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Utility Expected From Activity Participation

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Running headline: Utility of Activity Participation

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Abstract

Some behavioral modelling of travel demand rests on the assumption that travel choices are related to utility expected from participation in activities which travel makes possible. With the aim of further clarifying the concept of utility of activity participation, two experiments were performed to provide empirical support for the hypothesis that the utility of the goal attained by participation in an activity may differ from the utility of activity participation per se. In Experiment 1 one group of university students rated likelihood of patronizing fictitious grocery stores, another group rated likelihood of impulse purchases. In support of the hypothesis, rated likelihood of patronizing the stores were independently affected by number of desirable goods available to purchase (goal utility), quality of personal service provided by staff (utility of activity participation), and travel time (cost). Rated likelihood of impulse purchases was only affected by quality of personal service. Consistent with these results, Experiment 2 showed that a representative group of participants in a travel survey chose fictitious grocery stores on the basis of number of available goods to purchase, quality of personal service, and travel time.

Utility Expected From Activity Participation

Psychological applications in transportation planning were reviewed by Everett and Watson (1987). One such application is behavioral modeling of travel demand which is primarily concerned with forecasting travel choices (Levin & Louviere, 1981). For this application knowledge is needed of the decision-making process preceding households' choices of transportation modes, travel destinations, and departure times.

A recent development in behavioral transport research is the activity-based approach (see Axhausen & Gärling, 1992; Kitamura, 1988; for reviews). In this approach choices to travel are conceptualized as being dependent on the value of participating in the activities that travel makes possible. Travel is therefore considered to be a *derived* demand. The activity-based modeling of travel choices rests on assumptions about how value or utility is expected to accrue from activity participation (Supernak, 1992; Winston, 1982, 1987). A common basic tenet is that this utility depends on the extent to which a goal is attained. Similar conceptions exist in psychology (see Gärling & Garvill, 1993, for review).

The present research questions that utility of activity participation is exclusively related to goal attainment. If defined in this way, that performance of an activity per se has some value is overlooked. An alternative assumption is that utility is expected from *both* goal attainment and participation in the activity per se. Distinguishing between these two kinds of utilities has implications for analyses of travel choices.

In a similar vein Omodei and Wearing (1990) point out that a distinction is possible to make between motivational theories that locate positive effects in the attainment of desired 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 are at least one attempt at proposing an autotelic theory (Csikszentmihalyi, 1975). Perhaps this reflects a dominance also in psychology of the view that goal attainment is the only basis for assessing the value of activity participation.

The brief reference to motivational theories in psychology nevertheless suggests some theoretical plausibility for the hypothesis that people expect utility to accrue from activity participation per se, not only from its goal attainment. Empirical evidence for this hypothesis was sought in two experiments to be reported below. These experiments examined whether choices of activity participation are jointly influenced by an activity's goal utility and the utility of participating in the activity. Grocery shopping was chosen as the target activity for which goal utility was varied as the number of desirable goods available to purchase, while utility of activity participation was independently varied as the quality of personal service provided by staff. The main dependent variable was ratings of likelihood to choose stores at different travel distances.

If activity choices are to different extents influenced by goal utility and utility of activity participation, such an observation would strengthen the hypothesis that both kinds of utilities are expected from activity participation. In Experiment 1, an additional group of subjects therefore rated likelihood of impulse purchases. It was hypothesized that likelihood to choose the stores would be influenced most strongly by number of available goods to purchase, less strongly by quality of personal service. The reverse pattern of effects was expected for likelihood of impulse purchases.

Since Experiment 1 was limited in generalizability by the fact that university students participated as subjects, in Experiment 2 data were collected in connection with a travel survey of a representative sample of multiperson households. Both husbands and wives participated, thus making possible to also assess gender differences in the extent to which subjects are influenced by goal utility and utility of activity participation, respectively. Because women in general are more responsive to social cues, it was hypothesized that they would be influenced by the quality of personal service to a larger extent than men would be.

