ISA Conference Nice France 1986

RATIONAL CHOICE AND FRAMING: THE SITUATIONAL SELECTION OF UTILITY ARGUMENTS

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1. Introduction

While more and more perceptive sociological theorists are moving from role-theoretical preoccupations to a serious consideration of rational choice and expected utility theory in particular, some of their colleagues from neighboring fields (psychologists, political scientists and even some economists) are busy criticizing expected utility theory and suggesting alternatives (see Ungson and Braunstein, 1982, Feather, 1983 and Wright 1986 for some reviews of recent literature). Simon's theory of bounded rationality probably was the first major constructive revision of utility theory in economics and of expected utility theory (see Simon 1955 and 1982) and his theory of "satisficing" may be the best known alternative theory. But, as Simon himself (1985:295) observed: cognitive psychology has come a long way in the last thirty years, giving rise to numerous alternative formulations. Kahneman and Tversky's "prospect theory" is one such alternative and, in the opinion of experts like Einhorn and Hogarth, "the first comprehensive attempt at an alternative formulation." (Einhorn and Hogarth, 1982:34, emphasis added). Their theory (see Kahneman and Tversky, 1979 and 1984) is based on the idea that decision situations must first be structured or framed before the decision can take place and that differently framed situations will bring forth different decisions.

While the idea is not new, its elaboration is new and well worth the attention it receives. It can indeed make sense of many choice phenomena that expected utility theory cannot easily explain. Sociologists should also welcome prospect theory because it bridges an important gap between rational choice theory and the basic sociological insight that the definition of the situation matters. The classical attempt to bridge this gap in Parsons' The Structure of Social Action (1937) must be considered a failure and since then sociologists have not shown any comparably serious effort in this direction.

Yet, for the sociologist interested in rational choice theory and its application to social situations, prospect theory also poses some serious problems because it leaves considerable room for personal idiosyncracies and does not systematically account for important differences in choice behavior.

The purpose of the following paper is to throw a brief glance at Subjectively Expected Utility (SEU) Theory and some of its

problems, and then to have a closer look at some of the features of prospect theory that are supposed to remedy these problems. Finally, I will discuss some shortcomings of Prospect Theory and suggest some way of circumventing them with the aid of a model of stochastic choice. In particular, I will concentrate on what I believe is the central issue of framing: the situational saliency of goals or, expressed in a language closer to rational choice theory: the situational selection of utility arguments.

2. SEU Theory and some of its problems

Subjectively Expected Utility Theory can briefly be summarized by an number of its prominent features.

First, it is a theory of rational action. This means that, for the achievement of his or her goals, the individual chooses subjectively appropriate behavioral alternatives within the limits imposed by given constraints.

Second, individuals are assumed to have transitive preferences with which each (projected) outcome of an alternative can be assigned a utility index number.

Third, individuals are assumed to have subjective estimates of risk such that each outcome can be weighted by a subjective probability of its occurrence.

Fourth, individuals are assumed to choose the alternative with the highest net utility, which can be expressed in terms of the "as if" decision rule to choose the alternative with the highest weighted sum of utility index numbers ($\Sigma p_i u_i$).

Like any other theory of rational choice, SEU theory is highly incomplete: many auxiliary assumptions have to be made in order to apply it. Some of these assumptions are being made so frequently that they are generally taken to be a part of SEU theory. Criticism of SEU theory is most directed at its auxiliary assumptions. For the present paper, the most troublesome assumptions are:

1) the invariance assumption: the description of an alternatives should not influence the decision. Violation of this assumption can be illustrated by the following experiment (see Kahneman and Tversky,1979): subjects are asked to choose between winning a sure \$500 and an even chance of winning \$1000 or nothing. They are also told that they have just been given \$1000. Eighty-four percent of the subjects chose the sure gain of \$500. In a second experiment, subjects are asked to choose between a sure loss of \$500 and an even chance of losing \$1000 or nothing. They are also told that they have just been given \$2000. Sixty-nine percent preferred the risky prospect. In effect, the final results are identical in both experiments but the choices differ due to the formulation of the problem.

2) the unbounded rationality assumption. This point is actually a variety of assumptions grouped together. For us, the two most important ones to mention are: a)the assumption that attention is not limited, rendering the number of outcomes supposedly considered by an individual a matter of convenience of

the researcher; b) the assumption that subjective probability follows the principles of objective probability by adding to unity and by the former being a linear function of the latter.

