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Consumer choice is often influenced by the context, defined by the set of alternatives under consideration. Two hypotheses about the effect of context on choice are proposed. The first hypothesis, tradeoff contrast, states that the tendency to prefer an alternative is enhanced or hindered depending on whether the tradeoffs within the set under consideration are favorable or unfavorable to that option. The second hypothesis, extremeness aversion, states that the attractiveness of an option is enhanced if it is an intermediate option in the choice set and is diminished if it is an extreme option. These hypotheses can explain previous findings (e.g., attraction and compromise effects) and predict some new effects, demonstrated in a series of studies with consumer products as choice alternatives. Theoretical and practical implications of the findings are discussed.

Choice in Context: Tradeoff Contrast and Extremeness Aversion

The development of effective marketing strategies requires an understanding of the manner in which consumers choose among alternatives. It is commonly assumed that each alternative has a utility or subjective value, and the consumer selects the alternative with the highest value. This assumption, called value maximization (VM), underlies the classical economic theory of the consumer, and it has been widely used in marketing for both theoretical and practical purposes. A major implication of VM is that the preference between alternatives is independent of the context, as defined by the set of alternatives under consideration.[1] Thus, if the consumer prefers brand x to brand y in one context (e.g., when only x and y are available), then y cannot be preferred to x in another context (e.g., when a third brand, z, is added to the choice set).

Recent evidence, however, indicates that consumer preferences are influenced by the context of choice, contrary to VM (e.g., Payne, Bettman, and Johnson 1992). For example, under certain conditions, the market share of a given brand increases rather than decreases when a new brand is introduced. Such findings could have significant implications for marketers' product line, positioning, communications, and competitive strategies. To incorporate context effects in the analysis of consumer choice, we need to understand how preferences are influenced by the set of alternatives under consideration. This is the main goal of the present research.

We propose two principles, tradeoff contrast and extremeness aversion, that describe the effect of context on choice. These principles can account for previous findings, such as the attraction (or asymmetric dominance) effect discovered by Huber, Payne, and Puto (1982) and the compromise effect observed by Simonson (1989). In addition, they lead to new predictions that are tested in the following experiments. We first introduce the two hypotheses and then report the empirical evidence.

Tradeoff contrast. Contrast effects are ubiquitous in perception and judgment. The same circle appears large when surrounded by small circles and small when surrounded by large ones. Similarly, the same product may appear attractive on the background of less attractive alternatives and unattractive on the background of more attractive alternatives. We propose that the effect of contrast applies not only to single attributes, such as size or

[1]The term "context" is sometimes used in the literature in a broader sense that includes, in addition to the choice set, other characteristics of the choice environment (see, e.g., Bettman, Johnson, and Payne 1991).

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attractiveness, but also to the tradeoffs between attributes.

Consider the choice between options that vary on two attributes. If neither option dominates the other, the comparison between them involves an evaluation of differences along the two attributes. Suppose x is of higher quality and y has a better price. The decision between x and y, then, depends on whether the quality difference outweighs the price difference, or equivalently on the tradeoff between price and quality implied by these options. According to the tradeoff contrast hypothesis, the choice between x and y is influenced by other implied tradeoffs in the set of options under consideration. In particular, the tendency to prefer x over y will be enhanced if the decision maker encounters other comparisons in which the exchange rate between price and quality is higher than that implied by x and y. Consider, for example, a consumer who is evaluating two personal computers; one has 960K memory and costs \$1200 (x) and the other has 640K memory and costs \$1000 (y). The choice between x and y then depends on whether the consumer is willing to pay \$200 more for an additional 320K of memory. The tradeoff contrast hypothesis predicts that the consumer is more likely to select x if the choice set includes pairs of options for which the cost of additional memory is greater than that implied by the comparison between x and y.

Extremeness aversion. One of the major findings that has emerged from the analysis of both risky and riskless choice is the presence of loss aversion: outcomes that are below the reference point (losses) are weighted more heavily than outcomes that are above the reference point (gains). Loss aversion explains a variety of phenomena, such as the status quo bias, the buying-selling discrepancy, and the endowment effect (Kahneman, Knetsch, and Thaler 1991; Tversky and Kahneman 1991). To explain the effect of context, we extend the notion of loss aversion to advantages and disadvantages that are defined in relation to the other available alternatives, rather than in relation to a neutral reference point. A consumer who considers three VCRs that differ in quality and price, for example, is likely to evaluate the advantages and disadvantages of these products in relation to each other. Suppose x has the highest quality and price, z has the lowest quality and price, and y is intermediate on both attributes. The assumption that disadvantages loom larger than the respective advantages tends to favor the intermediate option y, because it has only small disadvantages in relation to the other options. This is the extremeness aversion hypothesis.

Method. The effects of context on choice were examined in a series of 22 experiments. The number of participants in each experiment ranged from 100 to 220, with about equal numbers of men and women. The subjects were undergraduate and graduate students of business administration (about two-thirds) and psychology at three West Coast universities. Several problems were replicated with business executives. The respondents in all studies received a questionnaire titled "Survey of Consumer Preferences," which was administered in a classroom setting. Questionnaires included different numbers of choice problems (between three and 14) and required between five and 25 minutes to complete. Subjects were told that there were no right or wrong answers and that they should consider only their personal preferences. All tests are based on a between-subjects comparison.

We went to great pains to use realistic materials and to give subjects information similar to what is typically available to consumers who are making actual purchases. For example, in choice among paper towels, the stimuli consisted of samples of paper towels that the subjects could inspect to assess their quality. In other cases, subjects received color pictures of consumer products taken from the Best General Merchandise Catalog, as well as the written descriptions of the products from that catalog (see Figure 1). In several studies, subjects were informed that some of them, drawn at random, would receive the item they selected from certain choice sets.

In the following two sections we investigate two families of context effects implied by tradeoff contrast and extremeness aversion, respectively, and review the empirical evidence. (Additional data are included in Appendices A and B). Theoretical and practical implications are discussed in the final section.

TRADEOFF CONTRAST

In deciding whether or not to select a particular option, people commonly compare it with other alternatives that are currently available as well as with relevant alternatives that have been encountered in the past. Accordingly, we distinguish between two types of context effects—local effects due to the impact of the offered set of alternatives and background effects due to the influence of past options. In this section, we discuss in turn tradeoff contrasts that are induced by the background and by the local context.

Background Contrast

Figure 2 illustrates the experimental design used in the study of background contrast.[2] Respondents first made three choices between options in the background set, followed by two choices between options in the target set. The independent variable was the rate of exchange between the attributes in the background set. Half of the subjects chose between options on the upper line where the exchange rate between attributes 1 and 2 was high and the other half chose between options on the lower line where the exchange rate was low (see Figure 2). All subjects received the same target options on the middle (dotted) line.

[2]Unless specified otherwise, the alternatives used in the studies varied on two dimensions labeled so that higher values are preferable to lower values.

