

Introduction

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Experienced conflict and difficulty characterize some decisions, but not all of them. Which decisions can be characterized in this way? What makes some tradeoffs appear hard while others are made easily? How does conflict affect the experience of decision making, and the way in which decisions are made? What is the relation between decision conflict and emotions, such as regret, and between decision conflict and moral conflict? Do people try to avoid making certain decisions because of the conflict? Does experienced conflict interfere with consistent judgment of tradeoffs, of the sort required for public policy? What can be done to help people avoid the negative effects of conflict? What can be done to make difficult tradeoffs more consistent? [Who cares about the judgments? And anyway, judgments of what?] And finally, at the other end of the spectrum, what can be done to get people to acknowledge and deal with difficult tradeoffs and associated conflict, instead of avoiding them by making impulsive decisions?

These were some of the questions that occupied Jane Beattie and her collaborators before her untimely death in 1997. Her former collaborators and colleagues felt that an edited book on this important subject would provide a useful contribution to the literature as well as a fitting memorial to Jane.

The book includes articles by Jane's former collaborators as well as other colleagues working on the topic of conflict and tradeoffs in decision making. The articles attempt to review relevant literature as well as to report new findings, so that the book may serve as an introduction to the topic for students as well as experienced researchers. The articles review existing relevant research and also include new results. They span the range from providing answers to important theoretical questions to providing demonstrations of practical importance of these issues in private and public decision making applications.

In this chapter, we introduce the major themes of the book and provide some background.

In a sense, most of our behavior does not involve decision making. We do things without thinking. We do not consider options or evaluate consequences. At times, though, we catch ourselves in a moment of confusion.

¹This is a nearly final version of the introduction to Weber, E. U., Baron, J. & Loomes, G. (Eds.) (2000). *Conflict and tradeoffs in decision making: Essays in honor of Jane Beattie*. New York: Cambridge University Press.

We don't know what to do, or what to advise others to do. Some of these moments are characterized by a feeling that some fact is missing. If we had it, we would know what to do. At other times, we feel a sense of conflict. Different reasons pull, or push, in different directions. Such conflict is the topic of this book.

Psychology has been concerned with such conflict for a long time. It was part of the psychology of learning. Early cognitive theories of learning were satirized as having the rat "lost in thought at the choice point" (). Kurt Lewin (1951) classified conflicts in terms of approach and avoidance. "Approach" meant that some outcome was better than the status-quo, and avoidance meant that it was worse. Approach-approach conflicts were between two better outcomes, approach-avoidance conflicts involved whether to change the status quo when the only alternative was better in some ways and worse in others.

Another line of work grew out of studies of stress in World War II by Irving Janis and others, culminating in the "conflict-theory model of decision making" (Janis & Mann, 1977). According to this view, decisions are easy, involving little stress, when doing nothing (not changing from the status-quo or default) involves little risk, or when there are serious risks of *not* changing but no risk of changing. These patterns are called "unconflicted adherence" and "unconflicted change." When either option (change or no change) has risks, and when the decision maker has hope to find a better solution and sufficient time to do so, he or she will engage in "vigilant" decision making, i.e., will seek information and weigh the options. Vigilant decision making occurs in situations of moderate stress. If it is not realistic to hope to find a better solution because all options are expected to be worse than the status-quo (although one might still be better than others), the most common decision making style is "defensive avoidance," i.e., not thinking about the decision at all. Finally, if there is time pressure, a condition of frantic and disorganized search called "hypervigilance" may result, in which the decision maker considers one option after another, with little search for evidence. When the decision maker does seek evidence, the search is unsystematic, and the most useful evidence is often overlooked. Defensive avoidance and hypervigilance are both examples of high-stress decision making. A unique feature of the conflict-theory model, for which much support exists, is the claim that decision making is highly influenced by situational factors. The same person may make rational, methodical decisions in one situation and very poor decisions in others. The theory also claims that the quality of decision making affects the outcome (Herek, Janis, & Huth, 1987).

Meanwhile, also since about 1950, part of psychology — what we shall

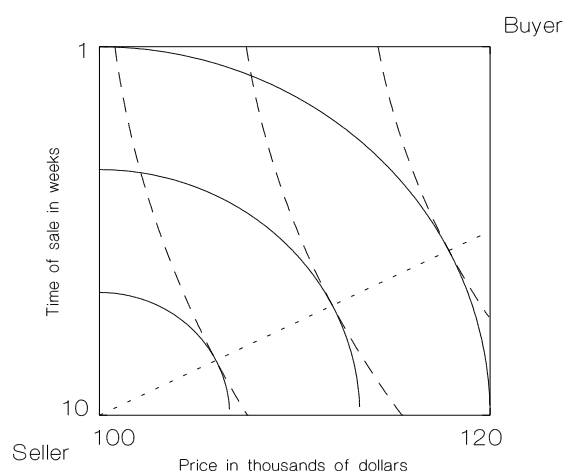


Figure 1: Representation of buyer and seller indifference curves for price and selling date of a house sale. The dotted line represents the Pareto frontier.

call the JDM approach — came under the influence of economics (see Edwards & Tversky, 1967). Since the late 19th century, economics had been thinking of choice among bundles of goods as based on quantitative trade-offs. Edgeworth (1881) showed how choices involving two goods could be represented in terms of indifference curves, as shown in Figure 1, which represents jobs that differ in salary and amount of free time. Each curve represents options that were equally preferred. Of two points on the same curve, the one in the lower right would be better in terms of money but worse in terms of time. A point above the curve would be preferred to any point on the curve.

The ideal consumer is characterized as choosing the combination of amounts of the two goods that will maximize the total utility. This involves equating the marginal utilities of the goods consumed. For example, a classic tradeoff is between leisure time and money. (Money, of course, is really a proxy for other goods to be consumed later.) If you have 20 hours of leisure per week and you are offered a chance to work five additional hours for \$250, you have to figure out if that is worthwhile. The more of your time you sell in this way, the more valuable the remaining time becomes. As a result, you require a higher payment to give it up. You reach an optimal amount of leisure when the an additional \$50 is worth less to you than that the utility of an additional free hour.

