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Marketing Theory 2007 7: 39

DOI: 10.1177/1470593107073844

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Context effects and models of preferential choice: implications for consumer behavior

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Abstract. *The article summarizes extant research on context effects and choice theories in a straightforward fashion. The context effects are used as benchmarks to compare six choice theories. The context effects include similarity, attraction, compromise, and reference point effects. The considered theories include simple scalability model, random utility model, elimination by aspects model, strategy switching models, componential context model, and connectionist network model of choice. The article discusses the implications of each model for consumer behavior, and suggests that the choice of model should depend on the characteristics of products, consumers and purchase process.* **Key Words** ● attraction ● choice models ● compromise ● reference point ● similarity

Research on consumer behavior has shown repeatedly that consumers' choices depend on the specific set of alternatives in which an option is considered (e.g. Huber et al., 1982; Lehmann, 1972; Lehmann and Pan, 1994; Prelec et al., 1997; Simonson, 1989; Simonson and Tversky, 1992). The same product may be more desirable in one context and less desirable in another context. This article reviews



four context effects produced by adding a new product or option to an existing choice set. This includes the well documented similarity effect (Sjoberg, 1977; Tversky, 1972a, 1972b; Tversky and Sattath, 1979), attraction effect (Heath and Chatterjee, 1995; Huber et al., 1982), and the compromise effect (Simonson and Tversky, 1992; Tversky and Simonson, 1993). Reference point effects also belong to this category, demonstrating that the context of the product influences the internal standard used to judge both this and other products (Tversky and Kahneman, 1991).

The practical implications of context effects for marketing strategies are numerous, including guidelines for positioning, pricing and promoting products (e.g. Adaval and Monroe, 2002; Nowlis and Simonson, 2000). From a theoretical point of view, these effects provide the benchmarks that any model of decision making must strive to explain. The main purpose of the article is to use these benchmarks to compare six classes of choice models, including, simple scalability models, random utility models, elimination by aspects models, strategy switching models, context dependent preference models, and connectionist network models of choice.

The article is organized as follows: Section 1 provides a brief overview of the four context effects considered here. Section 2 presents six models of preferential choice. The presentation of each model begins with a concise summary of the choice mechanism. We then discuss the ability of each model to account for the different context effects. Section 3 compares the theoretical models in terms of the tradeoff between accuracy and model complexity. We suggest that the choice of model should depend on the purpose of the application and discuss the implications for consumer research.

Brief presentation of context effects

We start with a brief presentation of the context effects and point to the rational principles each of them violates. In the following, the notation $\Pr[A \mid \{A, B, C\}]$ denotes the probability of choosing option A from the set of options $\{A, B, C\}$.

The similarity effect

A hypothetical consumer considers an Audi A4 (\$25,760, rated 8.3 at Edmunds.com depicted as 'B' in Figure 1) and a Volkswagen Jetta (\$17,675, rated 7, depicted as 'A' in Figure 1). Going back and forth between the two options, she adds another option of a Suzuki Aero (\$14,019, rated 6.7, depicted as 'S' in Figure 1). Now the Jetta seems less attractive than the A4.

The similarity effect refers to situations where a consumer considers options A, B and S as shown in Figure 1. Suppose the consumer first considers two options: car B is low on economy but high on quality, car A is high on economy but considerably lower in quality. Assume the consumer goes back and forth between these two options, and that the probability of her choosing either of them is equal. Suppose the consumer experiences the same uncertainty when considering cars S



Figure 1

The similarity effect

and B, and that the probability of choosing either of them is also equal. When all three cars are presented together, the similarity effect shows that the similar options A and S hurt each other but do not hurt option B. Thus the probability of choosing car A or S decreases and the probability of choosing car B stays unaffected (Brenner et al., 1999; Hsee and Leclerc, 1998; Sjöberg, 1977; Tversky, 1972a, 1972b; Tversky and Sattath, 1979).

The similarity effect violates the rational principle of independence from irrelevant alternatives which states: if option A is chosen at least as often as B in a binary choice set, then A should also be chosen at least as often as B when a new option is added to form a triadic choice set. Note that the binary choices are all equal: $\Pr[A|\{A,B\}] = \Pr[S|\{B,S\}] = \Pr[A|\{A,S\}] = .50$ implying all the three options are equally attractive. Based on the binary equality it would be logical to expect the equalities to hold when a third irrelevant alternative is added to the choice set. That is, the probabilities to choose A, B or S from a triadic set should all be equal. However, for the triadic choices the probability ordering changes to $\Pr[B|\{A,B,S\}] > \Pr[A|\{A,B,S\}] = \Pr[S|\{A,B,S\}]$.

