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Making sense of numbers: Effects of alphanumeric brands on consumer inference ☆

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ABSTRACT

This research examines when and how the presence of seemingly innocuous, non-diagnostic numbers in brand names (e.g., 7-UP) impacts consumers' judgments. Building on anchoring theory, our central proposition is that numbers contained in alphanumeric brand names can act as implicit anchors that subsequently bias (either upward or downward) consumers' assessment of a product's price, weight, volume, etc. We qualify this proposition, however, by showing that such anchoring effects occur primarily when (a) the numeric component of a name appears relevant to the judgment at hand and (b) consumers evaluate product attributes superficially (rather than systematically).

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1. Introduction

Brand and product names play an important role in marketing (Aaker, 1991). Accordingly, brand naming research grew considerably in the last two decades (Klink, 2000; Lowrey & Shrum, 2007; Pan & Schmitt, 1996). Recent findings indicate that brand names can help identify manufacturers and promote products (Friedman, 1985), assist advertising recall (Keller, Heckler, & Houston, 1998), shape product evaluation (Yorkston & Menon, 2004), affect product demand (Sullivan, 1998), and signal quality (Brucks, Zeithaml, & Naylor, 2000). Historically, however, much of the research in the area was guided by a "linguistic" approach wherein the properties of brand names examined were sounds and meanings. Although this paradigm provides an appealing theoretical basis for much brand naming research, its ability to serve as a universal theoretical framework is limited because it is primarily applicable to alphabetic brand names, which neglects the fact that a fair amount of brand names now consist of letters *and* numbers (e.g., Airbus A330, 7-UP, V8 Juice, And1 Basketball, 7-Eleven, A1 Steak Sauce). Addressing this gap in the literature, Gunasti and Ross (2010) recently showed that consumers hold implicit beliefs about the numbers contained in product names (i.e., greater numbers signal better configuration or quality). As a result, a computer named X-200 is often judged more favorably than one named X-100. Of note, Gunasti and Ross' (2010) work examines contexts in which consumers are exposed to various options *simultaneously*. In their study, participants were able to compare products side by side before making a decision. Colloquially, this form of decision-making based on joint evaluations is akin to a "within-subjects" situation wherein consumers can conveniently experience several options at once.

The present work extends the aforementioned line of research by examining decision contexts in which consumers consider products *in isolation*. We ask, how do alphanumeric brand names impact perceptions, attitudes, and judgments when consumers evaluate a product on its own (i.e., without any point of comparison)? After all, it is quite common for consumers to experience only one product/service at a time (e.g., in advertising, when receiving a gift). As such, what inferences do consumers draw when offered to purchase a computer called X-200? Referring to the earlier colloquialism, our work examines decision-making based on *separate* product evaluations, which is more akin to a "between-subjects" situation wherein consumers cannot make simple comparisons between products in the marketplace.

With this critical distinction in mind, the central premise of our work is that numbers contained in brand names can be utilized by consumers as anchors to assess product attributes (e.g., price, weight, volume). Furthermore, we propose that alphanumeric brand names influence not only product evaluation and preference-formation but also memory and inference-making. For instance, consumers may perceive that the Airbus A330 has roughly 330 seats and that a can of 7-UP sells for approximately HK$7 (i.e., US$ 0.9) at convenience stores in a city like Hong Kong. Moreover, we argue that anchoring occurs primarily when the number is relevant to (i.e., consistent with) a given product's attributes and when consumers use a less effortful (i.e., superficial) processing mode, rather than a rigorous (i.e., systematic) one.

In subsequent sections, we first review the literature in this field, highlighting the differences between our research and some recent work on alphanumeric brand names. We then present the results of

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five experiments intended to examine our key hypothesis and its boundary conditions. We conclude by discussing the theoretical and managerial implications of our findings.

