Section III, Chapter 2: Consumer Products and Consumer Behavior

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Abstract

In many markets, consumers face a choice problem in which the marginal cost of obtaining additional information necessary to improve a purchase decision exceeds the marginal benefit of the improved decision. For example, in the United States there are over five-hundred different brands and variations on brands of breakfast cereal. It is likely that no consumer makes the best possible purchase decision, save by accident, because the cost of obtaining full information about the competing brands far exceeds the benefit of employing the information in decision-making. In this situation, the consumer knows that the best he can hope for is a satisfactory purchase decision as opposed to the optimal purchase decision.

This problem is not restricted to low-price products. The number of brands of cars, combined with the number of options available for each brand of car, and the fact that many brand attributes (e.g., mileage, handling, reliability) can only be imperfectly measured without first-hand experience, means that automobile consumers also face the problem of limited information and are aware that they face limited information. As with breakfast cereals, most automobile consumers are aware that their purchase decision will not be the optimal decision but (they hope) will be satisfactory.

The lack of information presents a risk to the consumer. Because the consumer is aware of the lack of information, the consumer will attempt to mitigate the risk through the use of heuristics. Using the number and positioning of observed brands relative to each other in the attribute space, consumers infer information about the unseen brands and so improve their purchase decisions.

Theoretical Approaches to the Study of Consumer Behavior

Most research into consumer behavior follows one of five approaches depending on the tools and assumptions employed: economic approach, psychodynamic approach, behaviorist approach, cognitive approach, and humanistic approach.

The economic approach takes as its starting point that consumers are economic agents who seek to maximize their happiness subject to constraints. The economic approach assumes that humans are rational and that they correctly employ information available to them. The psychodynamic approach assumes that consumer behavior arises from biologically driven instinct. In modeling man as a rational animal, the economic approach tends to ignore the "animal" part in favor of the "rational" part, while the psychodynamic approach tends to ignore the "rational" part in favor of the "animal." The behaviorist approach is akin to the psychodynamic approach in that it tends to regard human choice as being driven by impulses rather than cognition. Unlike the psychodynamic approach, the behaviorist approach holds that human behavior is not driven by biology but by learned responses to external stimuli. Where the psychodynamic approach regards human behavior as the playing out of imperatives arising from who we are, the behaviorist approach regards human behavior as the playing out of imperatives arising from what we have experienced. The cognitive approach assumes that human behavior arises largely from cognition wherein the person processes information gleaned from his environment and society. In this branch of thought, emphasis is placed on the processes of perceiving stimuli, encoding those stimuli as memory, thinking about the memories, and developing motivations for action from thought and emotion. The humanistic approach is more holistic in that it assumes that the human is, together, rational, emotional,

spiritual, and animal. Consequently, not only is human behavior is influenced by all these factors together, but through self-awareness, the person can choose his behavior rather having it thrust upon him by biology, stimulus, or logic.

Consumer Choice in the Presence of Incomplete Information

Popular conceptions of industries tend toward the extreme and theoretical cases of industry structure: perfect competition and monopoly. On one hand, people tend to accept the theoretical case of monopoly without question. Much concern about "reining in markets" revolves around concern that this theoretical case is, if not real, is a real possibility. On the other hand, people tend to dismiss the theoretical case of perfect competition. When told that competition is good because it encourages low prices and large selection, people commonly respond, "well, that might be true in theory."

Interestingly, in both of these extreme cases, the consumer plays only the nominal role of purchaser. Neither case requires any contribution on the part of the consumer beyond purchasing the product. In perfect competition, there are so many firms and the products, service, and support are so similar that consumers simply look for the lowest price. The result is that all firms end up charging the same price for the same product. The consumer's choice reduces to a simple binary: buy or don't buy. In the case of monopoly, the consumer's role is largely unchanged. The monopoly firm has no competitors, so (as with perfect competition) the consumer faces a single price for a single product. Again, the consumer's choice is largely binary: buy or don't buy. Monopoly firms will attempt to extract additional revenue by offering "upgrade" variations that cost the firm little. Economists call this, "price discrimination." The

purpose of price discrimination is to encourage each consumer to pay the maximum that consumer is willing to pay. But the consumer's choice as to which level of upgrade to purchase usually comes after the consumer has already determined that he will buy the product at all.

Consumer choice becomes interesting in the intermediate cases. Fortunately (at least for consumer behavior researchers), the intermediate cases comprise the overwhelming majority of cases. In contrast to the extremes of monopoly and perfect competition, most industries are better characterized as monopolistically competitive. For the purpose of this discussion, oligopoly industries can be included in the discussion of monopolistic competition when consumers regard the oligopolists' products as heterogeneous.

Monopolistically competitive firms produce a variation (or multiple variations) of a product that is distinguished, if not in an objective sense then at least in the minds of the consumers, from other variations. Each variation is called a "brand." The term is not to be confused with, "brand name" which refers to the manufacturer. Two brands may come from different manufacturers (e.g., Nike sports shoes versus Reebok sports shoes), or the same manufacturer (Toyota Sienna versus Toyota Highlander), or may be variations on the same product from the same manufacturer (e.g., Sherwin-Williams flat white latex paint versus Sherwin-Williams gloss white latex paint). Brands vary according to *salient attributes* – attributes that the consumer deems important enough to influence the consumer's choice. Where consumer behavior is concerned, it doesn't matter whether brands differ objectively. All that is necessary is that consumers believe that they differ. Taste tests of bottled water versus tap water bear this out. When told they are tasting bottled versus tap, subjects report that the bottled water tastes better. But in blind taste tests, subjects report no difference in taste

(Teillet *et al.*, 2010). As consumers don't purchase water under blind conditions, it is their beliefs that matter, not the objective reality. These beliefs will drive more complex behaviors than we observe in either monopoly or perfectly competitive markets.

When faced with the many brands of a monopolistically competitive industry, the consumer encounters an information problem that does not manifest in the extreme cases of monopoly and perfect competition. In a monopolistically competitive industry, the many differing brands present a triple problem for the consumer. First, there are many brands, each of which the consumer perceives to be meaningfully different from the others. Second, given the large number of brands, it is too costly for the consumer to obtain the information necessary to make the best purchase decision because (a) brands may exist of which the consumer is unaware and, (b) even for brands which the consumer knows to exist, the consumer may be unsure of the qualities of the brands' salient attributes. For example, a typical consumer is aware of many, but not all, brand names of beers. Also, the same consumer may have never tried some of the brands he could name and so may have no first-hand knowledge of the qualities of those brands' salient attributes. Third, the consumer is aware of his incomplete knowledge and so knows that he is making an imperfect choice (Kivetz and Simonson, 2000).

As in voter-behavior models, the consumer faces a rational ignorance problem wherein the best decision the consumer can make is one made without full information because, beyond a certain point, the marginal benefit of having additional relevant information is less than the marginal cost of obtaining the information (Caplan, 2001; Bettman, 1971). Many products come with costs other than price. For example, cigarettes come with health costs,

small cars come with safety costs, computers come with obsolescence costs. The term "benefit" used throughout this chapter is benefit net of these expected costs. For example, the benefit a smoker anticipates from a cigarette is, for the purposes of this analysis, the satisfaction the smoker receives from smoking a cigarette less the (present discounted value of) damage the smoker expects to his health, the psychic cost to his worrying about his health, etc.