The attraction effect

A hypothetical consumer considers an Audi A4 (\$25,760, rated 8.3, 'B' in Figure 2) and a Volkswagen Jetta (\$17,675, rated 7, 'A' in Figure 2). Going back and forth between the two options, she adds another option of a Toyota Prius (\$20,480, rated 7, 'D' in Figure 2). Now the Jetta seems more attractive than the A4.

The attraction effect refers to situations where a consumer considers options A, B and D as shown in Figure 2. Again, the comparison between A and B leads to uncertain preference and the probability of choosing either of them is equal. Next,

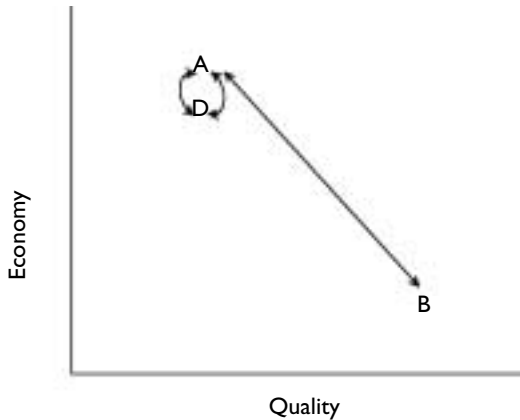


Figure 2

The attraction effect

car D is added to the choice set. Note that car D is similar to, but also dominated by, car A (i.e. A and D are the same on economy, but A is better on quality). Adding the decoy option D to the choice set enhances the probability of choosing the dominant option A. Heath and Chatterjee (1995) review a large number of studies examining the attraction effect. The finding is fairly robust and it has been obtained when A is initially favored over B as well as when B is initially favored over A (see Huber et al., 1982).

The attraction effect violates the rational principle of regularity. Regularity states that addition of an option D to an existing set of options A, B should either leave the probabilities of choosing A or B unchanged (if D is never chosen), or it should decrease these probabilities (if D is sometimes chosen). Put formally, $\Pr[A|\{A,B\}] \geq \Pr[A|\{A,B,C\}]$. However, the attraction effect shows the opposite pattern where $\Pr[A|\{A,B\}] < \Pr[A|\{A,B,D\}]$.

The compromise effect

A hypothetical consumer considers an Audi A4 (\$25,760, rated 8.3, 'B' in Figure 3) and a Volkswagen Jetta (\$17,675, rated 7, 'C' in Figure 3). Going back and forth between the two options, she adds another option of a Saturn ION (\$11,995, rated 5.6, 'A' in Figure 3). Considered against the two extremes, the Jetta seems more attractive than before.

For this effect suppose the consideration set includes cars A, B and C as shown in Figure 3, and also suppose that the first comparison is made between cars B and C. Simonson and Tversky (1992; see also Tversky and Simonson, 1993) review experiments that tested the effect of adding an extreme option A to a set already containing B and C. The addition of A turns C into a compromise option that is midway between the two extremes. The findings show that the probability of choosing the compromise option C is increased relative to the extreme options.

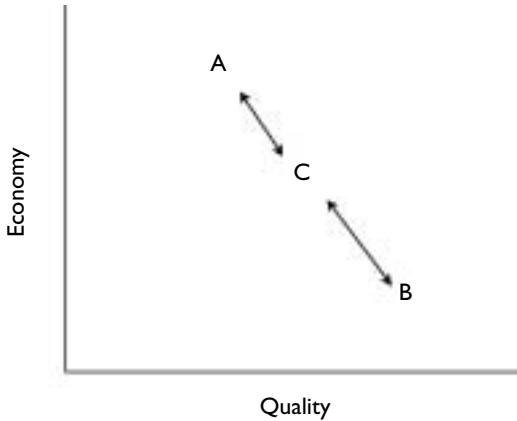


Figure 3

The compromise effect

Suppose, that in a binary choice, B and C are chosen equally often so that $\Pr[B|B,C] = .50$. When a more extreme option A is added to the set, making C the middle option, it is found that $\Pr[C|\{A,B,C\}] > \Pr[B|\{A,B,C\}]$ and $\Pr[C|\{A,B,C\}] > \Pr[A|\{A,B,C\}]$. The compromise effect is another violation of independence from irrelevant alternatives.