3) the decreasing marginal utility assumption which implies that marginal utility decreases in all regions of the utility function.

A few illustrations of these points will appear in the following section in which Kahneman and Tversky's prospect theory will be presented. These two authors have investigated many problems with auxiliary assumptions of SEU theory.

3. Prospect Theory

Prospects are alternatives that may involve some risk, i.e. they are the kind of alternatives to which expected utility theory applies. Kahneman and Tversky could show that, contrary to expected utility theory, the choices people make among various prospects also depend on the way the decision situation is formulated. A by now famous example is the following (with the percentage of subjects choosing a particular option in brackets).

"Problem 1:imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimates of the consequences of the programs are as follows:

If program A is adopted, 200 people will be saved. [72%]

If program B is adopted, there is a one-third probability that 600 people will be saved and a two-thirds probability that no people will be saved. [28%]

Which of the two programs would you favor?"

In Problem 2, the same cover story is followed by a different description of the same prospects associated with the two programs:

"Problem 2: If Program C is adopted, 400 people will die [22%]

If Program D is adopted, there is a one-third probability that nobody will die and a two-thirds probability that 600 people will die.[78%]

Which of the two programs would you favor?" (Tversky and Kahneman, 1981:453)

Options A and C and B and D, respectively, are identical in terms of the effect the programs have on the number of people killed, yet subjects virtually reverse their choice due to the different formulation of the prospects. In problem 1, their choice is risk

averse; in Problem 2 their choice is risk seeking. Why is this so? Expected utility theory has no ready answer to this question. For Kahneman and Tversky, the formulation influenced the way subjects structured or framed the choice situation. In Problem 1, the reference point is the expectation that 600 people will die, but by opting for Program A one can make sure that 200 people will be saved. In Problem 2, the reference point is the expectation that nobody dies and by opting for program C all one does it to make sure that 400 people will die, while opting for D one leaves at least a sizable chance that nobody will die.

While the reversal in choice pattern can be made plausible by describing the situational interpretations in a certain way, prospect theory is supposed to explain systematically why the choice was risk averse in Problem 1 and risk seeking in Problem 2. What does this theory look like? It is composed of three different groups of assumptions:

1. assumptions about utility functions
2. assumptions about decision weights
3. assumptions about the reformulation of options so as to simplify subsequent evaluation and choice.

For the purposes of this paper, the first set of assumptions is the most important, but let us briefly look at all three (without any pretension of completeness).

3.1 Assumptions about utility functions

Kahneman and Tversky assume that the utility (or value) of some outcome is always subjectively measured in terms of gains and losses relative to some neutral reference point. While this assumption is not incompatible with expected utility theory, it does run counter the implicit auxiliary assumption that outcomes are evaluated in terms of absolute states of wealth or welfare.

Next, they assume that utility (or disutility) decreases marginally with increasing gains (or losses). This implies an S-shaped utility function for gains and losses, with the neutral reference point being the point of inflection (see Figure 1).

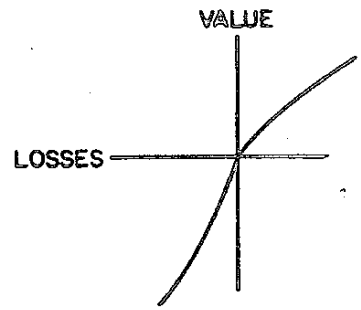

Figure 1.

Since it has been repeatedly observed that people weigh losses heavier than gains of the same amount, Kahneman and Tversky assume that the utility function is steeper for losses than for gains rather than symmetrical around the reference point. This is a very important assumption because it accounts for many effects previously not captured by expected utility theory, such as people's reluctance to accept fair bets.

Clearly, the reference point is very important because it determines what will be seen as gain and as loss. Here they assume that it "is largely determined by the objective status quo, but it is also affected by expectations and social comparisons" (Kahneman and Tversky, 1984:349) and they assume that it is quite unstable (Tversky and Kahneman, 1981:456).

3.2 Assumptions about decision weights

Following SEU theory, Kahneman and Tversky state that the value of an outcome is multiplied by a decision weight before it is evaluated. For almost all values, this weight is a monotonic function of the stated or objective probability with which the outcome occurs, but, contrary to SEU theory, it is not itself a probability. There is thus also no presumption that decision weights have to add to unity.

