Context Effects without a Context: Attribute Balance as a Reason for Choice

ALEXANDER CHERNEV*

This article extends the notion of context effects beyond the relational properties of choice alternatives to include attribute balance as a reason for choice. The data reported in two experiments demonstrate that attribute balance has a significant impact on extremeness-aversion and trade-off-contrast effects reported in prior research. The proposition that consumers use attribute balance as a reason for choice is further supported by the finding that attribute balance moderates the impact of justification on the strength of extremeness aversion and trade-off contrast. These findings offer a new perspective on the decision processes underlying context effects in choice.

The literature on behavioral decision theory has shown that contrary to the principle of value maximization (Luce 1959) consumer preferences are influenced by the decision context, defined by the relational properties of alternatives under consideration (Payne 1982; Payne, Bettman, and Johnson 1993). Prior research has further proposed that the effect of context on choice is described by two main principles: trade-off contrast and extremeness aversion (Simonson and Tversky 1992). A common assumption for both trade-off contrast and extremeness aversion is that they are based on the relational properties of choice alternatives, such that the evaluation of a given alternative is a function of its performance relative to the other options in the choice set.

Recent research has further argued not only that extremeness aversion is a function of the relational properties of choice alternatives but also that it depends on the dispersion of attribute values within each of the alternatives (Chernev 2004). To illustrate, consider a scenario in which choice alternatives are described by attributes using readily comparable metrics, say 100-point rating scales. In this scenario consumers are likely to compare not only the options' values across different attributes but also attribute values within each of the options. As a result, an option with balanced attribute values (60, 60) tends to be perceived as less extreme than an option with values (70, 50), an effect that is not contingent on the relational properties of the choice alternatives in the set.

Building on prior findings, this research investigates the role of attribute balance as an intrinsic factor moderating both extremeness-aversion and trade-off-contrast effects in choice. Moreover, this research documents the role of attribute balance as a compelling reason for choice that is independent from the decision context defined by the relational properties of choice alternatives. The theoretical analysis, the research hypotheses, and two empirical studies are described in more detail in the next sections.

*Alexander Chernev is associate professor of marketing, Kellogg School of Management, Northwestern University, Evanston, IL 60208 (ach@northwestern.edu). The author thanks Gregory Carpenter, Joel Huber, Vincent Nijs, Itamar Simonson, the editor, the associate editor, and the three reviewers for their advice and constructive comments.

THEORETICAL DEVELOPMENT

Background

Attribute Balance. To deal with the increasing number and complexity of products and product features available to consumers, many companies have begun to describe their offerings using aggregate attributes such as reliability, quality, value, performance, features, ease of use, and customer service. Such aggregate attribute scales are also commonly used by consumer guides and rating services in an attempt to standardize product evaluations across categories. Because these aggregate attributes are not associated with a particular metric, they commonly rely on universal metrics such as numbers, stars, and partially filled circles. In this context, this research examines a scenario in which one of the choice alternatives has equal attribute values—an alternative referred to as balanced.

The concept of balanced alternatives can be related to the notion of all-average options discussed in prior research (Dhar, Nowlis, and Sherman 2000; Dhar and Simonson 2003; Shafir 1993). The commonality of these two concepts is that both are defined relative to a reference point used to evaluate the extremeness of choice alternatives. The key difference is the reference point used to evaluate options' extremeness. For the all-average option, the extremity of each of the attributes is defined using a relatively independent anchor. To illustrate, the attribute values of the all-average option are typically defined through attribute-

specific qualifiers such as "average," "medium," and "typical." In contrast, for balanced alternatives the reference point is determined by the relationship between two or more attribute values (e.g., 60, 60) rather than by a single attribute-specific qualifier. As a result, attribute values of the balanced option, considered independently, may not necessarily be a natural anchor. For example, an option with values (69, 69) is balanced even though its attribute-specific values do not represent natural anchors.

Extremeness Aversion and Trade-off Contrast. The extremeness-aversion principle posits that, all else being equal, an option with relatively more extreme values tends to be viewed as less attractive than an otherwise equivalent option with moderate values. The most prominent manifestation of extremeness aversion is the compromise effect, which predicts that the addition of an adjacent nondominated alternative tends to increase the choice share of the alternative that becomes the middle option (Simonson 1989; see also Huber and Puto 1983). For example, adding option A″ to the set AB in figure 1 tends to increase the share of option A, whereas adding option B″ tends to increase the share of option B. Thus, if a consumer is uncertain which of the two attributes is more important, the selection of a compromise that combines both attributes might be easiest to justify.

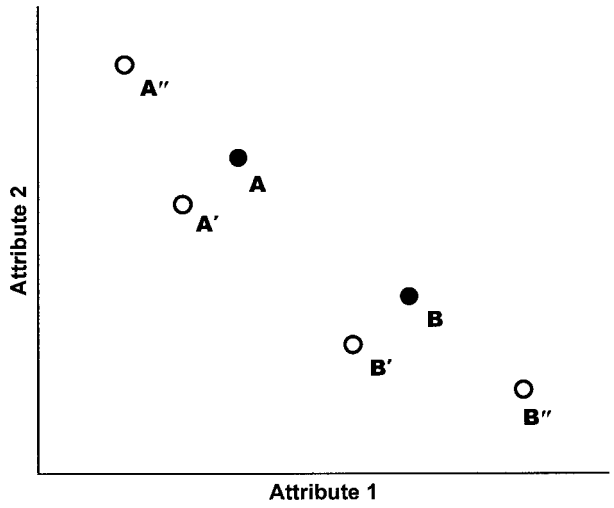
The trade-off-contrast principle argues that consumer preference for a given alternative is a function of the other trade-offs within the decision set. The most prominent manifestation of the trade-off contrast is the attraction (asymmetric dominance) effect, which refers to the empirical finding that a new alternative can increase the choice share of similar alternatives in the decision set—an effect first reported in an experiment by Huber, Payne, and Puto (1982). Consider the example given in figure 1. The core set includes nondominated options A and B, such that selecting either one requires trading off gains on one dimension for losses on the other. The added alternative is asymmetrically dominated: option A′ is dominated by option A on both attributes but is dominated by option B on only one dimension. Similarly, option B′ is dominated by option B on both dimensions but is dominated by option A on only one of the attributes. In this context, it has been shown that adding an asymmetrically dominated alternative increases the probability of choosing the dominant option.

