Research Report

CHOICE UNDER CONFLICT: The Dynamics of Deferred Decision

Amos Tversky[1] and Eldar Shafir[2]
[1]*Stanford University and* [2]*Princeton University*

Abstract—*Choice often produces conflict. This notion, however, plays no role in classical decision theory, in which each alternative is assigned a value, and the decision maker selects from every choice set the option with the highest value. We contrast this principle of value maximization with the hypothesis that the option to delay choice or seek new alternatives is more likely to be selected when conflict is high than when it is low. This hypothesis is supported by several studies showing that the tendency to defer decision, search for new alternatives, or choose the default option can be increased when the offered set is enlarged or improved, contrary to the principle of value maximization.*

The experience of conflict is the price one pays for the freedom to choose. Conflict arises because a person does not always know how to trade off costs against benefits, risk against value, and immediate satisfaction against future discomfort. As a consequence, it is often difficult to make important decisions, such as family planning, as well as insignificant decisions, such as what clothes to pack for a weekend trip. The resolution of conflict is complicated by the presence of uncertainty about the consequences of one's actions, and it is further hindered by the anticipation of dissonance and regret.

Conflict plays no role in the rational theory of choice. In this theory, each option x has a value $v(x)$ such that, given an offered set, the decision maker selects the option with the highest value. This principle of value maximization underlies the standard analysis of decision making under uncertainty and the classical theory of riskless choice, which are widely used in economics, political theory, and management science. The rational theory of choice does not deny the existence of conflict; it merely assumes that conflict has no direct bearing on decision. In contrast, we argue that the presence of conflict not only influences the psychological state of the decision maker, but can also affect the actual choice.

When one option is better than another in all essential respects, there is no conflict and choice is easy. However, when each option has significant advantages and disadvantages, people often experience conflict that makes choice aversive and compels them to delay decision and seek additional information or options. Thus, people are more likely to defer choice when conflict is high than when it is low. As will be shown below, this hypothesis is inconsistent with value maximization.

Although conflict has played an important role in psychological analyses of decision making (see, e.g., Coombs & Avrunin, 1988; Festinger, 1964; Janis & Mann, 1977; Lewin, 1935; Miller, 1944), it does not have a standard formal definition, nor is there a generally accepted procedure for measuring conflict. Nevertheless, it is sometimes possible to manipulate conflict by varying the relative attractiveness of the available options. Consider a situation in which a person can select one of two alternatives, denoted x and y, or defer the decision and maintain the status quo. The latter option may allow the decision maker to consider the problem further, to seek relevant information, and perhaps even to discover new alternatives. From the standpoint of value maximization, deferring choice is just another option to be selected whenever its (subjective) value exceeds that of the available alternatives. In contrast, we propose that people are more likely to defer decision when the choice between x and y is difficult (e.g., when the alternatives are about equally attractive but not identical) than when the choice is easy (e.g., when x dominates y). Furthermore, we propose that this tendency holds even when the former choice set is at least as good as the latter. This hypothesis is tested in our first study. In the second study, we investigate the hypothesis that adding a new alternative to a given choice set can increase conflict and enhance the tendency to defer decision, contrary to value maximization.

STUDY 1: SEARCH FOR OPTIONS

In many situations, the decision maker can choose among the available options or search for additional alternatives. For example, a person who wishes to buy a used car may settle for a car that is currently available or continue searching for additional models. Seeking new alternatives usually requires additional time and effort; it may also involve the risk of losing some of the previously available options. In the present study, which extends earlier unpublished work by Shmuel Sattath, we investigated the effect of conflict among available options on the decision to search for additional options. (For other work on deferred decision, see, e.g., Busemeyer & Rapoport, 1988, and references therein.) Subjects were presented with pairs of options, such as bets varying in probability and payoff, or student apartments varying in monthly rent and distance from campus. On each trial, the subject could choose one of the two options or, instead, request an additional option, at some cost.

Figure 1 illustrates the design of this experiment. The four options displayed vary on two quantitative attributes, or dimensions. Assume that the attributes are labeled so that higher values are preferred to lower values. Hence, the choice between x and x' and the choice between y and y' involve no conflict because the umprimed options dominate the respective primed options (i.e., they are superior on both dimensions). In contrast, the choices between x and y

Address correspondence to Amos Tversky, Department of Psychology, Building 420, Stanford University, Stanford, CA 94305.

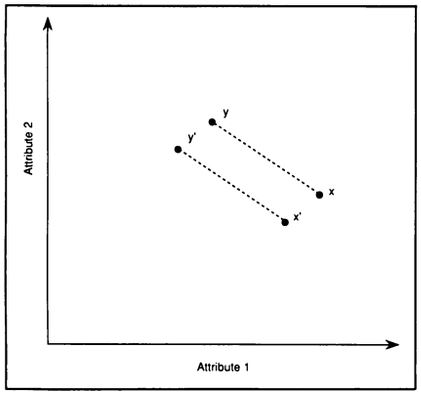

Fig. 1. A graphic illustration of the options in Experiment 1.

and between x' and y' involve conflict because the xs are better on the first dimension and the ys are better on the second.