The assumptions can be summarized in two major point. First of all, they assume a category-boundary effect: impossible outcomes are discarded while possible but highly unlikely outcomes are generally given a much higher weight than their low probability of occurrence would warrant. Thus going from impossible to possible has generally a large effect although the absolute difference in probability is small. A similar effect is assumed for the other end of the scale: merely probable outcomes are given a much lower weight than their medium or high probability would warrant. Going from certain to probable has thus generally a large effect although the absolute difference in probability may be small. Exceptions to this rule are assumed to be the result of simplifications (see point 2.3).

Second, it is assumed that the ratio of decision weights is closer to unity when the probabilities are low than when they are high. Thus, although p=.002 is twice as probable as p=.001 and the same is true of p=.8 and p=.4, $\pi(.001)/\pi(.002) > \pi(.4)/\pi(.8)$.

Taking these assumptions together leads to the kind of nonlinear weighting function depicted in Figure 2.

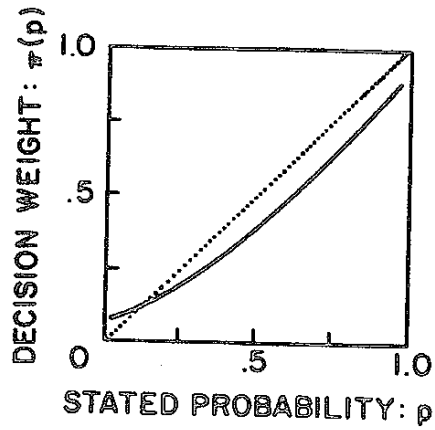

Figure 2

In contrast to probabilities, decision weights will generally be subadditive, i.e. they will not add to unity.

Again, Kahneman and Tversky can show that with the help of this weighting function, choice phenomena can be explained that would be very puzzling to expected utility theory.[2]

3.3 Assumptions about the reformulation of options.

Kahneman and Tversky make a great number of assumptions which could be grouped into this category. I will single out only two:

First, prospects will be simplified. Rounding probabilities or outcomes is one way of doing this. For example, (101,.49) will be changed into (100,.50). In this way, very small probabilities can be rounded to zero rather than given a proportionately heavy weight in the decision making; or probabilities close to 1 may be rounded to unity rather than weighted proportionately less. In this way the function for decion weights is not well behaved in the vicinity of certainty.

Second, they assume that people will evaluate options in terms of a "minimal account" which simplifies evaluation. It concentrates on the most direct consequences of an option, leaving out other aspects. Thus, in a gamble, people will generally concentrate on, say, the money to be won or lost and they will leave out other assets or the outcomes of previous gambles. This concentration reflects people's intuition that consequences should be causally linked to acts, and it reflects the assumed fact that gains and losses, i.e. desirable and undesirable <u>changes</u> are more important to people than steady states.

At times, so Kahneman and Tversky assume, the minimal

account may give way to some more inclusive account in which, say, the previous losses still play a role. The by now famous example of this is the following: you are asked to imagine that you decided to go to a play where admission is $10 per ticket. As you enter the theater, you discover that you have lost a $10 bill. Question: would you still buy the ticket? 88% of the subjects said "yes". Contrast this to the following scenario. Same as before, but this time you have bought the ticket ahead of time and as you enter the theater, you discover that you have lost the ticket. Would you pay $10 for another ticket? Now 54% of the subjects answered "no". In the first case, the loss of $10 is not specifically linked to the ticket purchase, while in the second case, the previous loss of the ticket still dictated the terms of the account in the decision to buy a new ticket. To pay $20 for the show was excessive for many subjects.

4. Some Problems with Prospect Theory

First: the experimental evidence seems to support the suggested nonlinear function for decision weights. What is lacking is an answer to the question what happens when the probabilities themselves are quite uncertain. There is much experimental support for the view that in highly ambiguous situations, the decision weight function may be more extreme or even altogether different (see Einhorn and Hogarth, 1985).

