

Not Just for Consumers: Context Effects Are Fundamental to Decision Making

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Psychological Science
 24(6) 901–908
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sagepub.com/journalsPermissions.nav
 DOI: 10.1177/0956797612464241
pss.sagepub.com


Abstract

Context effects—preference changes that depend on the availability of other options—have attracted a great deal of attention among consumer researchers studying high-level decision tasks. In the experiments reported here, we showed that these effects also arise in simple perceptual-decision-making tasks. This finding casts doubt on explanations limited to consumer choice and high-level decisions, and it indicates that context effects may be amenable to a general explanation at the level of the basic decision process. We demonstrated for the first time that three important context effects from the preferential-choice literature—similarity, attraction, and compromise effects—all occurred within a single perceptual-decision task. Not only do our results challenge previous explanations for context effects proposed by consumer researchers, but they also challenge the choice rules assumed in theories of perceptual decision making.

Keywords

preferential choice, attraction effect, similarity effect, compromise effect, perceptual decision making, decision making, perception, preferences

Received 3/10/12; Revision accepted 9/7/12

Numerous researchers have examined the role of context on preference in multialternative decision making: that is, how choices among a fixed set of options can be altered by the inclusion of other options. In the preferential-choice literature, three effects have been central to research on contextual sensitivity: the attraction (Huber, Payne, & Puto, 1982), similarity (Tversky, 1972), and compromise (Simonson, 1989) effects. Although decision theorists have found substantial evidence that these effects occur in high-level decision-making tasks, there is little evidence suggesting that the effects also arise in low-level tasks, such as simple perceptual decision making (Choplin & Hummel, 2005; Tsetsos, Usher, & McClelland, 2011). In the present experiments, we found the first evidence that all three context effects can occur within the same perceptual-decision task.

To understand context effects, consider someone choosing between two cars to purchase; one is inexpensive but poor quality, the other is higher quality but expensive. The decision maker chooses between the cars by evaluating two attributes, economy and quality. A context effect of the sort we examined arises when a third

car is added to the choice set, which results in the decision maker changing his or her mind about the original two cars. The three effects arise according to the particular relationships the third choice has with the original two choices. Figure 1 schematically represents the positions of various options within a two-dimensional space defined by two attribute values.

The attraction effect is an enhancement in the choice probability that one of the two original options (the *focal option*) will be selected through the introduction of a similar but inferior *decoy option*. In the cars example, the decoy might be similar to the expensive, high-quality car but slightly inferior on both attributes. That is, the decoy could be more expensive and lower quality. More generally, consider a choice set $\{X, Y\}$ and two decoys, A_X and A_Y , in which A_X is similar but slightly inferior to X , and A_Y is a similar but inferior to Y . The attraction effect occurs

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when people show a stronger preference for X when it is presented along with its inferior comparison (A_X), and similarly for Y . Formally, the attraction effect occurs when the probability of choosing X is greater when the decoy favors X than when it favors Y , and vice versa: $p[X | \{X, Y, A_X\}] > p[X | \{X, Y, A_Y\}]$ and $p[Y | \{X, Y, A_X\}] < p[Y | \{X, Y, A_Y\}]$, respectively.

In our attraction-effect experiment, three different types of decoys were tested: range, frequency, and range-frequency. These decoys differed only in the manner in which they were inferior to the focal options, as illustrated in Figure 1. The range decoy refers to an option that is a little weaker than the focal alternative on the focal alternative's weakest attribute—so a range decoy increases the range of the attribute dimension on which