Figure 1
EXAMPLE OF CHOICE STIMULI: 35MM CAMERAS

ALT. A (MINOLTA X-370)

PRICE: **$169.99**

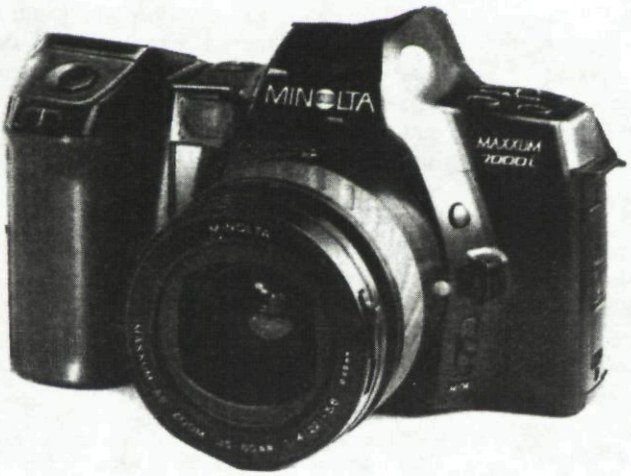
Minolta X-370 35mm SLR Camera Body. Compact quartz controlled aperture priority plus fully automatic/manual metering. LED viewfinder 1/1000 to 4 sec. shutter speed. Minolta 2-yr. ltd. warranty. Self-timer. Safe film-load signal. 3 lbs.
▲172405 ..... Your Price $169.99

ALT. B (MINOLTA - MAXXUM 3000i)

PRICE: **$239.99**

Minolta Maxxum 3000i 35mm SLR Camera Body. Predictive auto-focus camera. High-speed program mode. Integrated dual area metering. Advanced auto multi program selector. Minolta 2-yr. ltd. warranty. 1 lb.
▲282073 ..... Your Price $239.99

- World's fastest auto-focus SLR!
- Spot metering capability
- Continuous program adjustment
- Built-in AF illuminator
- Shutter speed 1/4000 to 30 sec.
- Minolta USA 2-yr.ltd. warranty.

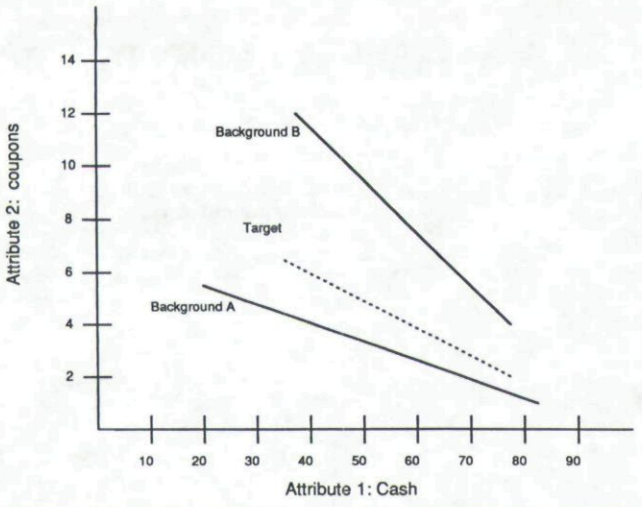


ALT. C (MINOLTA - MAXXUM 7000i)

PRICE: **$469.99**

Minolta Maxxum 7000i 35mm SLR Camera Body. Predictive auto focus adjusts for moving subjects up to the instant of exposure. Auto film handling and advance up to 3 frames per second with auto-focus control. 1 lb.
▲282014 ..... Your Price $469.99

Figure 2
BACKGROUND CONTRAST: CHOICE BETWEEN GIFTS



This design was employed in two domains, personal computers and gifts. The personal computers varied in memory and cost. The background exchange rate was \$4 per 1K memory in one version and \$0.5 per 1K memory in the other version. The exchange rate in the target sets was \$2 per 1K memory. We predicted that subjects exposed to the background in which the cost of memory is high would be more likely to select from the target sets the computer with the bigger memory than those exposed to the background in which the cost of memory is low. Respondents also chose between gifts consisting of a combination of cash and coupons. Each coupon could be redeemed for a regular book or a compact disk at local stores. Subjects were informed that one of them, selected randomly, would actually receive the gift that he or she had selected. The exchange rate was \$15 per coupon in one version and \$5 per coupon in the other. The exchange rate in the target sets was \$10 per coupon. We predicted that subjects exposed to the former background would be more likely to select from the target sets the gift with more coupons than those exposed to the latter background. The choice sets and the data for personal computers and gifts are presented in Table 1.

It is evident that the background influenced subsequent choices in the predicted direction. Of subjects who were exposed to background comparisons with a high cost of memory, 52% (averaged across the two target choices) chose the PCs with more memory from the target sets in contrast to 18% of those who encountered background comparisons in which memory was less expensive ($t = 3.8$, $p < .01$). Similar results were observed for gifts. Of subjects who were first exposed to the \$5 per coupon background, 73% subsequently chose the gifts with a larger cash component in contrast to 47% in the \$15 per coupon condition ($t = 2.8$, $p < .01$).

Note that for personal computers the effect of the background could be justified on normative grounds. A consumer who observed a background tradeoff of \$4 per 1K of memory can reasonably conclude that \$2 per 1K represents a good deal. Conversely, a consumer who encountered a tradeoff of \$0.5 per 1K may reach the opposite conclusion. However, the background effect for gifts is more difficult to justify. Suppose a person is just willing to trade \$10 in cash for a book coupon. Why should that person change his or her mind after observing gifts in which the corresponding tradeoff is \$5 or \$15? People's choices appear to be influenced by the background, whether or not it provides pertinent information about the quality of the options.

In the preceding experiment the background consisted of three pairs of options. Does the effect occur when the background is reduced to a single comparison? To answer this question, we used a similar design (see Figure 3). Half the subjects chose first between a and b, whereas the other half chose between a' and b'. After the background choice, all subjects chose between x and y. The background contrast hypothesis implies that y should be more popular among subjects who first chose between a and b than among those who first chose between a' and b'.

This hypothesis was tested in two product categories, personal computers that varied in memory and price, and tires that varied in duration of warranty and price. The results, reported in Table 2, confirmed our prediction ($t = 4.7$ and $t = 3.7$ for PCs and tires, respectively, $p < .01$ in both cases). The size of the effect was comparable to that observed in the previous experiment in which the background consisted of three comparisons instead of one. We replicated this result in other product categories (e.g., paper towels, dental insurance), using several variations of the experimental design, including a configuration in which both background pairs were on the same side of the target pair (see Appendix A).

A different interpretation of the data in Tables 1 and 2 is based on the variation in the range of the attributes. Recall that in the preceding tests, one background presents a wider range of values on one attribute and a smaller range on the other. If extending the range of values on a given dimension reduces the advantage (disadvantage) of an alternative on that attribute, the preceding results can be explained by variations in the range of the attributes without invoking the notion of tradeoffs.[3] Huber and Puto (1983) tested this hypothesis using two-dimensional alternatives and found that, whereas variations in the rate of exchange influenced choice in a manner consistent with the tradeoff contrast hypothesis, extension of the range had no significant impact (see also Wedell 1991). It appears that the large background effect reported above cannot be explained by attribute range.

[3]For a discussion of range effects, see, for example, Lynch, Chakravarti, and Mitra (1991), Mellers and Birnbaum (1982), and Parducci (1965).