It is noteworthy that the degree of conflict associated with a given choice is not determined by the overall value of the options. Consider the following risky prospects: x = (65% to win \$15), x' = (65% to win \$14), and y = (30% to win \$35). The choice between x and x' involves no conflict because x dominates x', but the choice between x and y does involve conflict because x offers a better chance to win whereas y offers a larger prize. Suppose you are indifferent between x' and y. These options then have the same subjective value, yet they compare differently with x. While the choice between x' and x is easy, the choice between y and x is not. Hence, the degree of conflict associated with a choice between options depends on the relation among their attributes, not simply on their overall values. A well-known illustration of this point is due to L.J. Savage (see Luce & Suppes, 1965, p. 334; Tversky, 1972). Imagine a choice between a trip to Paris, a trip to Rome, and a trip to Rome plus a complimentary drink, denoted Rome-plus. Assuming you find Paris and Rome equally attractive, these will nonetheless compare differently with Rome-plus. The choice between Rome and Rome-plus is easy because it involves no conflict, but the choice between Paris and Rome-plus may be difficult since the conflict between the cities is not eliminated by the introduction of a complimentary drink.

Consider a situation in which a person can choose between two available alternatives or pay to obtain an additional alternative, selected at random from a known set. Let s denote the option of seeking a new alternative. According to value maximization, the decision maker should select s if and only if its expected (subjective) value exceeds that of the best alternative currently available. If this principle is applied to the alternatives displayed in Figure 1, it follows readily that if $v(s)$ exceeds both $v(x)$ and $v(y)$, it must also exceed $v(x')$ and $v(y')$, since $v(x) > v(x')$ and $v(y) > v(y')$. Consequently, value maximization implies that if s is selected from $\{s, x, y\}$, it must also be selected from $\{s, x, x'\}$, as well as from $\{s, y, y'\}$.

Let $P(s; x, y)$ denote the percentage of subjects who chose s from the choice set $\{s, x, y\}$. It follows readily from value maximization that

$$P(s; x, y) \leq P(s; x, x'), P(s; y, y').$$

According to value maximization, the percentage of subjects who seek an additional alternative cannot be greater in the conflict condition in which x and y are offered than in either dominance condition, when x and x', or y and y', are offered.[1]

Considerations of conflict suggest the opposite prediction: The decision maker is more likely to request an additional alternative in the conflict condition, when the decision is difficult, than in the dominance condition, when the decision is easy. As a consequence, we predict

$$P(s; x, y) > P(s; x, x'), P(s; y, y'),$$

contrary to value maximization.

To test the opposing predictions, we constructed three sets of four gambles, as in Figure 1. Four pairs of gambles of the form $\{x, y\}$, $\{x', y'\}$, $\{x, x'\}$, and $\{y, y'\}$ were constructed for each set. The order of the pairs was randomized, and every subject received one pair from each set. The subjects in this experiment (N = 224) were recruited by ads in the University of Oregon newspaper. The problems were presented in written form in a classroom setting. Subjects first reviewed the entire set of 12 gambles to familiarize themselves with the available options. They were then given the following instructions.

> Imagine that you are offered a choice between the following two gambles:
> x. 65% chance to win \$15
> y. 30% chance to win \$35
> You can either select one of these gambles or you can pay \$1 to add one more gamble to the choice set. The added gamble will be selected at random from the list you reviewed.

Subjects were asked to indicate whether they wanted to add another gamble or select between x and y. Subjects then chose their preferred gamble from the resulting sets (with or without the added option). The participants were instructed to treat each problem separately; they were told that the gambles they chose would be played out and that their payoffs would be proportional to the amount of money they earned minus the fees they paid for the added gambles. Subjects' earnings ranged from \$3 to \$7, with an average of \$5.

Following the choice among gambles, subjects were presented with a parallel design involving choice among hypothetical student apartments. As in the first experiment, subjects reviewed a master list of 12 apartments to familiarize themselves with the available options. The instructions read as follows.

> Imagine that you face a choice between two apartments with the following characteristics:
> x. \$290 a month, 25 minutes from campus
> y. \$350 a month, 7 minutes from campus
> Both have one bedroom and a kitchenette. You can choose now between the two apartments or you can continue to search for apartments (to be selected at random from the list you reviewed). In that case, there is some risk of losing one or both of the apartments you have found.

Subjects were asked to indicate whether they wanted to add another apartment or select between the available apartments.