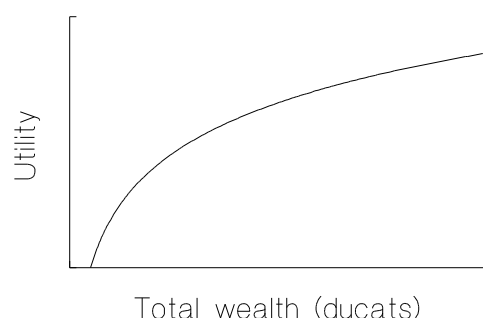


Figure 2: Utility of a person’s total wealth, according to Bernoulli.

We often think of these curves as resulting from two utility functions, one for money and one for time. The term “utility” was originally coined by Jeremy Bentham (1789), who argued that actions should maximize utility. “By utility is meant that property in any object, whereby it tends to produce benefit, advantage, pleasure, good, or happiness, (all this in the present case comes to the same thing) or (what comes against to the same thing) to prevent the happening of mischief, pain, evil, or unhappiness . . .” (p. 2). Evidently, Bentham had a broader concept in mind than simply pleasure and pain, but he did not dwell on its breadth.

A similar concept was developed much earlier by Bernoulli (1738), in order to explain (in essence) why people were not willing to pay \$500 for a 50% chance to win \$1000. Bernoulli proposed that the utility of \$1000 was less than twice that of \$500, so the expected utility of the bet — 50% of the utility of \$1000 — was less than the utility of \$500. Bernoulli’s idea of utility was quantitative. He thought of it as something that could be measured on a numerical scale. Figure 2 shows Bernoulli’s idea of the utility of money.

This idea, in combination with Bentham’s idea of maximizing utility as the proper basis for action, led to the kind of theory that Edgeworth developed. Edgeworth’s indifference curves could be explained in terms of these utility curves for the two goods in question. Free time, like money, would also have a utility function. The indifference curves in Figure 1 can be derived from the utility functions. Each indifference curve connects points with the same total utility. The total utility is the sum of utility on the time function and the money function.

The money-vs.-leisure decision is a classic tradeoff. Money and leisure are both good things, but the world is constructed so that more of one means less of the other. It is this sort of perversity of the world that puts us in

situations of conflict and requires us to make hard decisions. This much was known by early psychologists, but the new idea is that these things can be thought of quantitatively, in terms of the utility of different goods, or the utility of different attributes of options. The field of judgment and decision making, as we know it today, grew out of this infusion of economic thinking into psychology. In this way, it is different from the work of the learning theorists and of Lewin.

Major credit for making psychologists aware of economic theory must go to Ward Edwards (1954). Edward and his students (and a few others) began a program of research into the psychology of judgment and decision making. The idea was, and is, to compare judgments and decisions to economic models that specify the optimal responses. Models of optimal responses are now called “normative.”

The chapters in this book are mostly about tradeoffs that can be analyzed quantitatively in this way. They are in the judgment and decision making (JDM) tradition begun by Edwards, rather than the earlier psychological tradition exemplified by Lewin. Nor are they in the economic tradition. Economists tend to assume that individual decisions are rational and then go on to work out the implications of this assumption for aggregate behavior. The JDM tradition represented in this book, on the other hand, takes a more data-driven approach, i.e., it attempts to explain and predict decision making behavior, whether such behavior appears to be rational or irrational. Two classes of questions are addressed. The first category contains questions about the role of tradeoffs and conflict in choice behavior. What makes tradeoffs difficult? How do people resolve conflicts when they make everyday decisions? The other category contains questions about the measurement of tradeoffs, that is, the measurement of the relative utilities of two goods, such as time and money, or money and risk. Such measurement is undertaken for the evaluation of public programs, e.g., those directed at risk reduction.

Jane was interested in both of these problems. In graduate school, her interest in tradeoffs was triggered in part by research of her advisor, Jon Baron, who had just written a paper on “Tradeoffs among reasons for action” (1986) and in part by Barry Schwartz’s book *The battle for human nature* (1986), which argued against the moral appropriateness of making tradeoffs in some situations (and hence against the economic way of thinking). In Jane’s thesis, she saw the two problems as related. She thought that the measurement of tradeoffs would be more difficult, and hence less internally consistent, when the tradeoff itself was difficult.

Role of tradeoffs in choice behavior

One of the psychological questions addressed in the literature and in Jane's thesis concerns difficulty. Some tradeoffs are made so easily that the decision maker does not even notice making them, others seem extraordinarily difficult. Perhaps the first psychologist to address this issue quantitatively was Roger Shepard (1964). Shepard had been studying perceptual judgments, such as judgments of the similarity of visual forms that varied in two dimensions, such as the size of a circle and the angle of a radius drawn inside the circle. Shepard found that for this pair of dimensions (but not for all pairs of dimensions) subjects did not give consistent weights to the two dimensions. Subjects would attend to one dimension or the other, but rarely to both. Shepard suggested that people might have a similar problem making decisions that involved conflict between two attributes. He thought of the problem as a general one. As they thought about a tradeoff, they would first think about one attribute, then the other. The weights of the two attributes would depend on the decision maker's "frame of mind," which would fluctuate without a stable middle point.

In her thesis, Jane Beattie (1988) suggested that Shepard's problem might apply to some pairs of attributes more than others. The difficulty of making a tradeoff might be especially great when this kind of fluctuation occurred. She tested various hypotheses about the determinants of tradeoff difficulty and its effects. In particular, she presented students with scenarios like the following: "You have a term paper due tomorrow and cannot get an extension. You have an eye infection and have been told not to do any reading or writing, but if you leave the paper your grade will suffer." The subject then considered two options: "You are put in pain but your grade does not suffer" vs. "You are not put in pain, but you get a worse grade." Scenarios involved tradeoffs between commodities (apartments, computers, etc.), non-commodities (health, pain, grades, etc.), and currencies (time and money). Subjects rated each scenario on "decision difficulty" (the dependent variable) and on the following scales:

Q1 Is it ever wrong to trade off these two alternatives?

Q2 How sure are you that you would make the right decision?

Q3 How important is the first alternative to you?

Q4 How important is the second alternative to you?

- Q5** How easy is it to imagine a decision involving these two alternatives in which you didn't care which alternative happened?
- Q6** How easy is it to imagine a decision involving these two alternatives in which you found it very difficult to choose which alternative you wanted to happen?
- Q7** How long to you think you would have to spend thinking about a decision with these two alternatives?
- Q8** How experienced are you at making decisions involving these two alternatives?
- Q9** To what extent do you think this is a moral decision?
- Q10** How vaguely described is this decision?
- Q11** How similar are these two alternatives?
- Q12** Do you have rules for making decisions of this kind?