Table 1
BACKGROUND CONTRAST: MULTIPLE COMPARISONS

Category: personal computer

Version A (slope: \$4/K) (n = 49)		*Version B (slope: \$.5/K) (n = 51)*	
Choice set	*Share (%)*	*Choice set*	*Share (%)*
Background pairs			
640K/\$1560 or 740K/\$1960		640K/\$1320 or 740K/\$1370	
1000K/\$3000 or 1024K/\$3096		1000K/\$1500 or 1024/\$1512	
512K/\$1048 or 640K/\$1560		512K/\$1256 or 640K/\$1320	
Target pairs (slope: \$2/K)			
640K/\$1380 or 840K/\$1780	47 53	640K/\$1380 or 840K/\$1780	92 8
960K/\$2020 or 1024K/\$2148	49 51	960K/\$2020 or 1024K/\$2148	73 27

Category: gifts (cash and coupons for free books/CDs)

Version A (slope: \$15/coupon) (n = 51)		*Version B (slope: \$5/coupon) (n = 49)*	
Choice set	*Share (%)*	*Choice set*	*Share (%)*
Background pairs			
\$52 and 3 coupons or \$22 and 5 coupons		\$77 and 4 coupons or \$67 and 6 coupons	
\$82 and 1 coupons or \$67 and 2 coupons		\$42 and 11 coupons or \$37 and 12 coupons	
\$37 and 4 coupons or \$22 and 5 coupons		\$62 and 7 coupons or \$57 and 8 coupons	
Target pairs (slope: \$10/coupon)			
\$47 and 5 coupons or \$37 and 6 coupons	47 53	\$47 and 5 coupons or \$37 and 6 coupons	77 23
\$77 and 2 coupons or \$67 and 3 coupons	47 53	\$77 and 2 coupons or \$67 and 3 coupons	69 31

Local Contrast

Recall that background contrast refers to past experience, whereas local contrast refers to tradeoff comparisons within the offered set. Suppose y is clearly superior to z but x is not (see Figure 4). The tradeoff contrast hypothesis predicts that the addition of z to the set $\{x,y\}$ will increase the attractiveness of y relative to x.

Let $P(x;y)$ be the proportion of consumers who chose x from the offered set $\{x,y\}$ and $P(x;y,z)$ be the proportion of consumers who chose x from the set $\{x,y,z\}$. Next, let

$$P_z(x;y) = P(x;y,z)/[P(x;y,z) + P(y;x,z)].$$

Thus, $P_z(x;y)$ measures the popularity of x relative to y, inferred from the choice set $\{x,y,z\}$. If y is clearly superior to z but x is not (Figure 4), the tradeoff contrast hypothesis implies $P_z(y;x) > P(y;x)$. If the effect is very strong, the addition of z can actually increase y's market share, yielding $P(y;x,z) > P(y;x)$. This pattern of preference, called asymmetric dominance effect, violates the assumption that the popularity of an option cannot be increased by enlarging the offered set. The significance of this assumption, called "regularity," stems from the fact that if each individual satisfies value maximization, regularity holds in the aggregate data.[4] Failures of regularity therefore represent violations of value maximization. Regularity is also implied by most probabilistic choice models (see, e.g., Luce 1977; McFadden 1973; Tversky 1972).

[4]Note that VM does not imply $P(x;y) = P_z(x;y)$. Because of taste differences, the addition of z can change the (aggregate) share of x relative to y, even if each individual satisfies VM (Tversky and Simonson in press).

Figure 3
BACKGROUND CONTRAST

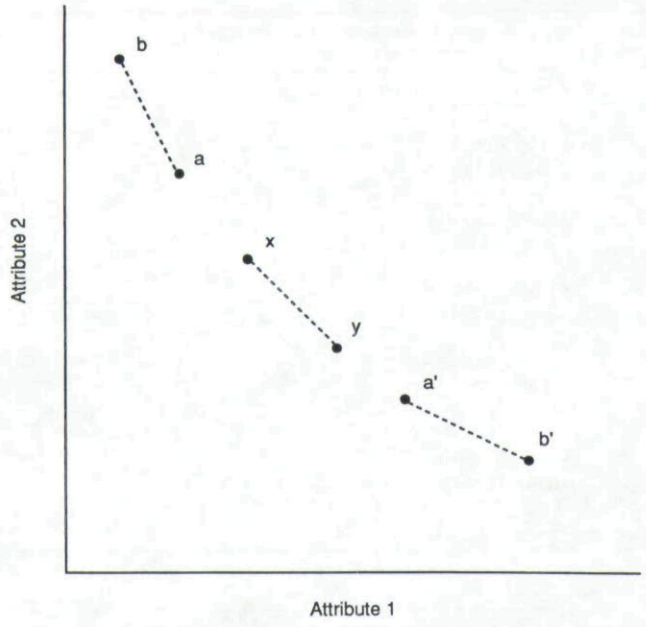
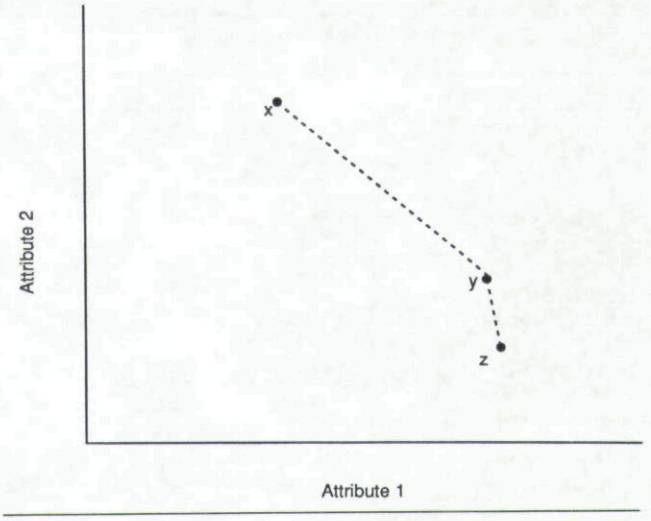


Table 2
BACKGROUND CONTRAST: SINGLE COMPARISON

		Share (%)	
Memory	Price ($)	Version A (n = 109)	Version B (n = 111)
Category: personal computer			
Background pairs			
a 600K	650	91	
b 620K	950	9	
a' 740K	1250		6
b' 1200K	1350		94
Target pair			
y 640K	1000	38	68
x 720K	1200	62	32
Category: tires			
		Share (%)	
Warranty	Price ($)	Version A (n = 111)	Version B (n = 109)
Background pairs			
a 55,000 miles	85	12	
b 75,000 miles	91	88	
a' 30,000 miles	25		84
b' 35,000 miles	49		16
Target pair			
x 40,000 miles	60	57	33
y 50,000 miles	75	43	67

Figure 4
ASYMMETRIC ADVANTAGE



Asymmetric dominance was first demonstrated by Huber, Payne, and Puto (1982; see also Huber and Puto 1983; Ratneshwar, Shocker, and Stewart 1987; Simonson 1989) and several explanations of this phenomenon have been proposed. We have already discussed an account based on range effects that has been rejected by the data of Huber and Puto. Another possible explanation is that the region with more alternatives (see Figure 4) is perceived as more desirable, leading to the selection of the best alternative in that region. However, this explanation is inconsistent with the results of the background contrast studies in which respondents were most likely to select from the target set the alternative that was the most distant from the background set they considered (see Figure 3). Finally, Ratneshwar, Shocker, and Stewart argued that the asymmetric dominance effect results from the respondents' inability to evaluate the alternatives meaningfully, and that it will be substantially reduced with more meaningful alternatives. Indeed, previous demonstrations of asymmetric dominance employed fairly schematic alternatives, such as hypothetical beers varying in price and taste rating. In the present studies, we replicate the asymmetric dominance effect using richer and more meaningful alternatives and explore two related phenomena, called enhancement and detraction.

