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Travel Choice and the Goal/Process Utility Distinction

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SUMMARY

The concept of utility emanating from decision theory is employed in applied research aiming to understand and forecast the travel choices the general public make. Related to a distinction between telic and autotelic motivational theories, it is argued that in this area the prevalent definition of utility as goal-related evaluations of outcomes of activities (*goal utility*) needs to be complemented by the notion that utility is also experienced from performing the activities themselves (*process utility*). The validity of the distinction thus introduced between goal and process utility was demonstrated empirically in two studies of choices of travel destinations. In Experiment 1, one group of students rated the likelihood of patronizing fictitious grocery stores and another group rated the likelihood of impulse purchases in these stores. In addition to travel time, the rated likelihood of patronizing the stores was independently affected by the number of desirable goods available to purchase (goal utility) and the quality of personal services provided by staff (process utility). In contrast, the rated likelihood of impulse purchases was only affected by the latter. In Experiment 2, similar results were obtained for choices of fictitious grocery stores by a representative sample of car-owning households participating in a travel survey.

A less well-known field of applied cognitive psychology is transportation planning (see review of Everett and Watson, 1987). In this area knowledge is sought about the general public's demand for transport services. The primary use of such knowledge is in forecasting choices of transportation modes, travel destinations, and departure times. As noted by Levin and Louviere (1981), it is possible to apply a large number of methods developed in attitude research and in cognitive-psychological research on decision making and judgement. Of particular interest to transport planners are so-called stated-preference methods in which subjects express their preferences for fictitious options. As will be exemplified in this article,

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substantive contributions from cognitive psychology may be as desirable as methodological ones are.

A recent development in transportation research investigating travel demand is the activity-based approach (see Axhausen and Gärling, 1992; Kitamura, 1988, for reviews). In this approach choices to travel are assumed to depend on the value of participating in the activities made possible by travel. Travel is therefore considered to be a *derived* demand. As an example, travelling to a grocery store is only valuable because it makes possible grocery shopping. However, psychologically this may not be true. As will be argued further below, any activity may have both an intrinsic as well as an instrumental value.

Because of their close connection to microeconomic theory, studies of travel choice have relied almost invariably on a utility-maximization framework (Ben-Akiva and Lerman, 1985; McFadden, 1979). This framework is also applied to choice of activity participation (e.g. Damm and Lerman, 1981; Kitamura, 1984; Recker, McNally and Roth, 1986; Winston, 1987). A criticism articulated by Gärling, Kwan and Golledge (1994) is that the utility-maximization framework fails to explicate *how* utility is maximized. This is, of course, a basic question addressed in decision-making research in cognitive psychology (see, e.g. Payne, Bettman and Johnson, 1993). Another criticism of the utility-maximization framework, of concern in the present paper, is that is does not provide a psychologically meaningful definition of utility.

In decision theory (von Neumann and Morgenstern, 1947) utility is defined as a quantity assigned to a consequence of an action. It is an intervening, non observable variable that explains preferences revealed through observed actual choices. A problem with this definition is its circularity (McNully, 1990). In actual practice any observable variable may be substituted for utility if it predicts choices. As noted by Kahneman and Snell (1990), the explanatory force of the concept of utility therefore needs to be reinstated. They believe one way of doing this is to link it to subjective experience. In such a formulation a choice would be governed by predicted or expected *experiences* of utility of outcomes of actions. Examples are found in the work of Kahneman and associates themselves (Kahneman and Snell, 1992; Varye and Kahneman, 1992). Some of our previous research also provides examples (Gärling, Lindberg and Montgomery, 1989; Lindberg, Gärling and Montgomery, 1988, 1989a, 1989b; Lindberg, Hartig, Garvill and Gärling, 1992). In this research we attempted to find correlations between residential choices and the extent to which such choices were believed to lead to the attainment of life goals. It was thus assumed that utility depends on cognitive representations of means-end relationships.

Since the outcomes of travel choices are conceptualized as activities (Axhausen and Gärling, 1992), the question needs to be raised of how activities are experienced. Omodei and Wearing (1990) noted a distinction between motivational theories that locate positive effects in the attainment of desired goals or end states (telic theories) and theories that locate positive effects in the movement towards such end states (autotelic theories). In the former category are included either theories in which end states are considered to reflect relatively few common needs, or theories in which end states are considered to consist of relatively numerous personal goals. Although the bulk of motivational theories belong to these categories (e.g. McClelland, 1985; Nuttin, 1984), there is at least one attempt at proposing an autotelic theory (Csikszentmihalyi, 1975).