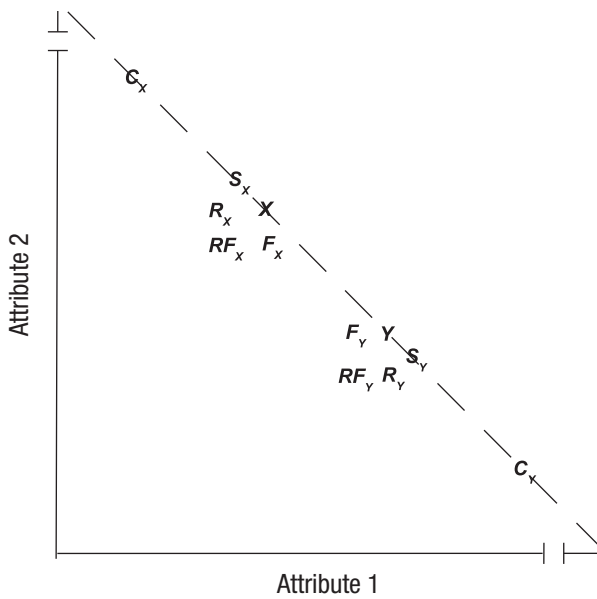


Fig. 1. The various locations of options plotted in a two-dimensional space defined by the two attribute values. Two options, X and Y , differ in that one is noticeably stronger on Attribute 2 and the other is noticeably stronger on Attribute 1, respectively. The range decoy for each of these options (R_X and R_Y , respectively) has a lower value on that option's weaker attribute. The frequency decoy for each of these options (F_X and F_Y , respectively) has a lower value on that option's stronger attribute. The range-frequency decoy for each option (RF_X and RF_Y , respectively) has a lower value on both attributes. Differences in choice probabilities for sets $\{X, Y, R_X\}$ and $\{X, Y, R_Y\}$ demonstrate the range attraction effect, differences in choice probabilities for sets $\{X, Y, F_X\}$ and $\{X, Y, F_Y\}$ demonstrate the frequency attraction effect, and differences in choice probabilities for sets $\{X, Y, RF_X\}$ and $\{X, Y, RF_Y\}$ demonstrate the range-frequency attraction effect. Similarity decoys for each option (S_X and S_Y , respectively) are slightly different from, but equally attractive as, the existing option. Differences in choice probabilities for sets $\{X, Y, S_X\}$ and $\{X, Y, S_Y\}$ demonstrate the similarity effect. Compromise decoys for each option (C_X and C_Y , respectively) make intermediate options more attractive. The compromise effect is demonstrated by comparing the choice sets $\{X, Y, C_X\}$ and $\{X, Y, C_Y\}$. The breaks in the axes indicate that they have limited range. The dashed line indicates the indifference line; options on this line are preferred equally.

the focal alternative is the weakest. The frequency decoy refers to an option that increases the frequency of the attribute dimension on which the focal option is superior. The range-frequency decoy combines range and frequency manipulations. All three decoy types were tested because previous research (Huber et al., 1982) demonstrates that different decoys result in different magnitudes of the attraction effect.

The similarity effect occurs when an option is added that is slightly different from, but equally attractive as, an existing option, which increases the probability that the dissimilar option will be selected. For example, the addition of a car similar to the expensive, high-quality car results in the decision maker preferring the inexpensive, low-quality car. Informally, when there are two very similar options, an option dissimilar to both becomes more attractive. Consider a choice set $\{X, Y\}$ and two decoys, S_X and S_Y , in which S_X is similar to X , and S_Y is similar to Y (see Fig. 1). The similarity effect occurs when the probability of choosing X is greater when the decoy is similar to Y than when it is similar to X , and vice versa: $p[X | \{X, Y, S_X\}] < p[X | \{X, Y, S_Y\}]$ and $p[Y | \{X, Y, S_X\}] > p[Y | \{X, Y, S_Y\}]$, respectively.