Experiment 1

Method

Subjects. Forty four undergraduates at University of Umeå, 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 (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 having answered an unrelated questionnaire, they obtained a booklet with brief descriptions of 27 grocery stores appearing on separate pages. The descriptions were constructed by orthogonal combination of number of goods on the shopping list available to purchase (10, 12, or 14 out of 16), quality of personal service provided in the store (very bad, average, or very good), and travel time by car to the store (8, 12, or 16 minutes). The descriptions were presented twice in consecutive blocks according to orders that were individually randomized.

Subjects in one of two conditions were instructed to rate 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 service provided may make shopping more pleasant but that they were perfectly welcome to ignore this information if not relevant.

In the other condition subjects were instructed to rate likelihood of purchasing some additional goods which 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 purchased, extremely bad personal service, and 20 minutes travel time) and one having better values (16 goods purchased, extremely good personal service, and 4 minutes travel time). Subjects participated in the experiment for about 45 minutes. On the average 15 minutes of that time were devoted to filling out the booklet. After having done that, subjects were debriefed and paid.

Results and Discussion

In support of the hypothesis that subjects take into account both goal utility and utility of participating in an activity, Figure 1 shows that the ratings of likelihood of patronizing the stores increased with number of available goods and quality of personal service. The ratings of likelihood of impulse purchases were only affected by quality of personal service. These observations were substantiated by a 2 (rating instructions) by 2 (gender) by 3 (number of available goods) by 3 (quality of personal service) by 3 (travel time) analysis of variance (ANOVA) which yielded significant effects of number of available goods, $F(2, 76) = 36.90, p < .001$, of quality of personal service, $F(2, 76) = 79.84, p < .001$, and of the interaction between rating instructions and number of available goods, $F(2, 76) = 26.19, p < .001$. 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 trend reliable. As expected, the ratings

of likelihood of patronizing the stores thus differed from the ratings of likelihood of impulse purchases in being affected by number of available goods to purchase. Another difference was that quality of personal service more strongly affected rated likelihood of impulse purchases. However, the interaction between rating instructions and quality of personal service was only close to significant, $F(2, 76) = 2.13, p < .25$.

Insert Figure 1 about here

The ANOVA also yielded a significant interaction between number of available goods and quality of personal service, $F(4, 152) = 2.55, p < .05$, which was reliably modified by rating instructions, $F(4, 152) = 4.48, p < .01$. As Figure 1 shows, for the group of subjects who rated likelihood of patronizing the stores, a tendency of a fan effect is discernible. Thus, goal utility and utility of activity participation may combine multiplicatively (Anderson, 1981a, 1981b). However, before definite conclusions are drawn, both a theoretically and empirically firmer basis is needed.

As indicated in Figure 2, the ratings of likelihood of patronizing the stores decreased with travel time. No such decrease was observed for the ratings of likelihood of impulse purchases. In the ANOVA the main effect of travel time and its interaction with rating instructions were reliable, $F(2, 76) = 8.30, p < .01$, and $F(2, 76) = 7.82, p < .01$. A Scheffé post hoc test showed that the linear trend accounted for the effects. Only for the group of subjects who rated likelihood of patronizing the stores was the linear trend reliable. Thus, travel time did not reliably affect the ratings of likelihood of impulse

purchases. Although not expected, such a difference between the conditions is plausible. Travel time was also involved in significant interactions with quality of personal service, $F(4, 152) = 3.18, p < .05$, and with quality of personal service and number of available goods, $F(8, 304) = 2.16, p < .05$. Violations of the additive model is again suggested, but this time the significant interactions did not involve rating instructions.

Insert Figure 2 about here

Experiment 2

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 ($M=38.4, s=5.7$), the women between 21 and 45 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 which subjects answered consisted of a battery of questions primarily concerned with travel habits. In addition to some background questions in different parts of the questionnaire, only one part was relevant to the present study. 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 service. The latter factor could be ignored if irrelevant.

