option vs. option with clear probability) of experiment 6 and, within this condition, manipulated brand name (real or fictitious). We also added another condition. In this condition, the ambiguous option was given the less established brand name and the unambiguous option (the one with clear probability) was given a fictitious name. Thus, this experiment had a fictitious names condition, an ambiguous option-established brand condition, and an ambiguous option – less established brand condition. The remainder of the procedure was the same as in experiment 6A. One hundred and twenty-four subjects participated in this experiment in exchange for course credits.

Results and Discussion. The proportion of subjects that chose the ambiguous option was 12 out of 42 in the fictitious name condition, 14 out of 42 in the ambiguous option-less established brand condition, and 20 out of 40 in the ambiguous option – established brand condition. The difference between the fictitious name condition and the ambiguous option-less established brand condition was not significant. The contrast between the fictitious brand and ambiguous-established brand condition was significant (Wald chi-square = 3.88 $p < .05$). The contrast between the ambiguous-less established and the ambiguous-established conditions approached significance (Wald Chi-square = 2.98, $p < .1$). This experiment rules out a potential alternative explanation in experiment 6A.

4. General Discussion and Conclusion

While the influence of brands is usually attributed to perceptions that consumers hold about them, the main contention of this paper is that the confidence with which such perceptions are held plays an important role as well. We have termed “established brands” those brands that consumers tend to evaluate

with greater confidence. To demonstrate the power of established brands, we have shown that some consumers prefer dominated established brands to dominating un-established brands. Our hypothesis is that these consumers express ambiguity aversion, a psychological concept already used in the domain of choice under uncertainty to characterize the behavior of consumers who exhibit a preference for gambles involving precise probabilities. Thus, the gist of this work was to introduce a source of brand equity that is not necessarily correlated with perceptions of quality –even broadly defined- and to expand our understanding of environments (consumer types and choice contexts) that have an impact on brand equity.

In particular, the preference for established brands (in categories involving infrequent purchases) is more likely for consumers who also exhibit ambiguity aversion in choices among gambles (experiment 1), and it is more likely in environments of decision under uncertainty that make ambiguity aversion more salient (experiment 2 and 3). Un-established dominating brands, in contrast, have a better chance to be selected in choice environments that train consumers to choose on the basis of product attributes (experiment 4), and when the brand information is unanimous and reliable (experiment 5).

The findings also shed new light on the nature of ambiguity preferences in decision-making. Ambiguity aversion is not a stable trait and it can be stimulated by recent –or multiple- choices among ambiguous prospects, including choices involving un-established brands (experiment 2 and 3). Experiment 6 played with the association between ambiguity aversion and the preference for established brand, to suggest that established brand tags attached to ambiguous gambles would mitigate ambiguity, just like probability numbers do.

From a marketing standpoint, one can discern a number of potentially useful implications that could not be derived from existing branding literature. First, the notion that ambiguity avoiders seek established brands suggests a new dimension for segmentation and targeting. We can speculate that investors who take risks in countries with sub-standard accounting practices, entrepreneurs, people who are less information voracious, people who have more children at a younger age, might be expected to take a chance with un-established brands based on their apparent qualities (without too much concern for confidence in one's beliefs). In contrast, established brands might have more of an advantage with people who seek to confirm their beliefs before acting. One might consequently suggest that (un-)established brands, in the course of a product life cycle, should expect more (less) traction with latecomers than with innovators.

The results of experiments 2 to 4 suggest that un-established brands have a greater chance to be selected in environments where ambiguity aversion was not made salient through earlier choices

involving ambiguous gambles and un-established brands. This means that too many new brands cannot co-exist in one consumers' choice environment, and perhaps that people who have lived in the same town for a long time (being only exposed to an unambiguous environment that inspires confidence) will be less prone to fall for established brands. An entrepreneur (presumably ambiguity neutral) located in a conservative, unambiguous, environment might be a prime target for an un-established brand. In contrast, one may speculate that ambiguity-averse people placed in un-established contexts will be a great target for established brands. An un-established service (such as a new business school) might be well advised to surround itself with more established options that will help inhibit ambiguity aversion (e.g., locate itself in a well-established city, host participants in well-known branded hotels, etc.). The purpose here is not to tap into secondary brand associations, but rather to inhibit ambiguity aversion. A straightforward implication of this framework is that established brands can gain from making ambiguity salient, e.g., through advertising.

Based on the findings of experiment 5, one might consider that un-established brands should be more concerned by the dispersion of their customer's satisfaction than established brands. Endorsement by credible sources is obviously more important for un-established brands than for established ones. The idea of tagging ambiguous gambles with established brand names (experiment 6) may be relevant in the domain of brand extensions: established brands can bring value to ambiguous prospects in vastly unrelated domains, and it is not clear that un-established brands could do the same.

From a methodological standpoint, this research has faced the challenge that the forces behind brand equity are multiple, making it hard to isolate a particular factor such as ambiguity aversion. We resolved this difficulty by focusing on one particularly puzzling manifestation of brand equity (the preference for dominated established brands) that is hard to reconcile with more conventional accounts of brand equity, and the second device we employed was to investigate in depth the association between brand preference and seemingly disconnected behaviors in contexts where the force of interest (ambiguity aversion) is behaviorally defined with most purity.

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APPENDIX A

Established and Less Established Brands as Pretested in Reference Population

Product Category	Established Brand	Less Established Brand
DVD player	Sony	Toshiba
MP3 player*	Sony	Toshiba
TV	Pioneer	Panasonic
Computer	Dell	Compaq
Hi-fi music system**	Aiwa	Sharp
Digital camera***	Nikon	Fuji
Sports shoes	Adidas	Pony
Gel pen	Pentel	Zebra
Noodles	Nissin	Doll
Rice	Golden Elephant	Golden Scent

* = Each experiment used either DVD players or MP3 players, but never both.

** = More than 50% subjects said that they never shopped for a Hi-fi music system, and therefore this category was not used, except to manipulate brand focus in experiment 4.

*** = Samsung was used in experiment 1 and Fuji was used in the other experiments because it was felt that Samsung is a brand that covers across many categories beyond photographic products.

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