The compromise effect occurs when an option is made more attractive when presented as a compromise between alternatives. For example, a third car that is moderately expensive and has moderate quality is preferred over the original options because it represents a compromise between them. More generally, consider a choice set $\{X, Y\}$ and two decoys, C_X and C_Y , in which C_X is an extreme option that makes X assume the middle ground, and C_Y is an extreme option that makes Y assume the middle ground (see Fig. 1). The compromise effect occurs when the probability of choosing X is greater when X is a compromise rather than an extreme alternative, and similarly with Y : $p[X | \{X, Y, C_X\}] > p[X | \{X, Y, C_Y\}]$ and $p[Y | \{X, Y, C_X\}] < p[Y | \{X, Y, C_Y\}]$, respectively.

The three effects have been important for preference theories because they violate an intuitively appealing property called *simple scalability* (Krantz, 1964; Tversky, 1972). This property states that alternatives in a choice set can be given a strength-scale value, s , that is independent from the other options, and the probability of selecting a particular option is determined by the strength using the formula $p[x | A] = F[s(x), s(y), \dots, s(z)]$, where F is an increasing function in the first variable and a decreasing function in the remaining variables. This property underlies most of the utility models used to study choice behavior and choice rules assumed in theories of perceptual decision making, including Luce's (1959) ratio-of-strengths model.

To understand the violation, consider the attraction effect. According to the simple-scalability property, the inequality $p[X | \{X, Y, A_X\}] > p[X | \{X, Y, A_Y\}]$ implies that

the strength of A_X is less than the strength of A_Y . However, the inequality $p[Y | \{X, Y, A_X\}] < p[Y | \{X, Y, A_Y\}]$ implies that the strength of A_Y is less than the strength of A_X . Because these two statements cannot both be true, the property is violated. Violations of the property by the similarity and compromise effects follow a similar argument. Models of preference have been adapted to account for these findings in terms of properties specific to high-level choices. However, if the same violations occur in more elementary decision-making tasks, it may be worthwhile to reconsider the psychological locus of the effects.

Context effects have been demonstrated in a wide range of high-level decision-making tasks, such as choices among consumer products (Huber et al., 1982; Pettibone & Wedell, 2000; Simonson, 1989) in situations including real in-store purchases (Doyle, O'Connor, Reynolds, & Bottomley, 1999), among candidates for scholarships (Tversky, 1972), in elections (Pan, O'Curry, & Pitts, 1995), among gambles (Tversky, 1972; Wedell, 1991), in likelihood-judgment problems (Windschitl & Chambers, 2004), in episodic-memory tasks (Maylor & Roberts, 2007), among selection of mates (Sedikides, Ariely, & Olsen, 1999), and in inference problems (Trueblood, 2012). These experiments have demonstrated that context effects play a significant role in behavior and can impact real-life decisions.

Although the evidence for context effects in high-level decision making is quite substantial, there is much less evidence for these effects in low-level tasks. In Tversky's (1972) original demonstration of the similarity effect, his perceptual stimuli did not produce a significant effect, but Choplin and Hummel (2005) found a significant attraction effect with ovals and line segments in a similarity-judgment paradigm. Tsetsos and colleagues (2011) obtained the similarity effect using time-varying psychophysical stimuli. Although these studies have added to the understanding of context effects, the evidence is distributed across different experimental paradigms, and there is still no demonstration that all three effects can arise in the same low-level decision-making task, which may explain why these findings have had less impact.

Besides illustrating that the three context effects can occur in a simple perceptual task, the current research adds to recent evidence that all three can be obtained under the same experimental paradigm (Trueblood, 2012). Decision theorists have attempted to explain the three effects with a single model (Roe, Busemeyer, & Townsend, 2001; Usher & McClelland, 2004). However, until recently, there has been no evidence indicating that the three effects can occur in the same paradigm in either consumer choice or perception. Because these models assume that a single set of cognitive mechanisms produce the three effects, it is crucial to demonstrate the effects in the same paradigm. In the current experiments,

we also used within-subjects manipulations unlike, for example, those used in Choplin and Hummel (2005), thus demonstrating that context effects in perception occur at the individual level: within the same people as well as within the same paradigm.