A common feature of extremeness aversion and trade-off contrast is that both are defined through the relative position of the alternatives in the multiattribute space. The research presented in this article extends these effects beyond the context determined by the relational properties of choice alternatives to incorporate the context-independent attribute-balance effects.

Reason-Based Choice. Recent research has advanced the notion that consumer choice under preference uncertainty can be better understood when based on reasons for and against each alternative (Shafir, Simonson, and Tversky 1993; Simonson 1989). Because most choice models do not account for the relations among alternatives in the choice set, a key advantage of reason-based analysis is that it incorporates the relational properties of choice options.

FIGURE 1

ATTRACTION AND COMPROMISE EFFECTS: AN ILLUSTRATION



NOTE.—Options A and B comprise the core set. To demonstrate the attraction effect, either option A′ or option B′ is added. To demonstrate the compromise effect, either option A″ or option B″ is added.

Extant reason-based literature has shown that the need for justification influences the strength of extremeness aversion and trade-off contrast effects, whereby these effects are stronger when consumers expect their decisions to be evaluated by others (Simonson 1989; Simonson and Nowlis 2000). These findings were attributed to the fact that dominance (in the case of the attraction effect) and compromise (in the case of extremeness aversion) provide universal reasons for choice that are independent of any particular preference structure. Thus, when asked to justify their choice from a set with a constant rate of trade-offs (e.g., ABA″ or ABB″ in fig. 1), consumers were more likely to select the middle alternative when they expected their choice to be evaluated by others. Similarly, when asked to justify their choice from an asymmetrically dominant set (e.g., ABA′ or ABB′), consumers who expected to have to justify their decisions were more likely to choose the dominant option. These justification effects have been attributed to the fact that the dominance and compromise relationships are not contingent on subjective tastes and, hence, are more likely to be used to justify choice to consumers with unknown preferences.

Building on the extant literature, this article posits that the above reasoning extends not only to the relationship between the alternatives but also to the dispersion of attribute values within each alternative. The proposition that attribute balance can serve as a reason for choice is examined in the context of extremeness aversion and trade-off-contrast effects in the following sections.

Attribute Balance as a Reason for Choice: Extremeness Aversion

The attribute-balance effect in extremeness aversion was documented by Chernev (2004), who found that balanced alternatives are viewed as the least extreme even when they are not the middle option in the set. To illustrate, consider a set comprising four alternatives as shown in figure 2*A*. Each option is described by two attributes, each using a 100-point rating scale: A (40, 80), B (50, 70), C (60, 60), and D (70, 50). The extremeness-aversion principle predicts that adding option A to the set BC will make option B a compromise and will increase its relative share, whereas adding option D to the set BC should make option C a compromise and increase its relative share (Simonson and Tversky 1992).

Note that the selection of option B as the compromise alternative in the set ABC is contingent on the assumption that the extremeness evaluations are based on comparing the performance of the options, one attribute at a time, whereby the trade-offs are determined by the attribute-specific proximity of the alternatives. If, however, consumers compare the option-specific trade-offs defined by the dispersion of attribute values within each alternative, then, as shown in figure 2*B*, the option with the lowest dispersion of attribute values will be the least extreme option, regardless of its relative position in the choice set. As a result, the compromise alternative in the set ABC is the balanced option C rather than the middle option B.

Conceptually, the above example implies that the compromise effect has two different antecedents: it can be driven by the relational properties of choice alternatives (relational compromise) or, alternatively, it can be associated with attribute balance (balanced-option compromise). Contrasting these two antecedents allows testing whether attribute balance is indeed independent of the relational properties of choice alternatives. In particular, the middle option should be less preferred in sets where one of the adjacent (nonmiddle) options is balanced than when none of the options is balanced:

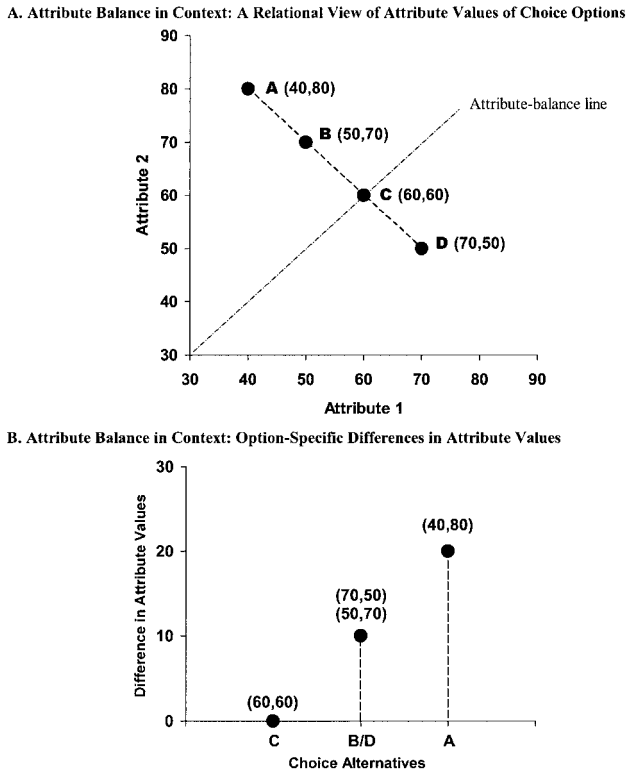
H1: Extremeness aversion is a function of attribute balance. In particular, the relative share of the middle option will be greater when no balanced alternative is present than in the presence of an adjacent balanced alternative (replication of prior findings).

The attribute-balance effect predicted in hypothesis 1 was attributed to the fact that individuals process the available information by combining attribute scales in a way that positions the balanced option as the middle alternative. This argument builds on the notion that the similarity of the attribute values of the balanced alternative makes this option stand out and focuses attention on the dispersion of attribute values within each alternative. The research presented in this article extends the cognitive account for attribute-balance effects in extremeness aversion advanced by prior research to introduce motivational factors such as the need for justification. In this context, it is proposed that the effect predicted by hypothesis 1 can be attributed to the fact that attribute balance provides consumers with a compelling reason for choosing that option. Building on the notion that asking consumers to justify their choices increases their reliance on the decision context (Simonson 1989), this research further argues that asking consumers to justify their decisions should also increase the share of the balanced option. The rationale for this prediction is that when the decision maker's ideal attribute combination is uncertain, attribute balance provides a compelling reason for choice because it is not contingent on individual-specific preferences.