Asymmetric Dominance

Differential discounts. Subjects were first given pictures and descriptions of five microwave ovens taken from the Best catalog. They were asked to examine the products carefully to familiarize themselves with the options available on the market. Subjects were then asked to choose among some of these products. Half of the subjects chose between *x* and *y*, whereas the other half chose among *x*, *y*, and *z* (see tabulation below). Though *y* does

not dominate z, it seems more attractive because it is favored by the sale (35% off vs. 10% off).

Category: microwave oven	Share (%) Set 1 ($n = 60$)	Set 2 ($n = 60$)
x Emerson (.5 cu. ft.; regular $109.99; sale price 35% off)	57	27
y Panasonic I (.8 cu. ft.; regular $179.99; sale price 35% off)	43	60
z Panasonic II (1.1 cu. ft.; regular $199.99; sale price 10% off)	—	13

As predicted, the addition of the less attractive Panasonic II increased the market share of the more attractive Panasonic I ($t = 1.9$, one-tail, $p < .05$) at the expense of the Emerson. It is noteworthy that asymmetric dominance was observed even though the respondents reviewed all relevant options prior to the choice. That is, those who chose between x and y were also aware of z. This effect therefore cannot be explained by the information conveyed by the offered set.

Choice across categories. It could be argued that context effects in general and asymmetric dominance in particular are confined to situations in which consumers are not familiar with the products and have no direct way to evaluate their quality. To address this question, we tested the asymmetric dominance effect using paper towels and facial tissues. These product categories were selected because they are highly familiar and because subjects can readily assess the quality of the various brands by inspecting the samples. A pilot study showed a high agreement among subjects in the rankings of the quality of paper towels, which were highly correlated with those published by *Consumer Reports*. The inclusion of both paper towels and facial tissues in the same choice set also enabled us to test asymmetric dominance in choices across categories, which are commonly made by consumers (Johnson 1984).

Subjects were asked to select either a roll of paper towels or a box of facial tissues. In one version of the questionnaire, they were presented two brands of paper towels and one brand of facial tissues, whereas in the other version they were presented two brands of facial tissues and one brand of paper towels. In the category with two options, the quality of one of the samples was clearly superior to that of the other. The superior towel and the superior tissue were included in both versions of the questionnaire. The following tabulation summarizes the results.

Category: paper towels/facial tissues	Share (%) Version A ($n = 115$)	Version B ($n = 106$)
x High quality paper towel	63	52
w Low quality paper towel	10	—
y High quality facial tissue	28	42
z Low quality facial tissue	—	7

Evidently, the asymmetric dominance effect holds even for products that are highly familiar and whose quality can be readily assessed. As predicted, the market shares of both the high quality paper towel and high quality facial tissue were significantly greater ($t = 1.7$ and $t = 2.2$, respectively, both $p < .05$) when they were superior to another option in the same category. This example shows that dominance or near-dominance within a category increases the tendency to choose that category. Another example of this phenomenon, involving dinners and photo portraits, is described by Tversky and Kahneman (1991).

Cash versus goods. In this study subjects were informed that some of them, selected randomly, would receive $6. They were further told that the winners would have the option of trading the $6 for a pen. Subjects were asked to examine the available pens and indicate whether they would like to trade the $6 for a pen. Later, 10% of the participants received either $6 or the pen they had chosen.

In one version of the questionnaire, subjects were presented an elegant Cross pen. In the other version, subjects were given an additional option—a lesser known brand name that was selected specifically for its unattractiveness. The following tabulation summarizes the results.

Category: cash/pen	Share (%) Version A ($n = 106$)	Version B ($n = 115$)
x $6	64	52
y Cross pen	36	46
z Other pen	—	2

Though very few subjects selected the less attractive pen, its inclusion in the offered set increased the percentage of respondents who preferred the more attractive Cross pen from 36% to 46% ($t = 1.5$, $p < .10$). This observation suggests that the tendency to pay cash for a good can be increased by the introduction of an inferior alternative.

Risky choice. In an unpublished study conducted by Payne, Bettman, and Simonson, subjects chose among three-outcome bets with non-negative outcomes. Each choice set consisted of a basic pair (x,y) and a third bet (x') that was dominated by x but not by y. Subjects were presented both $\{x,y,x'\}$ and $\{x,y,y'\}$, where y' was dominated by y but not by x. They were informed that they would actually play one of the bets and receive the appropriate payoffs. The results showed that bets were, on average, 17% more popular when they dominated another bet than when they did not ($p < .01$). This finding again illustrates tradeoff contrast in a situation where the offered set provides no additional information about the worth of the options.

We also tested the asymmetric dominance effect when the added alternative was not available for choice (e.g., out of stock). The inclusion of an unavailable alternative that dominates one option but not the other did not produce a consistent pattern of results. In some cases it de-

creased the market share of the "dominated" alternative (in accord with asymmetric dominance), in some cases it increased the share of the "dominated" alternative (see Farquhar and Pratkanis 1987), and in other cases it had no effect.[5] The effect of an unavailable alternative appears to depend on the product category, the position of the unavailable alternative in the set, and the perceived cause of unavailability, which may indicate either low or high popularity. The effect of unavailable alternatives calls for further research.

Enhancement and Detraction.

The typical demonstration of asymmetric dominance employs three options x, y, z, such that z is dominated (or nearly dominated) by y but not by x. The tradeoff contrast hypothesis, however, implies that the offered set will affect choice even when no option has a decisive advantage over another. Asymmetric dominance therefore can be viewed as an extreme form of tradeoff contrast. In this section, we investigate a milder form of tradeoff contrast, which is probably more common in everyday life.

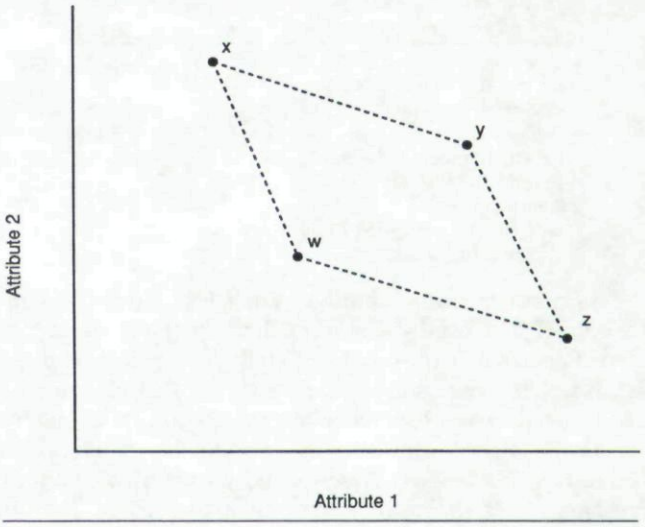
Consider the options displayed in Figure 5. Suppose the consumer does not have a strong preference between x and z and that y and w, respectively, are slightly more and less attractive than x and z. Because the contrast of the x–z tradeoff with the y–z and the y–x tradeoffs favors y, it is expected to fare better in the triple than in the pairs; that is, $P_x(y;z) > P(y;z)$ and $P_z(y;x) > P(y;x)$. This pattern is called "enhancement." Similarly, because the contrast of the x–z tradeoff with the w–z and w–x tradeoffs is unfavorable to w, it is expected to fare worse in the triple than in the pairs; that is, $P_x(w;z) < P(w;z)$ and $P_z(w;x) < P(w;x)$. This pattern is called "detraction." Note that in the binary choice there is only one tradeoff, and hence no room for tradeoff contrast. Once a third option is introduced, a decision maker can compare the three tradeoffs, which enhances the attractiveness of y and detracts from the attractiveness of w. We report two tests of enhancement and detraction, using unleaded gasoline and personal computers.