In Experiment 1, we investigated the attraction effect using simple perceptual stimuli and three types of decoys: range, frequency, and range-frequency. In Experiments 2 and 3, we used the same stimuli and decoy types to investigate, respectively, the similarity and compromise effects. Tables S1, S2, and S3 in the Supplemental Material available online provide parametric details of the stimuli used in each experiment.

Experiment 1: The Attraction Effect

Method

Fifty-three undergraduate students from the University of Newcastle participated in Experiment 1 for course credit, completing the experiment online at a time of their choosing. Participants were told that they would see three rectangles on each trial and should select the rectangle that had the largest area by pressing one of three keys. They did not receive any feedback during the experiment, so there were no consequences for their selections.

The rectangle stimuli varied in height and width, with these two features acting as attribute dimensions analogous to price and quality in the cars example given in the Introduction. Anderson and Weiss (1971) showed that height and width are perceived separately and then integrated to form area estimates. Even if the rectangles were perceived as unidimensional stimuli (e.g., in terms of aspect ratio), that would not affect the implications of our experimental outcomes (e.g., Choplin & Hummel, 2005, used unidimensional stimuli in their attraction-effect experiments.)

The height and width of each rectangle was specified in pixels. For example, the rectangles associated with location X in Figure 1 were created using a bivariate normal distribution in which the mean height was 50 pixels, the mean width was 80 pixels, and the variance in each dimension was 2 pixels, with no correlation between variance in height and width (see Fig. 2 for examples of stimuli). Allowing for noise in the height and width of the rectangles helped introduce variation in the task. The height and width of rectangles at other locations in Figure 1 were determined in a similar manner. The rectangles corresponding to alternatives X and Y were selected so that on each trial they had the same area.

On each trial, three rectangles were presented on the screen from left to right. The rectangles were solid black and oriented vertically or horizontally. The background

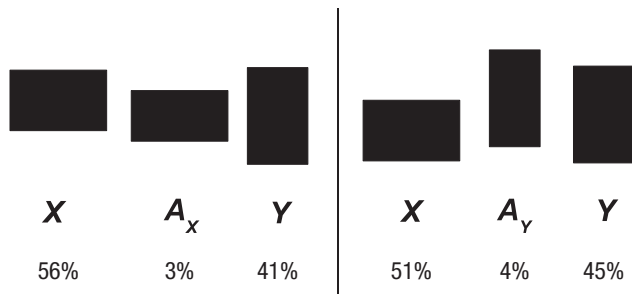


Fig. 2. Example of two range-decoy trials and mean choice probabilities from the attraction-effect experiment (Experiment 1). X and Y represent two choice options on a given trial, with A_x and A_y representing decoy options for X and Y , respectively. The left panel shows a trial in which X was the focal option, and the right panel shows a trial in which Y was the focal option.

screen was white. The vertical placements of the rectangles varied so that they did not all sit on the same horizontal axis. The rectangles were numbered from left to right, and the location of different rectangles (i.e., decoy, focal, and nonfocal) was randomized across trials. On a given trial, the focal stimulus was the rectangle enhanced by the decoy stimulus.

Each participant completed 720 randomized trials, which were divided into 180 trials with range decoys, 180 trials with frequency decoys, 180 trials with range-frequency decoys, and 180 filler trials. The 180 trials for each type of attraction decoy were further divided so that, in the attribute space, the decoy was placed near one alternative for half of the trials and near the other alternative for the remaining trials. Counterbalancing the stimuli in this way avoids confounding the context effects with many biased guessing strategies. In the filler trials, ternary choice sets were used; these trials contained one rectangle that clearly had a larger area than the rest, which provided the participant with an objectively correct option. The number of correct choices in filler trials provided an estimate of accuracy.