Effects of reference point

A hypothetical consumer ordered a Hyundai Elantra (\$13,439, rated 7.4, depicted as 'E' in Figure 4) from a local dealership. Unfortunately, there was a delay in supply. The dealer said she could either stick to her order or choose between two other cars. One is a Honda Civic (\$13,470, rated 8.1, 'B' in Figure 4) and the other is a Saturn ION (\$11,995, rated 5.6, 'A' in Figure 4). From this vantage point the Civic seems more attractive. Could the choice be reversed if she initially ordered a different car?

Tversky and Kahneman (1991) conducted a pair of studies that manipulated the reference points used for a choice between three options. While the findings are usually taken to demonstrate loss aversion effects, they can also be considered as context effects.

Figure 4 exemplifies the first study. Under one condition, participants were asked to imagine that they currently owned product E, and they were then given a choice of keeping E or trading it for either product A or product B. To continue with the hypothetical cars example, from the reference point of E, car B has a small advantage on quality and no disadvantage on economy; whereas A has both large advantages (economy) and disadvantages (quality). Under these conditions, E was rarely chosen, and B was strongly favored over A. Under another condition, par-

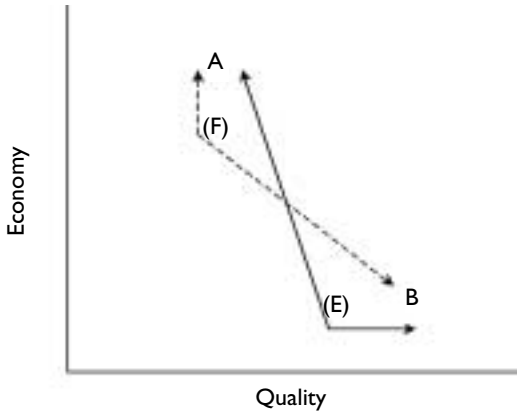


Figure 4

A reference point effect (first study)

ticipants were asked to imagine that they owned product F, and they were then given a choice of keeping F or trading it for either A or B. To continue with the hypothetical cars example, from the reference point of F, car A has a small advantage on economy and no disadvantages on quality; whereas now car B has both large advantages (quality) and disadvantages (economy). Under this condition, F was rarely chosen, but now A was slightly favored over B, reversing the earlier preference relation between these two. This effect is another example of a violation of the independence from irrelevant alternatives property for choice.

The second study also manipulated a reference point, but in this case, using either option S or T (see Figure 5). In one condition, participants were asked to imagine that they trained on job T, but that job would end and no longer be available, and they had to choose between two new jobs A or B. From this reference point, job B has small advantages and disadvantages over T, whereas A has large advantages and disadvantages. Under these conditions, option B was strongly favored over option A. In a second condition, participants were asked to imagine that they trained on job S, and in this case, preferences reversed, and option A was strongly favored over option B. Another demonstration of reference-point effects is provided by Herne (1998).

This concludes the empirical review. The similarity, attraction, and compromise effects are well established, and they have also been observed at the individual level of analysis. The reference point effects are less well established and need further research regarding their robustness. Together these findings form a benchmark set of phenomena that any preferential choice model must attempt to explain.

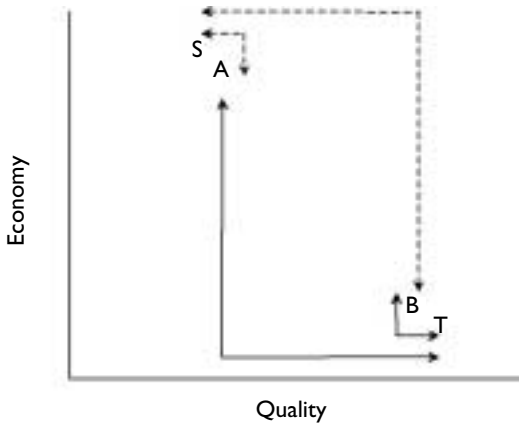


Figure 5

A reference point effect (second study)

Theoretical models

This section compares six models of preferential choice. A brief presentation of each model summarizes the choice mechanism of each model at the conceptual level (formal details about the models can be obtained from the original references). Next, we report which of the empirical phenomena reviewed above can be accounted for by each model. A model may fail to account for a certain context effect for two reasons. First, a context effect may violate a principle of rational decision making that is assumed by the choice model. Consequently, a model that satisfies that principle, cannot account for the effect. Second, it is possible to prove that the effect cannot be produced by a choice model for any selection of its parameters. When the latter is the reason, we explain why the model fails at the conceptual level here, and the formal proofs can be obtained from Busemeyer et al. (2003).