Second, it is difficult to see any compelling theoretical reason why the only admissible utility function should be about gains and losses. Kahneman and Tversky make a point of it that "loss" and "cost" are not identical. "The owner of a store, for example, does not experience money paid to suppliers as losses and money received from customers as gains...Payments made by consumers are also not evaluated as losses but as alternative pruchases...In this analysis, a person will buy a camera if its subjective value exceeds the value of retaining the money it would cost." (Kahneman and Tversky, 1984:349) If costs and losses are different then there must be utility functions that compare quantities of goods (such as indifference maps) or that assign a utility index number to quantities of one good. Under what conditions, then, would a loss/gain utility function become relevant?

Third, the authors of prospect theory offer no theoretical reason for S-shaped utility functions. For this reason, they also only consider S-utility functions for gains and losses. Are there others? If so, are they all asymmetric?

Fourth, Kahneman and Tversky had introduced minimal accounts as the most general way in which people select utility arguments situationally. Yet, minimal accounts leave no room for the influence of other, less salient utility. They observe that <u>at times</u> inclusive accounts will prevail, but this leaves their theory rather <u>ad hoc</u> on this point. For a theory of framing, this is rather damaging because by any reasonable understanding of the what the authors mean by "account", it is central to peoples'

definition of the situation.

This does not mean that it is really clear what exactly they do mean by "account". For example, they hint at the possibility that uncompensated losses (sunk costs) exert their influence through an inclusive account because through them, a previous situation interferes with the present one. According to Thaler (1980) sunk costs do exert a considerable influence on behavior, contrary to neoclassical theory. This would imply that inclusive accounts are much more general than Kahneman and Tversky make them out to be. Yet, it is not quite clear why one account is inclusive and the other is minimal. Supposedly, previous situations will always have some influence on later ones. The authors' theoretical elaboration is much too vague on this point.

Fifth, in prospect theory. reference points are crucial for the choice behavior because they govern what is gain and what is loss. But prospect theory contains no theoretical guidance as to what reference points people will have in a given situation. Sometimes it will be the status quo, sometimes it will be expectations, sometimes it will be social comparisons. When will it be what? As we will see later on, the attempt to manipulate the reference point on the basis of prospect theory is not easily met with success (see Fischoff, 1983).

Sixth, when Kahneman and Tversky predict that, say, alternative A will be chosen, then they consider any choice percentage above .5 to be a confirmation of their prediction. The reduction of choice percentages from 55% to 45% is a "reversal" of choice while the much larger difference between, say, 55% and 95% can be ignored because they both confirm the same hypothesis. Why do the choice percentages differ? The authors see no problem in this and prospect theory offers no answer for it. Something important must have been left out of their theory.

All this theoretical vagueness makes framing a very subjective process, so that it is difficult to use prospect theory for sociological analyses in which changes in constraints rather than subjective states carry the major explanatory burden (see Lindenberg, 1984)[3] Of what I would take to be the five most important requirements for a useful behavioral theory in the social sciences (see Lindenberg, 1985:108), prospect theory does not quite meet two: it requires much (too much) information about each individual to which it is applied and it makes it difficult to formulate bridge-assumptions that link descriptions of social conditions to descriptions of the individual choice situation.[4]

5. New Suggestions conerning S-Utility Functions

Recently, Lindenberg and Wilke (1986) have argued that when ever a two valued (i.e. positive/negative) utility function is projected on to a continuous utility function, the result will be a S-utility function. For example, we predicted that grades in Holland, running from 1=very bad to 10=excellent, will be tied to an S-utility function because there is a good (pass) and a bad (fail) region and the function is virtually continuous throughout. This prediction was confirmed by experimental data.

Where or not such a function is asymmetric is not to be settled in advance. While there is good evidence that a function for

gains and losses is asymmetric around the inflection point, it is not therefore to be expected in all other cases. For example, we found a S-utility function for help efficiency that was symmetric around the inflection point.

The reason we assume the overlay of two such functions to produce a S-utility function is that a small step <u>closer</u> to the good region will be worth more than a small step further <u>into</u> the the good region. Kahneman and Tversky actually suggest something similar when they say "the utility function of an individual who needs $60,000 to purchase a house may reveal an exceptionally steep rise near the critical value." (Kahneman and Tversky, 1979:278), but their preoccupation with gains and losses may have prevented them from incorporating this insight into their theory.