So long as the marginal benefit of having additional information exceeds the marginal cost of acquiring the information, the consumer will expend more effort on collecting and processing information. The marginal benefit of having additional information takes two forms: a reduction in *external uncertainty* and a reduction in *internal uncertainty*. External uncertainty arises from the consumer's incomplete information about what brands exist and the brands' salient attributes (price in understood to be a salient attribute). Internal uncertainty arises from the consumer's incomplete information about the utility, or satisfaction, he will obtain from a given set of attributes (Davies and Cline, 2005).

For example, the benefit to having more information about competing brands of chewing gum is relatively small. While there are likely brands of chewing gum of which the consumer is unaware, the attributes of chewing gum (regardless of the brand) are small in number and tend not to vary overly much across brands. Thus, the consumer faces little external uncertainty. Similarly, assuming the consumer has had chewing gum before, there will be little internal uncertainty as to the utility the consumer will receive from a given set of chewing gum attributes. Hence, the consumer experiences relatively little internal uncertainty. Facing little uncertainty, the consumer does not stand to gain much from acquiring additional information about chewing gum brands and attributes. Compounding this is the fact that the

cost of making an erroneous purchase decision is low – at worst, the consumer selects a brand that he ends up hating and is out the price of a pack of gum. So, we would expect the consumer to expend about as much energy as it takes to scan the shelf in front of him and grab the first pack that he recognizes. That is, the consumer will expend very little effort acquiring more information about competing brands.

Conversely, the benefit to having more information about competing brands of cars is relatively large. Given advertising and the fact that people see many cars every day, it is unlikely that there exist brands of which the consumer is unaware. However, the consumer is very likely to be unaware of all the brands' salient attributes (external uncertainty), and is unlikely to be sure about his reactions to those attributes (internal uncertainty). For example, a consumer might be aware that some brands have all wheel drive and even know exactly how all-wheel drive works. But, if the consumer has never owned a car with all-wheel drive, the consumer may incorrectly judge his reaction to the attribute. That is, the consumer may not know how much he likes (or dislikes) all-wheel drive until he actually experiences driving an all-wheel drive car over time and under varied road conditions. In addition to internal uncertainty, the consumer faces external uncertainty. Number of seats, engine power, mileage, safety features, sound system, warranty, expected maintenance costs, color, detailing, available upgrade packages, price, and financing options are just a few of the salient attributes about which the consumer will likely have limited knowledge. Where a car is concerned, not only does the consumer likely experience significant uncertainty, but the cost of making an erroneous purchase decision is high. Consequently, the consumer will tend to expend significant effort acquiring more information about competing brands (Petty and Cacioppo, 1990).

Consumer Choice and Observed Context Effects

Faced with a choice from among many heterogeneous variations on a product, not only can it be irrational for the consumer to collect all the information necessary to make the best purchase decision, but the consumer will be aware that it is irrational yet forced to make a decision nonetheless. Experimental evidence suggests, however, that the consumer does not make the choice blindly but rather relies on low-cost heuristics to guide him to a better choice. The consumer constructs these heuristics from his perception of how the brands are positioned relative to each other according to their salient attributes. In the consumer behavior literature, these heuristics are known as *context effects*. Context effects are the effects on the likelihood of consumer choice due to the juxtaposition of brands according to the similarities of their salient attributes.

The importance of context effects in the consumer choice process is well-documented (Payne, 1982; Huber and Puto, 1983; Simonson and Tversky, 1992; Heath and Chatterjee, 1995; Slovic, 1995; Bhargava *et al.*, 2000). Several context effects identified through experimentation are:

- *Attraction Effect*: The likelihood of consumer choice for a target brand increases when a new, but strictly inferior, brand is positioned close to the target brand.
- *Substitution Effect*: The likelihood of consumer choice for a target brand decreases when a new, but asymmetrically inferior, brand is positioned close to the target brand.
- *Compromise Effect*: The likelihood of consumer choice for two target brands decreases when a new brand is positioned between the two target brands.

- *Lone-Alternative Effect*: The likelihood of consumer choice for a set of similar target brands decreases when a new brand is positioned far from the existing brands.
- *Polarization Effect*: The likelihood of consumer choice for two disparate target brands increases when a new brand is positioned between the target brands.

Experimental research largely focused on the existence of context effects. The original stream of experimental literature left largely unaddressed the question of *why* the context effects exist. The answer, of course, lies in consumer psychology. Attempts to explain individual context effects include Parducci's range-frequency theory, categorization effects, social judgment theory, rank based preferences, and tradeoff contrast (Parducci, 1965; Kardes *et al.*, 1989; Simonson and Tversky, 1992; Pan and Lehmann, 1993; Prelec *et al.*, 1997; Davies and Cline, 2005; Sinn *et al.*, 2007). However, these explanations were post-hoc and applied to individual context effects only. Davies and Cline (2005) proposed a set of heuristics that derived from psychological principles and explained all observed context effects in a single general framework. Subsequent discussion in this chapter draws from their framework.

Consumer Choice and Uncertainty

The consumer choice process is complicated by two categories of uncertainty: external and internal. These uncertainties create a discrepancy between the satisfaction a consumer expects to receive from consuming a brand and the satisfaction the consumer actually receives. These uncertainties make it difficult for the consumer to make the optimal purchase decision.

External uncertainties arise from the consumer's incomplete knowledge about brands' objective salient attributes:

- *Partial information*. The consumer is unaware of all the brands that exist.
- *Measurement error*. The consumer incorrectly evaluates brands' salient attributes.
- *Obsolete information*. The consumer fails to update his evaluation of brands' salient attributes as those attributes change over time.

Internal uncertainties arise from the consumer's incomplete knowledge about the consumer's subjective reactions to brands' salient attributes:

- *Absolute utility error*. The consumer is uncertain as to the amount of satisfaction he will receive from a brand's given salient attribute.
- *Relative utility error*. The consumer is uncertain as to the rate of tradeoff of satisfaction derived from one salient attribute versus another.

For example, a consumer who is choosing a brand of beer may not be aware of all the brands that exist and are available to him (partial information). For those beers of which the consumer is aware, the consumer may think that a particular brand is high in calories when it isn't, or has a hoppy taste when it doesn't (measurement error). For those beers of which the consumer is aware and for which the consumer has correctly evaluated the salient attributes, the consumer may be unaware that a particular brand altered its formula and now contains more calories than before (obsolete information). Each of these sources of uncertainty contribute to the likelihood of the consumer making a sub-optimal choice when selecting a brand of beer.