In expectancy-value types of attitude theories, the degree of expected goal attainment is the single important factor used to explain activity choices (e.g. Feather, 1982; Fishbein and Ajzen, 1975; Heckhausen, 1977). Such an assumption appears to be heavily influenced by the definition of utility in decision theory where it refers to evaluations of consequences or outcomes. In contrast, autotelic theories suggest that activities may sometimes be chosen because performing them is in itself desirable.

In this study we distinguish between utility expected from participating in an activity *per se*, what we call *process utility*, and utility expected from attaining a goal through activity participation, *goal utility*. Our aim is to show empirically that these two kinds of utility exist. In doing so we demonstrate a distinction that we feel is an important ingredient of a psychologically meaningful definition of utility. Specifically, we expect that the distinction will have bearings on the current understanding of the reasons for choices to travel. A utility-maximization framework (Ben-Akiva and Lerman, 1985) has in general, depicted travel choices as overly 'rational' (i.e. goal directed), leaving little room for the influence of subjective experience. From this reasoning even the very basic assumption that travel demand is derived from the utility of activity participation may be questioned since sometimes travel is perhaps in itself desirable. However, in the following we will not question this assumption but instead focus on the utility derived from the activities (such as grocery shopping) made possible by travel.

In two experiments reported below, we examine whether choices to travel, which make possible participation in activities, are jointly influenced by the activities' goal utility and the utility of participating in the activities (process utility). Grocery shopping is chosen as the target activity for which goal utility was varied as the number of desirable goods available to purchase. Process utility was independently varied as the quality of the personal services provided by staff. The main dependent variable was ratings of the likelihood to choose stores at different travel distances.

If activity choices are found to be influenced to different extents by goal utility and process utility under different conditions, such an observation would strengthen the validity of the distinction between these two kinds of utilities. In Experiment 1 an additional group of subjects therefore rated the likelihood of impulse purchases. It was hypothesized that the likelihood of choosing the stores would be influenced most strongly by the number of available goods to purchase and less strongly by the quality of personal services. The reverse pattern of effects was expected for ratings of the likelihood of impulse purchases.

Since Experiment 1 was limited in generalizability by the fact that students participated as subjects, Experiment 2 consisted of a partial replication in which data were collected in connection with a travel survey of a representative sample of multiperson households.

EXPERIMENT 1

Method

Subjects

Forty-four undergraduates at Umeå University, between 20 and 41 years old ($M = 24.0$ years, $s = 4.8$ years), participated as subjects in return for the equivalent of

$10 in payment. Ten men and 12 women were randomly assigned to each of two conditions. In one condition (ratings of the likelihood of impulse purchases) two men were discarded because they failed to follow the instructions.

Procedure

Subjects participated in the experiment individually or in small groups monitored by a female experimenter. After answering an unrelated questionnaire, they obtained a booklet with brief descriptions of 27 grocery stores appearing on separate pages. The descriptions were constructed by the orthogonal combination of the number of goods on the shopping list available to purchase (10, 12 or 14 out of 16), quality of personal services provided in the store (very bad, average or very good) and travel time by car to the store (8, 12 or 16 min). The descriptions were presented twice in consecutive blocks according to orders that were individually randomized.

Subjects in one of the two conditions were instructed to rate the likelihood of patronizing the stores on a numerical scale ranging from 0 (not at all likely) to 100 (very likely). They were informed that not being able to purchase all goods would cause inconvenience. Subjects were also informed that the quality of the personal services provided in the stores may make shopping more pleasant. However, they were explicitly told to ignore this information if considered irrelevant.

In the other condition, subjects were instructed to rate the likelihood of purchasing some additional goods that were on sale. These goods were described as highly desirable, although not on the shopping list. In other respects the instructions were essentially the same. The ratings were made on the same type of rating scale, ranging from not at all likely (0) to very likely (100).