Simple scalability models

This class of models includes the Luce (1959) ratio of strengths choice model as well as the choice models used in several more recent applications (Harless and Camerer, 1994; Hey and Orme, 1994). The choice mechanism of these models suggests that each option is assigned a real valued utility. The choice between the options is a probabilistic function of these utilities (Becker et al., 1963). Suppose we have three options, A, B and C. The probability that option A is chosen increases with the utility of A, and decreases with the utilities of alternative options B and C.

Tversky (1972b) proved that this class of models satisfies the rational principle



of independence from irrelevant alternatives. Consequently, this class of models cannot account for the similarity, compromise, and reference point effects that violate this principle. Depending on specific assumptions about the relation between the probability to choose an option and the utilities of the options, this model may be able to account for the attraction effect (Busemeyer et al., 2003).

Random utility models

This class of models includes the probit choice model (Bock and Jones, 1968; De Soete et al., 1989; Thurstone, 1959), the generalized extreme value model (McFadden, 1981) and others. The choice mechanism of these models assumes that each option is assigned a random utility, but that the choice is deterministic: choose the option with the largest random utility. Thus, for two alternatives A and B, the probability of choosing A is equal to the probability that the utility of A is larger than the utility of B. Moving to three options A, B and C, the probability of choosing A is equal to the probability that the utility of A is larger than the utilities of both B and C.

The standard random utility model can account for the similarity effect when the random utilities are permitted to be correlated (De Soete et al., 1989; Edgell and Geisler, 1980; McFadden, 1981). The model does not rule out the compromise effect, yet it does not provide a compelling explanation for it either. Finally, the standard random utility model must satisfy the rational principle of choice of regularity (Block and Marschak, 1960; Luce and Suppes, 1965; McFadden, 1981). Therefore, it cannot account for the attraction effect.

The choice mechanism of the random utility model does not allow it to account for reference point effects. Consider, for example, the reference effect shown in Figure 5. In one condition the consumer is situated at S and prefers A over B. In another condition the consumer is situated at T and reverses to prefer B over A. Note that the starting points (i.e. reference points) are not actually available in the choice set (recall, those were the jobs that were ending). The random utility model can only consider the actual options A and B, and is insensitive to the different starting points. Therefore the model must predict the same choice probabilities under both reference point conditions.

Elimination by aspects model

This model was originally proposed by Tversky (1972a, 1972b; Tversky and Sattath, 1979). The elimination by aspects model is based on characterizing each option as a collection of aspects, and each aspect is assigned a value that represents its importance. Some aspects appear in several options (common) and some aspects appear in just one option (unique). The basic choice mechanism involves two steps. At the first step, one of the aspects is chosen. The choice is probabilistic so that a more important aspect has a higher probability to be selected than a less important aspect. At the second step, any option that does not contain the chosen aspect is eliminated. The process of selecting an aspect and



eliminating any option that does not contain it continues until only one option remains, which is then chosen.

The elimination by aspects model was originally designed to account for the similarity effect (Tversky, 1972a). Tversky (1972b) proved that the elimination by aspects model satisfies the regularity principle. Therefore, this model cannot account for the attraction effect.

The choice mechanism of the elimination by aspects model cannot account for reference point effects. Consider the predictions of the model regarding the reference point effects of options E and F shown in Figure 4. In one condition the consideration set includes options A, B and E. Note that all the aspects of option E are contained in option B, and so option E is always eliminated from the set. The choice is thus reduced to A and B. In the second condition the consideration set includes options A, B and F. Similarly, all the aspects of F are contained in option A, and so option F is eliminated and never chosen. The problem again reduces to a choice between A and B. Therefore, the elimination by aspects model must predict that the probabilities of choosing A and B from triadic sets are the same under the two reference point conditions. The choice mechanism of the elimination by aspects model cannot account for the compromise effect either, as long as one assumes that options A and B are more dissimilar than options A and C, or options B and C (see Busemeyer et al., 2003, for a proof). To account for the attraction, compromise, and reference point effects, Tversky and Simonson (1993) developed an alternative model based on the concept of loss aversion.

Componential context model

Tversky and Simonson (1993) proposed a context dependent preference model, called the componential context model, which relies on the concept of loss aversion (Tversky and Kahneman, 1991). According to this model, there is an essential difference between consideration sets that include two options and consideration sets that include three or more options. When the choice set includes two options the value assigned to each option is context free. One problem with the latter assumption is that this model fails to account for context effects found using just binary choices (see Mellers and Biagini, 1994).

