Leisure Activity Participation Models and The Level of Discourse Theory

David J. Snepenger and John L. Crompton

ABSTRACT: The level of discourse theory was empirically tested to determine if it could aid researchers in selecting the most useful independent variables for population and subpopulation models of leisure participation. A primary data set and three studies from the social group literature were employed in the investigation of population and subpopulation models. The analysis indicated that those models which met the requirements of the level of discourse theory demonstrated greater empirical utility than those models which did not meet the requirements. Recommendations for combining social aggregate and social action independent variables in population and subpopulation participation models are presented.

KEYWORDS: Level of discourse theory, population and subpopulation models, social aggregate and social action variables.

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Since the early 1960's, modeling participation has been a major area of inquiry within the leisure field (Proctor 1962; Burdge 1969; Romsa and Girling 1976; Kelly 1980). This effort has been predicated on the assumption that prediction of participation rates, and identification of those variables which are most useful for the task, would facilitate the delivery of services and optimize utilization of resources (Clawson and Knetsch 1966). However leisure research in general, and participation modeling in particular, seldom have been translated into effective human behavior guidelines from which capital budgeting and other resource allocations can be made (Burdge and Field 1972). Further, from a theoretical perspective, the leisure literature has produced neither robust prediction models nor very compelling explanatory paradigms. Consequently, much of the study of participation in leisure activities continues to rely on multivariate statistical tools such as factor, cluster, or regression analysis to explore and identify relationships, without clear a priori expectations guided by theory.

Within the participation literature, models focus either on research popu-
lations which consist of participants and nonparticipants or on subpopulations which are comprised only of participants. Burdge's (1969) investigation of occupational prestige, Washburne's (1978) study of the influence of ethnicity, and Gentry and Doering's (1979) research on biological and psychological measures of sexual orientation utilized population models to discriminate between participants and nonparticipants in selected leisure activities. Examples of subpopulation models include those constructed to explore the utility of occupational prestige (Cunningham et al. 1970), sociodemographics (Romsa and Girling 1976) and early life experiences (Sofranko and Nolan 1972). These studies were intended to discriminate levels of participation only among participants.

The population and subpopulation dichotomy of research focus crystalizes for the researcher and/or decisionmaker when the issues of equitable allocation or efficient management of leisure resources and services come to the forefront.

Equity is a complex concept interpreted in alternate ways by different people (Crompton and Lamb 1983). However, its basic concern is with fairness. Public leisure agencies, in contrast to private organizations, are mandated to attempt to deliver services to all subgroups in a population, since most, if not all, citizens pay for those services through the tax system. Population level studies are concerned with extensity of participation and equity. They seek to identify which groups do, or do not use particular services and to guide decisionmakers in selecting service offerings which are most appropriate for particular citizen subgroups. Population level studies thus identify participation patterns, which when integrated with participation preferences, offer information as to which services should be initiated, expanded, or contracted.

In contrast, subpopulation investigations exclude nonparticipants and focus upon the behavior and benefits sought from participation. Frequently, they seek insights into how best to maximize the satisfaction of existing users. They are concerned with intensity of participation and efficiency.

A fundamental issue which has not been directly addressed in the leisure participation literature regards the types of variables most appropriate for use as predictors in population and subpopulation studies. Substantively, the issue is whether or not the conditions which affect the equitable distribution of leisure resources and services are different from those conditions which affect the efficient management of leisure resources and services. From an empirical testing perspective, the issue is, "should population and subpopulation models use the same independent variables."

Population and subpopulation models in their most basic form can be expressed as conditional statements. In general, a conditional statement model has the following form: if $x$, then $y$ under conditions $a$, $b$ and $c$. The $x$ and $y$ are the independent and dependent variables respectively and the $a$, $b$ and $c$ the *ceteris paribus* conditions (Kerlinger 1969). Zetterberg (1965) suggests several varieties of conditional statement models, but the basic structure of these models is the same. For example, a stochastic conditional statement model would be of the following form: if $x$, then probably $y$. When research problems are formulated into conditional statement models, other aspects of the
research process follow. For instance, guidelines for choosing the research design, data collection procedures, and statistical techniques have been well documented (Campbell and Stanley 1963; Cochran 1977; Siegel 1956). However, the selection of independent variables for the conditional statement model often remains problematic for the researcher.