With the purpose of anchoring the rating scale, all subjects were given two practice trials with one store having worse values than the other stores (8 goods available to purchase, extremely bad personal service, and 20 min travel time) and one having better values (16 goods available to purchase, extremely good personal service, and 4 min travel time). Subjects participated in the experiment for about 45 min. An average of approximately 15 min of that time was needed to fill out the booklet. Afterwards subjects were debriefed and paid.

Results and Discussion

In support of the distinction between goal and process utility, Figure 1 (*right panel*) shows that the ratings of the likelihood of patronizing the stores increases with the number of available goods and the quality of personal services. It may be seen (*left panel*) that in contrast to this, the ratings of the likelihood of impulse purchases are only affected by the quality of personal services. These observations were substantiated by a 2 (rating instructions) $\times$ 2 (gender) $\times$ 3 (number of available goods) $\times$ 3 (quality of personal service) $\times$ 3 (travel time) analysis of variance (ANOVA), which yielded significant effects of number of available goods, $F(2, 76) = 36.90$, $p < 0.001$, $MS_e = 16625.5$, of quality of personal services, F, $(2, 76) = 79.84$, $p < 0.001$, $MS_e = 10828.5$, and of the interaction between rating instructions and number of available goods, $F(2, 76) = 26.19$, $p < 0.001$, $MS_e = 11799.9$. Scheffé post hoc tests indicated that the main effects were due to reliable linear and quadratic trends, whereas the interaction effect was only due to the linear trend. Only in the group of subjects who rated the likelihood of patronizing the stores was the linear

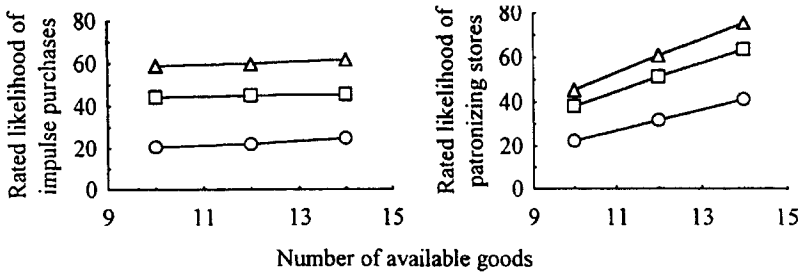

Figure 1. Ratings of the likelihood of impulse purchases and of patronizing stores as functions of number of goods available to purchase and quality of personal services (very bad denoted by *circles*, average denoted by *squares*, and very good denoted by *triangles*).

trend due to number of available goods significant. As expected, the ratings of the likelihood of patronizing the stores thus differed from the ratings of the likelihood of impulse purchases in being reliably affected by the number of available goods to purchase. Another difference was that the quality of personal services more strongly affected the ratings of the likelihood of impulse purchases. However, in this case the interaction between the rating instructions and the quality of personal services did not quite reach significance, $F(2, 76) = 2.13$, $p < 0.25$, $MS_e = 2898.3$.

The ANOVA also yielded a significant interaction between the number of available goods and the quality of personal services, $F(4, 152) = 2.55$, $p < 0.05$, $MS_e = 193.4$, which was reliably modified by the rating instructions, $F(4, 152) = 4.48$, $p < 0.01$, $MS_e = 340.5$. As Figure 1 shows, for the group of subjects who rated the likelihood of patronizing the stores, a tendency to a fan effect is discernible. Thus, goal and process utility may combine multiplicatively (Anderson, 1981a,b). Both a theoretically and empirically firmer basis are however needed before definite conclusions are drawn.

As indicated in Figure 2, the ratings of the likelihood of patronizing the stores decreased with travel time. No such decrease was observed for the ratings of the likelihood of impulse purchases. In the ANOVA the main effects of the travel time and its interaction with the rating instructions were both reliable, $F(2, 76) = 8.30$, $p < 0.01$, $MS_e = 2936.8$, and $F(2, 76) = 7.82$, $p < 0.01$, $MS_e = 2766.9$. A Scheffé post hoc test showed that the linear trend accounted for the effects. Only for those subjects who rated the likelihood of patronizing the stores was the linear trend due to travel time significant. Thus, travel time did not reliably affect the ratings of likelihood of impulse purchases. Although not expected, such a difference between