Even if the consumer has full information about all the brands and their salient attributes – that is, the consumer experiences no external uncertainty – the consumer is still subject to internal uncertainty. For example, the consumer may believe that he likes hoppy

beers. But perhaps from changing tastes, what he is eating with the beer, the environment in which he is drinking it, or even how many hoppy beers he has recently consumed, the consumer realizes upon tasting the beer that he is not getting the satisfaction he expected from the hoppiness. This is absolute utility error. Unlike with measurement error, the consumer has not misjudged the beer's hoppiness – the consumer would report that the beer is precisely as hoppy as he expected. Rather he has misjudged his reaction to the hoppiness – the consumer would report that, upon trying the beer, he realizes that he isn't "in the mood" for a hoppy beer.

With relative utility error, the consumer doesn't misjudge his reaction to the beer's salient attributes but rather his willingness to trade off those attributes. For example, the consumer may have full information about the taste and the calories of two beers (i.e., the consumer has no external uncertainty). The consumer may also correctly anticipate his reaction to each of the beers' tastes and to each of the beers' calorie contents (i.e., the consumer has no absolute utility error). The consumer knows the extent to which he prefers the taste of brand A to that of brand B and also knows that brand A has 10 percent more calories than brand B. But, the consumer misjudges the extent to which he is willing to trade off better taste for fewer calories and so erroneously chooses to consume brand B.

Representing the Consumer's Mental Map of the Product Market

The reason a consumer cares about brand attributes at all is because the consumer believes he will obtain different levels of satisfaction from different levels of each salient attribute. Were that not the case, the attribute would not be salient and, therefore, not of

interest to the consumer. Note that what matters is the consumer's belief, not the reality, as it is the belief that affects his behavior. For example, a consumer who believes that genetically modified organisms (GMOs) are not harmful, or who is unaware of controversies surrounding GMOs, will ignore whether competing brands contain GMOs – even if GMOs are, indeed, harmful. Similarly, a consumer who believes that "frost brewing" beer improves its taste will compare competing brands based on whether they are frost brewed – even if frost brewing has no effect on taste but is simply a marketing gimmick. This is not to say that consumers will remain in a state of ignorance. Over time, consumers will tend to revise their beliefs based on experience and new information (Akcura *et al.*, 2004). However, at the moment in time when the consumer makes a purchase decision, the consumer is bound by his current beliefs. Beer provides a good example of this sequence of belief-trial-revision. Some beer producers described their beers as "fire brewed." Much marketing effort went into convincing consumers that fire brewing generated a better taste. For a while, many consumers responded by associating fire brewing with better taste. With experience, consumers determined that fire brewing had no real effect on taste. Marketers then described beers as "ice brewed." The same sequence of consumer response followed by realization that ice brewing had no appreciable effect on taste ensued. Similarly used terms include "premium," and "lite" – neither one of which has an agreed definition, but are simply used to alter consumers' beliefs about the beers.

Because the satisfaction gained from levels of the salient attributes is what matters to consumers, consumers will mentally position brands relative to each other according to the satisfaction the levels of the salient attributes represent. For example, suppose a consumer is about to purchase a gallon of milk. The consumer is concerned with price but is also concerned

with helping local businesses and so wants to buy local goods where possible. If there is no other attribute that is important enough to the consumer to alter the consumer's purchase decision, then the consumer recognizes two salient attributes: price and proximity. The consumer gets greater satisfaction from a lower price and greater satisfaction the closer is the manufacturer's location to the consumer's home.

Figure 1 depicts the consumer's mental map of these brands. Distance along the axis denotes the consumer's expected satisfaction from the level of the attribute, not the level of the attribute itself. For example, in this map, the further up the vertical axis a brand is located, the greater is the satisfaction the consumer receives from the brand's price. That is, the further up the axis the brand is, the lower is its price. The further to the right a brand is located, the greater is the satisfaction the consumer receives from the brand's manufacturer's proximity to the consumer. That is, the further to the right the brand is, the closer is its manufacturer.

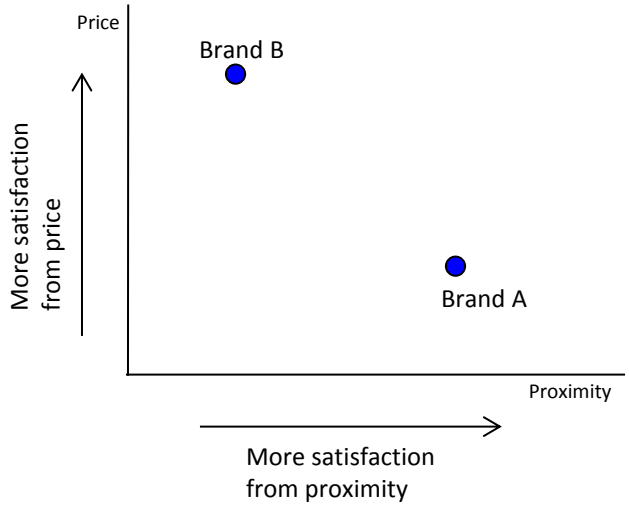

Figure 1. Depiction of the utility obtained from a brand's attributes.

Representing the consumer's mental map in this way gives us the means to express easily directional changes in satisfaction the consumer gets from changes in levels of the salient

attributes (up is better than down, right is better than left) without having to quantify the changes. Also left unaddressed is how the consumer resolves tradeoffs. For example, the figure shows that the consumer receives more satisfaction from Brand A's proximity than from Brand B's proximity, but more satisfaction from Brand B's price than from Brand A's price. The figure shows that the consumer will have to weigh the tradeoff of Brand A's better proximity for Brand B's better price, but does not indicate which the consumer will prefer.

Brand Clustering

Humans' natural proclivity for pattern recognition causes consumers (consciously or subconsciously) to group the brands of which they are aware according to similarities in the levels of the brands' salient attributes. This is called, *brand clustering* (Bettman, 1971). Reinforcing consumers' tendencies to mentally cluster brands, producers will produce brands with salient attribute levels that match consumers' preferences. To the extent that consumers' preferences are heterogeneous but clustered, brands' attributes will also be clustered. For example, suppose a large number of consumers prefers coats that are very stylish, but aren't concerned with durability. Another large number of consumers prefers coats that are very durable, but aren't concerned with style. However, few consumers prefer coats that are moderately stylish and moderately durable. In an attempt to maximize their market shares, coat manufacturers will produce brands that cluster around one or the other of these two attributes, but will tend not to produce brands that are midway between the two. As a counterargument, one can imagine waiting until next season to get this season's stylish coats at a lower price. However, that argument either (a) introduces a third salient attribute, "current

season," and again we'll see clustering but this time in three dimensions, or (b) muddles the definition of "stylish" as style itself is a function of time. Consequently, clustering of consumer preferences leads to brand clustering.

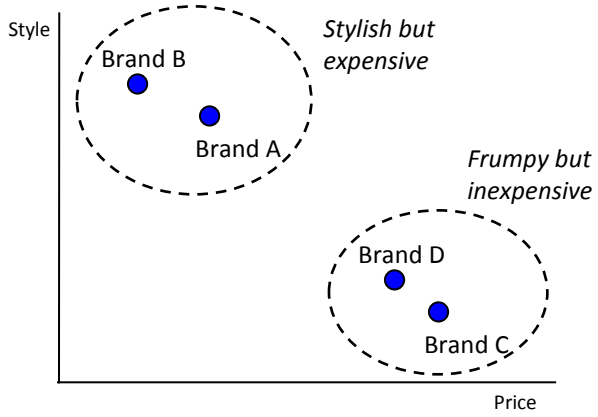

Figure 2. Four brands arranged into two clusters.