Subjects differed in which of these measures accounted for their decision difficulty judgments. In general, though, the most important predictors were certainty (Q2), ease of imagining that one did not care (Q5), ease of imagining that one could not choose (Q6), morality (Q9), similarity (Q11), and the product of Q3 and Q4, which was high when both alternatives were important. When the alternatives were more similar, the tradeoff was easier. People have difficulty trading off attributes that seem quite different, hence hard to compare. Moral decisions were more difficult for some people, but easier for others; Beattie suggested that the latter applied rules. Although these results were preliminary, they inspired further research by Beattie and others.

An extension of her work with Sema Barlas is included here as the first chapter. Beattie and Barlas propose a set of psychological categories to account for differences in decision difficulty (commodities; non-commodities; and currencies). They found that these categories, along with other features of the decision (e.g., similarity and importance of alternatives), can be used to predict the difficulty of the decision. They also found sex differences in category structure, with women requiring a two-dimensional solution (importance of alternative and degree of personalness) while men's judgments were one-dimensional (importance). Decisions between categories were easier than those within, and decisions involving non-commodities were more

difficult than those involving other items. Category information also predicted choice behavior in a “choices between equally preferred alternatives” paradigm (non-commodities were chosen most often), and reaction time to choose (decisions involving non-commodities took longest).

Beattie, Baron, Hershey, and Spranca (1994) developed a new concept of decision difficulty, which they called “decision attitude.” Your attitude toward a decision is whether you want to make that decision or avoid it. Notice that avoiding a decision is not the same as doing nothing. (Otherwise, decision attitude would be the same as attitude toward the default option.) Decision attitude was measured in two ways. First, subjects were asked to rate how much they would like to be in each of three situations: getting A without choosing it; getting B without choosing it; or choosing between A and B. Second, subjects were asked whether they would want to choose A or B, or whether they wanted some random device to make the decision. The second question is actually a choice of a more complex kind, but subjects tended to see it as a way of “not deciding,” since its results matched those of the first method. In most cases, subjects wanted to make most the decision themselves, i.e., they were “decision seeking” in the sense of rating making the decision as better than getting either of the two options. Some decisions, though, created real “decision aversion,” e.g., deciding which of your children would get a medical treatment when only one could get it, or even deciding which of someone else’s children should inherit an antique piano. Even making a risky decision for a single other person, like decision which of two medical treatments to give, induced some aversion. Generally, decision aversion was mostly apparent when the decision required violating a rule of equal treatment and when it could cause a bad outcome for someone else. These properties seem to be moral ones, based on principles of equity and self-determination (autonomy). Beattie et al. looked at the influence of other factors, such as anticipated regret for decisions affecting the self, and losses versus gains, but failed to find any effects.

In 1996, however, Jane supervised an undergraduate project (Shepard, 1996), which yielded more promising results concerning gains and losses, and which should be replicated. The study used a version of the Asian Disease Problem (Tversky & Kahneman, 1981):

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease which is expected to kill 600 people. Two alternative vaccines to combat the disease exist. Assume that the exact scientific estimate of the consequences of the vaccines are as follows:

Vaccine A: 200 saved
 Vaccine B: 600 saved (33% chance)
 No one saved (67% chance)

Imagine 3 possibilities. In each case, you are a citizen of the U.S. and must be vaccinated against the disease.

Situation 1: Only vaccine A is available
 Situation 2: Only vaccine B is available
 Situation 3: Both vaccines A and B are available and you must choose whether you want vaccine A or vaccine B.

Subjects rated each situation on a -100 – 100 scale. In half the conditions, “ x die” was replaced with “ $600 - x$ saved. (The probability was not changed, apparently an error.) In half the conditions, the subject took the perspective of a “medical officer responsible for administering the vaccine program.” The number of subjects showing decision seeking or aversion (as defined by Beattie et al., 1994) was:

Condition	Seeking	Neutral	Aversion
Officer-saved	6	7	12
Officer-lost	3	2	20
Citizen-saved	10	9	6
Citizen-lost	19	5	1

Most subjects were decision seeking when making decisions for themselves and decision averse when making decisions for others. Both of these effects were (almost significantly) greater in the loss frame than in the gain frame (despite the apparent error).

The hypothesis that tradeoffs are more difficult when dimensions are dissimilar was tested further in the work of Beattie and Baron (1995), which concerned the judgment of appropriate penalties for causing harm. Subjects preferred penalties that were more similar to the harms. For example, if a logging company negligently cut down 100 square miles of protected forest (because the company did not check to make sure it could legally cut the timber in question), subjects preferred a penalty in which the company had to give return about the same amount of forest of the same type to the government, in contrast to a penalty in which the company returned even a larger amount of a different kind of forest (or money). When setting the optimal penalty of each kind, subjects asked for a greater area of different-type forest than of same-type forest. They also indicated that they found the judgments of different-type forest penalties to be more difficult.

As Zeelenberg, Inman, and Pieters point out in their chapter, psychologists have known about the role of regret in decision making for some time. Regret research in the JDM tradition is more recent. Bell (1982) and Loomes and Sugden (1982) simultaneously proposed that many of the deviations of observed choices from expected-utility theory could be explained in terms of anticipated regret. These deviations had also been explained by features of prospect theory (Kahneman & Tversky, 1979), so for these cases “regret theory” became an alternative to prospect theory.

The idea (based on Savage, 1954) is that we experience outcomes of choices by comparing them to outcomes that would have occurred if we had chosen differently. If we buy shares of stock and their price goes down, we regret the purchase because we compare the outcome to what would have happened if we had done nothing. If we consider buying shares, do not buy them, and the price goes up, we regret our omission. (Kahneman and Tversky, 1982, found that people expect to feel stronger regret as the result of action than as the result of an omission.)