Subjects were told that oil companies were soon expected to introduce a greater variety of unleaded gasoline (between 85 and 95 octane), and that independent research had shown that higher octane gasoline improves the performance of most cars. They were then asked to choose among different types of unleaded gasoline that varied in octane and price. In a second task, subjects chose among personal computers that varied in memory and price. The choice sets, presented to different groups of subjects, and the data are reported in Tables 3 and 4, which also include the normalized shares, for example, $P_x(y;z) = P(y;x,z)/[P(y;x,z) + P(z;y,x)]$.

As implied by enhancement, y had a higher relative share in the triples than in the pairs in all four cases. Let

[5]The data can be obtained from the first author.

Figure 5
ENHANCEMENT AND DETRACTION



$D_x(y) = P_x(y;z) - P(y;z)$ and $D_z(y) = P_z(y;x) - P(y;x)$. Thus, $D_x(y)$ measures the degree to which the addition of x to the set $\{y,z\}$ changes the relative popularity of y and z. In particular, $D_x(y) > 0$ if the addition of x hurts z more than y, and $D_x(y) < 0$ if x hurts y more than z. In accord with enhancement, the average value of $D_x(y)$ and $D_z(y)$ for personal computer and unleaded gas was .15, which was statistically significant separately in two

Table 3
ENHANCEMENT AND DETRACTION: UNLEADED GASOLINE

Enhancement

	Option		*Share (%)*		
	Octane	*Price /gallon ($)*	*Set 1 (n = 56)*	*Set 2 (n = 61)*	*Set 3 (n = 50)*
x	87	1.01	27	39	—
y	90	1.08	64	61	68
z	93	1.21	9	—	32
$P_z(y;x)$:				71	
$P_x(y;z)$:					88

Detraction

	Option		*Share (%)*		
	Octane	*Price /gallon ($)*	*Set 4 (n = 52)*	*Set 5 (n = 57)*	*Set 6 (n = 52)*
x	87	1.01	48	58	—
w	90	1.14	23	42	67
z	93	1.21	29	—	33
$P_z(w;x)$				32	
$P_x(w;z)$					44

Table 4
ENHANCEMENT AND DETRACTION: PERSONAL COMPUTERS

Enhancement

	Option		Share (%)		
	Memory	Price ($)	Set 1 (n = 55)	Set 2 (n = 53)	Set 3 (n = 54)
x	640K	1000	22	36	—
y	760K	1175	58	64	54
z	840K	1400	20	—	46
$P_z(y;x)$				72	
$P_x(y;z)$					74

Detraction

	Option		Share (%)		
	Memory	Price ($)	Set 1 (n = 58)	Set 2 (n = 56)	Set 3 (n = 51)
x	640K	1000	48	59	—
w	720K	1225	17	41	43
z	840K	1400	35	—	57
$P_z(w;x)$				26	
$P_x(w;z)$					33

of the four comparisons ($p < .05$). Similarly, as implied by detraction, w had a lower relative share in the triples than in the pairs in all four cases. The average value of $D_x(w)$ and $D_z(w)$ was $-.15$, which was statistically significant in one comparison ($p < .05$) and marginally significant in another comparison ($p < .10$).

These data support the predicted patterns of enhancement and detraction. They differ from the tests of asymmetric dominance in that the tradeoffs were not extreme and the results were accordingly less dramatic. Though the predicted changes in relative popularity were confirmed, no significant violations of regularity were observed. Note that detraction (but not enhancement) is consistent with the similarity hypothesis that the addition of an extreme option hurts the similar (middle) alternative more than the less similar (extreme) alternative (see Tversky and Simonson 1992). However, enhancement (but not detraction) can be explained by extremeness aversion, discussed in the next section. Tradeoff contrast accounts for both enhancement and detraction, but the similarity hypothesis and extremeness aversion may also contribute to the observed effects.

EXTREMENESS AVERSION

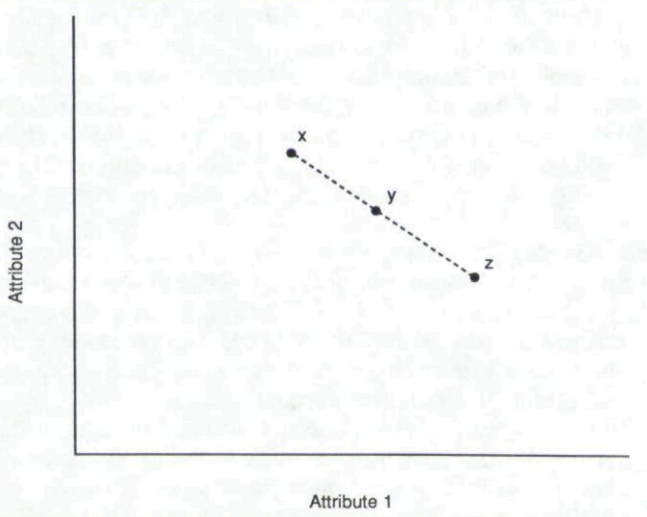
Studies of both risky and riskless choice provided evidence for the principle of loss aversion, according to which losses generally loom larger than the corresponding gains (Tversky and Kahneman 1991). Losses and gains are usually defined in relation to a neutral reference point that corresponds to the status quo. In many choice problems, however, alternatives are evaluated in terms of their advantages and disadvantages defined in relation to other options. To explain the effect of context on choice, we extend the notion of loss aversion and propose that disadvantages are weighted more heavily than the corresponding advantages.

Consider a set of three options that vary on two attributes, such that y is between x and z, denoted $x|y|z$; for example, $x_1 < y_1 < z_1$ and $x_2 > y_2 > z_2$ (see Figure 6). Here, each extreme option (x and z) has a large advantage and a large disadvantage relative to the other extreme, and it has a small advantage and a small disadvantage relative to the middle option (y). The middle option, in contrast, has small advantages and small disadvantages in relation to both extremes. If (pairwise) disadvantages loom larger than the corresponding advantages, the middle option y should fare better in the triple than in the pairs. That is, $P_x(y;z) > P(y;z)$ and $P_z(y;x) > P(y;x)$.

We distinguish two forms of extremeness aversion—compromise and polarization. Compromise occurs when both inequalities hold. That is, the addition of x to $\{y,z\}$ increases the share of y relative to z and the addition of z to $\{x,y\}$ increases the share of y relative to x. Compromise is expected if disadvantages loom larger than advantages on both attributes. Polarization occurs when only one of the inequalities holds. It is expected if disadvantages loom larger than advantages on one dimension but not on the other. We use the term "extremeness aversion" to refer to either compromise or polarization—that is, at least one of the above inequalities holds.

Compromise and polarization are generally inconsistent with value maximization, even though they need not violate regularity. We have shown (Tversky and Simonson 1992) that under very plausible conditions, which were confirmed by data, value maximization implies the

Figure 6
EXTREMENESS AVERSION



following betweenness inequality: if y is between x and z on all relevant attributes, then $P(y;z) > P_x(y;z)$ and $P(y;x) > P_z(y;x)$. That is, the middle option y (in Figure 6) is expected to lose relatively more than the extreme option x from the introduction of the other extreme z. This implication of value maximization is at variance with extremeness aversion, which implies that y will lose relatively less than x from the introduction of z. The opposing predictions were tested in the next series of studies.

Compromise

In the following tests of the compromise effect, either z or w is added to the pair x, y, such that either x or y becomes the middle alternative (i.e., $w|x|y$ and $x|y|z$; see Figure 6).