2. Conceptualization

2.1. Literature review

As mentioned earlier, most research on brand naming focuses on alphabetic brand names by examining their semantic meaning and phonetic characteristics. Past research suggests, for instance, that a brand name should be meaningful and suggestive (Kashmiri & Mahajan, 2010; Lee & Ang, 2003). Robertson recommends brand names that are verbally related to their product class, elicit mental images, and make use of morphemes (Robertson, 1989). This suggestiveness principle was later qualified by Keller et al. (1998) who argue that a suggestive brand name can also inhibit recall of subsequently advertised product benefits unrelated to the meaning of the brand name. Relatedly, Klink (2000) argues that the sound of a brand name (i.e., its phonetic features) can communicate information about a product, such as its size, speed, and weight. Similarly, Yorkston and Menon (2004) show that consumers use the information they gather from phonemes in brand names to infer product attributes and evaluate brands. Lastly, Pan and Schmitt (1996) conducted a comparative study to show that native English speakers' attitudes toward a product are more influenced by sound matching (e.g., a female voice for women's products and a male voice for men's products) than native Chinese speakers'.

As mentioned earlier, this linguistic line of research is primarily relevant to purely alphabetic brand names. However, a number of brands in the marketplace now include a combination of letters *and* numbers (e.g., 3M, 5th Avenue, 67 Jeans, V8 Juice, And1, Airbus A380). Surprisingly, few papers have attempted to rigorously tackle the question of how consumers process alphanumeric brand names. Pavia and Costa (1993), for instance, find that alphanumeric brand names are more suitable for technically complex, manufactured items such as electronics, computers, stereo components, and cameras. In addition, they find that alphanumeric brand names are appropriate for unemotional, formulated products such as vitamin-rich cereals. Ang (1997) investigates how consumers respond to alphanumeric brand names from a socio-cultural perspective. The central idea here is that the same number can have different associations in different cultures. For example, "7", a lucky number in Western societies, is undesirable in Chinese culture because it is associated with the cult of life after death and death festivities. Recently, Gunasti and Ross (2010) contributed significantly to this slim line of research by showing that consumers implicitly perceive that higher numbers signal better configuration or quality (e.g., a PC called X-200 is more favorable than one called X-100). Qualifying this claim, Gunasti and Ross (2010) also showed that this "higher is better" heuristic is used more (less) by people with a low (high) need for cognition.

2.2. Alphanumeric brand names as implicit anchors

To augment this line of research, we examined the effects of alphanumeric brand names in a new context and from a new perspective.

Gunasti and Ross (2010) investigate consumption scenarios in which participants can conveniently evaluate products (whose brand names have been manipulated) *side by side* before finally choosing one. In contrast, we investigate situations in which consumers evaluate *only one product at a time* (e.g., viewing marketing communications, receiving a gift). For example, we ask, what inferences would a consumer make from an ad for an MP3 player called M-200? In the absence of a reference point (e.g., M-100), it would be difficult for consumers to rely on Gunasti and Ross' (2010) "higher is better" heuristic because the very perception of "higher" (or "lower") requires the presence of a comparison. For situations in which consumers evaluate a product/service in isolation, we propose that the number contained in a brand name may function as an implicit anchor that subsequently biases consumer judgments. The anchoring and adjustment literature (Tversky & Kahneman, 1974) provides the theoretical basis for our argument.

According to Tversky and Kahneman (1974), when a complex task is divided into simpler steps, partial computation often serves as an anchor. For example, Tversky and Kahneman (1974) asked participants to estimate the product of 8 numbers from 1 to 8. These numbers were presented in either ascending or descending order. Students shown "$1\times2\times3\times4\times5\times6\times7\times8$" made a median estimate of 512, whereas those shown "$8\times7\times6\times5\times4\times3\times2\times1$" made a median estimate of 2250. The interpretation of this result is that respondents tried to multiply the first few factors of the product before adjusting either upward or downward. Adjustments were generally insufficient relative to the true value of 40,320. In the first set of guesses, however, adjustments were much more insufficient because they started from a lower anchor.