Results

Four subjects' data were removed from analysis because their accuracy on filler trials was 2 standard deviations lower than the average. Figure 2 shows results from the range-decoy trials, which showed a clear attraction effect: The presence of the decoy shifted preferences away from the nonfocal option toward the focal option. The mean choice probabilities for all three decoys are shown in Figure 3, collapsed across both possible positions of the decoy (i.e., favoring X vs. favoring Y).

Across the three types of decoys, the choice probability for the focal alternative was significantly larger

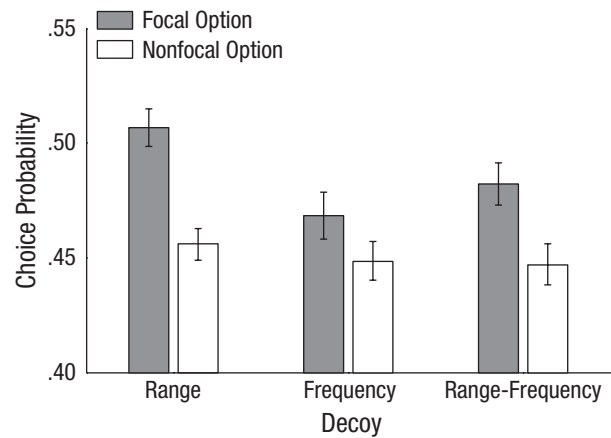


Fig. 3. Results illustrating the attraction effect (Experiment 1): mean choice probability as a function of decoy type and choice option. Error bars show standard errors of the mean.

than the choice probability for the nonfocal alternative, $t(48) = 2.601$, $p = .012$. Analyzing the three types of decoys alone, we found that the range decoy produced the strongest effect, $t(48) = 3.616$, $p < .001$, followed by the range-frequency decoy, $t(48) = 2.085$, $p = .042$. The frequency decoy produced a minimal effect, $t(48) = 1.135$, $p = .262$, which confirms previous evidence that frequency decoys produce very weak attraction effects (Huber et al., 1982). The percentage of participants showing each effect were 69% with the range decoy, 61% with the range-frequency decoy, and 59% with the frequency decoy. Similar percentages were obtained in Choplin and Hummel's (2005) attraction experiment involving ovals, in which 58% of subjects selected the focal option.

Discussion

In Experiment 1, the range and range-frequency decoys produced the standard attraction effect. Further, the ordering of effect size across the three decoys (i.e., range followed by range-frequency followed by frequency) replicated the findings of Huber et al. (1982) for choices among consumer goods. Thus, the attraction effect not only generalizes to simple perceptual tasks, but it also retains the same ordering of effect size as in high-level tasks.

Experiment 2: The Similarity Effect

Method

Sixty-two undergraduate students from the University of Newcastle participated in Experiment 2 for course credit. The conditions, instructions, and design were the same as in Experiment 1, with the exception of the height and

width of the rectangle stimuli. We used two choice sets to test the similarity effect when height was greater than width and two choice sets to test the similarity effect when width was greater than height. The two choice sets for each location arose from the two possible placements of the decoy option (i.e., near one alternative vs. near the other).

Each participant completed 720 randomized trials, 270 with choice sets in which height was greater than width, 270 with choice sets in which width was greater than height, and 180 filler trials. The similarity trials were further divided so that the decoy was a similar, competing option placed near one alternative for half of the trials and near the other alternative for the remaining trials. Filler trials were the same as in Experiment 1.

Results

All participants had accuracy within 2 standard deviations of the average accuracy on the filler trials. Mean choice probabilities for the similarity effect are shown in Figure 4, collapsed across the two different types of choice sets (i.e., height greater than width and width greater than height) and decoy positions. Here, the term “focal” refers to the dissimilar alternative because this is the alternative that should be enhanced by the decoy if the similarity effect is observed.