Cameras. This test involved 35mm Minolta cameras (see Figure 1). In one version there were two cameras, whereas in the other version a third camera was added. The prices and the descriptions of the cameras (including pictures) were taken from the Best catalog. The results follow.

Category: 35mm camera		*Share (%)*	
Brand	*Price ($)*	*Set 1 (n = 106)*	*Set 2 (n = 115)*
x Minolta X-370	169.99	50	22
y Minolta Maxxum 3000i	239.99	50	57
z Minolta Maxxum 7000i	469.99	—	21

The results show that x and y were equally popular in set 1, but the addition of the top-of-the-line Maxxum 7000i in set 2 increased the popularity of y relative to x from 50% to 72%, $D_z(y) = P_z(y;x) - P(y;x) = .57/(.57 + .22) - .50 = .22$, SE = .068, $t = 3.2$, $p < .01$. We replicated this result in a subsequent study in which the subjects reviewed a set of five cameras, including the preceding three cameras, before making a choice from set 1 or from set 2. The observed violation of the betweenness inequality and hence of value maximization therefore cannot be explained by different states of information about the alternatives available on the market.

Unavailable options. We also tested the compromise effect when the added (extreme) alternative was not available for choice. Table 5 summarizes the data for calculator batteries (from Simonson 1989). The results demonstrate a compromise effect even though the effective choice set was identical in all three conditions ($D_x(y) = .09$, $t = 1.5$, $p < .10$, and $D_z(y) = .26$, $t = 4.3$, $p < .01$).

An alternative design used to test the compromise effect involves three sets with the betweenness relations $v|w|x$, $w|x|y$, and $x|y|z$. In this design, w, x, and y serve as a middle alternative in one set and as an extreme alternative in one or two of the other sets. Table 6 reports the results for calculators varying in number of functions and reliability (from Simonson 1989) and portable grills varying in size and weight. As can be seen, each calculator was relatively more popular when it was in the middle than when it was extreme. To test the betweenness inequality in this design, we compare choice sets (e.g., sets 1 and 2) that have two options in common (e.g., w and x). Compromise implies $P_v(w;x) > P_y(w;x)$, etc. The share of w relative to x is .51 in set 1 (.48/(.48 + .47)) and .37 in set 2 (.26/(.26 + .45)) ($t = 2.0$, $p < .05$). The corresponding values for the comparison of x with y are .61 in set 2 and .47 in set 3 ($t = 2.0$, $p < .05$).

The same pattern of results was obtained for portable grills. The share of w relative to x is .58 in set 1 and .38 in set 2 ($t = 2.1$, $p < .05$). The corresponding values for the comparison of x to y are .62 in set 2 and .36 in set 3 ($t = 2.5$, $p < .05$).

Table 5
A COMPROMISE EFFECT WITH UNAVAILABLE ALTERNATIVES

Category: calculator battery[a]				
Brand		*Share (%)*		
Expected life (hr.)	*Probability of corrosion (%)*	*Set 1 (n = 126)*	*Set 2 (n = 124)*	*Set 3 (n = 119)*
w 10	0	—	UA[b]	—
x 12	2	57	66	40
y 14	4	43	34	60
z 16	6	—	—	UA

[a]From Simonson (1989).
[b]UA indicates that the alternative was presented but was unavailable for choice.

Polarization

We have attributed the compromise effect to the notion that disadvantages loom larger than the correspond-

Table 6
COMPROMISE EFFECT

Category: calculator[a]				
Option		*Share (%)*		
No. of functions	*Chances of defect in 2 years (%)*	*Set 1 (n = 124)*	*Set 2 (n = 126)*	*Set 3 (n = 121)*
v 8	1	5	—	—
w 16	3	48	26	—
x 24	5	47	45	36
y 32	7	—	29	40
z 40	9	—	—	24

Category: portable grill				
Option		*Share (%)*		
Cooking area (sq. in.)	*Weight (lb.)*	*Set 1 (n = 77)*	*Set 2 (n = 70)*	*Set 3 (n = 72)*
v 160	4	31	—	—
w 220	7	40	27	—
x 280	10	29	44	26
y 340	13	—	29	47
z 400	16	—	—	26

[a]From Simonson (1989).

ing advantages. The difference in the evaluation of advantages and disadvantages, however, may depend on the attributes in question; it can be large for one attribute and negligible for another. The combination of two such attributes should yield an asymmetric pattern of extremeness aversion, called "polarization."

We have encountered this pattern in several studies in which the options varied in quality (e.g., magnifying power of binoculars, coverage of dental insurance) and price. In most cases, the low quality, low price option was relatively less popular in sets of three options than in sets of two, but this was not true for the high quality, high price option. These findings suggest extremeness aversion for quality, but little or no extremeness aversion for price. The asymmetry between price and quality was examined in several categories.

AM/FM cassette recorder. The descriptions of the alternatives (taken from the Best catalog) included brand names, features, pictures, and prices. The options and the results are summarized in Table 7.

As in previous tests, we compared the relative shares of options in binary and trinary choices. Given the triple $x|y|z$, with $x_1 < y_1 < z_1$ and $x_2 > y_2 > z_2$, we computed the following measures:

$$D_x(y) = P_x(y;z) - P(y;z)$$
$$D_z(y) = P_z(y;x) - P(y;x)$$
$$D_y(x) = P_y(x;z) - P(x;z)$$

$D_x(y)$ and $D_z(y)$ estimate the impact of adding an extreme option on the relative shares of the adjacent and nonadjacent alternatives, whereas $D_y(x)$ measures the effect of adding a middle option on the relative shares of the two extremes.

The betweenness inequality implies that the addition of x (or z) should reduce the share of the adjacent option y more than that of the nonadjacent option z (or x). Compromise, in contrast, predicts that the addition of either x or z would increase the share of y relative to the other extreme. Finally, polarization makes the same prediction for one dimension but not for the other. This discussion can be summarized in the following statements.

1. If both $D_x(y)$ and $D_z(y)$ are nonpositive, the betweenness inequality holds (i.e., no compromise, no polarization).
2. If both $D_x(y)$ and $D_z(y)$ are positive, we obtain compromise (i.e., betweenness is violated in both directions).
3. If $D_x(y)$ and $D_y(x)$ are positive and $D_z(y)$ is not, we obtain polarization that favors x; similarly, if $D_z(y)$ is positive, $D_y(x)$ is negative, and $D_x(y)$ is nonpositive, we obtain polarization that favors z.

We applied these indices to the AM/FM cassette data (Table 7), where the two dimensions are quality and price. The data yield:

$$D_x(y) = .53 - .40 = .13,\ t = 1.4,\ \text{NS},$$
$$D_z(y) = .29,\ t = 3.2,\ p < .01,\ \text{and}$$
$$D_y(x) = -.34,\ t = -3.6,\ p < .01.$$

This pattern indicates polarization that favors quality, because $D_z(y)$ is positive, $D_y(x)$ is negative, and $D_x(y)$ is not significantly different from zero. As we move from binary to trinary choice, the low quality option x is the big loser. Note that the two extreme options x and z were about equally popular in the binary comparison (set 4), but z was nearly five times more popular than x in the trinary choice.