In a separate study, Tversky and Kahneman (1974) asked students to estimate what percentage of African countries were members of the United Nations. Before they made their estimate, participants were given a random anchor generated by a spinning wheel that contained the numbers 0–100. The wheel was rigged so that half of the participants received 10 as their anchor and the other half 65. Participants were then asked whether the percentage of African countries was higher or lower than their given anchor. Those whose anchor equaled 10 provided an average estimate of 25%, whereas those whose anchor equaled 65 provided an average estimate of 45%. Since this article, the anchoring and adjustment phenomenon has been widely documented for a variety of measures, such as distance estimates (Kwong & Wong, 2006), price estimates (Mussweiler, Strack, & Pfeiffer, 2000), and probability assessments (Plous, 2006).

The manner in which consumers use brand names, however, differs from the typical anchoring paradigm wherein participants are *explicitly* asked whether the answer to a focal question is smaller or larger than an arbitrary number. According to research on communication norms (Schwarz, 1994), participants in these studies are likely to rely on anchors because they assume that all of the information available to them is relevant. The numbers contained in brand names, however, are not always informative and/or meaningful to consumers. In some cases, these numbers are created for identification purposes only (e.g., Sony's music player CS200AD). We propose that consumers may associate alphanumeric brand names with certain product-related information, *regardless* of the original intent behind the brand name. That is, consumers may use alphanumeric brand names as anchors to infer unknown product attributes. For instance, consumers may think that the Airbus A330 has roughly 330 seats, even though the name "A330" has nothing to do with seat capacity.

This anchoring effect should not always occur, however. We propose indeed that at least two boundary conditions moderate this effect. First, consumers should perceive that the numbers contained in alphanumeric brand names are relevant to a given product's attribute. In the Airbus A330 example, the number "330" should be seen as relevant to the number of seats in the aircraft, but not to its comfort, weight, ticket price, etc. Second, consumers should rely on a heuristic/superficial processing mode rather than a systematic/deliberate one. Previous research (Epley & Gilovich, 2006; Maheswaran, Mackie, & Chaiken, 1992) shows that anchoring is indeed more pronounced when cognitive resources are constrained (e.g., when consumers work under time pressure or are distracted).

Five experiments were conducted to examine our central hypothesis and its two boundary conditions.

3. Experiment 1

The purpose of the first experiment was to demonstrate the basic proposition that consumers rely on alphanumeric brand names to make inferences about product attributes. To this end, we asked

participants to estimate the number of seats in two aircrafts of equivalent capacity (i.e., Airbus A330 vs. Boeing B767).

In two pretests with 66 and 61 undergraduates, we first sought to ascertain whether consumers might in fact relate aircraft brand names to seat capacity. To this end, we asked participants to indicate what the number contained in the brand name Airbus A330 (or Boeing B767) stands for. In the Airbus case, 36 participants (i.e., 55%) associated "330" with the number of seats (e.g., number of passengers, capacity, number of seats). The remaining participants inferred various other meanings such as engine model, length of the aircraft, etc. Similarly, the association made most often in the Boeing case also related to seat capacity. Consistent with our premise, 25 of the 61 participants (i.e., 41%) thought that "767" stands for the number of passengers, capacity, number of seats, etc. The next most common associations regarded speed, code of development, and various other aspects.

Given the apparent connection in the minds of consumers between aircraft names and seat capacity, we expected that the participants in our main study would estimate the number of seats to be greater in the Boeing B767 than in the Airbus A330.

3.1. Method

One hundred forty-five undergraduates who participated in this study for course credit were randomly assigned to either the Airbus or the Boeing condition following a between-subjects design. After being informed that the purpose of the survey was to assess college students' knowledge about aircrafts, participants were asked how many seats the Airbus A330 (Boeing B767) has. To avoid extreme responses, we collected answers using an 11-point scale, ranging from "1" (100 seats) to "11" (1000 seats) and separated by nine 100-seat increments.

3.2. Results

An analysis of variance revealed that participants did believe that the Boeing B767 ($M = 463$) has more seats than the Airbus A330 ($M = 395$; $t(143) = 2.24$; $p < .05$). Consistent with our hypothesis, this finding suggests that consumers do use the numbers contained in alphanumeric brand names as anchors to infer specific product attributes.