Notice that this kind of comparison is one of two kinds that we could make. We could also compare outcomes to what would have happened if the world had turned out differently. Thus, we could compare the price of the stock to what it would have been if interest rates had not gone up, etc. This kind of comparison leads to disappointment as distinct from regret. Disappointment can occur in the absence of a decision, but regret requires a choice. [Jon, I don’t think the last statement is true, or at least I don’t see in which way it is. Both clearly require some choice to be made. They differ in whether you find out what the outcome under the other choice alternative would have been. That is required for regret to occur.] Zeelenberg, Inman, and Pieters, in their chapter, review evidence that people distinguish regret and disappointment.

Regret, not disappointment, is the more important issue in decision conflict. Decisions are often difficult because we fear that we will regret whatever choice we make. A similar fear of disappointment surely exists and makes people averse to taking risks, but disappointment alone cannot lead to self blame. It is the possibility that another choice option may lead to a better outcome that causes true conflict.

The domain of Bell and Loomes and Sugden’s theory of regret were choices between gambles. The idea is that, when people think about gambles, they think of the decision in terms of options, probabilistic states of the world, and outcomes. For example, the states of the world might be the different numbers that might come up in a lottery. The options are which number you bet on. The outcomes are the amounts you would win. The

outcome depends on your bet and on the state of the world. Regret theory proposes that people choose the option that minimizes the regret that they anticipate to experience after the selected lottery is played. They do so by comparing the outcome of each choice in each state of the world to the outcome of the other choice in the same state.

The theory turned out to be less useful than originally thought as an account of choices among gambles (Starmer & Sugden, 1993), but the basic idea was borne out by a great deal of subsequent research. We can study the role of anticipated regret by looking at the effects of “resolution” of the uncertainty, i.e., whether or not the decision maker finds out what would have happened if another option were chosen. The original theory assumes that, *ex-ante*, the decision maker always imagines the consequences of all options and compares them to each other in every possible state of the world. This could be true, but it turns out not to be true. It matters whether people think they will know about outcomes *ex- post* (Boles & Messick, 1995; Josephs et al., 1992; Ritov & Baron, 1995; Zeelenberg et al., 1996). For example, Zeelenberg and his colleagues (1996) gave subjects a choice between a “risky” gamble and a “safe” gamble. The gambles were chosen to be equally attractive (as determined in a matching task). An example of a risky gamble is a 35% chance to win 130 Dutch Guilders (vs. nothing), and a safe gamble is a 65% chance to win 85 Guilders. When subjects expected to learn the outcome of the risky gamble, even if they chose the safe one, 61% of them chose the risky gamble. When they expected to learn the outcome of the safe gamble, even if they chose the risky one, only 23% chose the risky gamble. What subjects tended to avoid was losing the gamble they chose and learning that they would have won if they had chosen the other gamble. This result indicates not only that people pay attention to resolution but also that regret has a larger effect than rejoicing. Attention to rejoicing would lead to the opposite result: subjects would think that they might win the gamble they had chosen and lose the other gamble.

In their chapter, Zeelenberg, Inman, and Pieters discuss yet another property of regret, its influence on subsequent behavior. The present evidence that regret can mediate the effect of learning from experience. Thus, when we make choice A, learn that choice B would have been better, and experience regret, we are more likely to change to B at the next opportunity than if we do not experience regret. This result fits nicely with the findings of Markman et al. (1993), who found that knowing that there will be another opportunity to make the same decision makes people attend more to how they might have done better, thus increasing their susceptibility to regret itself. Zeelenberg et al. point out that the effect of regret on subsequent

behavior is specific to regret, as distinct from disappointment. They also show that actions lead to greater regret than inactions (at least in the short term), and to greater effort to undo the effects of the bad decision, e.g., to make amends to those who were hurt.

Murray's chapter (based on work originally supervised by Beattie) examines the role of anticipated regret and other factors on the aversiveness of making decisions about prenatal testing. Screening tests, carried out on samples of maternal blood at 16 weeks gestation, can provide estimates of the risk of Down's Syndrome and Spina Bifida in a fetus. Pregnant women and their partners can then use these risk estimates to help them decide whether to have further tests such as amniocentesis in order to obtain a definite diagnosis. Murray reports findings from an interview study of 40 pregnant women that examined how they decided whether to accept or decline one such test, the "Triple Test". Psychological factors, such as decision aversion, regret, and omission/commission bias, which have been shown to be important in laboratory studies of decision making, were found to be influential in this real-life decision. Only some of the women who took part in the study welcomed the opportunity to make a choice about testing. Others found it difficult and unpleasant to anticipate what they might do if they got a positive test result and they felt they had to think about such possible later choices in order to decide whether or not to have the triple test. Predicting their future preferences was extremely difficult for some women and the data from follow-up interviews showed that such preferences often changed over time. Although the Triple Test decision was presented to them as a choice they could make, many women felt they would be going against the "norm" to decline the test and this led to greater sense of responsibility and anticipation of self-blame in some of those who refused it. Those who could vividly imagine future situations in which they might regret their choices, reported finding the Triple Test decision particularly difficult.

The Markman et al. study just described is one of many that illustrate how people re-frame decisions to focus more on one feature of the outcome of one option, at the expense of other features. Such re-framing is affected by various properties of the decision itself. The features can be positive or negative, by comparison to some natural reference point, and the reference point may itself be labile. David Houston, in his chapter, discusses the various factors that make people attend to positive and negative features, and how such attention mediates the effect of these factors on decision making.

Houston discusses several factors that can affect the resolution of choice dilemmas by systematically enhancing the salience of the good features of a pair of alternatives at the expense of the bad features, or vice versa. Such

differences in feature salience can, in turn, affect which features contribute disproportionately to a judgment. In a way, Houston resurrects Lewin's idea of different types of decision conflict (approach-approach, approach-avoidance, etc.) and turns it into an empirical theory rather than just a framework for description.

In particular, Houston reports evidence that people tend to ignore common features of choice alternatives. If the common features are bad ones, then people view the decision as a choice between sets of good features, and vice versa. Moreover, when people are asked to compare one option to another, the unique features of the subject get more attention. This effect, combined with the first, yields a rich set of predictions. Attention to positive vs. negative features also depends on whether subjects are told to choose one option or reject one option. This effect further enriches the predictions of the theory. The theory makes predictions not only for choice but also for regret. Regret is greater when the choice is based on the least bad of two sets of unique bad features. This is because the bad features of the chosen option cannot be forgotten. Houston discusses research on the practical implications of this approach for consumer behavior and for political choice. For example, the theory explains why negative political advertising reduced the tendency to vote.