Additional examples of polarization that favor quality (or performance) over price are presented in Table 8 (see

Table 7
POLARIZATION

Category: AM/FM cassette player

Option		Share (%)			
Brand	Price ($)	Set 1 (n = 51)	Set 2 (n = 57)	Set 3 (n = 58)	Set 4 (n = 57)
x Emerson (mid-line)	39.99	45	—	9	51
y Sony (mid-line)	64.99	55	40	48	—
z Sony (top)	149.99	—	60	43	49

Table 8
POLARIZATION

Product category: dental insurance

Plan		Share (%)			
Coverage (%)	Annual premium ($)	Set 1 (n = 54)	Set 2 (n = 57)	Set 3 (n = 58)	Set 4 (n = 51)
v 50	130	57	28	31	33
w 67	165	—	25	—	—
x 67	180	—	—	24	—
y 67	195	—	—	—	12
z 90	240	43	47	45	55

Category: binoculars

Option		Share (%)			
Magnifiying power	Price ($)	Set 1 (n = 38)	Set 2 (n = 40)	Set 3 (n = 41)	Set 4 (n = 40)
v 7X	20	45	12	17	5
w 12X	28	—	53	—	—
x 12X	32	—	—	28	—
y 12X	36	—	—	—	24
z 17X	44	55	35	55	71

Category: personal computer

Option		Share (%)			
Memory	Price ($)	Set 1 (n = 56)	Set 2 (n = 57)	Set 3 (n = 50)	Set 4 (n = 55)
w 640K	1200	57	26	86	34
x 645K	1280	—	16	14	—
y 700K	1400	—	—	—	7
x 740K	1420	43	58	—	58

also Appendix B). In all three categories, the introduction of a middle alternative substantially reduced the relative share of the low quality, low price option and increased the relative share of the high quality, high price option. This effect was statistically significant in six of seven comparisons. Moreover, in five of seven tests, regularity was violated.

We interpret these results in terms of extremeness aversion that applies to quality but not to price. Recall that there is no extremeness aversion in binary choice because no option is more extreme than another. The question remains why, given a set of three or more options, consumers find the lowest quality more aversive than the highest price. We have no definite answer to this question. We speculate that quality or performance defines the goal of a purchase, whereas price is merely a means for achieving that goal. As a consequence, quality may be perceived as more important than price, and this tendency is enhanced in the trinary choice because the lowest quality in a set of three (or more) appears less acceptable than the lower quality in a set of two. If this conjecture is valid, we would expect polarization for other pairs of attributes in which one is more prominent than the other (Tversky, Sattath, and Slovic 1988). Some evidence consistent with this hypothesis, involving CD players and bets, is reported in Appendix B. In both cases, polarization favors the dimension that respondents consider more important (sound quality for CD players and probability of winning for bets). The conditions that give rise to polarization warrant further study.

In sum, the betweenness inequality leads to the prediction that the addition of an extreme alternative will hurt the middle alternative more than the other extreme. This prediction of value maximization appears intuitively compelling. For example, the addition of a top-of-the-line camera might be expected to reduce the market share of a mid-line camera more than the share of a basic camera. However, contrary to both standard theory and naïve intuition, we found large and systematic violations of the betweenness inequality. In a wide range of choice problems, the extreme rather than the middle alternative was the big loser. Future research may help characterize the situations in which the betweenness inequality is violated or satisfied. In particular, we hypothesize that the betweenness inequality (and hence value maximization) is more likely to be satisfied when consumers evaluate each alternative separately on the basis of its absolute rather than relative characteristics.

DISCUSSION

We investigated two hypotheses about the effect of context on choice—tradeoff contrast and extremeness aversion. These hypotheses account for several phenomena reported in the literature and predict additional effects observed in the present studies. In this section we briefly summarize the main results and discuss their theoretical and practical implications.

The tradeoff contrast hypothesis extends the notion of contrast to the comparison of tradeoffs. It explains the asymmetric dominance effect (Huber, Payne, and Puto 1982) whereby the addition of an inferior option increases the market share of the superior option. We also demonstrated more common forms of tradeoff contrast, called enhancement and detraction, that do not involve extreme tradeoffs or clearly inferior options. Tradeoff contrasts are not limited to the local context defined by the offered set. Indeed, we show that preferences are systematically influenced by the tradeoffs among previously encountered options.

The extremeness aversion hypothesis derives from the notion that disadvantages loom larger than the respective advantages, which extends the notion of loss aversion. It explains the compromise effect (Simonson 1989) whereby the addition of an extreme option increases the share of the middle option relative to the other extreme. This is a symmetric form of extremeness aversion that applies to both attributes. In many cases, extremeness aversion applies to only one attribute. We observed this pattern, called polarization, in choices involving tradeoffs between quality and price. In such situations, the addition of a middle option favors the high quality, high price option relative to the low quality, low price option.

We have discussed tradeoff contrast and extremeness aversion separately. Sometimes, both hypotheses may be relevant to the interpretation of a particular pattern of choice. For example, we interpreted enhancement and detraction in terms of tradeoff contrast. However, in a test that involves nondominated two-dimensional options, extremeness aversion also comes into play. Specifically, compromise is expected to amplify enhancement and inhibit detraction.

Both tradeoff contrast and extremeness aversion are expected to have less impact in situations in which consumers have well-established preferences. If a consumer habitually purchases the same brand in a category, for example, context effects are unlikely to play a major role. In contrast, when people are uncertain about the values of options, they are more likely to use the context in determining the "best buy." Context effects can sometimes be justified normatively in terms of the information derived from the background or the local context. However, the same effects are observed even when the context provides no new information about the options. Evidently, people make context-based inferences about the worth of alternatives whether or not the context provides a valid basis for such inferences.

In some cases, people are unaware of context effects, as they are generally unaware of priming and anchoring. In other situations, people use the context explicitly to justify their choices to themselves and to others. For example, people often rationalize the choice of a middle option as a compromise between extremes, as documented in verbal protocols of choice experiments (Simonson 1989). We investigated tradeoff contrast and extremeness aversion using aggregate choices as the dependent variable. The use of process measures, such as verbal protocols or patterns of information acquisition, might improve our understanding of the conscious

and unconscious inferences that underlie the observed context effects.

Theoretical Implications

Our findings suggest that context effects are both common and robust, representing the rule rather than the exception in choice behavior. The prevalence of context effects presents a challenge to marketing researchers and more generally to decision theorists. The systematic failure of value maximization undermines the standard theory of consumer choice and calls for an analysis that explains the effects of context on choice. Though these effects can be viewed as manifestations of bounded rationality, they cannot be readily explained as attempts to reduce effort and minimize the cost of thinking. Both tradeoff contrast and extremeness aversion entail assessments that seem more complicated than those implied by value maximization. More generally, context effects imply that people take into account comparative characteristics of alternatives that tend to complicate the choice task. This process, we believe, is driven primarily by an attempt to achieve better resolution and identify the best choice, not merely by the tendency to simplify the task.

Elsewhere (Tversky and Simonson, in press), we have proposed a theoretical analysis of the effect of context on choice. As in the standard theory of the consumer, each alternative x is characterized by a vector $(x_1, \ldots, x_n)$ and preference is monotone in each attribute. Assume that an option x is selected from an offered set S if $V^S(x)$ exceeds $V^S(y)$ for all y in S. Thus, $V^S(x)$ represents the value of option x in context S. To obtain a simple representation, we impose additivity, that is, $V^S(x) = v_1^S(x_1) + \ldots + v_n^S(x_n)$. The simplest context-dependent additive model that accounts for tradeoff contrast is obtained by letting $v_i^S(x_i) = w_i^S v_i(x_i)$, $i = 1, \ldots, n$. Here, the choice set S affects only the weight associated with each attribute or, equivalently, the rate of exchange between attributes. This form is essentially the same as the contingent weighting model of Tversky, Sattath, and Slovic (1988). We assume that the tradeoff between a pair of attributes in a given set is a weighted combination of the "prior" tradeoff and the mean tradeoff in the set of options under consideration, where the weight reflects the degree of context dependence. It is easy to show that this model can explain the various manifestations of tradeoff contrast described above.