4. Experiment 2

The purpose of experiment 2 was twofold. First, for the sake of generalizability, we aimed to replicate our previous findings in a different product domain. Whereas experiment 1 tested our hypothesis in a relatively unfamiliar product category (i.e., aircrafts), experiment 2 employed two famous and familiar soft drink brands as stimuli: Sprite and 7-UP.

Second, we sought to examine a first boundary condition to our effect. We argued earlier that the extent to which anchoring occurs depends on the perceived relevance between a number (e.g., 330) and the product attribute under consideration (e.g., number of seats). To test this idea, we asked participants to infer not one but a variety of attributes from the names Sprite and 7-UP. We hypothesized that participants would associate "7" with the price of 7-UP (note: cans of Sprite and 7-UP typically sell for HK$5–10 in Hong Kong, where this experiment was conducted) but not with other attributes, such as volume, vitamin content, etc. This prediction differs notably from what one would expect from the "higher is better" heuristic (Gunasti & Ross, 2010). If the latter was the driving force behind our effect, then participants' ratings and estimations of *all* attributes should follow the same rule and, therefore, exhibit the same pattern.

4.1. Method and results

Ninety-six students from HKUST were randomly assigned to either the Sprite or the 7-UP condition before being asked to estimate their drink's price, volume, history (i.e., launch years), calories, and number of vitamins. Next, participants guessed the average weekly consumption of their drink (i.e., how many cans a person consumes per week) before rating its taste (0 = not at all tasty; 9 = very tasty).

Consistent with our prediction, price estimates in the 7-UP condition ($M = 6.28$) were closer to HK$7 than those in the Sprite condition ($M = 5.79$; $t(94) = 2.99$, $p < .01$). Importantly, however, we did not find any significant difference for any other estimates (see Table 1). Hence, these findings provide evidence for the *selective* nature of our anchoring hypothesis (i.e., that alphanumeric brand names affect only specific consumer inferences). Of note, the "higher is better" heuristic (Gunasti and Ross, 2010) constitutes an improbable alternative explanation for our findings. If the latter underlay our results, one would expect most (if not all) attributes under consideration to follow the same heuristic; hence exhibit the same pattern of results. It was not the case, however.

5. Experiment 3

Because experiments 1 and 2 used real brand names, one may legitimately wonder whether participants' prior knowledge about these brands may somehow account for (or even contribute to) our findings. To dispel this concern, we opted to feature in the present experiment (as well as in subsequent ones) hypothetical brand names. Furthermore, for the sake of generalizability, we chose to feature in experiment 3 (and in subsequent ones) yet another product category, MP3 players. In sum, experiment 3 aimed to provide more direct evidence for our selective anchoring hypothesis while ruling out alternative explanations rooted either in the specific brand names or in the specific product categories featured in our studies so far.

5.1. Method

5.1.1. Pretest

A review of MP3 brands and models available in Hong Kong (where this study was administered) revealed that such products average HK $500 in price, ranging from HK$100 to HK$1000. Accordingly, we decided to name our MP3 players M-200 and M-900. To verify that participants would perceive these numbers as relevant to price, we asked 32 pretest participants to rate from 1 (very irrelevant) to 7 (very relevant) the relevance of the numbers "200" and "900" for a set of attributes typical of MP3 players (i.e., price, battery life, storage capacity). These attributes were presented in a random sequence to rule out any potential order effect. Consistent with our assumption, participants perceived these two numbers as more relevant to price ($M = 5.50$) than to battery life ($M = 3.00$; $t(31) = 7.19$, $p < .001$) or to storage capacity ($M = 2.97$; $t(31) = 7.34$, $p < .001$), thereby satisfying our first boundary condition (cf. study 2).

Table 1
Results of experiment 2.