Figure 2 shows a consumer's mental mapping of the four brands of which the consumer is aware. The axes measure utility derived from the indicated attributes. Consequently, the further up a brand is located, the more utility the consumer derives from the brand's style (i.e., the brand is more stylish). The further to the right a brand is located, the more utility the consumer derives from the brand's price (i.e., the brand is less expensive).

Brands A and B are similar in that their styles provide the consumer much satisfaction while their prices provide the consumer little satisfaction. Brands C and D are similar in that their styles provide the consumer little satisfaction while their prices provide the consumer much satisfaction. Mentally, the consumer will regard Brands A and B as the "stylish but expensive" brands, and Brands C and D as the "frumpy but inexpensive" brands.

Of course, it is possible that consumer preferences do not cluster for some products and some attributes but are rather uniformly distributed along some salient attributes. For

example, consumers don't perceive much meaningful difference between Internet bandwidth of 6 Mbps and 10 Mbps, so providers sell bandwidth in discrete chunks (6 Mbps, 30 Mbps, etc.). Meanwhile, consumers do perceive meaningful difference between 5 gallons of gas and 6 gallons of gas, so retailers sell gasoline in whatever quantity each individual consumer wants. The result is that, while quantity is a salient attribute for both bandwidth and gasoline, Internet service brands cluster according to quantity of bandwidth but gasoline retailers do not cluster according to quantity of gasoline.

Non-Compensatory Consideration and Compensatory Choice

A high-involvement purchase decision is one in which it is there is a high opportunity cost to selecting a sub-optimal brand, and it is costly to obtain information necessary for selecting the optimal brand or it is cognitively costly to weigh the tradeoffs of various brands' different attribute levels.

When a consumer faces a high-involvement purchase decision in the presence of many competing brands, the consumer's choice process divides into two phases: non-compensatory and compensatory decision making (Biehal and Chakravarti, 1986; Kardes *et al.*, 1993). The term, "compensatory" refers to the consumer's willingness to tradeoff a lesser level of one salient attribute for a greater level of another. A salient attribute is non-compensatory when the consumer regards some minimal level of an attribute as necessary. When an attribute is non-compensatory, there is no increase in the level of another attribute that can compensate for a decrease in the level of the non-compensatory attribute.

For example, a consumer who is part of a family of four is looking to purchase a house and requires three bedrooms. Suppose the consumer finds five bedrooms more desirable than four. The consumer would be willing to tradeoff five bedrooms for four in exchange for a more desirable location, or a bigger yard, or a lesser price. But, the consumer is unwilling to tradeoff four bedrooms for three no matter how desirable the other attributes. In the consumer's mind, the salient attribute, "number of bedrooms," is non-compensatory at four, but compensatory above four.

Because weighing attribute tradeoffs is cognitively costly, consumers will use non-compensatory attribute levels to reduce the number of brands they must compare. This leads naturally to a two-stage choice process. In the first stage (called *consideration*), the consumer eliminates from consideration all groups (or *clusters*) of brands that do not satisfy the minimum non-compensatory attribute requirements. For example, the consumer will eliminate from consideration all houses with less than four bedrooms. The consideration phase is less cognitively costly because the consumer is eliminating whole clusters of brands based on a simple rule. In the consideration phase, the consumer does not weigh attribute level tradeoffs, and need not examine all of a brand's attributes – if a brand fails to meet the minimum acceptable attribute level for any one attribute, that brand is removed from consideration regardless of the levels of its other attributes.

The second phase of the consumer choice process is choice-given-consideration, or simply, "choice." The choice phase is cognitively costly because the consumer must consider each salient attribute for each brand and weigh tradeoffs among those attributes. This problem can easily become intractable. For example, for just five competing brands of ice cream with

just three salient attributes (taste, calories, and price), the consumer would need to make 30 unique comparisons – each of which requires weighing the satisfaction the consumer expects to get from two attributes – in order to determine which brand was best. For example, there are more than 220 brands of beer in the US. If there were only three salient attributes for beer (for example, price, taste, aroma), a consumer would have to make more than 72,000 comparisons to determine which beer was best. A consumer who could make one comparison per second would require 20 hours to decide which beer to buy. That we don't take hours to make most purchase decisions indicates that consumers are eliminating large numbers of brands from consideration prior to weighing attribute tradeoffs.

Product Market Characteristics

Consumers juxtapose what information they (believe they) have about the brands they are aware exist to create a perceived product market. Experimental evidence suggests that consumers use these product market characteristics to form heuristics that guide their decision-making. Characteristics of the perceived product market include:

- *Cluster size*: The number of brands the consumer perceives to exist in each cluster.
- *Cluster variance*: The degree of difference among the brands within a cluster of the values of the brands' salient attributes.
- *Cluster frontier*: The (possibly) hypothetical ideal brand that is an agglomeration of the best observed salient attribute values among the brands in a cluster.
- *Brand variance*: The degree of uncertainty about a brand's true salient attribute values.

- *Granularity*: The ratio of the degree of brand dissimilarities between clusters to brand similarities within clusters.

The first two characteristics (cluster size, cluster variance) influence the consideration phase of the consumer choice process. The more brands a person perceives to exist within a cluster, the more consumers the person perceives are choosing brands within the cluster. In this way, the number of brands serves as a proxy for what others are purchasing. For example, if a person perceives that greater numbers of consumers are choosing Androids over iPhones then, other things constant, the person would be more apt also to choose an Android. This is a variation on the social behavior principle that, if a crowd of people gathers, others will join so as to partake in whatever is attracting the rest of the crowd.

Consideration

A person may have a predilection for brands in a cluster that has nothing to do with the number of brands in the cluster. For example, a person may be more likely to consider a suburban apartment to an urban one because the person grew up in a suburban environment – even though the person perceives that a larger number of available apartments exist in the urban environment. However, *changes* in the number of brands the person perceives to exist in a cluster will alter the likelihood of the consumer considering brands within the cluster (Hedgcock and Rao, 2009). For example, regardless of where the person grew up, the more ads the person sees for urban apartments (relative to suburban apartments) the greater will be the likelihood of the person considering an urban apartment. This gives us the first behavioral heuristic, the cluster size heuristic:

Cluster Size Heuristic

As the number of brands within a cluster of which a consumer is aware rises, the probability of the consumer considering the cluster increases.

This cluster size heuristic requires that the brands within a cluster be obviously similar in some meaningful way. For example, various brands of Android phone (Google Nexus, HTC One, Samsung Galaxy S6) are very similar to each other. But various brands of economy cars (Honda Civic, Mazda3, Chevrolet Volt) are less so. Consequently, the cluster size heuristic will tend to be a more useful heuristic when considering Android phones than when considering economy cars. Thought of another way, the more dissimilar brands are within a cluster, the more likely it will seem to the person that the person has incorrectly grouped together brands into a single cluster that properly belong in separate clusters.