Furthermore, because dispersion of the attribute values of a given choice alternative does not depend on the other options in the set, attribute balance might offer reasons that are inconsistent with reasons defined by the relational properties of the alternatives. Thus, when the balanced alternative is not the middle alternative, different options are defined as a justifiable compromise; as a result, asking consumers to justify their choice might increase the share of either the balanced or the middle alternative. Consequently, it is predicted that in the presence of an adjacent balanced alter-

FIGURE 2

ATTRIBUTE BALANCE IN CHOICE



NOTE.—Attribute values are given in parentheses. Option C (60, 60) is the balanced alternative.

native, the impact of justification on the strength of the compromise effect will be less pronounced than when neither of the options is balanced:

H2: Attribute balance moderates the effect of the need for justification on extremeness aversion. In particular, the need for justification will have a greater impact on the relative share of the middle option when no balanced alternative is present than in the presence of an adjacent balanced alternative.

Attribute Balance as a Reason for Choice: Trade-off Contrast

Consider the set ABA′B′, in which options A′ and B′ are asymmetrically dominated by options A and B (fig. 1). The attraction effect predicts that adding either option A′ or option B′ will increase the relative share of the corresponding option A or B. Recall, however, that hypothesis 1 argued that when one of the core options is balanced, this option will be perceived as the compromise alternative, providing consumers with a reason to choose this option. Because the balanced option is present in both the core and the extended sets, it readily provides consumers with a reason for choice. As a result, the marginal impact of adding an additional reason, derived from the dominance relationship in the extended set, will be weaker in the presence of a balanced alternative than when neither of the choice alternatives is balanced:

H3: Trade-off contrast is a function of attribute balance. In particular, the attraction effect will be less pronounced when one of the alternatives in the core set is balanced.

How does the need for justification influence the impact of a balanced option on trade-off contrast? Hypothesis 2 argued that because attribute balance is not contingent on individual-specific preferences, asking consumers to justify their decisions should also increase the share of the balanced option. Thus, in the presence of a balanced option consumers are given two potentially conflicting reasons for choosing from a set containing asymmetrically dominated alternatives. Because dominance and compromise reasons are not contingent on individual-specific preferences, they both offer readily justifiable reasons for choice. Asking consumers to justify their choices in this case is likely to favor different alternatives: the balanced option and the dominant alternative. In this context, the impact of the need for justification on the attraction effect should be greater when none of the options is balanced than when in the presence of a balanced alternative:

H4: Attribute balance moderates the effect of need for justification on trade-off contrast. In particular, the impact of justification on the attraction effect will be greater when no balanced alternative is present than in the presence of a balanced alternative.

To summarize, it is proposed that because balanced options are likely to be perceived as a compromise, they will moderate the strength of trade-off contrast and extremeness aversion (hypotheses 1 and 3). It is further argued that balanced options are likely to introduce an alternative reasoning that is potentially inconsistent with the reasoning implied by the relational properties of the alternatives, weakening the moderating effect of the need for justification (hypotheses 2 and 4). These predictions are tested in the following two experiments.

EXPERIMENT 1

The goal of this experiment was to test the proposition that attribute balance moderates the compromise effect (hypothesis 1) and that it further moderates the impact of the need for justification on the compromise effect (hypothesis 2).

Method

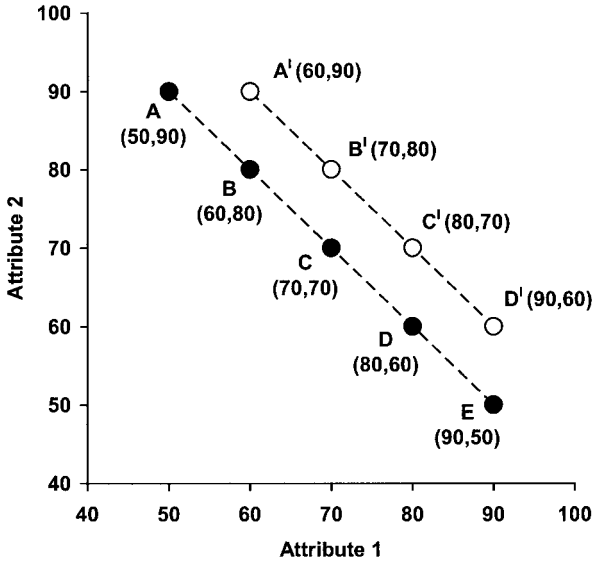
Four hundred and twenty-nine Northwestern University students were recruited to participate in the experiment. The study was conducted online, and respondents were told that the study examined how consumers make product decisions. Each participant was given a choice set from each of two different product categories, an MP3 player and a personal digital assistant (PDA), and was asked to select one of the options from each set. To avoid potential price-quality inferences, options were said to be equally priced. Each of the options was described by two attributes: the MP3 player was described by the number of features and ease of use and the PDA was described by application and reliability. The attribute performance of each option was given as a number on a 10-point scale, and the particular attribute values were designed to preserve trade-off consistency across options (Simonson and Tversky 1992). The specifics of the stimuli design are given in figure 3.

Choice stimuli comprised either two or three options as follows: ABC, BCD, CDE, A′B′C′, B′C′D′, BC, CD, and B′C′. These sets varied on several dimensions: size (two vs. three options), presence of a balanced alternative (present vs. not present), and location of the balanced alternative in the trinary sets (middle vs. adjacent). To test the experimental hypotheses, different combinations of these sets were compared (described in more detail in the next section).

To examine the role of reasons in extremeness aversion, this experiment also manipulated respondents' need for justification using the research paradigm introduced in prior research (Simonson 1989). Respondents in the justification condition were informed that at the end of the experiment they would have to justify their choices. After making a choice, these respondents were asked (1) to indicate which option was easiest to justify and (2) to justify their selection by writing down the rationale for their choice. Both the need for justification and the composition of the choice set were manipulated between subjects and were tested across two product categories.