The choice probability for the focal alternative was significantly larger than the choice probability for the nonfocal alternative, $t(61) = 2.882, p = .006$. This effect was consistent, occurring both on trials in which height was greater than width, $t(61) = 2.161, p = .035$, and on

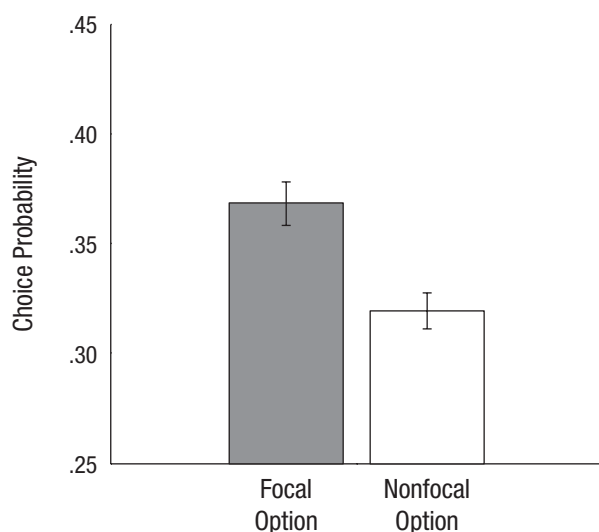


Fig. 4. Results illustrating the similarity effect (Experiment 2): mean choice probability as a function of choice option. Error bars show standard errors of the mean.

trials in which width was greater than height, $t(61) = 3.523, p < .001$, with 69% of subjects demonstrating the effect for both types of choice sets. The number of subjects demonstrating the effect is clearly more than in Tversky's (1972) perceptual experiment, in which only 3 out of 8 subjects showed the effect, but it is a little less than in Tversky's (1972) tasks involving candidates and gambles, in which 6 out of 8 and all 8 subjects demonstrated the effect, respectively.¹

Discussion

The results of Experiment 2 support the conclusion that the similarity effect generalizes to low-level tasks and confirm previous evidence for the similarity effect in perception (Tsetsos et al., 2011).

Experiment 3: The Compromise Effect

Method

Sixty-three undergraduate students from Indiana University participated in Experiment 3 for course credit. Participants completed the computer-based experiment in the laboratory. The instructions and experimental design were identical to those used in Experiments 1 and 2, except that the height and width of the rectangle stimuli differed. In Experiment 3, two choice sets were used to test the compromise effect: $\{X, Y, C_x\}$ and $\{X, Y, C_y\}$, in which all of the rectangles had equal area but height $C_x < \text{height } X < \text{height } Y < \text{height } C_y$, so X and Y were both compromise and extreme options.

Each participant completed 720 randomized trials, 360 testing the compromise effect and 360 filler trials. The former trials were further divided so that the decoy was an extreme option compared with one alternative for half of the trials and an extreme option compared with the other alternative for the remaining trials. Filler trials were the same as in the previous experiments.

Results

Four subjects were removed from analysis because their filler accuracy was 2 standard deviations lower than the average. Mean choice probabilities for the compromise effect are shown in Figure 5, collapsed across the two positions of the decoy. The choice probability for the compromise alternative tended to be larger than for the extreme alternative, collapsed across the two positions of the decoy, $t(58) = 1.967, p = .054$. The difference would be significant if a one-tailed t test were applied. Such a test would be justified because there is a clear hypothesis on the direction of the result. Further, the result was fairly consistent, with 66% of subjects showing the effect.

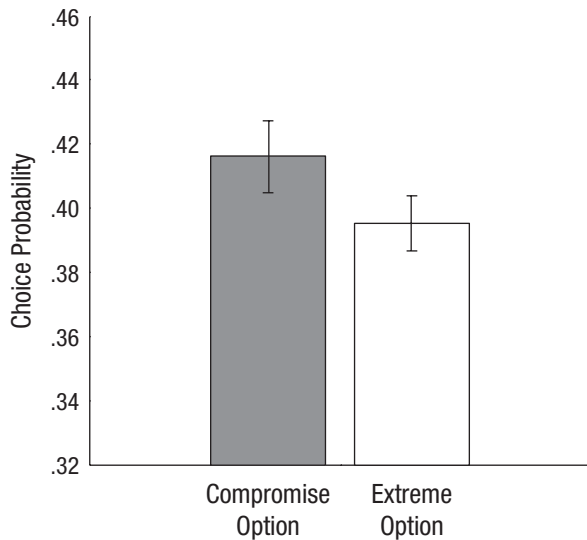


Fig. 5. Results illustrating the compromise effect (Experiment 3): mean choice probability as a function of option type. Error bars show standard errors of the mean.