For example, suppose a consumer who is looking to purchase a webcam is aware of seven brands and perceives only two salient attributes: price and resolution. Table 1 shows the consumer's mental mapping of the seven brands.

Table 1. A consumer's mental mapping of brands known to the consumer according to attributes the consumer regards as salient.

Brand	Price	Resolution	
Logitech C920	$62	1080p	High-price / high-resolution cluster
Microsoft LifeCam	$52	1080p	
Logitech C615	$47	1080p	
Logitech C525	$32	720p	Low-price / low-resolution cluster
Logitech C310	$32	720p	
Microsoft HD-3000	$24	720p	
Logitech C270	$20	720p	

Based on this information, the consumer mentally groups the webcams into two clusters: high-price / high-resolution (Logitech C920, Microsoft LifeCam, Logitech C615), and low-price / low-resolution (Logitech C525, Logitech C310, Microsoft HD-3000, Logitech C270). That there are more brands in the low-price / low-resolution cluster tells us nothing about the consumer's likelihood of considering one cluster over the other. Factors external to the salient attributes of price and resolution will determine the consumer's "baseline" likelihood of consideration for the two clusters. For example, the consumer may be on a tight budget or have limited use for a webcam (which would cause the consumer to favor the low-price / low-resolution cluster), or the consumer may be a professional photographer or an early adopter (which would cause the consumer to favor the high-price / high-resolution cluster). Perhaps through advertising or word-of-mouth, the consumer then becomes aware of an eighth brand, the HP HD 4310. Table 2 shows the consumer's updated mental map.

Table 2. The consumer's updated mental map after the consumer becomes aware of an eighth brand.

Brand	Price	Resolution
HP HD 4310	$62	1080p
Logitech C920	$62	1080p
Microsoft LifeCam	$52	1080p
Logitech C615	$47	1080p
Logitech C525	$32	720p
Logitech C310	$32	720p
Microsoft HD-3000	$24	720p
Logitech C270	$20	720p

This new brand is similar to the brands the consumer has already mentally grouped in the high-price / high-resolution cluster. The consumer's awareness of the additional brand triggers the cluster size heuristic and so the likelihood of the consumer considering the high-price / high-resolution cluster increases.

Alternatively, suppose that the eighth brand of which the consumer becomes aware is not the HP HD 4310, but instead the Logitech C930e. Table 3 shows the consumer's updated mental map when the additional brand is the Logitech C930e rather than the HP HD 4310.

Table 3. The consumer's updated mental map after the consumer becomes aware of a different eighth brand.

Brand	Price	Resolution
Logitech C930e	$95	1080p
Logitech C920	$62	1080p
Microsoft LifeCam	$52	1080p
Logitech C615	$47	1080p
Logitech C525	$32	720p
Logitech C310	$32	720p
Microsoft HD-3000	$24	720p
Logitech C270	$20	720p

Clearly, the Logitech C930e belongs in the high-price / high-resolution cluster. But notice that, unlike the HP HD 4310, it stands out as markedly more expensive than the other brands in the high-price / high-resolution cluster. More so than with the HP HD 4310, adding the Logitech 930e to the perceived product market may cause the consumer to question whether he has mentally grouped the brands correctly. For example, perhaps there are really three clusters: low-price / low-resolution, medium-price / high-resolution, and high-price / high-resolution. Or, adding the Logitech 930e to the perceived product market may cause the consumer to wonder that he has overlooked the existence of a third salient attribute that is causing the price of the C930e to be so high.

In short, introducing the C930e to the perceived product market increases the cluster size for the high-price / high-resolution cluster, but also causes the consumer to question his mental grouping of the brands. To the extent that the consumer is uncertain about his mental

groupings, he will rely less on heuristics based on those groupings. And this gives us the cluster variance heuristic:

Cluster Variance Heuristic

As dissimilarities among brands in a cluster increases, the probability of the consumer considering the cluster decreases.

Choice Given Consideration

In the first phase of the consumer choice process, the consumer uses low-cost non-compensatory criteria to select one cluster of brands for consideration. In the second phase of the choice process, the consumer employs cognitively expensive compensatory criteria to choose a single brand from within the considered cluster. The consumer begins by forming (either consciously or subconsciously) a perception of the perfect brand – a brand that embodies the best levels of the salient attributes of all the brands observed in the considered cluster. For example, suppose a consumer perceives two salient attributes for vanilla ice cream: taste and calories. The consumer mentally divides brands of vanilla ice cream into two clusters: premium (better taste but higher calories) and discount (worse taste but lower calories). In the first stage of the choice process, the person eliminates the discount brands from consideration, leaving the premium cluster. Within the premium cluster, the consumer is aware of the salient attributes of three brands of ice cream (where the taste attribute reflects what the person believes the taste to be – whether from personal experience, word-of-mouth, or some other source). Table 4 shows the consumer's mental map of the brands of which he is aware according to the attributes the consumer regards as salient.

Table 4. A consumer's mental mapping of brands known to the consumer according to attributes the consumer regards as salient.

Brand	Taste (1=low, 5=high)	Calories
Ben & Jerry's	5	250
Breyers	4	200
Haagen-Dazs	3	150

Because the consumer is aware that there are additional brands of which he is unaware, as the consumer considers tradeoffs between taste and calories within the premium cluster, the consumer forms a perception (given his available information) of the ideal brand. In the example in Figure 3, the ideal brand is an ice cream that has the taste of Ben & Jerry's but the calories of Haagen-Dazs. The location of the ideal brand within the cluster is called the *cluster frontier*.

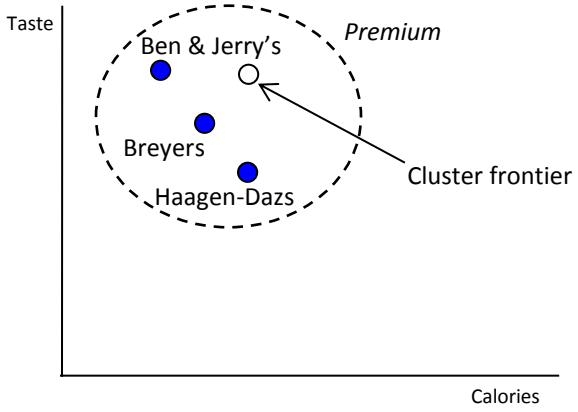

Figure 3. The cluster frontier is formed by combining the best attributes of the brands perceived to exist within the cluster.

In this example, the consumer is only aware of three brands. While the consumer can form an image of the ideal brand, he does not know whether the ideal brand actually exists. Table 5 shows the customer's mental mapping of the known brands and the ideal brand. Regardless of whether it actually exists, the ideal brand serves as a standard against which the consumer evaluates the brands of which he is aware.

Table 5. Comparison of the brands of which the consumer is aware to the consumer's perception of the ideal brand.