When closeness to the critical value does not carry any special significance, the shape may be different. For example, for the prospect of a sure loss of 50 and a gamble of (-40,.5) or (-60,.5) the utility function is likely to look like the function in Figure 3 which I call "kneel function" because it is similar to the pose of a kneeling person. It is entirely in the loss region, but the steps toward zero are like utility steps in the good region: every additional bit of damage control adds less utility (or removes less disutility) than the step before. For the steps away from the sure loss further into the bad direction, however, the sure loss is not likely to function as a zero reference point. Rather, "larger" damage will be seen relative to the extend of the sure loss damage. In other words, the function to the left of the sure loss will in all likelihood simply follow the path of decreasing marginal disutility.

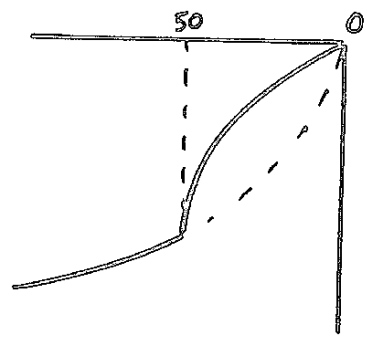

Figure 3. Kneel Utility Function

If good/bad criteria projected onto a continuous function can create S-utility functions, then social standards can create such functions. For example, while each student may have his or her particular reference point, the official pass/fail mark will easily exert its influence when persons with different personal inflection points interact. Official standards are like Shelling points, reducing transactions costs and helping to structure the situations consensually. Other examples of such standards are the

official poverty line, years of work to become eligible for pension benefits, land above or below the waterline near a dike etc. Due to such standards, it is possible that groups of people feel they are placed below the standard which would make them more risk seeking than the ones who feel they are above it.

6. The Discrimination Model of Probabilistic Choice and Framing

In order to explain choice percentages, one needs a stochastic decision theory, and in this case preferably one that also considers framing. Thus, this point cannot be dealt with quickly, for an alternative choice model has to be introduced first. I chose to present the Discrimination Model of probabilistic choice (Lindenberg, 1981) at this point because it has fared well in comparison to other probabilistic choice theories and it is very closely related to one important aspect of framing: the situational selection of utility arguments.

For our purposes here, it is sufficient to present only the two-alternative version of the model and to refer the reader to the literature for the general model and its derivation. The general idea behind the model is that the span of attention is so narrow that human beings will be able to focus on one main maximand at a time. This maximand (or main basket of goods) structures the situation and is thus the frame in terms of which the alternatives are being evaluated. The pure strategy would be to choose the alternative that maximizes this good, be it money or status or peace and quiet or norm-conformity. Discrimination between the alternatives in terms of this good will be maximal as well in the pure strategy: only one is the best and it will be chosen with probability 1.

The second main idea is that there are forces distracting from the pure strategy in case the choice is not considered to be unique.[5] For example, one may get bored always chosing the same alternative although it maximizes the main good. Or one may try to mitigate some negative distributional consequences for others that arise from always trying to get the largest piece of the cake. What ever the reasons, there are motivational pulls away from the pure strategy in the direction of pure non-discrimination (where one alternative is as good as the other).

Clearly, the distraction from the pure strategy is not an alternative frame. It cannot reverse the course of action dictated by the main basket. For this reason, the motivational pulls are said to reside in a side basket of goods.

The resulting choice probability depends on the tug-of-war between the two forces. For example, if I am in desperate need of money, then considerations of, say, boredom will have little weight, and I will select with high probability the alternative that maximizes money. If I am not so hard pressed, then boredom with selecting the same alternative will weigh heavier and the choice probability for the money-maximizing alternative will be

closer to .5. The saliency of the main maximand can be interpreted to be a kind of marginal utility of the good that is to be maximized. As we will see, however, it does differ from the conventional meaning of that concept in utility theory.

The saliency of the main maximand does not just depend on the strength of its contrary force. There may be cumulative factors that increase or decrease the motivational importance of the main good. For example, I may need money for paying my dentist which by itself may drive up the marginal utility of money. But if, in addition, I also need desparately money to pay my mortgage because otherwise they will take my house away, the two reasons work together to increase the saliency of money in certain decision situations.