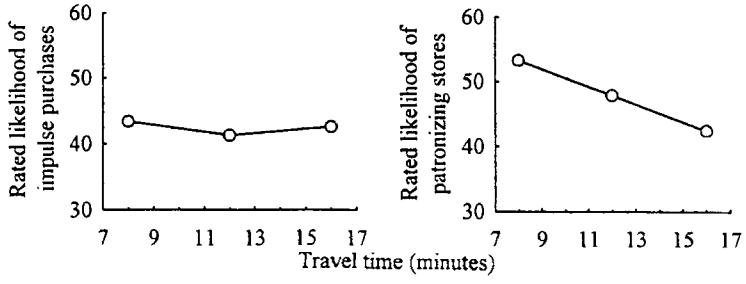

Figure 2. Ratings of the likelihood of impulse purchases and of patronizing stores as functions of travel time.

the conditions is plausible. Travel time was also involved in significant interactions with the quality of personal services, $F(4, 152) = 3.18$, $p < 0.05$, $MS_e = 160.7$, and jointly with the quality of personal services and the number of available goods, $F(8, 304) = 2.16$, $p < 0.05$, $MS_e = 101.2$. Violations of an additive model are again suggested, but this time the significant interactions did not involve the rating instructions.

EXPERIMENT 2

The purpose of Experiment 2 was to partially replicate Experiment 1 with another, more representative sample of subjects. In Experiment 2 data were collected in connection with a travel survey of a random sample of multiperson households.

Method

Subjects

Subjects were 41 randomly sampled couples of husbands and wives from Umeå. Inclusion in the sample required that the households were intact, that they had at least one child younger than 18 years old living with them, and that they owned a car. Of the originally sampled households, 15 refused, or were unable, to participate. The remaining men were between 24 and 51 years old ($M = 35.2$, $s = 5.7$). Thirteen men and 18 women had a college or university degree.

Questionnaire

Since the data collection was part of a travel survey, the questionnaire that subjects answered consisted of a battery of questions primarily concerned with travel habits. Only one part of the questionnaire was relevant to the present study (except for a few background questions in other parts). In this part, subjects were asked to indicate which of two grocery stores they would choose to patronize. The instructions informed subjects that the stores differed in travel distance, number of goods on the shopping list available to purchase and quality of personal services. Subjects were told to ignore the latter factor if they found it irrelevant.

All possible 36 pairs of descriptions of 9 stores were presented. The descriptions consisted of a subset of those used in Experiment 1 in which number of available goods (10, 12 or 14 out of 16), quality of personal services (very bad, average or very good) and travel time (8, 10 or 12 min) were varied according to a latin square. On each page in the questionnaire two descriptions appeared side by side. For each such pair, subjects first checked a box indicating which one (A or B referring to the left and right description respectively) they would choose, then they checked one of five boxes indicating how much better the chosen store was. The five boxes were labelled verbally from marginally better to very much better. The left-right position of each description was counterbalanced across pairs. Four different random orders of the pairs were used approximately equally often. All subjects were given a practice trial in which they compared one worse alternative (4 goods available to purchase, extremely bad personal service and 20 min travel time) with one better alternative (16 goods available to purchase, extremely good personal service and 4 min travel time).

Procedure

The questionnaires were administered in connection with home interviews performed by one of three male and three female trained students. After a telephone call by a

supervisor, who made an appointment for the interview if the household qualified for inclusion in the sample, the interviewer called to introduce himself/herself and to confirm the appointment. Subjects were told that the aim of the study was to assess how much households' daily travel by car contributes to air pollution. They were promised two cinema tickets in return for participating in the study, which also entailed keeping a car log for 1 week subsequent to the interview.

In the interview both husband and wife participated, whereas they answered the questionnaire individually while being monitored by the interviewer. The part consisting of the choices between stores was answered in approximately 15 min. On a later occasion when subjects were debriefed, they received the promised reimbursement.

Scoring

The ratings obtained of each pair were converted to a scale ranging from -5 to 5, where a positive value indicated that one of the stores was chosen, a negative value that the other store was chosen. An average was obtained for each store across the ratings of all pairs including that store. Such individual averages were submitted for statistical analyses as described below.