Brand	Taste (1=low, 5=high)	Calories
Ideal Brand	*5*	*150*
Ben & Jerry's	5	250
Breyers	4	200
Haagen-Dazs	3	150

Depending on the salient attributes and the consumer's knowledge, the consumer may believe that there are limits, called *technological constraints*, that restrict where the ideal brand can be located. Such limits are depicted in Figure 4. For example, the consumer may believe that good taste and high calories are necessarily related. So, the consumer may believe that it is not possible for a brand to exist that has a taste of 5 and calories of 150. Depending on the consumer's beliefs about the technological constraints, the consumer will mentally shift the location of the cluster frontier to account for the constraints. For example, the consumer may believe that, while a 5-150 combination of taste and calories isn't possible, a "second-best" of 4.5-160 is. Therefore, the consumer's awareness of technological constraints alters the consumer's mental mapping of the brands from that shown in Table 5 to that shown in Table 6.

Table 6. The consumer's awareness of technological constraints imposes limits on the ideal brand's location.

Brand	Taste (1=low, 5=high)	Calories
Cluster Frontier	*4.5*	*160*
Ben & Jerry's	5	250
Breyers	4	200
Haagen-Dazs	4	150

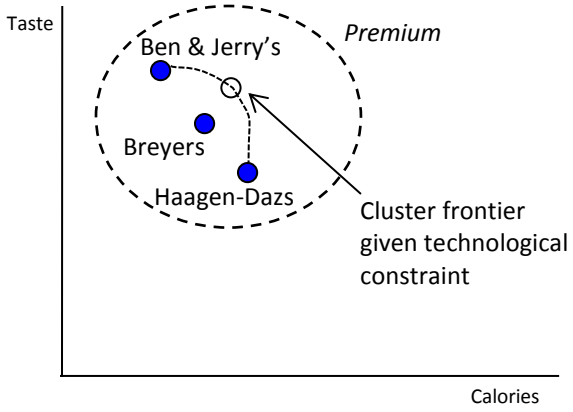

Figure 4. The consumer perceives that a technological constraint imposes limits on the possible locations of the ideal brand.

The consumer's goal is to choose the brand that maximizes his satisfaction. The brands are arranged in the cluster according to the satisfaction that their attributes impart. Therefore, the closer a given brand is to the cluster frontier, the more satisfaction the consumer can expect to receive from the brand. This gives us the cluster frontier heuristic:

Cluster Frontier Heuristic

The closer a brand is positioned to the cluster frontier, the greater is the probability of choice-given-consideration for that brand.

The cluster frontier heuristic requires that the consumer be able to evaluate exactly each known brand's salient attributes. There are many reasons why this might not be possible. It may only be possible to evaluate the salient attribute subjectively (e.g., taste). A consumer's

subjective evaluation can vary because of factors external to the brand. For example, if the consumer has recently eaten something sweet, he may rate the taste of low-fat ice creams lower than if he had not. Thus, the consumer's repeated subjective evaluation of a brand's attribute may change making the consumer unsure of the brand's attribute level. Even if the salient attribute can be evaluated objectively (e.g., calories), the consumer may not have a first-hand evaluation of the attribute and so must rely on others' reported evaluations. If those evaluations differ, the consumer will be unsure of the brand's attribute level. Even if others' evaluations agree, the consumer must believe the others' evaluations. If the consumer has reason to suspect that the evaluations, despite the fact that they agree, are not honest or accurately measured, then the consumer will be unsure of the brand's attribute level.

This lack of surety as to a brand's attribute's level is called *brand variance*. In the same way that cluster variance causes the consumer to be less sure of his mental grouping of brands into clusters, brand variance makes the consumer less sure of his positioning of brands within a cluster and, by extension, the position of the cluster frontier. The less sure the consumer is of the brands' positions relative to the cluster frontier, the less able the consumer is to rely on the cluster frontier heuristic. This gives us the brand variance heuristic:

Brand Variance Heuristic

The greater is a brand's variance, the lesser is the effect of the cluster frontier heuristic.

Usefulness of Heuristics

The heuristics are only useful to a consumer to the extent that the consumer is able to mentally group brands into clusters according to their salient attributes. It is the first step – consideration – that simplifies the consumer choice process by whittling down a large number

of competing brands to a set small enough that the consumer is willing to apply the cognitively costly evaluation of attribute level tradeoffs. If the consumer is less able (perhaps because of limited knowledge or perhaps because competing brands have not carved out unique market niches) to mentally cluster the brands, then the consumer will be less able to rely on the clustering heuristics. This gives us the final heuristic:

Granularity Heuristic

The lesser is the ratio of the brand differences within clusters to brand differences across clusters, the lesser are the effects of the cluster size and cluster variance heuristics.

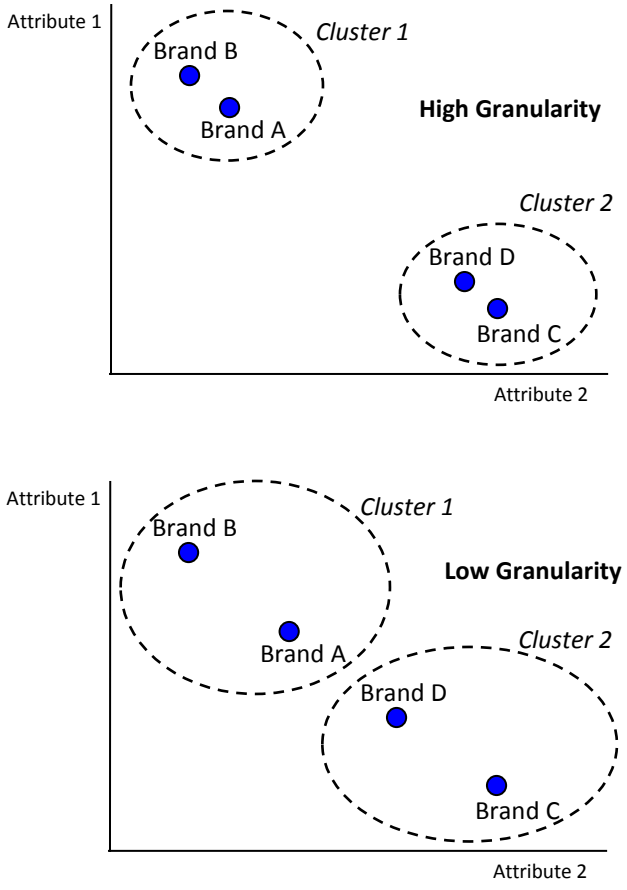

Figure 5. Mental mapping of brands exhibiting high and low granularity.

A comparison of a consumer's mental mapping exhibiting high and low granularity is shown in Figure 5. Compared to high granularity, low granularity implies possible flaws in how the consumer has mentally mapped the brands. It is less clear to the consumer whether Brands A and D belong in the same cluster or different clusters. Also, the larger distances within the clusters hint at possibly more numerous brands the consumer has not observed.