Luce, Payne, and Bettman, in their chapter, summarize another research program concerned with tradeoff difficulty. Like Zeelenberg et al., they examine both the determinants and effects of emotional responses to decisions and their outcomes. They are concerned with emotions in general, not just regret. Their view of conflict is in the tradition of the conflict-theory model of Janis and Mann (1977), but they are more explicit in defining the nature of threat-producing outcomes and effects and they also draw on more recent work on the psychology of emotion.

Two effects are of interest. One is that emotional conflict leads to simplified decision strategies, in which (for example) the decision is based on the single "most important" attribute rather than on a consideration of the tradeoffs among all relevant attributes. The other is that emotional conflict leads people to favor the status-quo or default option (just as negative political advertising may lead people not to vote). Both of these can be seen as clearer statements of what "defensive avoidance" means.

Luce and her colleagues define tradeoff difficulty as the degree to which making an explicit trade-off between two attributes (i.e., calculating an explicit exchange rate) generates threat or negative emotion. Threat, in this case, refers to a loss on some dimension relative to some natural reference point, such as a loss of safety. They find that measures of attribute-level loss

aversion seem to predict tradeoff difficulty more precisely than do measures of attribute-level importance. Loss aversion refers to the extra weight given to losses as opposed to equivalent gains (Kahneman & Tversky, 1979). Luce and her colleagues measured loss aversion in several ways, all based on comparison of explicit tradeoffs involving losses to tradeoffs based on nominally equivalent gains (e.g., a 20% decrease in salary vs. a 20% increase).

Another type of conflict is that between impulses and deeper values. Buying on impulse is an example. Impulse buying has been of theoretical and practical significance to economics, consumer behaviour and psychology. Economic and marketing approaches have traditionally assumed a rational decision-maker, and impulse buying presents a challenge to this assumption as such purchases are often ones that consumers wish - on reflection - not to have made. The clinical psychological literature has been concerned with examining the excessive impulse-buying behaviour of “compulsive” or “addicted” consumers.

Dittmar’s chapter (based partly on work done collaboratively with Jane Beattie) develops a social psychological model, which proposes that people buy on impulse in order to acquire material symbols of personal and social self-identity. This model explains, among other things, why certain types of goods (e.g., clothes) are bought impulsively more than others (e.g., basic kitchen equipment). Results of several studies, using a variety of methods, support the model’s prediction that the motivation to bolster self-image is a significant - if not the only - factor in impulse buying.

Typical of such conflicts is that the deeper values, those that the consumer would endorse after reflection, are affected more in the long term. This leads to two predictions, both of which are supported by the results. One is that impulse buyers will often experience regret after their purchasing. Indeed, the judgment that the decision was wrong, on reflection, is almost the essence of the phenomenon, and the step from this realization to the emotion of regret is a short one. The other is that impulse purchases will be characterized by high discount rates. That is, the buyer will behave as though the value of the good declines quickly over time. The results show that high discount rates characterize both the kinds of goods that are typically bought on impulse and, in general across a variety of goods, the people who buy them.

Measurement of tradeoffs and its applications

Shepard (1964) was pessimistic about the possibility of measuring tradeoffs. Despite his pessimism, psychologists developed several methods for measuring the kind of tradeoffs that economic theory required. Of interest to the theory is the extent to which a change in one dimension can be compensated by a change in another. That defines the relative weight of the two dimensions. To return to our earlier example, the two dimensions could be money and leisure time. The question would be, how much salary would you give up in order to increase your leisure time by 5 hours per week? At your current level of income and leisure time, if you would give up \$25,000 per year, then the tradeoff between time and money for you is about \$100 per hour ($\$25,000 / [50 \text{ weeks} * 5 \text{ hours per week}]$). Note that the tradeoff measure requires two units, one for each dimension.

One technique for assigning relative weights is to ask respondents simply to evaluate multidimensional stimuli holistically, with ratings or rankings. For example, each respondent rates many anti-pollution policies that differ in yearly deaths prevented and in yearly cost per driver for inspections. Utilities on each dimension and relative weights of dimensions are inferred from these responses. A great variety of methods use this approach. The two most common terms are functional measurement (e.g., Anderson & Zalaski, 1988) and conjoint analysis (Green & Wind, 1973; Green & Srinivasan, 1990; Louviere, 1988). Conjoint analysis is based on the theory of conjoint measurement, in which utility functions for each of the dimensions can be inferred from the indifference curves (Krantz et al., 1971), although, in practice, the full process of inference is often approximated with a regression model.

In these methods, the tradeoff between a given change on one dimension and a given change on the other should be unaffected by the range of either dimension used within the experimental session. If a change from 50 to 100 lives is worth a change from \$20 to \$40, then this should be true regardless of whether the dollar range is from \$20 to \$40 or from \$2 to \$400. The *marginal rate of substitution* between lives and money is \$20 ($\$40 - \20) for 50 lives ($100 - 50$), or \$0.40 per life. We shall call this the tradeoff between money and lives. (Of course the tradeoff may depend on where in the range it is measured, but it should not depend on the range itself.)

Beattie originally thought that tradeoff difficulty would increase the susceptibility of these multi-attribute rating tasks to extraneous influences, such as the effect of stimulus range. The idea was that, for some decisions, people would have definite ideas about just how willing they were to give up

one thing for something else. In other decisions, however, people might be uncertain about their preferences for dimensions and thus their willingness to trade off. In these cases, people would be easily influenced by extraneous factors. Thus, when tradeoffs are difficult, people might give less weight to each unit of an attribute (e.g., one dollar, for money) when the range of the attribute was larger. The extraneous influence here is that subjects think in terms of proportion of a range rather than the unit itself.

Beattie and Baron (1991), using a functional measurement task, found no effects of relative ranges on rates of substitution, using several pairs of dimensions, so long as (arguably) the dimensions were understandably related to fundamental values, i.e., to values that really mattered (e.g., effect on winning vs. injury rate of basketball players, risk of endometrial cancer vs. risk of osteoporosis in women considering estrogen replacement). They found range effects only when the dimensions were presented as arbitrary numbers, e.g., a score on a test, so that the range itself provided information about their relation to the values of fundamental interest (e.g., ability). Mellers and Cooke (1994) found range effects even under conditions like those in which we found none. Baron in his chapter in this volume, also finds what amounts to range effects, using familiar tradeoffs such as those between time and money.