Conditions	Price	Volume	History	Calories	Vitamins	Consume	Taste
Sprite	5.79	353.89	27.15	314.71	2.96	2.81	5.78
	(0.84)	(77.05)	(13.91)	(330.22)	(3.14)	(2.19)	(1.54)
7-UP	6.28	368.38	27.49	243.80	2.62	2.53	6.15
	(0.75)	(77.42)	(18.43)	(182.48)	(2.49)	(1.77)	(1.54)
t-value	2.99	.90	.10	−1.23	−.66	−.56	1.15
p	.002	.19	.48	.11	.26	.29	.13

5.1.2. Predictions

Having confirmed that participants do perceive "200" and "900" to be relevant to price, we predicted that these numbers may then act as implicit anchors that bias consumers' perceptions of price. More specifically, we expected that consumers viewing an MP3 player named "M-900" would price the product higher than consumers viewing a similar player named "M-200". Of note, however, this prediction should hold only as long as consumers do perceive the number-attribute connection. If, for some reason, consumers no longer perceived "200" and "900" to be relevant to price, the anchoring power of the numbers should vanish and consumers' inferences should not be impacted.

To manipulate the relevance of "200" and "900" to price while keeping the procedure constant across conditions, we devised a task wherein consumers estimated the price of their MP3 player either in HK dollars (i.e., a relevant currency) or in US dollars (i.e., an irrelevant currency). If our theory is correct, anchoring should occur in the HKD condition, but *not* in its USD counterpart.

5.1.3. Procedure

To test the above predictions, 142 students from HKUST were randomly assigned to one of four conditions following a 2 (brand name: M-200 vs. M-900) × 2 (currency: HKD vs. USD) between-subjects design. After informing participants that the purpose of the study was to investigate how consumers evaluate music players, we presented participants attributes typical of MP3 players, such as brand name, storage capacity, and battery life. This information was kept constant across conditions, with the exception of brand name (i.e., M-200 vs. M-900). After reviewing this information, participants were asked to estimate the price of their MP3 player. Consistent with our conceptualization, some participants performed this task in a currency that preserved the relevance of "200" and "900" for price (i.e., in HKD), while the rest did not (i.e., in USD).

5.2. Results

A two-way ANOVA was conducted to examine our predictions. As expected given the exchange rate (USD1 ≈ HKD8), the currency of quote yielded a large main effect. Participants in the HKD condition priced their device much higher on average than their counterparts in the USD condition ($M_{HKD} = 496.72$ vs. $M_{USD} = 61.38$; $F(1, 138) = 97.18$, $p < .001$). Neither the *brand name* main effect ($F(1, 138) = 1.68$, $p > .19$) nor the *brand name* by *currency* interaction ($F(1, 138) = 2.42$, $p > .12$) were significant. Our predictions, however, concerned more specifically the planned contrasts *within* each currency. To this effect, comparisons between brand names revealed that, when estimates were made in HKD, participants in the M-900 condition priced their device 29% higher on average than their counterparts in the M-200 condition ($M_{200} = 434.39$ vs. $M_{900} = 560.83$; $t(138) = 2.04$, $p < .05$). When estimates were made in USD, however, the two conditions did *not* differ ($M_{200} = 65.91$ vs. $M_{900} = 54.42$; $t < 1$, $p > .80$).

These findings provide converging evidence for our selective anchoring hypothesis. As long as "200" and "900" appeared relevant for the judgment at hand (i.e., price), the numbers anchored participants' perceptions about the MP3 players, thereby biasing their estimates. When the connection between numbers and price was absent, however, consumers' judgments were no longer impacted.

This simple demonstration of the power of alphanumeric brand names should appeal to practitioners (and maybe worry consumer advocates). Naming products is indeed entirely at the discretion of brand managers and is virtually costless. Yet, its potential to influence/manipulate consumers' perceptions of a product (e.g., price, value) is so substantial that it is surprising so little of the extant research examines the question.

Of note, the "higher is better" heuristic (Gunasti and Ross, 2010) constitutes again an unlikely alternative explanation for our results. If the latter underlay our findings, one would expect participants to price the M-900 player higher than its M-200 counterpart, *regardless* of the currency of quote.

6. Experiment 4

Our results from experiments 1–3 suggest that consumers use the numeric component of alphanumeric brands to infer unknown product attributes. For this to occur, however, consumers need to perceive *relevance* between the number in the brand name and the attribute under consideration (e.g., number of seats, price). Seeking to provide additional evidence for the "relevance" principle of our selective anchoring hypothesis, experiment 4 also aimed to further differentiate our findings from Gunasti and Ross' (2010). With that in mind, experiment 4 was designed as follows.