The percentages of s choices are summarized in Table 1. Because there were no systematic differences among the sets, the data were pooled across all pairs. In accord with value maximization, people searched more when both options were weak than when they were

1. If all the alternatives are taken from the same finite pool, the expected value of s is strictly greater under dominance $\{x, x'\}$ than under conflict $\{x, y\}$.

Table 1. *Percentage of responses seeking an added alternative (s) under dominance and under conflict*

	Dominance		Conflict	
Options	P(s; x, x')	P(s; y, y')	P(s; x, y)	P(s; x', y')
Gambles	28	32	46	64
Apartments	48	53	62	85

strong: P(s; x', y') exceeded P(s; x, y) for both gambles and apartments ($p < .01$). Contrary to the prediction of value maximization, however, P(s; x, y) exceeded P(s; x, x') and P(s; y, y') in both cases ($p < .05$). In other words, people searched more in the conflict than in the dominance condition.

This result shows that the search for additional alternatives is determined not only by the value of the best available option, as implied by value maximization; it also depends on the difficulty of choosing among the options under consideration. When the choice involves conflict, people are more likely to seek a new option than when the choice is easy, despite the fact that the best option in the conflict condition is at least as good as the best option in the dominance condition. Recall that the subjects reviewed the pool of options from which the added alternatives were randomly selected. Hence, even if the subjects did not remember all the options exactly, they had no reason to expect that the added option would be better in the conflict than in the dominance condition. Finally, note that the results of the present study cannot be explained by a satisficing model according to which the decision maker selects an option that exceeds some specified criterion. Because there is no reason to assume that the acceptability criterion is higher in the conflict than in the dominance condition, satisficing does not account for the greater demand for new options when conflict is high than when it is low.

STUDY 2: DEFERRED DECISION

The major testable implication of value maximization is that a nonpreferred option cannot become preferred when new options are added to the offered set. Thus, a decision maker who chooses y from the set $\{y, z\}$ will not choose z from the set $\{x, y, z\}$. This follows readily from value maximization: The former preference implies $v(y) > v(z)$, hence z cannot be chosen from any offered set that includes y. In particular, a decision maker who prefers y over the option to defer the choice, denoted z, should not prefer to defer the choice when both y and x are available.

Contrary to the prediction of value maximization, we propose that if x and y are about equally attractive (but not identical), the addition of x to the choice set $\{y, z\}$ can increase conflict and enhance the tendency to defer the choice. A case in point was described to us by Thomas Schelling, who some time ago had decided to buy an encyclopedia for his children. To his chagrin, he discovered that two encyclopedias were available in the bookstore. Although either one would have been satisfactory, he found it difficult to choose between the two, and as a result bought neither.

The present analysis suggests that the tendency to defer choice can be increased by adding an alternative that enhances conflict, whereas value maximization implies that no currently available option (including the option to defer decision) can be made more popular by enlarging the offered set. The contrasting predictions are tested in the following series of problems. The subjects in the present study were students at Princeton and Stanford universities. Each student answered a single question. One group of subjects ($N = 121$) was presented with the following problem. The percentage of respondents who chose each option is given on the right.

Suppose you are considering buying a compact disk (CD) player, and have not yet decided what model to buy. You pass by a store that is having a one-day clearance sale. They offer a popular SONY player for just $99, well below the list price. Do you

y. buy the SONY player 66%

z. wait until you learn more about the various models 34%

A second group of subjects ($N = 124$) was presented with the following problem.

Suppose you are considering buying a compact disk (CD) player, and have not yet decided what model to buy. You pass by a store that is having a one-day clearance sale. They offer a popular SONY player for just $99, and a top-of-the-line AIWA player for just $159, both well below the list price. Do you

x. buy the AIWA player 27%

y. buy the SONY player 27%

z. wait until you learn more about the various models 46%

Let P(z; y) denote the percentage of subjects who chose z from the set $\{y, z\}$, and let P(z; y, x) denote the percentage of subjects who chose z from the set $\{x, y, z\}$. It is easy to show that value maximization implies P(z; y) $\geq$ P(z; y, x). This condition, called *regularity*, states that the "market share" of any option cannot be increased by enlarging the offered set. The data above violate regularity since P(defer; SONY) < P(defer; SONY, AIWA).

The results indicate that the addition of a second CD player increases the tendency to delay the purchase ($p < .05$). When the SONY alone is available, it looks like a "good buy," and the same may be true for the AIWA. But when both models are available, the decision maker faces a conflict between the better priced SONY and the higher quality AIWA. The difficulty of resolving this conflict, we suggest, leads people to defer the decision and put off the purchase.