**The Level Of Discourse Theory**

The level of discourse theory offers guidance for selecting the most useful independent variables for discriminating the dependent variable in population and subpopulation models. In most research settings, the dependent variable reflects the focus of the research problem while the independent variable describes, explains, or predicts the observed variation. The level of discourse theory asserts that all variables in a model should be generalizations from the same set of objects (Kerlinger 1973). Therefore, the dependent variable in the conditional statement model places boundaries on the types of independent variables which can be selected for modeling the phenomenon under investigation (Dubin 1969). Given the restrictions of the level of discourse theory, isomorphic models would utilize independent variables that vary and only vary, over the set of objects specified by the dependent variable (Kim and Roush 1980). For a model to identify those factors which are, or are not inducements or constraints to the behavior in question, the researcher must select independent variables which are potentially binding to, and only binding to, those individuals or groups identified by the dependent variable.

Set theory offers explicit rules as a vehicle for manipulating abstract ideas such as the level of discourse. It provides the possibility of thinking precisely and systematically about very abstract ideas (Cohen 1980). A set theory test of the level of discourse theory for bivariate models is presented below. The test consists of the following three steps:

**Step 1:** The research problem is formulated as a conditional statement model; if $x$, then $y$.

**Step 2:** The set of objects that have variable $x$ as a characteristic is defined. Also, the collectively exhaustive set of objects that possess the $y$ characteristic is specified.

**Step 3:** The two sets of objects for variables $x$ and $y$ are compared. When the sets are congruent, then the variables in the model are at the same level of discourse. If the $x$ and $y$ sets are not congruent, then the model has mixed levels of discourse. In set notation, a model is formulated at the same level of discourse if, and only if, the intersection of $x$ and $y$, $x \cap y$, equals the union of $x$ and $y$, $x \cup y$. The intersection is the collection of objects which are common to both sets while the union is the collection of objects that are members of either $x$ or $y$.

The above test for the level of discourse is generalizable to multivariate models. In multivariate research settings, the first step would be to define all
variables in the model and determine the sets of generalized objects. If all variables in the model generalize to the same set of objects, then the model is logical with respect to the level of discourse.

Evaluating the level of discourse for the dependent variable offers the researcher a logical procedure for constructing an inventory of variables from which to describe the underlying causal structure of the phenomenon under investigation. However, to know that variables in a model are at the same level of discourse is not a prediction of the magnitude or direction of the relationship between variables. Rather, it is a statement of the location of the generalized objects within the model (Dubin 1969).

The definition of a group under study does not always provide sufficient information for selecting independent and dependent variables at the same level of discourse. The definition does not always place restrictions on the variables which can be tested together in a model, because it is not unusual for members of a selected population to have attributes which generalize to more than one universe of discourse. For instance, a selected population could be defined as only those who participate in an activity. With this population, it is possible to test the relationship between gender, a population level independent variable, and frequency of participation, a subpopulation level dependent variable. The members of this selected population have both the characteristics of gender and participation in the activity. However, these two attributes generalize to different universes of discourse. Gender can influence not only the frequency of participation, but also whether or not one engages in an activity. Such a situation is less likely to arise when a subpopulation level independent variable is used with a population level dependent variable because the collection of such data often becomes nonsensical. An example of such a situation would be the utilization of the subpopulation level independent variable, travel distance, with a dependent variable incorporating travelers and non-travellers. Little would appear to be gained from questioning non-travellers about travel distance because they do not travel.

The empirical validation of a model is likely to be enhanced when variables are at the same level of discourse. If this is not true, restriction in range is possible (Nunnally 1967). Since it is not unusual for 50 percent or more of a population to not participate in any given leisure activity, the empirical consequences of mixing levels of discourse in a subpopulation model can be considerable (Romsa and Girling 1976; Romsa and Hoffman 1980; Snepenger and Cheek 1982). The problem of shifting level of discourse, and hence restriction in range, manifests itself in an hypothesis test by biasing the chance of rejecting the null hypothesis. All other things being equal, fewer and weaker empirical relationships are likely to result when the independent and dependent variables in a model are not at the same level of discourse.

**Testing The Level Of Discourse Theory**

To evaluate the logical and empirical utility of the level of discourse theory for selecting independent variables for population and subpopulation models, leisure activity participation models for tennis were constructed and
analyzed. In addition, the appropriateness of the level of discourse theory was analyzed by using leisure participation models reported in the existing social group literature.