The context becomes involved when three or more options are presented in the choice set. In this case, the value of each option has two components. One component is context free (as before), and another component is context dependent. The latter is based on the concept of advantages and disadvantages of one option over another. For example, in most of the examples we used earlier, comparing options A and B, option A has a large advantage in terms of quality, but it has a large disadvantage in terms of economy.

A critical assumption of this model concerns loss aversion, and states that disadvantages have greater impact than advantages. To illustrate this idea, consider the reference point effects. In both studies, the option that was closer to the reference was favored over the option that was far from the reference. Take for example Figure 5, and consider the case when the reference S is close to option A: On the one

hand, option A has small advantages and disadvantages over the reference; on the other hand option B has large advantages and disadvantages over the reference point. Assuming that disadvantages have more impact, option B would suffer more due to loss aversion for its large disadvantages, and option A would be preferred.

Using the concept of loss aversion, the componential context model was designed to account for the attraction effect, the compromise effect, and the reference point effects. However, this model cannot account for similarity effects. This failure results directly from the loss aversion assumption, which implies that option A in Figure 1 would gain from the addition of a similar option S (similar to the reference effects). This is of course contrary to the empirical observation (see Roe et al., 2001, Appendix A for a proof).

Strategy switching models

One appealing idea from the decision making literature is that individuals have a set of strategies for making decisions, and they may switch strategies depending on choice set size or choice context (Gigerenzer and Selten, 2001; Payne et al., 1993). It is difficult to examine all possible strategy switching models, but we can consider a simple yet reasonable case. Assume that an individual may switch from a compensatory strategy to a non-compensatory strategy. The probability of using the non-compensatory strategy increases as the choice set size, n increases.

For the compensatory strategy we simply assume that each option is assigned a real valued utility. Utility theories assume that the option with the largest utility is chosen. If the utilities are equal, then the choice is random.

For the non-compensatory strategy, we assume a lexicographic rule. In this case, an individual first considers the most important dimension, and takes the best alternative on this first dimension; if more than one alternative is tied on the most important dimension, then the second dimension is considered, and the best on the second dimension is selected. Two options may be tied with respect to a particular dimension if the difference in their values is less than some small threshold. To provide greater generality, the order of dimension importance is allowed to change from one choice to another. For example, when there are two dimensions the probability that dimension 1 is more important and processed first would be denoted π_1 , and the probability that dimension 2 is more important and processed first would be denoted $\pi_2 = (1 - \pi_1)$.

To account for context effects with just binary choices (see Mellers and Biagini, 1994), we must assume that the non-compensatory lexicographic strategy is often used to make binary choices. Using the lexicographic strategy, this model can also account for the similarity effect (shown in Figure 1) as long as we assume that the difference between option A and option S is smaller than the threshold, so that these two alternatives are treated as tied. If quality is considered first then option B will be chosen. If economy is considered first then A and S would be preferred over B and the choice between them would be random. Thus the probability of choosing option B equals π_1 , and the probability of choosing option A equals $(.5) \cdot \pi_2$. Setting $\pi_1 = \pi_2$ reproduces the similarity effect.



This model cannot explain the attraction effect, the reference point effects, or the compromise effect (see Busemeyer, et al., 2003, for proof). Consider for example the compromise effect. Note that when all three options are presented, the lexicographic strategy would never choose the compromise, because it is not the best on any dimension. To account for the fact that the compromise is chosen most frequently in the triadic choice set, we must assume that the compensatory strategy is used, and that option C has the largest utility value. But the latter assumptions imply that the original binary choices are unequal, contrary to the empirical observations, and so this model cannot explain both the binary and triadic choice probabilities simultaneously.

Decision field theory

Roe et al. (2001; see also Busemeyer and Townsend, 1993) proposed a connectionist type of model for preferential choice called decision field theory. Decision field theory is a dynamic model which describes the evolution of preferences over time. According to this theory, the decision maker has a preference state at each moment in time for each option. This preference state changes over time as a result of changes in the attention to different dimensions of the choice options. For example, consider a choice set between cars A, B and C as shown in Figure 3. At one moment the consumer may focus on quality (e.g. imagining the feel of the acceleration of each car). At that moment, option A would have an advantage, option B would have a disadvantage, and option C would have neither. But at the next moment in time, the consumer's attention may switch and focus on economy (e.g. recall information about the gas mileage of each car). At this moment, option B would gain an advantage whereas option A would suffer a disadvantage. Thus changes in attention to different dimensions may produce different evaluations at each moment. The momentary evaluations of each option are used to update the strength of preference for each option over time and this updating process continues until the preference for one of the options is strong enough to exceed a threshold. The first option to exceed the threshold is chosen (see Roe et al., 2001, for the details).