FIGURE 3

ATTRIBUTE VALUES AND RELATIONAL PROPERTIES OF THE CHOICE OPTIONS IN EXPERIMENT 1



NOTE.—Attribute values are given in parentheses. Option C (70, 70) is the balanced alternative.

Results and Discussion

Choice Share Analyses. The data summarized in table 1 show that the dispersion of the shares of choice alternatives was influenced by the presence of a balanced option, whereby the balanced option was chosen most often, regardless of its relative position in the set. To illustrate, when the balanced alternative was one of the adjacent options in the trinary set, its combined choice share was 53.1% (set ABC) and 63.3% (set CDE). The share of the middle option was also a function of the presence and location of the balanced alternative: it was higher in the absence of balanced alternatives (47.0% for set A′B′C′ and 48.2% for set B′C′D′) and when the middle option was balanced (51.8% for set BCD); it was lowest when one of the adjacent alternatives was balanced (30.6% for set ABC and 25.5% for set CDE). This data pattern is consistent with the prediction stated in hypothesis 1.

The significance of the above data pattern was tested using categorical data modeling (Stokes, Davis, and Koch 2001). The first test compared the dispersion of choice shares of the middle alternative within the trinary sets with and without balanced options (ABC and CDE vs. A′B′C′ and B′C′D′). The model tested included the following factors: set size, presence of a balanced alternative, justification, product category, and interactions. The analysis showed a significant decrease in the choice share of the middle alternative in cases when one of the adjacent alternatives was balanced ($\chi^2(1) = 17.20$, $p < .01$), whereas the main effects of the justification manipulation, product category, and the relevant interactions were not significant ($\chi^2(1) < 1$). These data are consistent with hypothesis 1.

The significance of the compromise effect is measured by comparing the relative shares of choice alternatives between the binary and trinary sets (see Huber et al. [1982]; Simonson and Tversky [1992] for more detail). The dispersion of differences in the relative share of the middle option in the binary and the trinary sets is given in table 2. In the absence of a balanced alternative, the data show a positive compromise effect, whereby adding an adjacent alternative to a binary set increases the relative share of the middle option in the extended set ($P_{COMP} = 7.8\%$). The presence of an adjacent balanced alternative, however, resulted in a significant decrease in the relative share of the middle option ($P_{COMP} = -6.5\%$; $\chi^2(1) = 4.01$; $p < .05$). Thus, the relative share of the middle option was actually lower in the extended set than in the core set—a finding consistent with hypothesis 1.

Analysis of the strength of the attraction effect across the high- and low-justification conditions shows that when none of the options were balanced, the attraction effect was more pronounced for respondents who had to justify their decisions ($P_{COMP} = 4.7\%$ vs. $P_{COMP} = 10.3\%$; $\Delta P_{COMP} = 5.6\%$). In the presence of a balanced alternative, however, the difference in choice shares between the two justification con-

TABLE 1

SHARES OF CHOICE ALTERNATIVES AS A FUNCTION OF THEIR POSITION IN THE SET AND ATTRIBUTE BALANCE (EXPERIMENT 1)

	Low justification				High justification				Combined			
Set (balanced option)	*n*	*x* (%)	*y* (%)	*z* (%)	*n*	*x* (%)	*y* (%)	*z* (%)	*n*	*x* (%)	*y* (%)	*z* (%)
AB**C** (adjacent)	42	23.8	26.2	**50.0**	56	10.7	33.9	**55.4**	98	16.3	30.6	**53.1**
B**C**D (middle)	54	20.4	**51.9**	27.8	60	28.3	**51.7**	20.0	114	24.6	**51.8**	23.7
CDE (adjacent)	50	**58.0**	26.0	16.0	48	**68.8**	25.0	6.3	98	**63.3**	25.5	11.2
A′B′C′ (not present)	52	15.4	48.1	36.5	65	16.9	46.2	36.9	117	16.2	47.0	36.8
B′C′D′ (not present)	60	40.0	45.0	15.0	79	27.8	50.6	21.5	139	33.1	48.2	18.7

NOTE.—Notation used is as follows: *x, y,* and *z* denote the relative position of the choice option in the set *xyz*. In this context, *x* in the set ABC refers to the share of option A, *y* refers to the share of option B, and *z* refers to the share of option C. The set size is given by *n*. The choice shares of the balanced alternative are given in boldface. Reported results are averaged across product categories.

TABLE 2

THE COMPROMISE EFFECT AS A FUNCTION OF ATTRIBUTE BALANCE (EXPERIMENT 1)

Balanced option	Choice set composition		*P*		P_{COMP} (%)	ΔP_{COMP} (%)
	Binary set	Trinary set	Binary set (%)	Trinary set (%)		
Adjacent	BC, CD	ABC, CDE	39.0	32.5	−6.5	−.5
Middle	BC, CD	BCD	61.0	68.2	7.3	.6
Not present	C′D′	B′C′D′, C′D′E′	50.0	57.8	7.8	5.6

NOTE.—*P* is the relative share of the middle option, P_{COMP} is the change in the relative share of the middle option (the compromise effect), and ΔP_{COMP} is the difference in P_{COMP} between the high- and low-justification conditions.

ditions was less than 1%. This data pattern is directionally consistent with hypothesis 2, although it is not statistically significant.

The prediction that the presence of an adjacent balanced alternative will weaken the effect of justification on the compromise effect was based on the notion that justification might increase the choice share not only of the middle option but also of the balanced alternative. Therefore, an alternative strategy to test hypothesis 2 involved examining whether justification increased the combined share of the middle option and the adjacent balanced alternative relative to the other (nonbalanced) adjacent alternative. The data show that in the presence of a balanced option, 19.4% of respondents in the low-justification condition selected the adjacent, nonbalanced option, compared to only 8.7% of those in the high-justification condition ($\chi^2(1) = 4.66$, $p < .05$). In the absence of a balanced alternative, the corresponding difference between the middle and the adjacent options was nonsignificant ($\chi^2(1) < 1$). These data lend support to hypothesis 2.