6.1. Method

6.1.1. Predictions

We knew from the pretest in experiment 3 that MP3 models in Hong Kong range in price from HK$100 to HK$1000. As such, we hypothesized that an MP3 player with a numeric name *outside* this range (e.g., 1 or 10,000) should weaken the connection in consumers' mind between the product's price and the number embedded in its name. To test this idea, we introduced participants to one of four MP3 players before asking them to estimate the product's price. The models were identical in all aspects except name (i.e., M-1, M-200, M-900, and M-10000). In line with our conceptualization, we made two predictions. First, as in experiment 3, the numbers "200" and "900" should again act as implicit anchors and bias consumers' price estimates (i.e., M-200 < M-900). Second, in contrast, because they fall outside the normal price range of MP3 players, the numbers "1" and "10,000" should *not* influence consumers' price estimates (i.e., M-1 = M-10000). Of note, the "higher is better" heuristic (Gunasti and Ross, 2010) would again make different predictions under these experimental conditions (i.e., an upward trend in price should emerge across the four conditions).

6.1.2. Procedure

To tease apart the predictions above, 145 undergraduate students from HKUST were randomly assigned to one of four conditions (M-1, M-200, M-900, and M-10000) following a between-subjects design. As in experiment 3, we informed participants that the purpose of the study was to investigate how consumers evaluate music players. Accordingly, participants reviewed attributes typical of MP3 players (i.e., brand name, storage capacity, and battery life) before estimating the price (in HKD) of the product assigned to them. Product descriptions were again held constant across conditions, except for name.

6.2. Results

Replicating our earlier results, planned contrasts revealed that participants in the M-900 condition priced their MP3 player 24% higher than their counterparts in the M-200 condition ($M_{200} = 489.08$ vs. $M_{900} = 606.82$; $t(141) = 2.11$, $p < .05$). Because "1" and "10,000" fall outside the normal price range of MP3 players, however, we also hypothesized that participants in the M-1 and M-10000 conditions would not infer price from brand name. Consistent with this prediction, planned-contrast analyses revealed no difference between the two conditions ($M_1 = 511.44$ vs. $M_{10000} = 512.19$; $t < 1$, NS).

As noted earlier, the "higher is better" heuristic (Gunasti and Ross, 2010) would support different predictions. Specifically, the "higher is better" heuristic would forecast a general upward trend across conditions. Yet, none was found ($t < 1$, NS). Furthermore, price estimates in the M-1 condition were not lower than in the M-200 condition ($M_1 = 511.44$ vs. $M_{200} = 489.08$; $t < 1$, NS). Similarly, price estimates in the M-10000 condition were not higher than in its M-900 counterpart. In

fact, the latter planned-contrast revealed prices marginally *lower* in the M-10000 condition ($M_{900} = 606.82$ vs. $M_{10000} = 512.19$; $t(141) = 1.69$, $p = .09$). In sum, experiment 4's results are consistent with our theory and contradict what one would expect if the "higher is better" heuristic were at play (Gunasti & Ross, 2010).

After demonstrating in experiment 1 that alphanumeric brand names can anchor consumer judgments (e.g., number of seats in an aircraft), we examined in experiments 2–4 a first boundary condition to this effect. Specifically, we showed that, for anchoring to occur, consumers should first perceive the numbers embedded in brand names to be relevant to the judgment/attribute under consideration (e.g., price). We demonstrated this principle by either measuring or manipulating relevance across studies, thereby highlighting the selective nature of consumer anchoring. Along the way, we teased apart the contribution of our work from the merits of Gunasti and Ross' (2010) "higher is better" heuristic.

In the next study, we shed light on a second boundary condition to our effect, namely, the influence of information processing on consumer anchoring.