Gaining Information: The Iterative Choice Process

Modeling repeated consumer behavior in the presence of incomplete information requires examining the stages of consumer choice and what factors influence each stage. Howard and Sheth (1969) described a process in which a consumer, influenced by external stimuli and moderated by preferences and habit, move from the need to fulfill a desire to the purchase of a product to satisfy that desire. Consumption of the purchased product provides information and experience that influence future purchase decisions. Davies and Cline (2005) present the following iterative choice process that draws on the Howard and Sheth model.

Brands have true attributes that may or may not match the consumer's perception of those attributes. The consumer will gain true satisfaction from consuming a brand that may or may not match the satisfaction the consumer anticipates gaining from that brand. The consumer's perceptions of brands' attributes differ from the true brand attributes due to external uncertainty. The consumer's anticipated satisfaction differs from the satisfaction the consumer will actually attain due to internal uncertainty. Due to these uncertainties, the consumer develops an imperfect mental map of the competing brands. The product-market characteristics formalize the mental picture. The consumer uses cognitively inexpensive

heuristics that can be described using these product-market characteristics to whittle the competing brands down to a manageable cluster of brands. This is the consideration phase and the manageable set the consumer selects is the considered cluster. The consumer then employs more cognitively expensive heuristics to choose a single brand from among the considered cluster. After the consumer makes a choice and consumes the brand, the consumer gains information. With this information, the consumer can reduce his external and internal uncertainties. This iterative choice process is depicted in Figure 6.

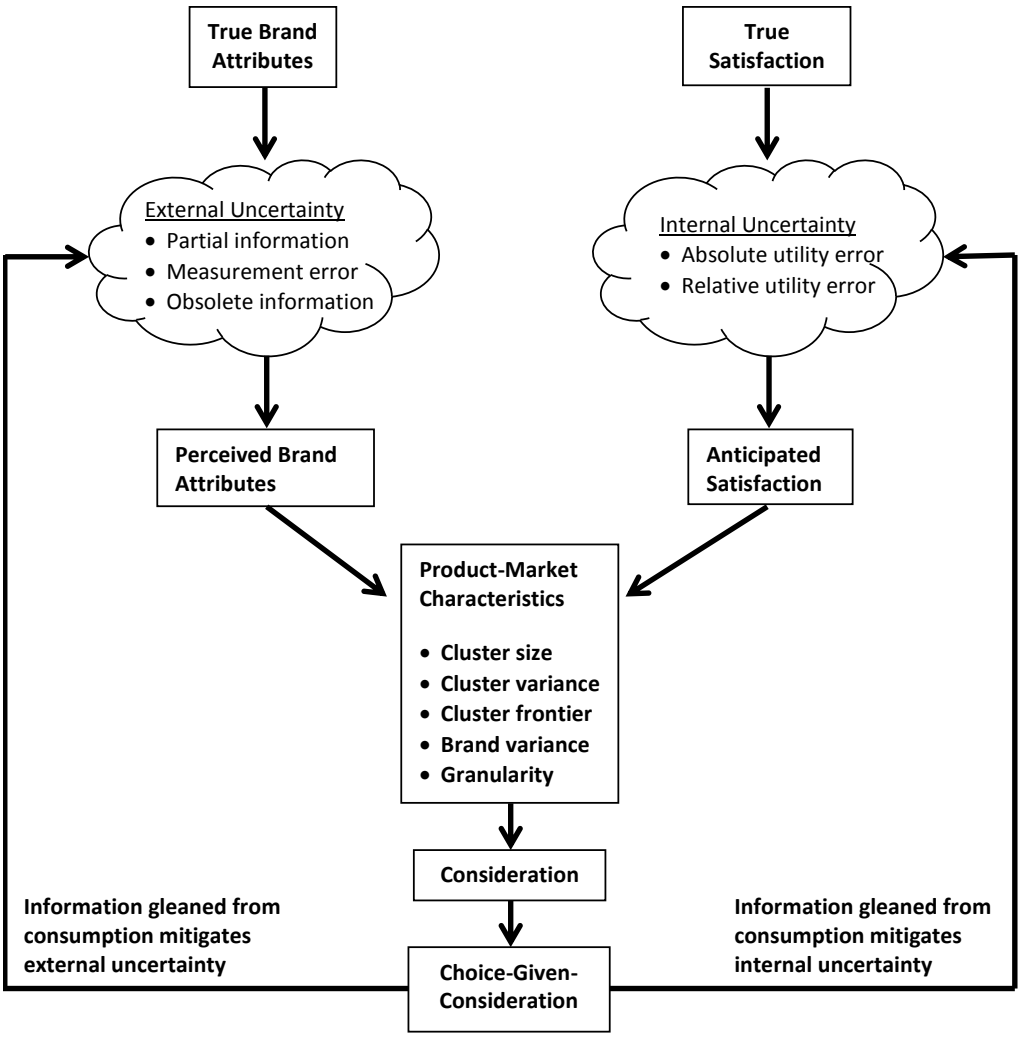

Figure 6. The iterative consumer choice process.

Examples and Applications

Ben Cohen, of Ben & Jerry's ice cream, happily says, "Never trust a skinny ice cream man." Calories, of course, are one of ice cream's few negative attribute. Fundamental marketing principles dictate that a company should not draw attention to its products' negative attributes. Yet, there is a case in which such an admission could actually help Ben & Jerry's market share. Suppose the salient attributes for ice cream are taste and calories, and that Ben & Jerry's is flanked within the premium ice cream cluster by two competitors, Brands A and B, as shown in Figure 7.

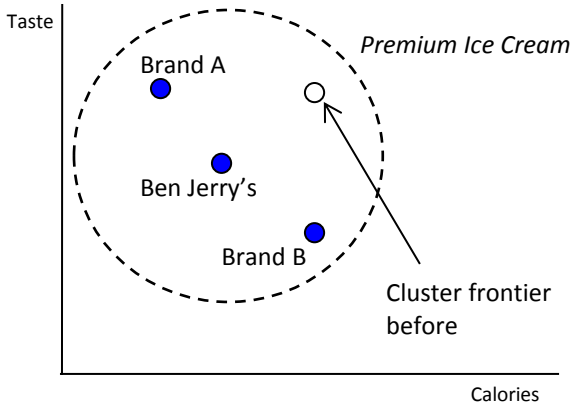

Figure 7. A consumer's perception of the premium ice-cream cluster in the absence of technological constraints.

Before announcing, "Never trust a skinny ice cream man," the consumer imagines the ideal premium ice cream as having Brand A's taste but Brand B's calories. The announcement reminds the consumer, not simply that Ben & Jerry's ice cream has a lot of calories, but more importantly, that great taste comes at a price of high calories. In short, the announcement reminds consumers that there is a technological constraint that prohibits the existence of a brand of ice cream that has Brand A's taste but Brand B's calories. Consumers now perceive a technological constraint that restricts the location of the cluster frontier as shown in Figure 8.