To account for extremeness aversion as well, we generalize the above form and set $v_i^S(x_i) = w_i^S f_i[v_i(x_i) - v_i(m_i^S)]$, where m_i^S is the minimal level of attribute i in S. This yields an additive difference model in which the contribution of attribute i is evaluated (by f_i) relative to the lowest level of that attribute in the relevant choice set. It follows readily that, in the two-dimensional case, compromise occurs if both f_1 and f_2 are strictly concave, and polarization occurs if one function is strictly concave and the other is linear. In this analysis, called the contingent additive model, the effect of the choice set on the value of an option is captured by two adjustments: an updating of the rate of exchange *between* attributes and a shift of the reference point *within* each attribute. Though this model is at best approximate and incomplete, it provides a parsimonious account of the patterns of choice discussed in this article.

Marketing Implications

Aside from their theoretical significance, context effects could have important practical implications for the prediction of consumer choice and the design of product positioning, communications, and competitive strategies. Tradeoff contrast and extremeness aversion might be used to critique and perhaps even revise standard methods for predicting consumer choice and market share. Because these methods (see, e.g., Green and Srinivasan 1990) assume value maximization, they do not take into account the presence of context effects. If these phenomena are as common and as orderly as suggested by the results reported here, a model that incorporates tradeoff contrast and extremeness aversion is likely to make better predictions than a model that ignores these effects. Though the contingent additive model outlined above cannot be readily estimated from aggregate data, a simplified version of this model could perhaps be used to modify standard methods of prediction that rely on value maximization. The development of such a procedure is left for future research.

The research reviewed here suggests that, when designing a new product, managers should consider not only its attribute values, but also its likely position in the relevant choice sets. For instance, polarization suggests that the introduction of a middle option between a high price, high quality brand and a low price, low quality brand will hurt the latter more than the former. Similarly, a new product that is positioned as clearly superior to another brand is likely to benefit from the asymmetric dominance effect.

Asymmetric dominance may contribute to the impact of promotions on sales and suggest an additional explanation for the finding that the elasticity associated with a deal exceeds price elasticity (Blattberg and Neslin 1990). Previous explanations of the impact of promotions have focused on their influence on purchase timing, on price discrimination, and on advertising. Asymmetric dominance provides an additional explanation. Because a brand on sale dominates the same brand when it is not on sale, the sale brand is likely to compare more favorably with other brands. In other words, the attractiveness of buying an item on sale may derive not only from the price reduction *per se*, but also from the implicit asymmetric dominance effect that is induced by the sale.

Context effects can be used to improve communications (e.g., comparative ads) and sales tactics. For example, Williams-Sonoma, a mail order and retail business located in San Francisco, used to offer one bread-baking appliance priced at $275. Later they added a second bread-baking appliance, which was similar to the first but was somewhat larger. The price of this item was $429, more than 50% higher than that of the original appliance. Not surprisingly, perhaps, Williams-Sonoma

did not sell many units of the new item. However, the sales of the less expensive appliance almost doubled, as implied by tradeoff contrast. To the best of our knowledge, Williams-Sonoma did not anticipate this effect.

In other situations, salespeople intentionally exploit context effects. A common tactic used to convince consumers to purchase a given product is to present another product and argue that the former is a bargain in comparison with the latter. Our analysis may help explain the basis for such tactics. It may also offer the consumer some insight, which could lead to more thoughtful decisions.

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APPENDIX A
BACKGROUND CONTRAST: ADDITIONAL EXAMPLES

Category: personal computer

Option		Share (%)	
Memory	*Price ($)*	*Version A (n = 62)*	*Version B (n = 65)*
Background pairs			
a 880K	1200	98	
b 480K	1000	2	
a′ 720K	1500		11
b′ 640K	700		89
Target pair			
x 720K	1200	40	80
y 640K	1000	60	20

Category: paper towels

Option		Share (%)	
Quality	*Price/roll ($)*	*Version A (n = 66)*	*Version B (n = 69)*
Background pairs			
a Medium	.69	66	
b High	1.13	34	
a′ Very low	.85		16
b′ Very high	.99		84
Target pair			
x Medium	.84	28	50
y High	.99	72	50

Category: dental insurance

Plan		Share (%)	
Coverage (%)	*Cost ($)*	*Version A (n = 109)*	*Version B (n = 111)*
Background pairs			
a 55	65	91	
b 60	150	9	
a′ 80	245		6
b′ 100	275		94
Target pair			
x 65	170	50	79
y 75	220	50	21

Category: dental insurance

Plan		Share (%)	
Coverage (%)	*Cost ($)*	*Version A (n = 61)*	*Version B (n = 60)*
Background pairs			
a 80	245	92	
b 85	340	8	
a′ 80	245		7
b′ 100	275		93
Target pair			
x 65	170	30	58
y 75	220	70	42

APPENDIX B
POLARIZATION: ADDITIONAL EXAMPLES

Category: camera[a]

Brand	*Price ($)*	*Share (%)*			
		Set 1 (n = 41)	*Set 2 (n = 41)*	*Set 3 (n = 39)*	*Set 4 (n = 40)*
w Minolta Compact	84.99	—	44	—	—
x Minolta X-370	169.99	63	32	31	52
y Minolta Maxxum 3000i	239.99	37	24	46	48
z Minolta Maxxum 7000i	469.99	—	—	23	UA[b]

Category: CD player[c]

Option		*Share (%)*		
Sound quality rating (0–100)	*No. programmable tracks*	*Set 1 (n = 46)*	*Set 2 (n = 46)*	*Set 3 (n = 45)*
w 80	32	26	9	11
x 82	28	—	—	22
y 87	18	—	37	—
z 89	14	74	54	67

Category: dental insurance[d]

Plan		*Share (%)*			
Coverage (%)	*Annual premium ($)*	*Set 1 (n = 71)*	*Set 2 (n = 77)*	*Set 3 (n = 85)*	*Set 4 (n = 81)*
v 50	110	—	—	—	32
w 60	150	—	29	—	20
x 70	190	49	22	29	48
y 80	230	51	49	23	—
z 90	270	—	—	47	—

Category: bets[e]

Bet		*Share (%)*			
Probability of winning	*$ amount*	*Set 1 (n = 75)*	*Set 2 (n = 75)*	*Set 3 (n = 79)*	*Set 4 (n = 83)*
v .25	800	—	—	—	28
w .35	550	—	28	—	13
x .45	350	51	17	33	59
y .55	225	49	55	25	—
z .65	150	—	—	42	—

[a]A comparison of set 1 with sets 2, 3, and 4 indicates polarization, which favors quality.
[b]UA indicates that the alternative was presented but was unavailable for choice.
[c]A comparison of set 1 with sets 2 and 3 indicates polarization favoring sound quality, which was judged to be the more important attribute in a separate study.
[d]A comparison of set 1 with sets 2 and 3 indicates polarization, which favors coverage.
[e]A comparison of set 1 with sets 2 and 3 indicates polarization, which favors probability of winning.

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