Measurement of tradeoffs has been important for a number of practical problems, and several methodological approaches to these problems have developed. In the field of marketing, research has concerned itself with the tradeoff of attributes of consumer goods, such as price and quality, and the various dimensions of quality. Conjoint analysis has been widely used for these purposes.

A second method is multi-attribute decision analysis (Keeney & Raiffa (1993)). In this method, respondents make explicit and implicit tradeoffs between dimensions. A researcher typically elicits these tradeoffs in an extended interview with each respondent, using a variety of methods. One method might require the respondent to set two ranges to be equally important, by manipulating one end of one of them. For example, "How many square miles of forest saved is equivalent to spending \$1,000,000 of the government's budget?" The two ends of the forest range are the current amount of forests and the current amount minus the amount to be given. The two ends of the money range are the current government budget and the current budget plus \$1,000,000. The differences are assumed to have equal utility.

Another method is to ask for a probability: "What probability of losing 1000 square miles of forest is equivalent to the government spending an additional \$1,000,000?" If the answer is 20%, then it is assumed that the

utility of losing \$1,000,000 is 20% of the utility of losing 1000 square miles. A third method is to ask for a direct judgment: “What is the ratio of an extra \$1,000,000 to losing 1000 square miles?” When different methods are used, the resulting answers can be checked against each other.

A variant of the first method is to use money as one dimension, in the form of a payment by the respondent. The researcher asks, “How much are you willing to pay to save 1000 square miles of forest?” Economists have given this method the name “contingent valuation” because it is like asking someone their willingness to pay in a contingent, or hypothetical, market (Mitchell & Carson, 1989). (Another form of the method uses willingness to accept instead of willingness to pay.) It has been applied extensively to measure the value of goods for which real markets do not exist, such as natural resources (wilderness areas, etc.) and human life and limb. In the latter application, people are asked how much they would pay to reduce their risk of death or injury by some (small) amount. If you are willing to pay \$10 to reduce your risk by .00001, then your life is approximately worth \$10/.00001 to you, or \$1,000,000. We cannot ask you directly how much you would pay for your life, or even to avoid a large risk of death, because the value of money to you is presumably lower if you die and so this value depends on the probability of death.

The contingent valuation method suffers from a major problem, observed by Kahneman and Knetsch (1992) in the context of natural resources and by Jones-Lee, Loomes, and Phillips (1995) in the context of life and injury. The problem is that it is insensitive to quantity. People are willing to pay about the same amount for a risk reduction of 4 in 100,000 for road injuries as they would pay for a reduction of 12 in 100,000. Likewise, they are willing to pay about the same to clean up the pollution in one lake as to clean up the pollution in many lakes. This phenomenon does not seem to be artifactual (Baron, 1997; Beattie et al., 1998).

Multi-attribute decision analysis suffers from similar problems, although practitioners are more aware of them. In particular, it is difficult to get subjects to pay attention to quantities when they compare dimensions. For example, when subjects are asked, which is more important, money or risk, they often answer the question without thinking about the quantities. Questionnaire designers ask such questions routinely and respondents answer them without realizing that the questions are almost meaningless. They should respond, “How much money for how much risk?” Even when subjects are told about the ranges — e.g., the difference between a risk of 4 in 100,000 and 8 in 100,000 and a difference in taxes between \$10,000 and \$10,200 — they tend to be undersensitive to variations in the range.

Doubling the range of money, for example, should approximately double its judged relative importance, but this rarely happens. Keeney (1992, p. 147) calls underattention to range “the most common critical mistake.”

Underattention to range can be reduced. Fischer (1995) found complete undersensitivity to range when subjects were asked simply to assign weights to ranges (e.g., to the difference between a starting salary of \$25,000 and \$35,000 and between 5 and 25 vacation days – or between 10 and 20 vacation days – for a job). When the range of vacation days doubled, the judged importance of the full range of days (10 vs. 20) relative to the range of salaries (\$10,000) did not increase. Thus, subjects showed inconsistent rates of substitution depending on the range considered. Subjects were more sensitive to the range, with their weights coming closer to the required doubling with a doubling of the range, when they used either matching or direct judgments of intervals. In matching, the subject changed one value of the more important dimension so that the two dimensions were equal in importance, e.g., by lowering the top salary of the salary dimension. In direct judgment, subjects judged the ratio between the less important and more important ranges, e.g., “the difference between 5 and 25 vacation days is 1/5 of the difference between \$25,000 and \$35,000.” (This is also called the method of “swing weights.”)

This kind of result leads one to wonder what people mean when they say that risk is twice as important than money. As Goldstein, Barlas, and Beattie point out in their chapter, people make statements about relative importance in negotiations (formal or informal) and in other situations where they communicate their desires to each other, as well as in tasks designed to measure utility. Even when subjects are asked explicitly to compare a range on one dimension with a range on another, they seem to be influenced by some concept of importance that is insensitive to the ranges. What could people mean when they say that one dimension is more important than another?

One approach to this question, used by Goldstein and his colleagues is to ask whether person B can reconstruct person A’s importance judgments after being told person A’s rank ordering of options. That is, importance judgments may have a communicative function even if they do not reflect explicit tradeoffs. The chapter’s first experiment manipulated the duration of a vacation prize and the amount of extra cash available for expenses. In different sets of vacations, the prizes had a different constant amount added, so that their range was either from \$600 to \$900 or from \$1100 to \$1400. Subjects had to guess the importance judgments of other (hypothetical) subjects concerning the two dimensions from knowing how the other subjects

ranked or priced the vacations.

Studies of preference reversals suggest that objective attribute importance depends on the response mode by which people express their preferences. Goldstein et al. investigated whether subjective judgments of relative importance also depend on the preference-response mode. They found changes in subjective importance that did not parallel the changes in objective importance (effect on choices). They also found evidence that people's interpretations of subjective importance depended on the preference-response mode. People did not (consistently) interpret importance to mean marginal rate of substitution. The problem of what people mean by "importance" is left unsolved by their results, but their method is a novel and useful approach that should be used in further studies.