Formally, the two-alternative version of the model has two components: the expected utility of discrimination, $E(U_d)$ and the (certain) disutility of discrimination, DU_d. Let $E(U_m)$ stand for the expected utility of a strategy (i.e. of a probability vector $[P_1, P_2]$), then the overall maximand is:

$$E(U_m) = E(U_d) - DU_d \qquad (1)$$

Specifically,

$$E(U_d) = ag_1P_1 + ag_2(1-P_1) = a(g_1 - g_2)P_1 + ag_2 \qquad (2)$$

where:

a = marginal utility of the main good (the main basket) g;
g_i = the sum of the utilities of outcomes of the ith alternative, each weighted by the appropriate event probability; (i=1,2)
P_i = stable state probability of choosing the ith alternative (i=1,2)

$$DU_d = (P_1 - 0.5)^2 \quad \text{with } P_1 \geq P_2 \qquad (3)$$

The disutility expression (equ. 3) is based on the idea of a global disutility of discrimination in which all possible "motives" that turn against the pure strategy are aggregated (see Lindenberg, 1980:298ff). A single motive can be conceptualized as follows: let x be a point such that $P_1 > x$ and interpret x as a reference point for an ideally <u>maximal</u> deviation from non-discrimination, then $P_1 - x$ is proportional to the disutility corresponding to this reference point. For example, for a situation in which strategies have distributional effects on self and others, equality may be connected with x=.5, equity with x=.7 and charity with x=.9. Rather than to list these and other motives as separate utility arguments, which would lead to arbitrary <u>ad hoc</u> lists and problems of commensurable measurement, one can aggregate over all the "motives" (i.e. reference points). Individuals are likely to have an idiosyncratic scatter of "motives" and with aggregate data, a <u>global</u> disutility (basket) is more likely to capture the joint effect of these scatters.

Mathematically the aggregation is simple: let $P_1 \geq P_2$ and $P_2 = 1-P_1$, then

$$DU_m = \int_{.5}^{P_1} (P_1 - x)\,dx + \int_{P_2}^{.5} (x - P_2)\,dx = (P_1 - .05)^2 \qquad (4)$$

Thus equation (1) turns into:

$$E(U_m) = a(g_1 - g_2)P_1 + ag_2 - (P_1 - .05)^2 \qquad (5)$$

Since the individual is assumed to maximize utility, it will choose the strategy $[P_1, P_2]$ that will maximize $E(U_m)$, the expected utility of the strategy. This point is uniquely determined by the following equation:

$$P_1 = a/2(g_1 - g_2) + .05 \qquad (6)$$

7. Application of the Discrimination Model to Prospect Theory

7.1 Changes in Marginal Utility

Framing in the Discrimination Model has a very definite meaning: the selection of one main utility argument in a situation and the chanelling of the influence of other utility arguments via the marginal utility of the main good. In other words, framing does not mean that other utility aspects are ruled out. Rather, it means that they are only admitted through the back door, namely as arguments influencing sign and size of R in the expression $a(1\pm R)$, where a is the marginal utility of the main good. Imagine that we have two kinds of experimental arrangements concerning an experiment that involves prospects with money. In one experiment, we motivate the subjects by offering considerable monetary incentives commensurate with the prospects, and in the other, we simply ask the subjects to imagine that they would get the money and have them do a great many paper and pencil tasks consecutively. Let us assume that we manage to manipulate the main frame in both cases: money. But then the saliency or marginal utility of money will in all likelihood be larger in the first than in the second arrangement, leading to considerable differences in choice probabilities.

An example of this can be found in Tversky and Kahneman (1981:455f). They report on various experiments they have done. In one, they told each group that 1 participant in 10, preselected at random, would actually be playing for money. Winners were paid immediately. One group had to consider the following problem: which of the following options do you prefer:

(A) a sure win of $30 or (B) an 80% chance to win $45. 78% chose the sure win. Later, the authors repeated this experiment. This time, only 54% chose the sure prospect, a large reduction unaccounted for by prospect theory. In fact, in the language of the discrimination model, the marginal utility a is reduced by almost 86%. At closer look at the experimental conditions reveals that the authors have changed the setup in such a way that motivation was bound to drop: they used a large group of respondents, multiplied the number of hypothetical decision problems each subject had to answer and did not give out any monetary incentives. If the theory has no room for the subjects' motivation then there is litte reason to pay any attention to such changes in experimental setups, resulting in seemingly unexplainable differences.

