Time Pressure and the Compromise and Attraction Effects in Choice

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ABSTRACT
Both the compromise effect and the attraction effect have demonstrated that deviation from preference among alternatives is independent of context. This study explores the effect of time pressure on the compromise and attraction effects, and demonstrates that the compromise effect is stronger when consumers are under higher pressure to choose.

INTRODUCTION
Both the compromise effect and the attraction effect have demonstrated that deviation from preference among alternatives is independent of context (Huber and Puto, 1983; Simonson, 1989). Independence from context occurs when a consumer prefers brand \( x \) to brand \( y \) in one context (for example, when only \( x \) and \( y \) are available), but then \( y \) cannot be preferred to \( x \) in another context (for example, when a third brand \( z \) is added to the choice set) (Simonson and Tversky, 1992). The compromise effect is an example in violation of the alternative of being independent of context. The compromise effect (or extremeness aversion) indicates that the addition of an option to a set of two (non-dominated) options enhances the share of the adjacent alternative relative to the nonadjacent (existing) alternative (Simonson 1989; Simonson and Tversky, 1992). In a compromise effect example, the “core” two-option set might include a pair of binoculars with 7X magnification power that costs $30 and a pair with 10X magnification that costs $60. This core set might be expanded by adding a pair of binoculars with 13X magnification that costs $90, such that the 10X pair becomes the “compromise” (or middle) option and the 7X and 13X pairs become the “extreme” options. If the compromise effect occurs in this case, the addition of the 13X option should lead to an increase in the share of the 10X option relative to the 7X option. Consumers chose 7X in a two-option set, whereas they chose 9X in a three-option set, in violation of the alternative of being independent of context (Simonson and Tversky, 1992).

In a demonstration of the attraction effect, a group of consumers was asked to choose between a pen that cost $6 and an elegant more expensive Cross pen. A second group chose from among a pen that cost $6, the same elegant Cross pen, and a clearly less attractive pen (Houghton, Kardes, Mathieu and Simonson, 1999). The results showed that the addition of the less attractive pen increased the share of the Cross pen, independent of the context of the alternative of violation.

Although compromise and attraction effects are interesting and have been demonstrated in many studies (e.g., Benartzi and Thaler, 2002; Chernov 2004a; Dhar, Nowlis and Sherman, 2000; Drolet, 2002; Huber & Puto, 1983; Lin et al., 2006; Malaviya and Sivakumar, 2002; Nowlis and Simonson, 2000), these studies typically looked at attraction and compromise effects in situations that allowed the decision maker to have an unlimited amount of time to perform the decision-making task. However, many real world decisions are made under some form of time constraint. Do decision makers use the same strategies when making decisions with and without time constraint? How do decision makers react when a deadline has been met or when a time constraint has been removed? This paper investigates these issues and proposes that consumer preference is determined by the degree to which decision time is constrained, and that time pressure moderates the significance of compromise and attraction effects. The theoretical analysis, research hypotheses, and two empirical studies are described in the next section.

TIME PRESSURE
Time pressure is often viewed as an external factor that influences consumer behavior. Relevant research has demonstrated that time pressure will constrain the quantity of information that is processed (Iyer, 1989). Hence, it is generally believed that increasing time pressure causes consumers to experience difficulties with decision making. In recent years, scholars have begun to examine the relationship between time pressure and choice deferral (Tversky and Shafir, 1992; Dhar, 1997; Luce, 1998). Dhar and Nowlis (1999) pointed out that when consumers are facing time pressure they will probably defer making a choice, but when they are facing the same attractive alternatives in a choice set, the proportion of decision deferral is lower under time pressure than without time pressure. Lin and Wu (2005) demonstrated that that if consumers perceive that they do not have enough time to evaluate products carefully, then they will not make decisions. However, when consumers have too much time (without time pressure) to make careful evaluation, they also tend not to make decisions. This occurs because, when the decision is made and the time to consider is too long, the disadvantages of the selected alternative are accepted, and the merits of the non-selected alternative are given up. Only under moderate time pressure, is the no-choice option proportion relatively low.

Research suggests that decision makers tend to speed up the execution of decision strategies or switch to simpler strategies when under time constraints (Edland and Svenson, 1993; Johnson, Payne and Bettman, 1993; Benson and Beach, 1996; Smith, Mitchell and Beach, 1982). They also accelerate the rate at which they examine information when making decisions under time pressure (e.g., Ben Zur and Breznitz, 1981). When faced with severe time constraints, decision makers either filter information or omit certain information from consideration altogether (Miller, 1960) and rely most heavily upon negative information (Wright, 1974). Moreover, consumers who are making choices under time pressure may alter their decision-making strategies. In particular, a number of different studies suggest that a common response to limited time is for the decision maker to shift from using compensatory to non-compensatory decision rules (e.g., Payne, Bettman and Johnson, 1988; Svenson, Edland and Slovic, 1990). Thus, consumers who are under time pressure are likely to simplify their selection decision by using less effortful, non-compensatory decision-making strategies. Although the use of such strategies may often be adaptive, consumers may, under time pressure, also use heuristics because they have no other choice (Dhar and Nowlis, 1999).