Ease-of-Justification Analyses. The ease-of-justification data, indicating which alternative was perceived by respondents as the easiest to justify, were collected only for the high-justification condition, which totaled 458 observations. The data summarized in table 3 display a pattern similar to that shown in table 1: respondents viewed the balanced alternative as being the easiest to justify, regardless of its relative position in the set. To illustrate, when the balanced alternative was one of the adjacent options (ABC and CDE), its choice share averaged 65.4%, whereas the share of the middle option averaged only 26.9%. When none of the options was balanced (A′B′C′ and B′C′D′), the choice share of the middle alternative averaged 47.9%. Finally, when the middle option was balanced, its choice share increased to 75%. The effect of the presence of an adjacent balanced alternative was significant, as indicated by a comparison of the shares of the middle option in sets with and without a balanced alternative (ABC and CDE vs. A′B′C′ and B′C′D′; $\chi^2(1) = 10.92$, $p = .001$). These data imply that respondents were more likely to view the balanced option as being the easiest to justify—a finding consistent with hypothesis 2.

Comparing the justification data with the choice data also reveals that a number of respondents selected the balanced option as being easiest to justify even if they did not choose that option. To illustrate, 57.1% of respondents selected the balanced alternative from the set ABC as being the easiest to justify, compared to 55.4% who chose that option for themselves. The corresponding shares for the set BCD were 75.0% versus 51.7% and 75.0% versus 68.8% for the set CDE. Analysis of the dispersion of these choice-justification discrepancies shows that they were more likely to occur when a balanced alternative was present than when there was no balanced option ($\chi^2(1) = 7.90$, $p < .005$). These findings are further consistent with the proposition that consumers view attribute balance as a compelling reason for choice.

TABLE 3

SHARE OF THE OPTION PERCEIVED TO BE EASIEST TO JUSTIFY AS A FUNCTION OF ATTRIBUTE BALANCE (EXPERIMENT 1)

Set (balanced option)	*n*	*x* (%)	*y* (%)	*z* (%)
AB**C** (adjacent)	42	10.7	32.1	**57.1**
B**C**D (middle)	54	18.3	**75.0**	6.7
CDE (adjacent)	50	**75.0**	20.8	4.2
A′B′C′ (not present)	52	18.5	47.7	33.8
B′C′D′ (not present)	60	30.4	48.1	21.5

NOTE.—The composition of the choice set is consistent with the representation given in fig. 2. The choice shares of the balanced alternative are given in boldface.

EXPERIMENT 2

The goal of this experiment was to show that attribute balance moderates the strength of the attraction effect (hypothesis 3) and that it further moderates the impact of the need for justification on the attraction effect (hypothesis 4).

Method

Two hundred and seven Northwestern University students were randomly assigned to the conditions of a 3 (choice set: binary [AB] vs. option A′ dominated [AA′B] vs. option B′ dominated [ABB′]) × 2 (balanced alternative: present vs. not present) × 2 (location of the balanced alternative: option A vs. option B) × 2 (justification: high vs. low) nested

factorial design. These conditions were tested in the context of four different product categories commonly used in consumer research: camera, toothpaste, printer, and mouthwash.

Respondents were presented with choice sets consisting of either two or three alternatives, each described on two attributes. As in the first experiment, options were said to be equally priced to avoid potential price-quality inferences. The values of all attributes were given as ratings on a 100-point scale. To account for possible effects associated with a specific set of numeric values, the attribute ratings of the choice options were varied across product categories as shown in the appendix.

An illustration of the relational properties of choice alternatives is given in figure 4. Options A and B composed the core set, to which dominated alternative A′ or B′ was added. Panel A displays a scenario in which neither of the options is balanced, whereas panel B depicts a scenario in which one of the core options is balanced. To account for potential attribute-specific effects, the design was counterbalanced so that in some conditions option A was the balanced alternative and in other conditions option B was the balanced alternative.

Participants were told that the study examined how people make product decisions. They were given four different decision sets, one at a time, and asked to make a choice. Respondents in the justification condition were also told that at the end of the experiment they would have to justify their choices. After making a choice, respondents in the justification condition were asked (1) to indicate the option that was easiest to justify and (2) to write down the reasons for their choice.

Results and Discussion

Choice Share Analyses. The choice share data summarized in table 4 show that the strength of the attraction effect was moderated by the presence of a balanced alternative. Thus, when neither of the options in the core set was balanced, these options gained share when they were dominating—a finding consistent with prior research. To illustrate, the choice share of option A was 44.3% in the core set; it went up to 55.1% when a third brand dominated by A was introduced and was only 33.0% when a third brand dominated by option B was included in the set.[1] The attraction effect, calculated as the difference between the relative shares of the brands in the core and the extended set, was 10.8% in the first case and 11.3% in the second case, or 11% if aggregated across the two conditions.

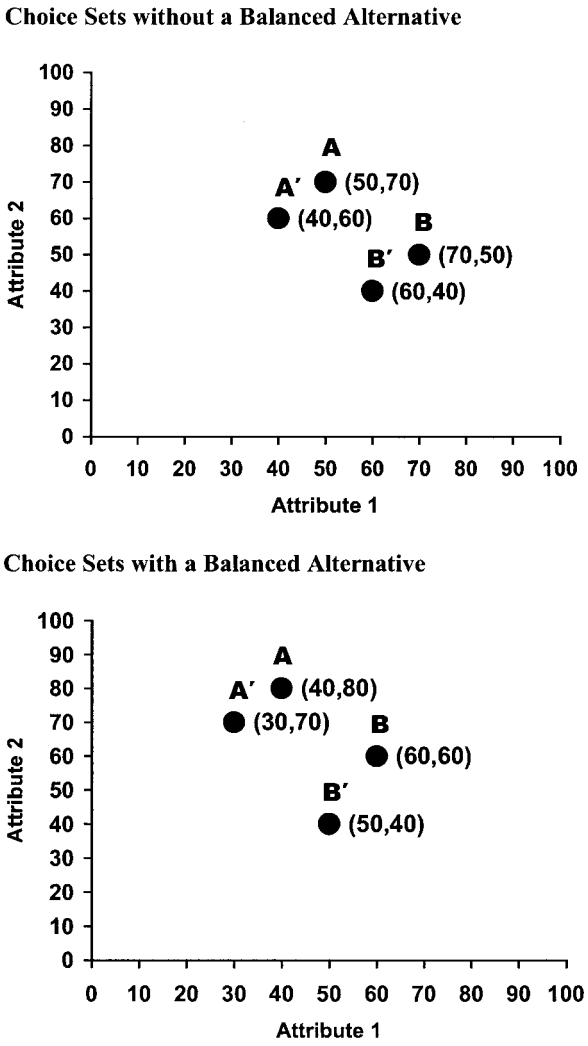
When the core set included a balanced alternative, however, adding a dominated option to either brand did not increase its relative choice share. To illustrate, the choice share of option A was 27.4% in the core set and remained essentially unchanged at 26.9% when a third brand dominated by A was introduced; however, choice share went up to 34.0% when a third brand dominated by option B was included in the set. The attraction effect was −.5% in the first case and −6.5% in the second case, or −3.5% across the two conditions. This pattern of dispersion of choice shares is consistent with the predictions made in hypothesis 3, which argues that the attraction effect is greater when none of the alternatives in the core set is balanced.