7. Experiment 5

As alluded to in our theoretical framework, previous research shows anchoring to be more pronounced when cognitive resources are constrained (e.g., when consumers work under time pressure or distraction) (Epley & Gilovich, 2006; Maheswaran et al., 1992). Therefore, given the heuristic nature of anchoring, we expected that consumers would rely more readily on alphanumeric brand names to infer unknown product attributes when they process information superficially rather than systematically. Experiment 5 was designed to test this idea.

7.1. Method

One hundred ten undergraduates from HKUST were randomly assigned to one of four experimental conditions following a 2 (brand names: M-200 vs. M-900) × 2 (information processing: superficial vs. systematic) between-subjects design. As in experiments 3–4, participants were told that the purpose of the study was to investigate how consumers evaluate music players. Accordingly, participants were to review information typical of MP3 players (i.e., brand name, storage capacity, and battery life) and price the product they were assigned (i.e., M-200 vs. M-900). Once again, model descriptions (other than brand names) were held constant across conditions, but the sequence in which participants reviewed information was not. To manipulate information processing, we asked half of the participants to estimate their player's price *before* rating its storage capacity and battery life (i.e., superficial processing), whereas the other half did so *after* (i.e., systematic processing). We predicted that anchoring would be less pronounced in the latter condition where participants processed information more systematically before pricing their product.

7.2. Results

The results of a two-way ANOVA on price estimates revealed a significant main effect of processing style ($F(1, 106) = 7.56$, $p < .05$). Specifically, the participants in the pricing-first condition (i.e., superficial processing; $M = 705.47$) provided higher estimates than their counterparts in the pricing-last condition (i.e., systematic processing; $M = 517.86$). As predicted, this main effect was qualified by a significant interaction ($F(1, 106) = 4.01$, $p < .05$). Anchoring was less likely when participants employed a more systematic (i.e., attribute by attribute) processing strategy ($M_{200} = 533.68$ vs. $M_{900} = 502.04$; $t < 1$) than when they estimated price before analyzing each attribute carefully ($M_{200} = 584.57$ vs. $M_{900} = 826.36$; $t(106) = 2.73$, $p < .01$). As hypothesized in our second boundary condition, these results support the notion of consumer anchoring being moderated by information processing.

8. General discussion

Consumers often infer unobserved product attributes from available cues (Huber & McCann, 1982; Kardes, Posavac, & Cronley, 2004). In turn, these unobserved attributes have been found to be more influential than readily accessible ones in many consumer decisions (Ford & Smith, 1987). Our research examined across a variety of product categories when and how alphanumeric brand names impact consumers' inferences of unknown attributes. Building on anchoring theory, we proposed that the numbers contained in alphanumeric brand names might act as implicit anchors, which can subsequently bias consumers' evaluations of a product's price, value, weight, capacity, etc. We qualified this proposition, however, by arguing that this anchoring effect is *selective*; it occurs mostly when (a) the numeric component of a name appears relevant to the judgment at hand and (b) consumers evaluate attributes superficially rather than systematically. Results from five experiments offer converging evidence in support of these hypotheses.

Experiment 1 showed that participants' estimates of seat capacity onboard a Boeing B767 are substantially greater than onboard an Airbus A330, although the actual capacity of these two airplanes is similar. Experiment 2 replicated this finding in the soft drink category by showing that consumers in Hong Kong infer the price of 7-UP to be closer to HK$7 than that of Sprite. More importantly, experiment 2 found this anchoring effect to be *selective*, i.e., more likely to influence perceptions of product attributes when the numeric component of the name appears *relevant* to the judgment at hand (e.g., "7" being relevant to price but not to volume, caloric content, etc.). The subsequent two experiments provided more direct evidence for this principle by manipulating the relevance of brand names' numeric component. When an irrelevant currency was used to infer price (experiment 3) or when the number embedded in brand names fell outside the normal range/distribution of the attribute considered (experiment 4), consumer anchoring disappeared. The fifth and final experiment identified a second boundary condition by demonstrating that consumers are more likely to bias their estimates (e.g., of price) when they process product information superficially rather than systematically.