We can predict that when consumers are facing product attribute or choice set alternative conflicts, increasing time pressure will make them inclined to use a non-compensatory decision rule to form attitudes or make choices based on the values of important attributes. This paper proposes that consumer preference is determined by the degree to which decision time is constrained, and that...
time pressure moderates the significance of the compromise and attraction effects.

**COMPROMISE EFFECT**

The compromise effect (or extremeness aversion) indicates that the addition of an option to a two-option set enhances the share of the adjacent relationship compared to the nonadjacent relationship (Simonson, 1989; Simonson and Tversky, 1992). As illustrated in Figure 1, the compromise effect occurs if the choice share of one option, B, relative to another existing option, A, is enhanced when a third option, C, which makes B a compromise option, is added to the set. The compromise is tested by comparing the relative share of the middle option with and without the third option in the set. For example, the binary choice set might include a pair of binoculars with a 7X magnification power that costs $30 and a pair with 10X magnification that costs $60. This binary choice set might be expanded by adding a pair with 13X magnification that costs $90, such that the 10X pair becomes the “compromise” (middle) option and the 7X and 13X pairs become “extreme” options. If the compromise effect occurs in this case, then the addition of the 13X option has led to an increase in the share of the 10X option relative to the 7X option. The magnitude of the compromise effect is typically assessed by comparing the relative shares of the two existing options with and without the third option in the set.

Extremeness aversion is the main cause of the compromise effect, which means that when all conditions are the same, the attraction of a relatively more extreme option will be lowered in comparison with other options (Chernev 2004; Simonson 1989; Dhar, Nowlis and Sherman, 2000; Kivetz, Netzer and Srinivasan, 2004; Tversky and Simonson, 1993). In the above example, among in the binary choice sets \{A, B\} and \{B, C\}, there is no extreme option. Only when the choice set becomes a trinary choice set, \{A, B, C\}, do options A and C become extreme options. Option B becomes a non-extreme option (compromise option), so that its attraction increases and the probability of it being chosen also increases.

The compromise effect, whereby brands gain market share when they become intermediate options in a choice set, is among the most robust phenomena documented in marketing behavioral research (e.g., Benartzi and Thaler, 2002; Chernev, 2004; Dhar, Nowlis and Sherman, 2000; Drolet, 2002; Nowlis and Simonson, 2000; Kivetz, Netzer and Srinivasan, 2004).

To understand the significance of time pressure on the magnitude of the compromise effect, the binary set \{a, b\} and the expanded trinary set \{a, b, c\} must be considered separately. In binary sets, the option to choose depends on personal preference. In trinary sets with time pressure, the compromise option is likely to lose a relatively large share to the non-compromise option because increasing time pressure makes decision makers inclined to use a non-compensatory decision rule to form attitudes or make choices based on values of important attributes. Therefore, when consumers are facing time pressure, they tend to focus on either price or
quality, which leads to the prediction that the non-compromise options will be chosen more often than the compromise option.

**H1:** The compromise effect will be smaller when consumers are under time pressure.

### ATTRACTION EFFECT

Huber and Puto (1983) propose that in the two-option choice set, the addition of a third option (called the “decoy”) will increase the percentage of a similar option in the original choice set (called the “target”); this phenomenon is called the attraction effect. As shown in Figure 2, in the case of A and B options, when option A is much lower in price than option B, but option B is much higher in quality than option A, it is very difficult for consumers to make a choice between option A (competitor) and option B (target). After option C, the price of which is almost the same as that of option B but the quality of which is lower than that of option B, joins the choice set, consumers will tend to choose option B from among options A, B, and C. This occurs because after the inferior option C is added, the advantage of option B (target) becomes more conspicuous. Then it is easier for consumers to compare the advantages of these options and recognize that B is an excellent option, and its probability of being chosen increases.

The attraction effect also involves another very interesting phenomenon. The appearance of an inferior option will have an obvious influence on the consumer’s decision making and choice, and this phenomenon opposes the independence of the irrelevant alternatives principle (Luce, 1977). The traditional economic theory deems that the preference or choice of one option is independent of whether or not other options exist. The attraction effect demonstrates that the existence of one inferior option is likely to make the advantages of a target option more conspicuous and increase the probability of consumers choosing the target option (Burton and Zinkhan, 1987; Huber and Puto, 1983; Malaviya and Sivakumar, 2002; Simonson, 1989; Simonson and Tversky, 1992).