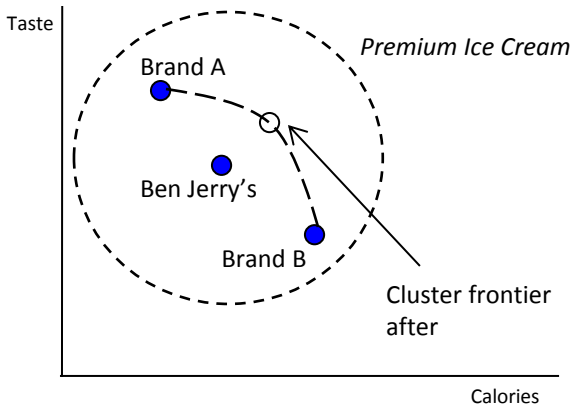

Figure 8. A consumer's revised perception of the premium ice-cream cluster in the presence of a technological constraint.

Provided Ben & Jerry's is located between two extreme brands, the announcement pushes (in the consumers' minds) the cluster frontier closer to Ben & Jerry's. By the cluster frontier heuristic, this increases the probability of choice-given-consideration for Ben & Jerry's. What we should observe is an increase in Ben & Jerry's market share at the expense of Brands A and B, but not at the expense of brands outside the premium ice cream cluster because the technological constraint has no effect on the consideration phase of the choice process – the probability of consideration for the premium ice cream cluster is unchanged.

In the mid 1990s, the Miller Brewing Company launched a new brand of beer, Red Dog. On attributes of taste and price, the new brand was positioned to be similar but inferior to Miller's flagship brand, Miller Genuine Draft (MGD). At the time, analysts contended that the entrant would simply siphon market share away from MGD to no net benefit for Miller. Suppose that, with the two salient attributes of price and taste, consumers mentally divide beer brands into two clusters: "domestic" (i.e., lower price and lesser taste) and "imported" (i.e., higher price and better taste). Figure 9 depicts a consumer's perceived product market for beer.

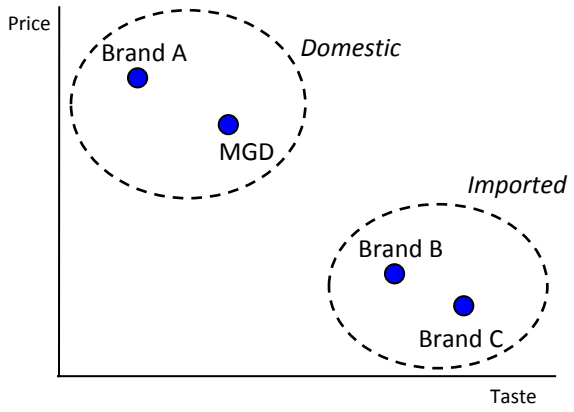

Figure 9. A consumer perceives four brands of beers existing in two clusters.

Beer consumers often form consideration sets on the basis of "import" versus "domestic," and consumers tend not to move often between the clusters. Introducing Red Dog and heavily advertising its entry, increased the number of brands consumers perceived to exist in the domestic cluster. The introduction of Red Dog causes our example consumer to update his mental map of the product market from that shown in Figure 9 to that shown in Figure 10. By the cluster size heuristic, the introduction of the new brand increased the probability of consumers considering the domestic cluster. Because Red Dog was positioned to be strictly inferior (though similar) to MGD, Red Dog's introduction had no effect on the domestic cluster's frontier. Thus, Red Dog had no effect on the probability of choice-given-consideration among domestic beers. The result, according to these positioning and salient attribute assumptions is that Red Dog's introduction would increase market shares for all brands in the domestic cluster at the expense of those in the imported cluster.

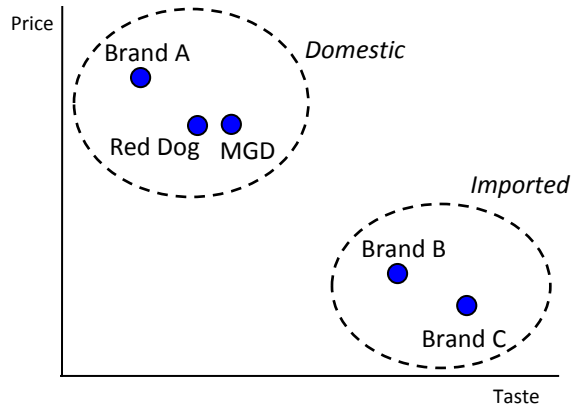

Figure 10. The consumer's perception of the product market for beer updated for the discovery of a new brand.

The consumer choice process and heuristics find application anywhere a consumer is faced with choosing one option from among many in a high-involvement setting. In selecting a mate, consumers follow the same heuristics – immediately eliminating from consideration whole groups of potential mates based on various salient attributes like looks, health, earning potential, personality. Politicians deliberately position themselves relative to their competitors in an attempt to gain votes. Voters, in turn, employ heuristics by considering only those candidates who satisfy some non-compensatory criteria (membership to a certain party, economic platform, social platform, looks, speaking voice), and then consider tradeoffs for only a small number of politicians who satisfy the non-compensatory criteria.

Brand Image and Consumer Behavior

Brand image can influence and, in the extreme, short-circuit the consumer choice process by causing the consumer to use the brand name as a replacement for some (or all) of the salient attributes. For example, if Toyota can successfully develop in the consumer's mind a brand image of reliability, then the consumer can come to regard the salient attribute of

"reliability" as being binary – a brand is reliable if and only if it carries the Toyota name. At the consideration phase, this means that the consumer could mentally cluster brands not by reliability but by the presence or absence of the Toyota name. Toyota advertising, by bringing the brand name to the consumer's mind, can have the same effect as an increase in the number of brands within the reliability (now Toyota) cluster. In sum, when the company's name is associated with a salient attribute in the consumer's mind, advertising can increase the probability of consideration for the company's brand by making the company's brand's cluster appear to be larger.

At the choice-given-consideration stage, repeated advertising could cause the consumer to mentally reposition competing brands further away from the cluster frontier. For example, if the consumer associates the salient attribute of reliability exclusively with the Toyota name, then additional advertising by Toyota can reinforce in the consumer's mind that non-Toyota brands are not reliable and so are, consequently, located further from the cluster frontier along the reliability dimension. In sum, when a company's name is associated with a salient attribute in the consumer's mind, advertising can increase the probability of choice-given-consideration for the company's brand by causing the company's brand to appear to be relatively closer to the cluster frontier.

Conclusion

Decades of experimental marketing research has revealed patterns in how consumer choice is affected by brand positioning, collectively known as context effects. Recent economic psychology research has proposed an underlying behavioral framework for explaining context

effects as functions of behavioral heuristics. Future research into the framework itself could include determining the degree to which consumer involvement (perhaps due to emotion, to purchase price relative to disposable income, or to frequency of purchase) can strengthen or mitigate the heuristics. Future research into applications of this framework include modeling and predicting voter choices among political candidates given changes in candidates' positions on salient issues, and investor choices of stocks wherein, along with objective attributes such as financial ratios and risk measures, investors' perceptions of other investors' expectations becomes a salient attribute. This latter application could yield insight into the formation and bursting of market bubbles.

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