One kind of tradeoff judgment has considerable importance for public policy, namely, that between monetary expenditures and risk to life and limb. The general result is that such tradeoffs raise a host of fundamental problems. Here, people's uncertainty/imprecision about their preferences, and the difficulties they have conceptualizing very small changes in already small probabilities of unfamiliar and disquieting health outcomes make their judgements vulnerable to many sources of bias and distortion — giving undue weight to factors that should not matter, while neglecting or underweighting other factors that should.

In 1995, a multidisciplinary team embarked on a large and ambitious project commissioned by a consortium of U.K. government departments and agencies, co-ordinated by the Health and Safety Executive. Their objectives were: a) to re-examine (and perhaps re-estimate) the money value used by the Department of Transport to represent the benefit of reducing the risks of premature death and injury in road traffic accidents; and b) to explore whether the same value should be used in other hazard contexts — e.g. public transport, domestic fires, radiation, occupational health, and so on. The chapter by Loomes describes the current state of this project, of which Jane Beattie was an active member. Drawing on team members' previous experience of the difficulties associated with a), most of the research during the first eighteen months demonstrated the robustness of numerous "unwelcome" influences. More recent work has explored other approaches which appear (at this early stage) to hold more promise — although many difficulties remain, and fundamental issues about how far 'true' preferences exist and how far stated preferences are constructed in response to the particular questions being asked (and what implications this may have for the way that policymakers use such data) are still far from resolved. Such issues are likely to stimulate an extensive and controversial program of research for

many years to come.

Baron's chapter further explores the measurement of tradeoffs between values, such as that between money and risk, or between health quality and length of life. One way to measure such tradeoffs is to ask respondents for attractiveness ratings of stimuli consisting of pairs of attributes, e.g., a reduction of 1/100,000 in the annual risk of death for \$100. Holistic ratings of this sort are useful if the tradeoffs are independent of irrelevant factors such as the range of values on each attribute within the session, or the magnitude of the highest value. Range is the difference between the highest and lowest items on a dimension; magnitude is the difference between the highest and zero. (In this sense, Goldstein, Barlas and Beattie manipulated magnitude and held range constant in their first study. They used "relative sensitivity" to talk about the effects of range and "impact" to talk about the effects of magnitude.) Unfortunately, such independence is not always found.

Another approach to eliciting consistent tradeoffs is to ask respondents to resolve the inconsistencies inferred from their responses to tasks that require comparisons of intervals on each dimension. This approach seems more promising. Two experiments illustrate each approach.

An important application of value measurement is multi-attribute decision analysis. In the last few years, decision analysis has been used extensively as an aid to negotiation among interested parties (stakeholders) in complex decisions such as those involving conflicts between commerce and the environment. The chapter by von Winterfeldt, a major proponent of this application, describes a systematic process for framing and analyzing decisions involving multiple stakeholders with conflicting objectives. The process, called stakeholder decision analysis, has evolved through many applications of decision analysis to highly controversial decisions. The process consists of several steps, including framing the decision problem, elicitation of values and objectives from stakeholders, developing measures for objectives, estimation of consequences, evaluation, decision making and implementation. While based on decision analysis, the steps in this process are largely qualitative and are equally useful for other formal analyses like dominance analysis, cost-effectiveness analysis, cost-benefit analysis. The paper illustrates the stakeholder decision analysis process with a detailed example of a major infrastructure improvement decision concerning the reduction of electromagnetic fields from electric power lines.

Another applied problem involving tradeoffs is in the development of decision aids. Spranca presents some work on the development of a computer decision aid for helping recipients of Medicaid (a U.S. health program for

the poor) choose their health-care providers. Tradeoffs at issue involve dimensions such as the cost of extra payments, the convenience of the services, and the possibility of staying with one's current doctor. The paper presents some key design features and history of a computerized decision support tool that was developed by RAND, American Institutes for Research and Digital Evolution to help Medicaid recipients in Florida to choose a health plan. The tool builds a personal summary table. The inputs for the personal summary table come from users' personal judgments of how plans did on major attributes, one attribute at a time. The tool stops short of using the computer to integrate information for users. This idea met with resistance from health plans, who feared it might work against them, and others who felt it would be paternalistic. Another possible objection could be that many people just do not think that decisions should be made by weighing attributes and making tradeoffs (Kahn & Baron, 1996).

Spranca also discusses two other applications of decision aids, one dealing with testing for breast-cancer genes and the other dealing with treatment of depression. The genetic testing problem raises issues of anticipated regret, very similar to those raised in Murray's chapter on fetal testing.

The last chapter concerns another kind of conflict, that between people's intuitive decisions and normative models, most notably, expected utility theory. People's intuitions have been shown to violate description invariance (framing effects), procedure invariance (preference reversals), transitivity and the independence axiom of expected utility theory. People's intuitive probability judgments sometimes violate the laws of Bayesian probability theory. Researchers disagree about how to interpret the conflict between people's intuitions and mathematical models. In particular, researchers disagree about whether the mismatch is due to a flaw in the models or a flaw in the people.

The chapter by Frisch argues that mathematical normative models can be viewed as tools for clarifying one's intuitions. Formal models do not eliminate the need for intuition. Arguably, the decision about whether to accept "axioms" is based on their intuitive compellingness, and the decision about whether two outcomes are the same or different also must be based on intuition (e.g., whether "receive \$500" the same as "receive \$1000 and then lose \$500").

Frisch argues that this emphasis on intuition as essential can be viewed as a female perspective. In the field of judgment and decision making, there is much controversy about "intuition" vs. "normative models." Analogously, perhaps, in the field of moral development, there is a contrast between Kohlberg's "rights and justice" approach and Gilligan's "responsibility and

caring” approach. However, in both domains, Frisch says, the disagreement is exaggerated. The question of how to develop a model of decision making that acknowledges the validity of both perspectives (importance of logical consistency as well as intuition and emotion) is addressed, through the idea of using intuitions and formal models as means of mutual clarification.