The tennis participation models were constructed from data collected from residents of a Texas Standard Metropolitan Statistical Area (SMSA). Two mail questionnaires one for tennis players and the other for non-tennis players were utilized. The tennis player questionnaire solicited information from members of the community tennis association and from participants in a local tournament. The other questionnaire went to residents of the SMSA who were selected on the basis of a telephone book cluster probability sampling procedure. Due to the influence of the lifecycle upon leisure socialization patterns, only those respondents of the two questionnaires who were 18 years of age or older were retained for the analysis (Cheek and Burch 1976). The two survey instruments provided 159 usable cases for analysis, 91 from tennis players and 68 from non-tennis players.

Through aggregation of the participation data, population and subpopulation level dependent variables were constructed. The population level dependent variable partitioned respondents into three levels: 1) nonparticipants 2) participate twice a week or less, and 3) participate more than twice a week. The partitioning distributed respondents into approximately equal thirds. The subpopulation dependent variable which excluded the nonparticipants, again partitioned respondents into equal thirds based on frequency of participation.

Independent variables at the population and subpopulation level of discourse were incorporated into the investigation. Table I displays the various models tested in the analysis. The first column lists the three models along with the kinds of independent variables employed. The first model combined independent and dependent variables both at the population level of discourse. For this model the two independent variables were sociodemographics and general psychographic items. Age, gender, income, education and occupation provided sociodemographic profiles, while 35 general life-style Likert-type items which were previously tested by Schewe and Calantan (1978) provided additional population level information. Examples of these are: 1) I love seafood and eat it whenever I can; 2) Taking a vacation brings the family close together; and, 3) A news magazine is more interesting than a fiction magazine. These two types of independent variables and the dependent variable had a population level of discourse because all individuals possessed sociodemographic characteristics, sentiments toward general psychographic items, and were either participants or nonparticipants in the activity.

The second model type incorporated the same population level independent variables with the subpopulation level dependent variable consisting of only participants. The independent and dependent variables possessed different underlying sets of generalized objects. This was so because everyone who participated had sociodemographic and general psychographic characteristics, but all individuals who had sociodemographic and general psychographic characteristics did not participate.

The third type of model evaluated subpopulation level independent vari-
### TABLE 1.
An Analysis of Population and Subpopulation Leisure Activity Participation Models

<table>
<thead>
<tr>
<th>Model Type</th>
<th>Number of Chi-square Tests of Independence</th>
<th>Total Number of Chi-square Tests for Model Type</th>
<th>Number of Associations</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Models with: Population level independent and dependent variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Sociodemographics</td>
<td>5</td>
<td>4*</td>
<td>40</td>
</tr>
<tr>
<td>2. General Psychographics</td>
<td>35</td>
<td>8*</td>
<td>12*</td>
</tr>
<tr>
<td>B. Models with: Population level independent variable and subpopulation level dependent variable</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Sociodemographics</td>
<td>5</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>2. General Psychographics</td>
<td>35</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>C. Models with: Subpopulation level independent and dependent variables</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Tennis Psychographics</td>
<td>80</td>
<td>11*</td>
<td>81</td>
</tr>
<tr>
<td>2. Social Group Variable</td>
<td>1</td>
<td>1*</td>
<td>12*</td>
</tr>
</tbody>
</table>

*An asterisk indicates that the number of associations was significant utilizing the multiple test of significance. All tests were evaluated at an alpha level of .05.

Variables with a subpopulation level dependent variable. The two types of subpopulation level independent variables were tennis specific psychographics and a social group variable. The activity specific psychographics elicited information on tennis related activities, interests and opinions. Examples of the 80 Likert-type items developed from focus group interviews with tennis players are: 1) I play tennis for the exercise; 2) I practice tennis drills to improve my game; 3) Transistor radios should not be allowed on tennis courts. The social group variable gave a measure of the social affiliation present during the tennis experience. The tennis players were asked whether they participated most often with a primary social group, family and friends; or with a secondary social group, tennis association, private club or tournament players.

Based on a two-stage statistical analysis, the logical and empirical utility of the two models with independent and dependent variables at the same level of discourse, and the one model with independent and dependent variables at different levels of discourse were ascertained. All statistical tests undertaken in the two-stage analysis adopted an alpha level of .05.