Discussion

The results of Experiment 3 provide the first evidence that, like the attraction and similarity effects, the compromise effect can arise in low-level tasks.

General Discussion

Previous research in consumer and perceptual preference has demonstrated that decisions are sensitive to context; however, these two literatures have been mostly independent. Our research demonstrates the potential utility of a unified account by showing that three context effects from the consumer-choice literature also occur in a perceptual-choice task. That is, our experiments suggest that these context effects are a general feature of

human choice behavior because they are a fundamental part of decision-making processes. As such, our results challenge explanations of these effects exclusively in terms that are unique to high-level decision making and thus call for a common theoretical explanation that applies across paradigms.

Although the study of context effects in preference and perception has generally proceeded independently, Dhar and Glazer (1996) argued that researchers should examine the similarities and differences in context effects across domains because mechanisms in existing theories of perceptual choice might be sufficient to account for the standard effects found in preferential choice. Table 1 shows choice probabilities from different experiments testing the effects across a variety of domains. The table shows that context effects generalize across a range of tasks; however, effect size varies by task. Future research is needed to understand why the effects are larger in some domains than in others. One possible explanation is that the effects become smaller with faster response times. This hypothesis is consistent with the results of experiments by Pettibone (2012) showing that attraction and compromise effects increase with deliberation time.

By demonstrating context effects in perception, we bring into question choice rules often used in theories of perceptual decision making, in the same way that early models of consumer preference—with simple scalability—were challenged by context effects in consumer choice. This challenge extends to the ratio-of-strengths rule, signal detection models, and other choice models that satisfy simple scalability (Luce, 1959; Medin & Schaffer, 1978; Nosofsky, 1986).

Recently, researchers have turned to modeling approaches that incorporate the dynamics of the decision-making process to account for context effects.² Two dynamic cognitive models, multialternative-decision-field theory (MDFT; Roe et al., 2001) and the leaky-competing-accumulators (LCA) model (Usher & McClelland, 2004),

Table 1. Mean Choice Probabilities in Attraction, Similarity, and Compromise Experiments

Study	Stimuli	Attraction effect	Similarity effect	Compromise effect
Tversky (1972)	Perceptual	—	.41, .44 ^a	—
Tversky (1972)	Gambles and candidates	—	.53, .42 ^a	—
Huber, Payne, and Puto (1982)	Consumer goods	.45, .59 ^a	—	—
Simonson (1989)	Consumer goods	.50, .65 ^a	—	.50, .34 ^b
Pettibone and Wedell (2000)	Consumer goods	—	—	.46, .32 ^b
Choplin and Hummel (2005)	Perceptual (ovals)	.58, .41 ^b	—	—
Trueblood (2012)	Inference	.56, .39 ^b	.51, .30 ^b	.48, .38 ^b
Current study	Perceptual	.51, .46 ^b	.37, .32 ^b	.42, .40 ^b

^aIn these studies, binary and ternary choice sets, rather than all ternary sets, were compared. In these cells, the choice probability of the focal option in the binary set is given first, followed by the choice probability of the focal option in the ternary set. ^bIn these studies, ternary sets were compared, and the choice probability of the focal option is given first, followed by the choice probability of the nonfocal option.

can account for the similarity, compromise, and attraction effects in consumer choice using a single set of cognitive principles. Both models are sequential-sampling models that assume that information is accumulated over time until a decision criterion is reached. The models also incorporate a sequential scanning of attributes, including ideas from Tversky's (1972) elimination-by-aspects heuristic.