Preferential context effects in this model are based on the similarity between alternative options. Analogous to perceptual context effects, the contrast between options increases as they are more similar (e.g. reside close to one another in our figures). This contrast boosts the superior option (making it seem even better) and diminishes the inferior option (making it seem even worse). The contrast between options decreases as they become less similar (e.g. located far from one another in our figures). This idea is in line with the Dhar and Glazer (1996) suggestion that preference and similarity judgments involve common processes. In fact, Dhar and Glazer (1996) showed that judged similarity of two alternatives changes as function of the introduction of a third alternative and that this change is in accordance with context effects. Decision field theory represents this idea utilizing a competitive recursive neural network, which is commonly used in connectionist models to produce contrast enhancement effects in perception (see Haykin, 1994).

Furthermore, this process, called recurrent inhibition, evolves over time, becoming more pronounced with the progress of the deliberation process.

Roe et al. (2001) demonstrated that based on the alternatives' similarity (e.g. the locations in our figures) decision field theory provides an explanation for the similarity effect, attraction effect, and compromise effect, using a common set of parameter values. For example, consider the attraction effect shown in Figure 2. Option D is close to yet dominated by option A, whereas option B is far from both of them. In this case, the strong contrast between the adjacent options D and A boosts the latter option and hurts the former. The preference for option D drives down, and the preference for option A builds up. Option B, residing far from the other options is not influenced by the contrast, and the preference for B remains unchanged. Consequently, option A is preferred over option B.

Roe et al. (2001) did not examine the reference point effects. Below we show that decision field theory accounts for these effects as well. First consider the study involving the reference point represented by option F (see also Figure 4). To derive predictions from decision field theory for this study, we simply set the evaluations of each option proportional to the coordinates of the options in Figure 4. We assumed equal probability of attending to each dimension at each moment in time. Contrast enhancement is allowed only between similar options A and F in one condition and between options B and E in another condition (as in Roe et al., 2001).

The predictions of the model are shown in Figure 6 (top panel). The top line shows the probability of choosing option A from the choice set of A, B and the reference F. As can be seen, as long as the contrast parameter (lateral inhibition) is positive, the model predicts that option A would be favored over B. The opposite pattern is predicted by the model when the reference point is changed to option E so that choice set contains options A, B and E. Here, the contrast boosts option B and hurts option E, leading to the preference of option B over option A.

To apply decision field theory to the second study, consider the reference point S (shown in Figure 5). For this study, we assume that each option is described by three dimensions: the values of the first two dimensions are taken from the co-ordinates of the options shown in Figure 5, and the third dimension represents job availability. Jobs A and B both have a positive value on dimension 3 (they are available), whereas jobs S and T both have negative values on dimension 3 (they are no longer available).

The choice probabilities, predicted by the theory, are illustrated in Figure 6 (bottom panel). The top line in this figure shows the probability of choosing option A when the reference point was option S, and the bottom line shows the probability of choosing option A when the reference point was option T. As can be seen, decision field theory reproduces the reversal in preference as a function of the reference point. In sum, we find that both reference point effects can be predicted for a wide range of parameter values by decision field theory.

One interesting prediction made by decision field theory is that the size and even the direction of context effects may depend on the amount of time provided to make a decision. In particular, decision field theory predicts that both the