The statistical significance of the results was tested using a model that included the following factors: whether a balanced alternative was present (BAL), whether the alternative was dominating in the extended set (DOM), whether respondents were asked to justify their decision (JUST), which

[1]Because the percentage of responses selecting the dominated option C was relatively small (only seven observations) and evenly distributed across conditions, choice shares reported are the relative shares of options A and B.

FIGURE 4

ATTRIBUTE VALUES AND RELATIONAL PROPERTIES OF CHOICE OPTIONS IN EXPERIMENT 2



NOTE.—Option B (60, 60) in panel B is the balanced alternative. Specific attribute values vary across product categories (see the appendix); values shown here are for the digital camera.

TABLE 4

SHARES OF CHOICE ALTERNATIVES AS A FUNCTION OF RELATIVE DOMINANCE AND ATTRIBUTE BALANCE (EXPERIMENT 2)

Balanced option and justification	Option	Share in core set (%)	Share when dominating (%)	Share when other option dominating (%)	Attraction effect (%)
Not present:					
Low	A	42.9	48.9	39.2	6.1
	B	57.1	51.1	60.8	3.6
		(49)	(48)	(52)	
High	A	45.8	60.8	26.9	15.0
	B	54.2	39.2	73.1	18.9
		(48)	(52)	(52)	
Combined	A	44.3	55.1	33.0	10.8
	B	55.7	44.9	67.0	11.3
Present:					
Low	A	25.3	27.7	30.4	2.4
	B	74.7	72.3	69.6	−5.1
		(96)	(96)	(80)	
High	A	30.0	26.1	37.5	−3.9
	B	70.0	73.9	62.5	−7.5
		(80)	(93)	(80)	
Combined	A	27.4	26.9	34.0	−.5
	B	72.6	73.1	66.0	−6.5

NOTE.—For presentation purposes, option B is designated as the balanced alternative. Sample sizes are given in parentheses. Choice shares of option C (less than 2% of all responses) are not shown.

of the core brands was the balanced alternative (CBAL), product category, and interactions. The analysis shows that the BAL*DOM interaction was significant ($\chi^2(1) = 11.83$, $p < .001$), indicating that the presence of a balanced alternative moderates the strength of the attraction effect. In particular, the attraction effect was significant in the absence of a balanced alternative ($\chi^2(1) = 10.16$, $p < .005$) and nonsignificant when a balanced alternative was present ($p > .20$). These findings lend support for the predictions made in hypothesis 3.

Product category had a significant main effect ($\chi^2(3) = 9.56$, $p < .05$); however, its interactions with the key factors were nonsignificant. This suggests that the observed effect was not likely caused by the specific product categories tested. The data also show that varying which of the two brands in the core set was balanced had a significant main effect (CBAL: $\chi^2(1) = 16.67$, $p < .001$), a finding consistent with the fact that across conditions the balanced option was more likely to be chosen. The interactions of this factor with the key factors were nonsignificant, indicating that the observed effects were not likely to be altered by this design factor.

The data further show that the strength of the attraction effect varied as a function of decision accountability: the effect was stronger when respondents had to justify their decisions. To illustrate, in the low-justification condition the choice share of option A was 42.9% in the core set; it rose to 48.9% when a third brand dominated by A was introduced and decreased to 39.2% when a third brand dominated by option B was included in the set. The attraction effect in this case was 6.1%, compared to 15.0% in the high-justification condition (the corresponding choice shares were 45.8%, 60.8%, and 26.9%). Choice shares of option B displayed a similar pattern, with the attraction effect increasing from 3.6% to 18.9% as result of justification. This finding is consistent with prior research showing that in the absence of balanced alternatives the attraction effect is more pronounced when individuals expect their decisions to be evaluated by others.

When one of the options in the core set was balanced, however, the effect of justification was less consistent. To illustrate, in the low-justification condition the choice share of option A was 25.3% in the core set; it increased to 27.7% when a third brand dominated by A was introduced and increased again to 30.4% when a third brand dominated by option B was included in the set. The attraction effect in this case was 2.4%, compared to −3.9% in the high-justification condition. Choice shares of option B displayed a similar pattern, whereby the attraction effect decreased from −5.1% to −7.5% if the need for justification was high.

Analyzing the impact of justification on the strength of the attraction effect reveals that the BAL*DOM*JUST interaction was significant ($\chi^2(1) = 4.54$, $p < .05$). Thus, in the absence of a balanced alternative, justification had a marginally significant impact on the strength of the attraction effect ($\chi^2(1) = 3.19$, $p < .10$), whereas when a balanced alternative was present the impact of justification was nonsignificant ($\chi^2(1) < 1$). These findings lend support for hypothesis 4.

Ease-of-Justification Analyses. The data summarized in table 5 show that when neither of the options in the core set was balanced, the dominant alternative was perceived as the easiest to justify (61.5% vs. 30.7%)—a finding consistent

TABLE 5

PERCEIVED EASE OF JUSTIFICATION AS A FUNCTION OF RELATIVE DOMINANCE AND ATTRIBUTE BALANCE (EXPERIMENT 2)

Balanced option	Option	Share when dominating (%)	Share when other option dominating (%)
Not present	A	61.5	30.7
	B	36.5	67.3
		(52)	(52)
Present	A	18.3	27.5
	B	79.6	72.5
		(93)	(80)

NOTE.—The data show the choice shares of the option perceived to be the easiest to justify. For presentation purposes, option B is designated as the balanced option. Sample sizes are given in parentheses. Choice shares of option C (not shown) are complementary to 100%.

with prior research. In contrast, when a balanced option was present, this option was perceived as easier to justify, regardless of its dominance in the set (79.6% vs. 72.5%). The difference in the choice shares of the option perceived to be the easiest to justify in these two conditions was significant ($\chi^2(1) = 9.71$, $p < .005$), indicating that the presence of a balanced alternative moderates the impact of dominance on the ease of justification. The observed effect was consistent across the product categories tested. The main effect of the position of the balanced alternative was significant (CBAL; $\chi^2(1) = 7.99$, $p < .005$), but it had no significant interactions with the focal variables, indicating that the observed effect was robust to the experimental design factors. These findings are consistent with hypothesis 3.