All possible 36 pairs of descriptions of nine 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 service (very bad, average, or very good), and travel time (8, 10, or 12 minutes) were varied in 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 verbally labelled 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 purchased, extremely bad personal service, and 20 minutes travel time) with one better alternative (16 goods purchased, extremely good personal service, and 4 minutes travel time).

Procedure. The questionnaires were administered in connection with home interviews performed by one of 3 male and 3 female undergraduate students who had received training. 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 or 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 theatre tickets in return for participating in the study which also entailed keeping a car log for one week subsequent to the interview.

In the interview husband and wife both 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 minutes. 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. Individual such averages were submitted to statistical analyses as described below.

Results and Discussion

Figure 3 shows that the mean ratings increased with number of available goods, increased with quality of personal service, and decreased with travel time. Since number of available goods and quality of personal service independently affected the ratings, the results again supported the hypothesis that subjects take into account both goal utility and utility of participating in an activity. Significant planned contrasts corresponding to the linear trend were obtained for number of available goods, $F(1, 320) =$

163.23, $p < .001$, quality of personal service, $F(1, 320) = 216.67$, $p < .001$, and travel time, $F(1, 320) = 120.20$, $p < .001$. As hypothesized, women were more affected than men by quality of personal service ($M = -1.49$, $.12$, and 1.37 compared to -1.24 , $.03$, and 1.21 for very bad, average, and very good service respectively). However, the interaction with gender did not reach significance, $F(1, 320) = 1.76$, $p < .25$.

Insert Figure 3 about here

General Discussion

The present results provided support for the hypothesis that two kinds of utility are expected to accrue from activity participation: the utility of the goal attained by participation in the activity and the utility of participation per se. The evidence in support included that university students in Experiment 1 rated likelihood to choose stores for grocery shopping based on both number of desired goods available to purchase (goal utility) and quality of personal service provided by staff (utility of activity participation), and the finding in Experiment 2 that a representative sample of car-owning households' stated choices of stores for grocery shopping were based on both these factors.

Rather than investigating actual activity participation by means of, for instance, an experience-sampling technique (Hormuth, 1986), the present studies investigated choices of travel destinations. Such choices are one important focus of travel-demand modelling (Levin & Louviere, 1981; Supernak, 1992). Although the present experiments used a laboratory-based

methodology, there seems to be little reason to doubt that they did not yield valid results (Levin, Louviere, & Schepanski, 1983; Norman & Louviere, 1974). The results were also generally consistent with the common assumption (e.g. Supernak, 1992), substantiated by investigations of actual choices, that the choice of a travel destination is based on both its attractiveness and the cost of travelling to it. In the activity-based approach (Axhausen & Gärling, 1992), attractiveness of a destination is related to the value of the activity that can be performed at the destination. The present contribution is to shed further light on the concept in models of travel choice of value or utility expected from activity participation.

The fact that in Experiment 1 rated likelihood of impulse purchases were differently affected by goal utility and utility of activity participation adds to the conceptual validity of the distinction between these two kinds of utility. Quite plausibly, the ratings of likelihood of impulse purchases were not affected by number of desirable goods available to purchase. The ratings were also less strongly affected by quality of personal service, although in this case the difference failed to reach statistical significance. In a similar vein, women tended in Experiment 2 to be more affected than men by quality of personal service at the same time as there was no gender difference in the effect of number of available goods.

The present line of inquiry is certainly worthwhile to pursue. Very recent, as yet unpublished empirical results in transport research of modelling departure-time choice witness to this. Several questions for further research to address suggest themselves. The degree to which the present results are generalizable to actual choices and to actual activity participation are two

such questions. However, more important would be to investigate the degree of generalizability to other activities than grocery shopping. Studies of this question may benefit from taking as its point of departure a taxonomy of activities based on beliefs about what goals they lead to (Gärling, Lindberg, & Montgomery, 1989). This is an example of sets of issues where psychological research can contribute to the activity-based approach of travel-demand modelling, as well as to other similar problems faced by the social and planning sciences (Gärling & Garvill, 1983).