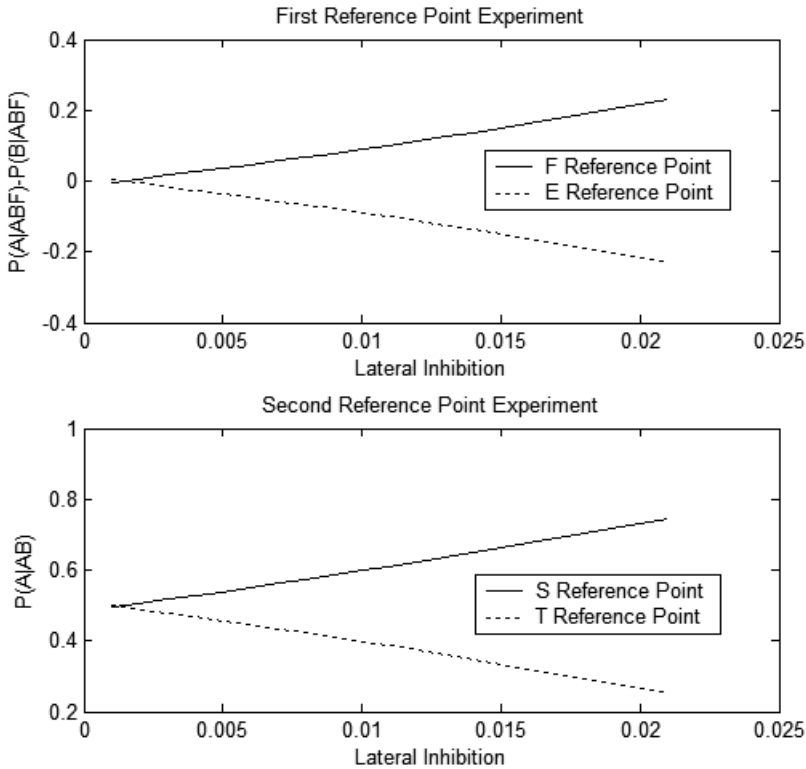


Figure 6

Decision field theory predictions for the reference point effects

attraction and compromise effects become larger when decision makers are encouraged to deliberate longer. Evidence supporting this prediction has been reported by Simonson (1989), and Dhar et al., (2000).

Decision field theory is one example of a connectionist model of decision making. Recently, two other connectionist models have been proposed to account for some of the phenomena reviewed above. Guo and Holyoak (2002) present a connectionist model that was designed to explain the similarity and attraction effects, but at this time, it does not account for the other effects. Usher and McClelland (2002) proposed an artificial neural network model that shares some assumptions contained in decision field theory, and this model has the potential to predict most of the effects we consider.

Comparison of models

Table 1, shown below, summarizes the ability of each model to account for each effect. The rows of this table indicate a clear ranking order of the alternative models' predictive ability. Simple scalability, elimination by aspects and strategy switching models, account each for only one context effect. Random utility model accounts for two context effects, the componential context model accounts for three effects, and decision field theory accounts for all four context effects. Focusing on the four context effects (the columns of Table 1) indicates a split between the similarity effect and the other effects of attraction, compromise and reference. The main contradiction concerns the question as to whether the addition of a third option hurts or promotes the nearest neighboring option. According to the attraction, compromise and reference effects, such additions elevate neighboring (or similar) options. According to the similarity effect, such additions hurt the nearest option. Indeed most models either account for the similarity effect, or for the other effects. The success of decision field theory to account for all the context effects is surprising. It implies a continuum between the two contradictory outcomes of promotion and descent, and suggests that this continuum is sensitive to the exact mapping of the similarities between the alternative options.

Table 1

Summary of the effects that can or cannot be explained by each model

Model	Context effects			
	Similarity	Attraction	Compromise	Reference point
Simple scalability	no	yes**	no	no
Random utility	yes	no	yes**	no
Elimination by aspects	yes	no	no	no
Strategy switching*	yes	no	no	no
Componential context	no	yes	yes	yes
Decision field theory	yes	yes	yes	yes

* Switching occurs between a compromise and a lexicographic strategy

** The model does not rule out the effect; however, it does not provide a compelling explanation for it

Instead of using Table 1 to choose the 'best' model, one could examine the implications of each model for consumer behavior. Note that each model employs different assumptions about the decision maker and about the decision problem he or she faces. The different choice mechanisms reviewed here may provide useful insights to different marketing applications matching certain context effects to segments of products, consumers and purchase process.



When utilities are known

In some situations consumers may know exactly how much a product is worth to them. For example, consider a consumer going to his favorite restaurant and choosing an entry from a menu he knows very well. As another example, think of a consumer who is considering several cars that are well known to him (e.g. to buy the same car he once had, to buy the same car his friend drives, or the same car his brother drives).

Two of the six models reviewed here apply to these situations where there is no uncertainty regarding the utility offered by each option, namely, simple scalability models and the strategy switching model. While both models represent the utilities of the options with real values, they differ in their choice process. According to the simple scalability models the choice is probabilistic and the decision maker would not necessarily choose the product that offers the largest utility. The strategy switching model on the other hand emphasizes systematic analysis of the alternative options and choice that maximizes utility.

Considering the examples above, the probabilistic choice mechanism seems more reasonable for the choice made at the restaurant, whereas the systematic analysis of options may be more suitable for the choice of a car. To generalize, simple scalability models may apply better to repeated consumption of short-lived and/or low-price products that make the choice relatively inconsequential, low in conflict, and low in need for justification. Taken together, these characteristics allow consumers to experiment, seek variety (Feinberg et al., 1992) and make unique choices (Simonson and Nowlis, 2000) at low or no risk. The strategy switching model may apply better in opposite cases where choices are consequential (e.g. durable high-price products) raising the need of consumers to feel in control, and to be able to justify their choice as 'best' or 'rational'.