The present findings contribute to several lines of research. First, as mentioned earlier, previous work on brand naming was largely devoted to the effects of semantic meaning and sound matching of *words*, paying little attention to the *numeric* components of brand names. The few papers that broke ground in the investigation of alphanumeric brand names focused primarily on the meaning carried by numbers. For example, Chinese brand names frequently contain "6" or "8" because these are perceived as lucky numbers in Asia (Ang, 1997; Pavia & Costa, 1993). We add to this literature by proposing an additional mechanism through which numeric brand names can influence consumer judgment. Namely, because consumers sometimes infer from numbers contained in brand names certain product attributes, alphanumeric brand names can influence consumers' inferences and/or distort knowledge retrieval. Compared to previous studies, our theoretical framework is more general and can therefore be applied to a variety of numbers, product classes, and cultures.

Second, our research also adds to the anchoring literature by showing that anchoring can happen spontaneously, without the need for heavy-handed manipulation. As our experiments suggest, consumers can spontaneously use the numbers contained in marketing communications (e.g., advertising, brand names), either to memorize product information and later use them as retrieval cues or to directly infer product attributes. This finding is consistent with existing literature on self-generated anchors. For example, when asked to indicate the height of the second tallest mountain in the world, one might use the height of the well-known Mount Everest and then adjust downward (Epley &

Gilovich, 2005). We extend this research stream by examining another type of anchor that, in fact, has no relationship with the focal judgment.

Our third contribution extends recent research on the influence of alphanumeric brand names on consumer inference-making. Most notably, Gunasti and Ross (2010) showed that consumers believe that higher numbers in brand names signal better product configuration or quality. Therefore, when consumers compare side by side two competing products named X-100 and X-200, the latter appears preferable. To complement the "higher is better" heuristic (Gunasti and Ross, 2010), we set out to examine whether consumers might use different heuristics when they *cannot* easily sample and compare products. After all, it is fairly common for consumers to experience the world only one product/service at a time (e.g., in marketing communications, when they receive gifts). As such, what inferences would consumers draw when viewing an advertisement for a single laptop named X-200? Our findings suggest that, under certain conditions, consumers do rely on the numeric component of alphanumeric brands to infer unknown product attributes. Hence, after Gunasti and Ross' (2010) description of number-based decision-making in joint-evaluation scenarios, our selective anchoring hypothesis offers a clearer understanding of how consumers evaluate a product or service when assessing it on its own.

Lastly, our findings have interesting implications for brand managers and consumers. For example, our results suggest that brand names might not only influence consumer memory and product evaluation but also play an important role in consumer brand knowledge development (Sen, 1999). By strategically naming their products, marketers may be able (and tempted) to seamlessly manipulate consumers' perceptions. For example, an MP3 player named M-600 sold for $500 should be perceived as offering greater value than one named M-500 sold at the same price. Additionally, according to our findings, the same brand name could lead to different conclusions in different countries. As demonstrated in experiment 2, the "7" in 7-UP is perceived as relevant to product price in Hong Kong where sodas sell for 5–10 HK dollars. It is unlikely, however, that consumers would make the same inference in the United States where soda cans sell for approximately 1 US dollar, or in Japan where they sell for 120 Yen. The results of experiment 3 confirmed this prediction.

Although we identified relevance and information-processing mode as moderators of consumer anchoring, further research is needed to examine other boundary conditions. For example, the likelihood or ease with which a number is connected to a particular product attribute may differ across individuals (e.g., as a function of expertise), leading to different product evaluations. Consider the Canon G10 digital camera, for instance. Novice consumers may infer that this camera has a resolution of 10 megapixels because pixels are the feature most widely used to assess digital cameras. Given that the actual resolution of this camera is 14.7 megapixels, such an inference would be detrimental to the perception of the product and result in less favorable evaluations by novices. Knowledgeable consumers, in contrast, may extract different meanings from this brand name. For example, they may associate "10" with the optical zoom since the optical zoom of most compact digital cameras ranges from 3 to 12. As such, an inferred optical zoom of 10 would lead to a rather favorable impression. Hence, the investigation of expertise as another moderator of alphanumeric brands' impact on consumer inference might hold promise in the search for a more integrated theory of selective anchoring.

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