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Figure Captions

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

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

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

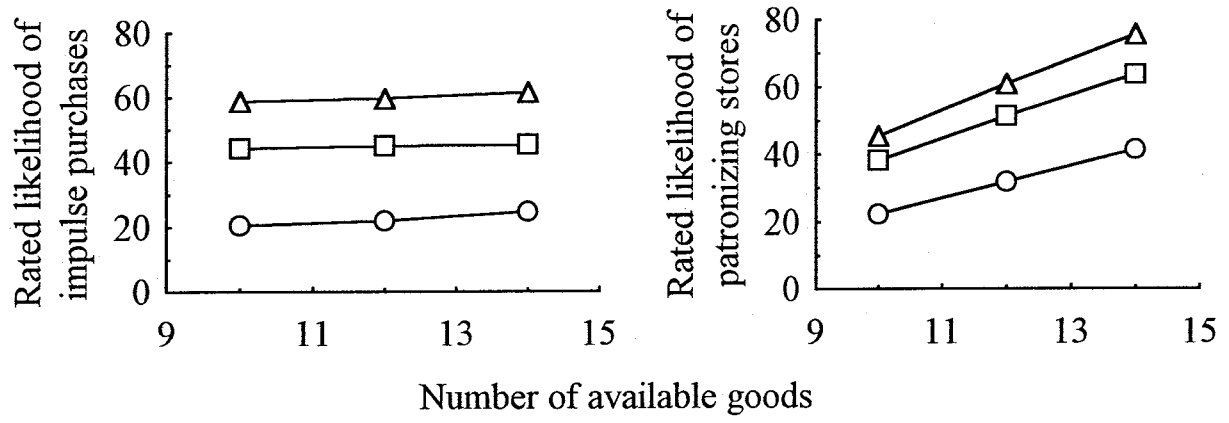


Figure 1

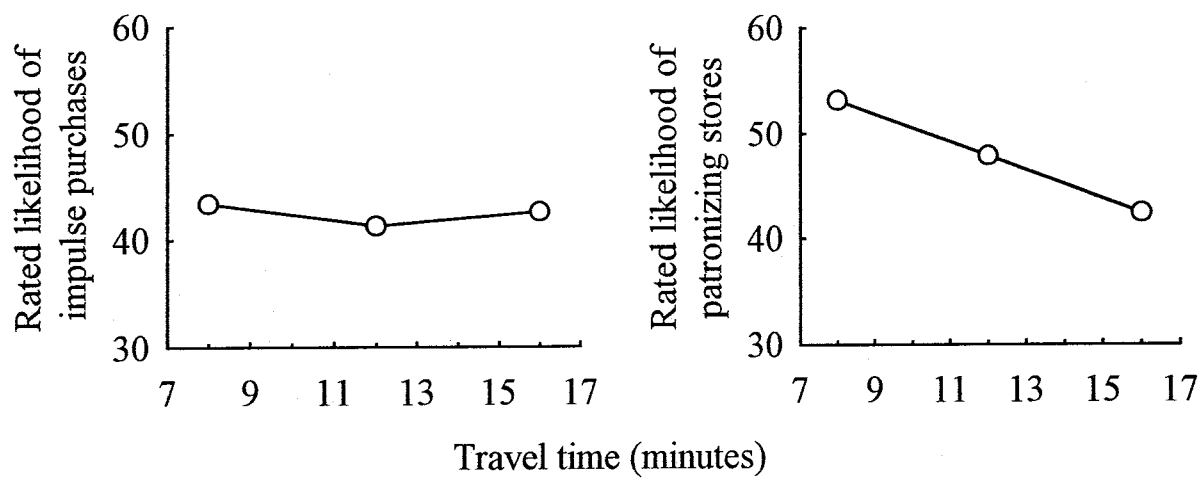


Figure 2



Figure 3