7.2 Loss Avoidance

As we have seen, it was not quite clear what "minimal versus inclusive" meant with regard to "accounts". Nor was it clear under what conditions the gain/loss utility function would be the prominent one. A hypothesis that would link their idea of asymmetric gain/loss utility functions and framing as situational selection of utility arguments would be the following:

a) The avoidance of uncompensated loss (i.e. the prevention of imminent loss and the reduction of recent loss) is itself a good that frames decision situations; b)the likelihood that this frame dominates other possible frames in any given situation grows disproportionately with the size of the loss.

For example, you were talked into buying an expensive ticket to a show in town by a friend and as you are about to be picked up by your friend and his car, he calls to tell you that he has unexpected guests and will not be able to go. You did not really want to go either but since you have purchased the ticket already you desperately try to find a ride into town (your wife has taken the family car elsewhere). The prevention of imminent loss will soon turn into reduction of recent loss as you give up trying to find a ride. While you are watching TV you keep thinking of ways to find some hidden compensation for purchasing the ticket.

Max Weber's analysis of the historical importance of various forms of the theodicy of suffering for the fabrication of cosmic arrangements that make suffering meaningful and thus compensated would be a case to which this hypothesis could be applied. Not necessarily religion as a communal credo and activity but religion as tied to elaborate schemes for the meaning of life would have to decline with a general decline in random shocks to valued assets.

In sum, if their are clear expectations as to the outcome(s) of a situations, there will an evaluation in terms of gains and losses. Whether this evaluation is going to structure the situation, i.e. whether loss avoidance becomes the overriding utility argument, depends on the size of the actual or anticipated loss and its likelihood increases disproportionately.

7.3 Stable Frames and Production Functions

Fischhoff (1983) saw clearly that in order to predict people's behavior with prospect theory, one would have to be able to predict the frame they will impose on a particular problem. He devised a series of experiments to test whether subjects' choice of a frame also coincided with the choice of prospects associated with this frame and whether people's frame could be easily manipulated. In the basic experiment he offered a scenario and three ways to structure it. Subjects were asked to select the frame they found most natural for this kind of a decision problem and they were asked to make their own choice among the prospects. Here is phrasing of the basic stimulus situation:

> "A civil defense committee in a large metropolitan area met recently to discuss contingency plans in the event of various emergencies. One emergency under discussion was the following: 'A train carrying a very toxic chemical derails and the storage tanks begin to leak. The threat of explosion and lethal discharge of poisonous gas is imminent.'
> Two possible actions were considered by the committee. These are described below. Read them and indicate your opinion about the relative merits of each.
>
> Option A: Carries with it a .5 probability of containing the threat with a loss of 40 lives and a .5 probability of losing 60 lives. It is like taking the gamble:
> Option B: Would result in the loss of 50 lives:
> lose 50 lives.
>
> Here are three ways one might think about this problem:
> 1. This is a choice between a 50-50 gamble (lose 40 or lose 60 lives) and a sure thing (the loss of 50 lives).
> 2. Whaterver is done, at least 40 lives will be lost. This is a choice between a gamble with a 60-60- chance of either losing no additional lives or losing 20 additional lives (A) and the sure-loss of 10 lives (B).
> 3. Option B produces a loss of 50 lives. Taking Option A would mean gambling over a .5 chance to save 10 lives and a

While choice of Option A was predicted for those who find frame 1 or 2 most natural for this decision problem, Choice of Option B was predicted for those who opted for frame 3 because in this frame option A supposedly has 50 dead as neutral reference point and an equal chance to gain 10 or lose 10 more. Since the utility function is said to be steeper for losses than for gains, the fair bet prospect A is not as attractive as the sure loss of 50 lives.

The result was different from this expectation: 86% of the subjects chose the gamble (Option A) independent of the frame preference of the subjects. Various reformulations and the added condition of presenting subjects with three different basic stimuli, each designed to be most suggestive of a particular frame, did not change the basic result: the choice of option was independent of the frame preference and it was also independent of the frame suggestion offered as basic stimulus. If people are as sensitive to framing effects as Kahneman and Tversky suggest they are, then surely one should be able to manipulate their frames more easily and they should choose more in accordance with the frame they find most natural for the decision problem. Kahneman and Tversky themselves were able to manipulate framing in the Asian disease example given above. Why did they succeed where Fischhoff's experiment failed?