Results and Discussion

Figure 3 shows that the ratings increased with the number of available goods, increased with the quality of personal services and decreased with the travel time. Since the number of available goods and the quality of personal services independently affected the ratings, the results again supported the distinction between goal and process utility. Significant planned contrasts corresponding to the linear trend were obtained for the number of available goods $F(1, 320) = 163.23$, $p < 0.001$, $MS_e = 6998.8$, the quality of personal services, $F(1, 320) = 216.67$, $p < 0.001$, $MS_e = 9312.0$, and the travel time, $F(1, 320) = 120.0$, $p < 0.001$, $MS_e = 5347.2$.

GENERAL DISCUSSION

The results supported the distinction between the two kinds of utility expected from activity participation: goal utility, or utility of the goal attained by

Figure 3. Ratings of preference for stores as functions of number of goods available to purchase, quality of personal services and travel time respectively.

participation in an activity, which is consistent with the current definition of utility in decision theory (von Neumann and Morgenstern, 1947) and expectancy-value theories (Feathers, 1982: Fishbein and Ajzen, 1975; Heckhausen, 1977), and process utility obtained from participation in the activity *per se*. The supporting evidence included that students in Experiment 1 rated the likelihood of choosing stores for grocery shopping based on both the number of desired goods available to purchase (goal utility) and the quality of personal services provided by staff (process utility), and that in Experiment 2 a representative sample of car-owning households took both these factors into account when choosing between different grocery stores.

The fact that in Experiment 1 the ratings of the likelihood of impulse purchases were differently affected by goal and process utility strengthens the validity of the conclusion that a distinction can be made between these two kinds of utility. As expected, these ratings were not affected by the number of desirable goods available to purchase. In addition, they were more strongly affected by the quality of personal services and not at all by the travel time.

Rather than investigating actual activity participation by means of, for instance, an experience-sampling technique (Hormuth, 1986), the present study examined choices of travel destinations where an activity can be performed. Such choices are important foci of studies of travel demand (Axhausen and Gärling, 1992). Although the present experiments used a laboratory-based methodology, it has in several cases been found to yield results that are externally valid (Levin, Louviere and Schepanski, 1983). The results were also consistent with the common finding in studies of *actual* choices of a travel destination that the choices are affected by both the attractiveness of the destinations and by the cost of travelling to them (e.g. Ben-Akiva and Lerman, 1985). In the activity-based approach (Axhausen and Gärling, 1992), the attractiveness of a destination is dependent on the utility of the activity that can be performed there. In the present research we have been able to shed further light on the concept of utility associated with activity participation. In doing so we saw reason to broaden the meaning of the concept as it is being used in models of travel choice relying on a utility-maximization framework (Ben-Akiva and Lerman, 1985; McFadden, 1979).

Theoretically, there is a need to further clarify the distinction between process and goal utility. A few suggestions amenable to empirical study will be offered here. First, it may be noted that whereas goal utility, as already pointed out, is similar to the current definition of utility, process utility appears more akin to what Kahneman and Snell (1990) referred to as experienced utility. Although goals may sometimes be conceived of as experienced (rather than having effect only), it seems difficult not to associate process utility with experience. At least it is plausible to offer as a first approximation the degree to which an outcome is *experienced* as one underlying dimension, distinguishing goal and process utility.

Second, another underlying dimension appears to be *time*. Process utility is obtained immediately whereas goal utility is delayed. A decision maker's tendency to discount utility of future consequences has recently attracted renewed interest (Björkman, 1984; Stevenson, 1986). In a similar vein, the problem of self-control has been conceptualized as a choice between immediate gratification and future benefits (Ainslie, 1975; Hoch and Loewenstein, 1991; Mischel, 1974). In particular, the

notion of Loewenstein and Prelec (1993) that a choice alternative is perceived either to have a sequence of outcomes extending in time or a single isolated outcome, is similar, if not identical, to our distinction between goal and process utility.

It may be possible to construct a taxonomy of choice outcomes on the basis of the experience and time dimensions. In such a taxonomy goal utility would be characterized as postponed and not experienced, whereas process utility would be an experienced immediate outcome. Other combinations would define different classes of outcomes. Important questions for future research to address are to what extent and how outcomes characterized in this way affect choices differently. A starting point is perhaps provided by our finding that choice of store and choice of goods to purchase were affected differently.

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