Ambiguity and conflict

Sometimes consumers start a choice process having only a vague idea of what they are looking for. Ratneshwar et al. (1996) report that ambiguity results in consumers' creating cross-categories consideration sets. For example, a consumer may want to buy something 'nice' to wear without defining what 'nice' means (e.g. casual or elegant, pants or shoes, etc.). As another example, consider a consumer who wants to go out but does not define whether going out means going to the movies or to a restaurant. When goals are not well defined, the criteria for evaluating options are ambiguous, and the utilities assigned to each option are volatile.

Random utility models seem to be useful in cases of ambiguity. Note, that according to this model, the utilities associated with each option may change rapidly. This model suggests that in these vague cases the effectiveness of positioning strategies may vary with regard to different context effects. For example, it seems reasonable that in face of ambiguity and frequent changes in the assigned utilities, one may prefer the compromise (or average) option. However, these recurring fluctuations may impede the establishment of a structured context and



clear-cut evaluations of dominance that are necessary for the formation of the attraction effect.

In contrast to ambiguity, conflicting goals refer to settings where consumers know what they are looking for in a product, yet each of the available alternatives offers only partial fulfilment of the requirements. Examples for such conflicts are numerous, including trade-offs between quality, price, waiting time, pleasure and so forth. Two models reviewed here apply directly to conflicting goals, namely, elimination by aspects model and the componential context model. Note, that elimination by aspects accounts for the similarity effect and the componential context model accounts for the attraction, compromise and reference effects. One difference between the two models refers to the way alternative options are evaluated. According to elimination by aspects each option is decomposed and the evaluation focuses on isolated aspects. The componential context model considers each option as a package deal offering a bundle of advantages and disadvantages. Note, that the latter model introduces elements of loss aversion and compensation that do not exist in the former. Further research may attend the relation between the different evaluation processes and their relation to different context effects.

Time pressure and deliberation

In many cases time pressure influences consumers' choice (Svenson and Maule, 1993). For situations involving time pressure, a dynamic model such as decision field theory is more useful than the other models reviewed here. Suppose a consumer hesitates between two houses. House A is very good on the most important dimension (e.g. location) but terrible in many of the less important dimensions (e.g. wallpapers, kitchen, bedroom size). House B is very bad on the most important dimension but very good on many of the less important dimensions. Now suppose that the real-estate agent places a deadline on the offers. A deadline of one hour would probably have a different effect than a deadline of seven days. Decision field theory assumes that the most important dimension catches attention first and less important dimensions are attended later in the deliberation process. Under short deadline, there is only time to process the more important features and so house A tends to be chosen. Under longer deadlines, there is more time to process all the features and so house B tends to be chosen (for elaboration on this topic, see Busemeyer and Johnson, 2004; Diederich, 2003).

Time pressure seems to reduce context effects and deliberation seems to enhance them (e.g. Dhar et al., 2000). One reason is that deliberation paradoxically increases preference uncertainty. Note that deliberation is usually taking place when there is initial uncertainty. In order to clarify preferences, the consumer may turn for the advice of friends, parents or experts. The deliberation process would probably also entail checking prices, comparing alternatives, going back and forth between dimensions such as the interior vs. the location of a house etc. Consequently, this process has the potential of increasing, rather than decreasing, the uncertainty. Of the six models reviewed here, decision field theory, which is



sensitive to time, seems to be the most accurate description of the deliberation process and of its influence on context effects.

Concluding comment

The above discussion demonstrates the importance of preferential choice models to understanding of consumer behavior. As an alternative to the choice of a single best model, one could argue for the usefulness of multiple theories and their differential application to marketing settings that differ in respect of products, consumers' characteristics, and the evaluation process. The choice of the four context effects reviewed here was based on their familiarity and robustness. However, the practical and theoretical implications of the models we considered could be further extended in relation to other effects of marketing strategy and consumer choice including, background vs. local context (Tversky and Simonson, 1993), choice deferral (Dhar, 1997; Dhar and Simonson, 2003), highlighting vs. balancing choices (Dhar and Simonson, 1999), numerical vs. verbal displays of information (Sen, 1998), and separate vs. joint evaluations (Hsee and Leclerc, 1998; Hsee et al., 1999).

Acknowledgement

Dr Busemeyer thanks the China Europe International Business School for their generous support during his sabbatical.

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