References

- Anderson, N. H., & Zalinski, J. (1988). Functional measurement approach to self-estimation in multiattribute evaluation. *Journal of Behavioral Decision Making, 1*, 191–221.
- Baron, J. (1986). Tradeoffs among reasons for action. *Journal for the Theory of Social Behavior, 16*, 173–195.
- Baron, J. (1997). Biases in the quantitative measurement of values for public decisions. *Psychological Bulletin, 122*, 72–88.
- Beattie, J. (1988). *Perceived differences in tradeoff difficulty*. Unpublished Ph.D. dissertation, Department of Psychology, University of Pennsylvania.
- Beattie, J., & Baron, J. (1991). Investigating the effect of stimulus range on attribute weight. *Journal of Experimental Psychology: Human Perception and Performance, 17*, 571–585.
- Beattie, J., & Baron, J. (1995). In-kind vs. out-of-kind penalties: Preference and valuation. *Journal of Experimental Psychology: Applied, 1*, 136–151.
- Beattie, J., Baron, J., Hershey, J. C., & Spranca, M. (1994). Determinants of decision seeking and decision aversion. *Journal of Behavioral Decision Making, 7*, 129–144.
- Beattie, J., Covey, J., Dolan, P., Hopkins, L., Jones-Lee, M., Loomes, G., Pidgeon, N., Robinson, A., & Spencer, A. (1998). On the contingent valuation of safety and the safety of contingent valuation: Part 1 — Caveat investigator. *Journal of Risk and Uncertainty, 17*, 5–25.
- Bell, D. E. (1982). Regret in decision making under uncertainty. *Operations Research, 30*, 961–981.
- Bentham, J. (1948). *An introduction to the principles of morals and legislation*. Oxford: Blackwell Publisher. (Original work published 1843)
- Bernoulli, D. (1954). Exposition of a new theory of the measurement of risk (L. Sommer, Trans.). *Econometrica, 22*, 23–26. (Original work published 1738)
- Boles, T. L., & Messick, D. M. (1995). A reverse outcome bias: The influence of multiple reference points on the evaluation of outcomes and decisions.

- Organizational Behavior and Human Decision Processes*, 61, 262–275.
- Edgeworth, F. Y. (1881). *Mathematical psychics*. London: Kegan Paul.
- Edwards, W. (1954). The theory of decision making. *Psychological Bulletin*, 51, 380–417.
- Edwards, W., & Tversky, A. (Eds.). (1967). *Decision making*. Harmondsworth: Penguin.
- Fischer, G. W. (1995). Range sensitivity of attribute weights in multi-attribute value models. *Organizational Behavior and Human Decision Processes*, 62, 252–266.
- Green, P. E., & Srinivasan, V. (1990). Conjoint analysis in marketing: New developments with implications for research and practice. *Journal of Marketing*, 45, 33–41.
- Green, P. E., & Wind, Y. (1973). *Multiattribute decisions in marketing: A measurement approach*. Hinsdale, IL: Dryden Press.
- Herek, G. M., Janis, I. L., & Huth, P. (1987). Decision making during international crises. Is quality of process related to outcome? *Journal of Conflict Resolution*, 31, 203–226.
- Janis, I. L., & Mann, L. (1977). *Decision making: A psychological analysis of conflict, choice, and commitment*. New York: Free Press.
- Jones-Lee, M. W., Loomes, G., & Philips, P. R. (1995). Valuing the prevention of non-fatal road injuries: contingent valuation *vs.* standard gambles. *Oxford Economic Papers*, 47, 676 ff.
- Josephs, R. A., Larrick, R. P., Steele, C. M., & Nisbett, R. E. (1992). Protecting the self from the negative consequences of risky decisions. *Journal of Personality & Social Psychology*, 62, 26–37.
- Kahn, B. E., & Baron, J. (1996). An exploratory study of choice rules favored for high-stakes decisions. *Journal of Consumer Psychology*, 4, 305–328.
- Kahneman, D., & Knetsch, J. L. (1992). Valuing public goods: The purchase of moral satisfaction. *Journal of Environmental Economics and Management*, 22, 57–70.
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decisions under risk. *Econometrica*, 47, 263–291.
- Keeney, R. L. (1992). *Value-focused thinking: A path to creative decision-making*. Cambridge, MA: Harvard University Press.
- Keeney, R. L., & Raiffa, H. (1993). *Decisions with multiple objectives: Preference and value tradeoffs*. New York: Cambridge University Press. (Originally published, 1976.)
- Krantz, D. H., Luce, R. D., Suppes, P., & Tversky, A. (1971). *Foundations of measurement* (Vol. 1). New York: Academic Press.

- Lewin, K. (1951). *Field theory in social science*. New York: Harper.
- Loomes, G., & Sugden, R. (1982). Regret theory: An alternative theory of rational choice under uncertainty. *Economic Journal*, *92*, 805–824.
- Louviere, J. J. (1988). *Analyzing individual decision making: Metric conjoint analysis*. Newbury Park, CA: Sage.
- Markman, K. D., Gavaski, I., Sherman, S. J., & McMullen, M. N. (1993). The mental simulation of better and worse possible worlds. *Journal of Experimental social Psychology*, *29*, 87–109.
- Mellers, B. A., & Cooke, A. D. J. (1994). Tradeoffs depend on attribute range. *Journal of Experimental Psychology: Human Perception and Performance*, *20*, 1055–1067.
- Mitchell, R. C., & Carson, R. T. (1989). *Using surveys to value public goods: The contingent valuation method*. Washington: Resources for the Future.
- Ritov, I., & Baron, J. (1995). Outcome knowledge, regret, and omission bias. *Organizational Behavior and Human Decision Processes*, *64*, 119–127.
- Savage, L. J. (1954). *The foundations of statistics*. New York: Wiley.
- Schwartz, B. (1986). *The battle for human nature: Science, morality, and modern life*. New York: Norton.
- Shepard, A. (1996). *The effects and interaction of 'framing' and decision attitude on choice*. Final Year Project, Department of Experimental Psychology, University of Sussex.
- Shepard, R. N. (1964). On subjectively optimum selection among multi-attribute alternatives. In Shelley, M. W. & Bryan, G. L. (Eds.), *Human judgments and optimality*, pp. 257–281. New York: Wiley.
- Starmer, C., & Sugden, R. (1993). Testing for juxtaposition and event-splitting effects. *Journal of Risk and Uncertainty*, *6*, 235–254.
- Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, *211*, 453–458.
- Zeelenberg, M., Beattie, J., van der Pligt, J., & de Vries, N. K. (1996). Consequences of regret aversion: Effects of expected feedback on risky decision making. *Organizational Behavior and Human Decision Processes*, *65*, 148–158.