The preceding explanation for the attraction effect focused on the dominance relationship. Such a relationship could provide a reason for preferring the relatively superior alternative. This finding is consistent with the notion that there is a fundamental difference between the compromise and attraction effects, in that the former is more cognitive, and the latter is more perceptual. In the compromise set, a choice of the middle option seems like a compromise and tends to be explained on the basis of its position between two extremes. Conversely, although people who are uncertain about their preferences gravitate to the asymmetrically dominating option, this more perceptual effect is not at all transparent, and most buyers use the asymmetric dominance relation to explain their choices (when explicitly asked, most rate asymmetrically dominating options as easier to justify (Dhar & Simonson, 2003; Simonson, 1989)). Under time pressure, consumers perceive that they do not have enough time (high time pressure) to evaluate carefully, and they are likely to simplify their selection decision by using heuristic strategy. The target option is explicitly relatively superior in comparison to a third option that is dominated by the target option, and this provides consumers with a reason to choose it. Thus, we predict:

**H2:** The attraction effect will be stronger when consumers are under time pressure.

### STUDY 1

Study 1 mainly aimed to explore whether time pressure influences the compromise effect. The study adopted a 2 (choice sets: binary or trinary) X 2 (decisions made either with or without time pressure) between-subjects design. A total of 320 respondents were randomly and equally assigned to either the high or low time pressure condition.

**Choice sets.** The choice sets were manipulated by asking that each subject make choices from either a binary option or a trinary option, and repeat the decision-making process with three kinds of products: microwave ovens, ovens, and binoculars. As has been described (see Figure 1), each category had a binary option version or a trinary option version so that the compromise effect could be tested. The binary option design is described in Figure 1 as options A and B, and the trinary set was formed by the addition of a third option C, which was a high price-quality option. The manipulation method of the choice set was adopted from Simonson (1989), and the binary choice set was distinguished from the trinary choice set using information from Consumer Reports.

**Time Pressure.** To avoid the potential problem in previous research whereby the time allowance was arbitrarily selected (Ordonez & Benson, 1997), 103 participants participated in a pretest in which they were asked to self-record the end time of the decision-making process. This data was used to determine the average time required to make a decision for either binary or trinary tasks. According to Benson and Beach (1996), high time pressure can be manipulated by subtracting one standard deviation from the mean. The results for the binary task, with 48 participants, indicated that the high time constraints were 39 seconds for microwave ovens, 32 seconds for ovens, and 41 seconds for binoculars. For the trinary task, with 55 participants, time constraints were 46 seconds for microwave ovens, 38 seconds for ovens, and 49 seconds for binoculars. Conversely, no time limit was set for subjects of low temporal pressure. Time pressure was manipulated by either giving subjects a total of either 112 (binary) or 133 (trinary) seconds to complete the survey (three product categories), or by allowing subjects an unlimited amount of time to make decisions. Time pressure was also manipulated by telling the respondents under time-pressure conditions that they had a certain amount of time to complete each decision. We then marked on the board each five-second increment until the final seconds were completed, and subjects were told there was no more time, and they had to move onto the next problem, where we repeated the procedure. Time pressure was measured on a seven-point scale (“no time pressure,” “too much time,” “more than adequate time available,” “adequate time,” “not adequate time available,” “need a lot more time to do,” and “too high time pressure”) (Suri and Monroe, 2003).

### RESULTS

For the binary task, the high time pressure group reported significantly higher levels of stress than the low time pressure participants (4.4 vs. 3.46, t_{158}=6.54, p<0.001, for high time pressure and low time pressure groups, respectively). For the trinary task, high time pressure participants also reported significantly higher levels of stress than low time pressure participants (4.16 vs. 3.58, t_{158}=3.31, p<0.001). These results imply that participants who were under low time pressure condition were more likely to perceive that there was sufficient time to complete the questions than participants who were under the high time pressure condition. Therefore, the manipulation check for time pressure is accordingly regarded as successful.

**Time Pressure Effect in the Compromise Effect.** The compromise effect is typically measured by comparing the relative shares of choice alternatives between the core and extended sets. Thus, if P (B; A, C) is the share of option B relative to options A and C in a selection that is made from set [A, B, C], then P_C{B;A} is the
share of B relative to A in a selection that is made from set \{A, B, C\}, where

\[
p_{c}(B; A) = \frac{p(B; A, C)}{p(B; A, C) + p(A; B, C)}
\]

Consistent with previous research, the compromise effect was measured in terms of the changes in the relative share that are associated with the addition of an adjacent alternative to the choice set, that is, \( p_{c}(B; A) - p(B; A) \). This measure was used to examine whether the compromise effect was moderated by time pressure.