Two alternative explanations of this pattern of preference come to mind. First, it could be argued that enlarging the offered set increases the tendency to defer the decision, regardless of whether conflict is increased. To test this hypothesis, we presented another group of subjects ($N = 62$) with the above problem except that the top-of-the-line AIWA player was replaced by a less attractive CD player. In this condition, there was little or no conflict between the SONY and the inferior player; we therefore expected no increase in the tendency to defer decision. Indeed, no one chose the

less attractive product, and only 24% chose to forgo the sale, as compared with 46% in the conflict condition. These observations indicate that the increased tendency to delay choice cannot be explained by the mere addition of options: The increase does not occur when the added options produce no conflict.

Another interpretation of the observed violation of regularity is that the subjects have inferred from the introduction of the AIWA that other high-quality products may be on sale, causing them to delay the choice and engage in further search. This interpretation, however, does not apply to the next experiment, in which the option to delay the choice was not available. Subjects (N = 80) agreed to fill out a brief questionnaire for $1.50 (the default). Afterwards, one half of the subjects were offered the opportunity to receive, instead of the $1.50, one of two prizes: a metal Zebra pen (henceforth, ZEBRA) or a pair of plastic Pilot pens (henceforth, PILOT). The prizes were shown to the subjects, who were also informed that each costs a little over $2.00. The other half of the subjects were offered only the opportunity to choose the ZEBRA instead of the $1.50. After making their decision, subjects received their chosen prize or the default payment. The results were as follows:

$$25\% = P(\text{default; ZEBRA}) < P(\text{default; ZEBRA, PILOT}) = 53\%.$$

When only one alternative was available, 75% of the subjects took advantage of the opportunity to exchange the default payment for a prize of greater value. However, when a second alternative was added, most subjects chose to retain the default option, contrary to regularity ($p < .05$). (For other violations of regularity and hence of value maximization, see Huber, Payne, & Puto, 1982, and Simonson & Tversky, 1992.)

The present experiment, involving pens, differs from the preceding experiment, involving CD players, in two respects. First, the choice was real rather than hypothetical. Second, there was no opportunity to delay the choice and obtain new information. The results suggest that conflict can increase the tendency to choose the default option, not only the tendency to defer choice.

It is difficult to overestimate the significance of the tendency to delay decision. Many things never get done not because someone has chosen not to do them, but because the person has chosen not to do them *now*. To illustrate this point, we offered students $5 for answering and returning a long questionnaire by a given date. One group (N = 56) was given 5 days to complete the questionnaire, a second group (N = 58) was given 3 weeks, and a third group (N = 57) was given no definite deadline. The corresponding rates of return were 60%, 42%, and 25%. Thus, the more time people had to complete the task, the less likely they were to do it. Just as the addition of options enhances the tendency to defer decision, so can the addition of time enhance the tendency to delay action. This observation, which represents a temporal violation of the regularity condition, is as common in daily experience as it is puzzling for decision theorists.

Acknowledgments—This work was supported by Grant No. 89-0064 from the Air Force Office of Scientific Research to the first author, by Grant No. 1-R29-MH46885 from the National Institute of Mental Health to the second author, and by a grant from the Hewlett Foundation to the Stanford Center on Conflict and Negotiation.

REFERENCES

Busemeyer, J.R., & Rapoport, A. (1988). Psychological models of deferred decision making. *Journal of Mathematical Psychology, 32,* 91–134.

Coombs, C.H., & Avrunin, G.S. (1988). *The structure of conflict.* Hillsdale, NJ: Erlbaum.

Festinger, L. (Ed.). (1964). *Conflict, decision and dissonance.* Stanford, CA: Stanford University Press.

Huber, J., Payne, J.W., & Puto, C. (1982). Adding asymmetrically dominated alternatives: Violations of regularity and the similarity hypothesis. *Journal of Consumer Research, 9,* 90–98.

Janis, I.L., & Mann, L. (1977). *Decision making: A psychological analysis of conflict, choice, and commitment.* New York: Free Press.

Lewin, K. (1935). *Dynamic theory of personality.* New York: McGraw-Hill.

Luce, R.D., & Suppes, P. (1965). Preference, utility, and subjective probability. In R.D. Luce, R.R. Bush, & E. Galanter (Eds.), *Handbook of mathematical psychology* (Vol. 3, pp. 249–410). New York: Wiley.

Miller, N.E. (1944). Experimental studies of conflict. In J.McV. Hunt (Ed.), *Personality and the behavioral disorders* (Vol. 1, pp. 431–465). New York: Ronald Press.

Simonson, I., & Tversky, A. (1992). Choice in context: Tradeoff contrast and extremeness aversion. *Journal of Marketing Research, 14,* 281–295.

Tversky, A. (1972). Elimination by aspects: A theory of choice. *Psychological Review, 79,* 281–299.

(RECEIVED 10/7/91; ACCEPTED 1/24/92)