Reason-Based Analyses. As part of the experimental procedure, respondents in the high-justification condition had to write down the reasons for their selection. These self-reported reasons for choice (Ericsson and Simon 1980) were classified into two categories: balance and dominance. The balance category included responses that identified context-based or balance-based compromise as a reason for choice: "middle option," "equal benefits," and "balanced ratings." The dominance category included responses that identified the dominance of one of the alternatives as a reason for choice: "better reliability," "more features," and so forth.

Quantitative analysis of these reasons shows that respondents were more likely to use the compromise rationale in the presence of a balanced alternative. Compromise was given as a reason for choice by only 9.1% of the respondents in the condition without a balanced alternative, compared to 35.2% of the respondents in conditions with a balanced alternative ($\chi^2(1) = 16.50$, $p < .001$).

Respondents' reasons for choice were also examined as a function of the chosen alternative. The data show that respondents who selected the balanced option were more likely to use compromise reasoning than those who selected either of the other options ($\chi^2(1) = 18.74$, $p < .001$). In particular, in choices from sets with a balanced alternative, 54.7% of the respondents who selected the balanced option used either context-based or balance-based compromise reasoning, compared to only 4.3% of those who chose either of the other options ($\chi^2(1) = 19.19$, $p < .001$). In contrast, in choices from sets without a balanced alternative, the difference in the use of compromise reasoning was only marginally significant (15.4% vs. 5.2%; $\chi^2(1) = 3.62$, $p < .10$). These findings are consistent with the proposition that in a choice set with asymmetrically dominant alternatives, individuals used the presence of a balanced alternative as a reason for choice, which, in turn, weakened their reliance on the dominance relationship between options.

GENERAL DISCUSSION

Attribute Balance in Context

Building on prior research (Simonson and Tversky 1992), this article extends the notion of context effects beyond the relational properties of choice alternatives to include the option-specific dispersion of attribute values. The attribute-balance effects reported in this research are relatively independent of the relative advantage of the options in the set because, unlike the traditional context effects, they are defined by an option's internal properties rather than relative to the other choice alternatives.

It is important to note that the context effects, derived from the relational properties of choice alternatives, and the balance effects, derived from the option-specific dispersion of attribute values, share certain similarities. Both effects assume the presence of preference uncertainty, whereby the decision maker has difficulty determining preference based on attribute weights and values alone. Both effects are also a function of the dispersion of the attribute values describing choice alternatives rather than a function of individuals' prior experience with the product. The key difference concerns the decision processes underlying each of these effects. The traditional context effects are focused on comparing options' performance across attributes. In contrast, attribute balance is defined by an option's internal properties, such as the equivalence of its own attribute ratings.

Attribute Balance as a Reason for Choice

Prior research has proposed that, by considering the relations among alternatives in the choice set, reason-based analysis can offer a valuable insight into understanding consumer behavior (Shafir et al. 1993; Simonson 1989). Building on this research, the current article demonstrates that reasons for choice can be derived not only from the relational properties of the alternatives but also from the option-specific dispersion of its attribute values. This research further shows that reasons based on options' attribute balance often dominate reasons based on relational properties. Thus, when presented with a decision problem in which reasons based on the relational properties of choice alternatives were inconsistent with the reasons derived from attribute balance, consumer choice was often guided by the balance-derived reasoning.

Attribute Balance and Trade-off Consistency

Findings reported in this research have important implications for understanding the impact of trade-off consistency on choice. The trade-off consistency of a given choice set is usually characterized by the rate of exchange between attributes (Simonson and Tversky 1992): some sets comprise alternatives in which the rate of exchange between attributes is constant (e.g., set ABB″ in fig. 1); in other sets the rate of exchange between attributes varies across alternatives (e.g., set ABB′ in fig. 1).

Because context effects were assumed to be driven solely by the relational properties of choice alternatives, prior research has suggested that trade-off contrast and extremeness-aversion effects are determined by the consistency of the exchange rate between attributes. Thus, scenarios with a varying rate of exchange between attributes have been used to document trade-off contrast, and scenarios with a constant rate of exchange between attributes have been used to illustrate extremeness aversion. Research presented in this article demonstrates that extremeness aversion and trade-off contrast are not necessarily contingent on the trade-off consistency of a given choice set and that extremeness aversion can influence choices from sets with both fixed and varying rates of exchange between attributes.

The finding that consumers compare attribute values within each of the alternatives also implies that trade-off contrast can be observed not only in sets with variable rates of exchange but also in sets where attributes have a constant rate of exchange—a proposition that is contrary to the assumption that different rates of exchange between attributes are a prerequisite for trade-off contrast. Indeed, even when the rate of exchange between attributes is held constant, the dispersion of attribute values within each of the alternatives can invoke trade-offs. To illustrate, an option with attribute values (70, 50) might be viewed as more extreme in the presence of the more balanced option (60, 60) than in the presence of a more polarized option (90, 30). In this case, the dispersion of attribute values of the other alternatives is used as a benchmark in evaluating the focal alternative, which implies the existence of trade-off contrast. Conceptually, this argument implies that trade-offs are not necessarily defined by comparing the performance of options across different attributes (as shown in fig. 2*A*); they can also be defined by comparing the alternative-specific dispersion of attribute values (as illustrated in fig. 2*B*). Accounting for trade-offs defined by the within-alternative dispersion of attribute values, therefore, is an important component of understanding consumer decision behavior.