Our demonstration of the three context effects in the same perceptual paradigm using within-subjects manipulations, and a parallel demonstration for inference problems reported in Trueblood (2012), provide direct support for the assumption made by both theories of a common mechanism operating at the level of individual participants. The phantom-decoy effect (Pratkanis & Farquhar, 1992), in which the probability of an asymmetrically dominated option increases when the dominant option is made unavailable, provides a further related challenge for choice theories. We did not study the phantom-decoy effect because little is known about the predictions of MDFT and the LCA model with regard to this effect (but see Busemeyer & Johnson, 2004, and Tsetsos, Usher, & Chater, 2010, for a brief discussion). Future research is needed to study this effect in perception as well as predictions from the models.

In Tversky and Kahneman's (1991) and Tversky and Simonson's (1993) reference-dependent theory of riskless choice, it is assumed that disadvantages affect the selection process more than advantages. In multiattribute choice, when an option is being considered, the theory postulates that individuals assess the advantages and disadvantages of that option along each attribute with respect to the other alternatives in the choice set. Disadvantages (losses) are weighted more than advantages (gains) in the decision process. Our demonstration that the three context effects occur in simple perceptual choices calls into question this loss-aversion explanation. In our stimuli, the attribute dimensions were nonhedonic, and the notion of gains and losses along attributes was absent. Thus, a parsimonious account of context effects that generalizes to a number of domains (e.g., consumer goods, inference, perception) cannot be based on loss aversion.

A similar criticism can be made of the LCA model. Although MDFT and the LCA model share many features, including providing the same explanation for the similarity effect, they have one striking difference. The LCA model accounts for the attraction and compromise effects with an asymmetric value function, consistent with the Tversky and Kahneman (1991) and Tversky and Simonson (1993) loss-aversion function. MDFT, in contrast, accounts for the attraction and compromise effects using a distance function that compares options along dominance and indifference dimensions (Hotaling, Busemeyer, & Li,

2010). The MDFT account is more plausible both for high-level tasks and for the current perceptual experiments because there is no arbitrary weighting of differences in attribute values. Rather, an option's relevance is determined by whether an individual views it as indifferent or as dominated by the other options. Although it is possible to reformulate the asymmetric value function in the LCA model in terms of attention to positive and negative differences rather than to gains and losses, it remains unclear why negative differences are weighted more than positive differences in perceptual decisions about the size of rectangles.

The inclusion of dynamics in MDFT and the LCA model provides them with flexibility that needs to be justified. Response-time measures provide one way to test the dynamic assumptions of these models. It might be possible to distinguish MDFT and the LCA model on the basis of response-time data as described by Tsetsos et al. (2010). Perceptual choice is an ideal domain for exploring the relationship between preference and response time because choices are made quickly and response-time measurement is easy. Future experiments building on the ones presented here could address these issues.

Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

Funding

Jennifer S. Trueblood was supported by the National Science Foundation's Integrative Graduate Education and Research Traineeship program in the Dynamics of Brain-Body-Environment Systems at Indiana University. Scott D. Brown and Andrew Heathcote were supported by Australian Research Council fellowships.

Supplemental Material

Additional supporting information may be found at <http://pss.sagepub.com/content/by/supplemental-data>

Notes

1. The number of subjects was calculated from Table 1 in Tversky (1972) by averaging across the different choice sets for each individual.
2. It should be noted that comparison-induced-distortion theory (Choplin & Hummel, 2002, 2005) offers an alternative approach to modeling both perceptual- and preferential-choice behavior. According to this theory, biased evaluations arise through language-expressible magnitude comparisons. Comparison-induced-distortion theory has been successfully applied to attraction-effect data but has not yet been applied to similarity- or compromise-effect data.

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