To test the compromise effect, an analysis was performed to compute the share of the compromise option in the binary set and the trinary set, which is denoted by “P” (see Chen, 2004a for a detailed discussion of the measure of the share), as shown in Table 1. The compromise effect \( (\Delta P) \) was measured in terms of the changes in “P” (the share of the compromise option) that are associated with the addition of an adjacent alternative to the core set. The significance of these data was examined using categorical modeling (Stokes, Davis & Koch, 2001) in which an individual’s probability of selecting the middle option was a function of time pressure status. The analysis indicated a significant interaction effect between time pressure and the choice set \( (\chi^2(1)=4.08, p<0.05) \). Across the three product categories, the share increase of the middle (compromise) option differed significantly between the two time pressure conditions (see Table 1). The average increase in the share of the compromise option was much larger among the low time pressure participants (+30%) than among the high time pressure participants (+9%), which indicates a weaker compromise effect in the participants with a high time pressure.

Overall, the findings on the choice of the compromise option and the occurrence of the compromise effect provide further evidence to support the prediction that time pressure influences choice behavior. Furthermore, the greater tendency to choose the middle option and to exhibit a compromise effect was much weaker in participants with high time pressure than in those with low time pressure, which supports the hypothesis of the moderating effect of time pressure on the compromise effect.

**STUDY 2**

Study 2 mainly aimed to explore whether time pressure influences the attraction effect. The study conducted a 2 (choice sets: binary or trinary) x 2 (decisions made either with or without time pressure) between-subjects design, which is consistent with study 1. All of the 392 participants, who were enrolled in marketing courses, took part in the study on a voluntary basis and were assigned to one of four conditions. The design of the binary set is requested to complete three choices with three categories: microwave oven, oven, and binoculars, and were randomly and equally assigned to one of four conditions. The design of the binary set is described in Figure 2 as options A and B, and an inferior option C relate to target option B was added to the binary set to become the trinary set. The manipulation of time pressure was identical to that in Study 1. A pilot test was firstly carried out to determine that time pressure was manipulated by either giving subjects a total of either 101 (binary) or 125 (trinary) seconds to complete the survey (three product categories). Without pressure allow subjects an unlimited amount of time to make decisions.

**RESULTS**

**Manipulation Check.** The reports for the binary task indicate that the participants felt a much higher time pressure (mean=4.47) in the high pressure condition than in the low pressure condition (mean=3.5), \( t_{104}=84.19, p<0.001 \). For the trinary task, it was also found that the high pressure participants felt much higher pressure (mean=4.42) than the low pressure participants (mean=3.45), \( t_{194}=4.61, p<0.001 \). This supports that the manipulation of time pressure is successful.

**Time Pressure Effect in the Attraction Effect.** The measuring method for the attraction effect is the same as that for the compromise effect, as shown in Table 1. After the addition of a third option (C, the inferior option) the target option (B) increased its percentage of being chosen (attraction effect). In the case of participants in the low time pressure condition category, across the three product categories, the percentage of target option being chosen increased from 46% in the binary choice set to 56% in the trinary choice set, \( DP=10\% \). By contrast, in the case with participants in the high time pressure condition, the percentage of the target option being chosen increased from 51% in the binary choice set to 67% in the trinary choice set, \( DP=16\% \). The statistics show that there was a significant difference in the increase in the target option between high and low time pressure, \( c^2(1)=4.07, p<0.05 \), which indicates a stronger attraction effect in the participants with high time pressure.

**CONCLUSION**

The data from Study 1 and 2 are consistent with H1 and H2, which state that the compromise effect will be weaker and the attraction effect will be stronger when consumers are under high pressure. Because of the significant implications of the finding that time pressure systematically moderates the magnitude of context effects, two follow-up studies will be conducted to test whether these results can be replicated and to gain further insights into the conditions under which high time pressure strengthens the attraction effect and weakens the compromise effect.

Previous work on behavior decision theory has shown how choice context affects decision preference in unlimited time conditions. The aim of this paper has been to show how systematic change in the compromise and attraction effects due to time pressure will influence preference change. This implies that context effects, such as the status quo, could be influenced by time pressure. The empirical investigation of this proposition is a promising area for further research.

**REFERENCE**


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**TABLE 1**

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<th>Low time pressure</th>
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<tr>
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<td>76</td>
</tr>
<tr>
<td>Attraction effect</td>
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<td>56</td>
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Note: P is the share of the middle option and ΔP is the change in relative share of the middle option (or target option) from the binary set to the trinary set.