On the basis of the Discrimination Model, one can find a coherent interpretation why Fischhoff's manipulations were unsuccessful while those of Kahneman and Tversky effective. In both cover stories, decisions have to be made that will catch a great deal of publicity and for which decion makers normally have to answer to higher authorities and to the public. In all likelihood, the main maximand is the prevention of public criticism afterward and subjects are aware of that. No manipulation of phrasing alone is likely to change this situational selection of a utility argument. Yet, what phrasing does is to offer clues about how public criticism can be prevented.

Take the example of Kahneman and Tversky. They state that the prospects are exact scientific estimates of the consequences. Common experience tells the decision makers that risk averse decisions maximize public approval when action is positive and risk seeking decisions maximize approval if action directed towards containing the damage. If the language of the exact scientific (and thus supposedly objective) estimate is in terms of x people saved then the most likely official reference point is that 600 would be killed. It is thus safe to follow the course of action which, due to the asymmetry of losses and gains everywhere, is likely to be approved everywhere: the riskless decision. Analogously, if the official language hints at a reference point of no deaths, then the action is directed toward containment of damage. Thus, the risk seeking course of action will probably be approved everywhere.

In Fischhoff's experiments, the situation was more complex. While the presentation of the situation in terms of symmetrical gains and losses may have had some effect comparable to Kahneman and Tversky's case, Fischhoff removed every official character of this description by asking which of three offered frames the subject finds most natural him- or herself. In this case a divergence of frame preference and option choice is not so surprising. Given the steady frame (avoidance of criticism afterward) and no solid clue as to how the public interprets the situation, the safest course of action is to choose the containment interpretation.

This view is strengthened by the result of Fischhoff's Experiment 5 in which he softened the language of the sure-loss

option. For example, instead of saying "would result in the loss of at least 40 lives", he now added a sentence before both options, saying "forty people's lives are going to be lost whatever you do" and in the sure loss option he would say "would result in the loss of 10 additional lives" which contrasted more favorably with the wording of the risky option: ".5 lose no additional lives and .5 lose 20 additional lives". The effect of this manipulation was that the percentage of sure-loss choices increased from 19% to 30%.

It seems to be useful to make a difference between a frame (as I understand the term here) and the interpretation of the situation. The former, as the main maximand in the situation, will help structure the situation further in terms of clues to reach the major goal rather than as ways to code gains and losses. In a language closer to economics than psychology one can say that given the situational frame, the further structuring of the situation is more in terms of a production function than a utility function. For the same reason, framing seems to be much less fickle and idiosyncratic than it first appeared in Kahneman and Tversky's prospect theory.

6. Summary and Conclusion

Kahneman and Tversky's prospect theory offers useful and important insights into choice processes. However, for a sociological application of this theory, it would be good to consider the social processes that create S-utility functions and to combine prospect theory with the Discrimination Model of probabilistic choice. The advantage of the combination is that framing takes on a very definite meaning, namely the situational selection of a main utility argument, without excluding the influence of other utility aspects. Another advantage is the separation of framing from the interpretation of situations for the purpose of instrumental action. Sensitivity to wording of problems may in many cases be sensitivity to situational clues about the expected behavior of others rather than changing one's decision frame. In this context it seemed useful to distinguish between utility and production functions.

FOOTNOTES

(1) Sociologisch Instituut, Groningen University, Oude Boteringestraat 23, 9712 GC Groningen. I would like to thank José Braspenning for help in locating various relevant publications for this project.

(2) For example Kahneman and Tversky (1979:267) report the following results: confronted with the prospects A:(6000,.45) and B:(3000,.90), 86% of the subjects chose B. But confronted with the same prospects in which the probabilities have each been divided by 450, the choice reversed: C:(6000,.001) versus D:(3000,.002), 73% of the subjects chose C.

(3) For an interesting radical suggestion toward a constraint-driven behavioral theory, see Frey and Foppa, 1986.

(4) I do not mean to imply that as it is, it cannot be used in the social sciences. See for instance Thaler (1980) for imaginative applications of prospect theory to the theory of consumer choice.

(5)For non-repetitive situations, the derivation is different but the model is almost identical to equation 6: $P_1=a(U_1-U_2)+.5$. This version is based on three assumptions: first, that P_1 is proportional to the difference in net-utility between the alternatives; second, that if this difference is zero, then there is no reason to favor one alternative and thus $P_1=P_2=.5$; third, that the sensitivity to differences in net-utility depends on the saliency (or marginal utility) of the main good.

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