Modeling Attribute Balance Effects in Choice

An important aspect of investigating the impact of context effects on choice is the ability to generalize these effects into a formal model. Most recently, such a model has been offered by Tversky and Simonson (1993; see also Bettman, Luce, and Payne 1998), who propose a componential-context model designed to incorporate two types of effects: trade-off contrast and extremeness aversion. This model is given by the equation

$$V_B(x, S) = \sum_{i=1}^{n} \beta_i v_i(x_i) + \theta \sum_{y \in S} R(x, y),$$

where $V_B(x, S)$ is the value of alternative x from a choice set S and background contrast B; β_i is the weight of attribute i; $v_i(x_i)$ is the utility corresponding to the value of the alternative x on attribute i; $R(x, y)$ is the relative advantage of option x over option y; and θ is the weight given to the relative advantage component of the model. The first component of the model captures an option's utility independent of the other alternatives in the set, whereas the second component accounts for context effects such as trade-off contrast and extremeness aversion. This model, however, is based on the assumption that context effects are driven solely by the relational properties of the choice alternatives (Tversky and Simonson 1993) and does not account for attribute-balance effects.

To account for attribute balance and its effects on choice, the componential-context model can benefit from an additional component. This third component is similar to context effects in that it can create systematic biases in consumer decision processes yet is relatively independent of the relational properties of the alternatives. One possibility to formalize the attribute-balance effect is to extend the componential-context model as follows:

$$V_B(x, S) = \sum_{i=1}^{n} \beta_i v_i(x_i) + \theta \sum_{y \in S} R(x, y) + \delta \sum_{\substack{i,j=1 \\ i>j}}^{n} \gamma_{ij} |x_i - x_j|,$$

where $|x_i - x_j|$ is the dispersion of the standardized attribute values of option x, γ is an attribute-comparability coefficient such that $\gamma = 1$ for attributes using identical scales and $1 > \gamma \geq 0$ when options' attributes use different scales and/

or scaling metrics, and, finally, δ is the weight given to the attribute-balance component of the model. Note that this attribute-balance adjustment is just one possibility to account for the attribute-balance effects. Extending the componential-context model to include attribute-balance effects is a promising area for further research.

APPENDIX

TABLE A1

ATTRIBUTES AND RATINGS OF CHOICE ALTERNATIVES IN EXPERIMENT 2

	Choice alternatives											
	None balanced				Option A balanced				Option B balanced			
Product category and attributes	A	B	A′	B′	A	B	A′	B′	A	B	A′	B′
Camera:												
Picture clarity	50	70	40	60	60	80	40	70	40	60	30	50
Reliability	70	50	60	40	60	40	50	30	80	60	70	40
Printer:												
Print quality	55	75	45	65	65	85	45	75	45	65	35	55
Printing speed	75	55	65	45	65	45	55	35	85	65	75	45
Toothpaste:												
Breath-freshening effectiveness	60	80	50	70	70	90	50	80	50	70	40	60
Tooth-whitening effectiveness	80	60	70	50	70	50	60	40	90	70	80	50
Mouthwash:												
Germ-killing effectiveness	65	85	55	75	75	95	55	85	55	75	45	65
Decay-preventing effectiveness	85	65	75	55	75	55	65	45	95	75	85	55

NOTE.—Options A and B comprise the core set. Options A′ and B′ are the asymmetrically dominated options added to the core set, such that A′ is dominated by A and B′ is dominated by B.

[*Dawn Iacobucci served as editor and Eugene Anderson served as associate editor for this article.*]

REFERENCES

Bettman, James R., Mary Frances Luce, and John W. Payne (1998), "Constructive Consumer Choice Processes," *Journal of Consumer Research*, 25 (December), 187–217.

Chernev, Alexander (2004), "Extremeness Aversion and Attribute-Balance Effects in Choice," *Journal of Consumer Research*, 31 (September), 249–63.

Dhar, Ravi, Stephen M. Nowlis, and Steven J. Sherman (2000), "Trying Hard or Hardly Trying: An Analysis of Context Effects in Choice," *Journal of Consumer Psychology*, 9 (4), 189–200.

Dhar, Ravi and Itamar Simonson (2003), "The Effect of Forced Choice on Choice," *Journal of Marketing Research*, 40 (May), 146–60.

Ericsson, Karl A. and Herbert A. Simon (1980), "Verbal Reports as Data," *Psychological Review*, 87 (July), 215–51.

Huber, Joel, John W. Payne, and Christopher Puto (1982), "Adding Asymmetrically Dominated Alternatives: Violations of Regularity and the Similarity Hypothesis," *Journal of Consumer Research*, 9 (June), 105–14.

Huber, Joel and Christopher Puto (1983), "Market Boundaries and Product Choice: Illustrating Attraction and Substitution Effects," *Journal of Consumer Research*, 10 (June), 31–44.

Luce, R. Duncan (1959), *Individual Choice Behavior: A Theoretical Analysis*, New York: Wiley.

Payne, John W. (1982), "Contingent Decision Behavior," *Psychological Bulletin*, 92 (2), 382–402.

Payne, John W., James R. Bettman, and Eric J. Johnson (1993), *The Adaptive Decision Maker*, New York: Cambridge University Press.

Shafir, Eldar (1993), "Choosing versus Rejecting: Why Some Options Are Both Better and Worse than Others," *Memory and Cognition*, 21 (July), 546–56.

Shafir, Eldar, Itamar Simonson, and Amos Tversky (1993), "Reason-Based Choice," *Cognition*, 49 (October–November), 11–36.

Simonson, Itamar (1989), "Choice Based on Reasons: The Case of Attraction and Compromise Effects," *Journal of Consumer Research*, 16 (September), 158–74.

Simonson, Itamar and Stephen M. Nowlis (2000), "The Role of Explanations and Need for Uniqueness in Consumer Decision Making: Unconventional Choices Based on Reasons," *Journal of Consumer Research*, 27 (June), 49–68.

Simonson, Itamar and Amos Tversky (1992), "Choice in Context: Tradeoff Contrast and Extremeness Aversion," *Journal of Marketing Research*, 29 (August), 281–95.

Stokes, Maura Ellen, Charles S. Davis, and Gary G. Koch (2001), *Categorical Data Analysis Using the SAS System*, 2nd ed., New York: Wiley.

Tversky, Amos and Itamar Simonson (1993), "Context-Dependent Preferences," *Management Science*, 39 (October), 1179–89.