In the first stage a series of chi-square tests of independence were undertaken for each of the three model types. The chi-square test of independence was selected to test whether the level of discourse theory would identify the kinds of variables which would be empirically related in a conditional statement model. It provided a measure of association which was deemed appro-
priate given the sample size and the nominal and ordinal levels of measurement of the independent and dependent variables (Marascuilo and McSweeney 1977).

Stage two of the analysis summarized the results of the chi-square tests of independence undertaken for each model type. The second stage of the analysis, however, presented a methodological problem. The use of multiple tests of significance may lead to inappropriate conclusions because as the number of independent statistical tests increases, the probability of rejecting a null hypothesis increases. Under conditions of repeated tests of significance, it is necessary to determine whether the number of "significant" tests is sufficiently large enough to indicate a nonchance occurrence. An upper-bound estimate of the experiment-wise error rate can be calculated by the following formula:

\[
\text{experimentwise error rate} = 1 - (1 - a)^k
\]

where \( a \) = the level of significance, and \( k \) = the number of tests of significance

As the formula shows, the probability of making a Type 1 error, that is rejecting the null hypothesis when in fact it is true, increases as the number of independent significance tests increases. The method suggested by Feild and Armenakis (1974) provides an upper-bound for the experimentwise error rate for a series of independent or dependent tests. Their multiple tests of significance procedure is based on the binomial expansion and compares the observed number of rejections of the null hypothesis with a specified probability distribution based on chance. It provided an objective means of making comparisons across the variable families and across the different model types.

Findings

For the first model which had population level independent and dependent variables, (Model type A), four of the five sociodemographics and eight of the thirty-five general psychographics were significantly associated with the population level dependent variable (See columns 2 and 3 of Table 1). The binomial test indicated that these types of variables were significantly associated with the population dependent variable (note the asterisk in Table 1). Furthermore, when the sociodemographics and the general psychographics were combined, the binomial test again indicated significance (See columns 4 and 5 of Table 1).

In contrast, in the model which mixed levels of discourse (Model B in Table 1), only one of the sociodemographics and two of the general psychographics were associated with the subpopulation dependent variable. The binomial test for multiple tests of significance indicated that these variable types were not significantly related to the subpopulation dependent variable. Additionally, when the sociodemographics and general psychographics were combined, the binomial test demonstrated that a significant relationship did not exist between the independent variable types and the dependent variable.
The chi-square test of independence for Model C indicated that 11 of the 80 tennis psychographics and the one social group variable were associated with the subpopulation dependent variable. Both of these subpopulation variables were found to be associated with the subpopulation dependent variable by the binomial test. When these two independent variables were combined, further support was demonstrated.

These data suggest the relevance of the level of discourse theory to the formulation of population and subpopulation models. Associations between the independent and dependent variables occurred more often when the variables were generalizations from the same set of objects, and less often when the variables were not generalizations from the same set of objects. The population and subpopulation models which did not mix levels of discourse produced significant relationships while the subpopulation model which mixed levels of discourse did not.

The Level Of Discourse Theory And The Social Group Literature

A major contribution to the modeling of participation in leisure activities has been the inclusion of the social group variable. Field and O'Leary's (1973) investigation of participation in water based leisure activities may be regarded as the seminal study in this area. They constructed both population and subpopulation models utilizing both sociodemographics and the social group variable. Their first model examined the predictive capabilities of sociodemographics which are a type of social aggregate variable at the population level. The model had a population level dependent variable, therefore both variables were at the same level of discourse. The authors noted that without exception the sociodemographics delineated between participants and nonparticipants in swimming, fishing, power boating and visiting a beach. Their next model utilized the sociodemographics with a subpopulation level dependent variable which excluded nonparticipants. Examined independently, none of the nine sociodemographic characteristics significantly differentiated levels of participation across the four activities. The sociodemographics were also treated simultaneously in a multiple correlation analysis and accounted for little of the variation in participation for participants only. With the exception of fishing (R-square = .261), the remaining R-square values were less than five percent. As the level of discourse theory would anticipate, these models which mixed levels of discourse did not generally differentiate participation among participants.

The third model examined by Field and O'Leary combined a subpopulation level social action variable, the social group, with the participants only subpopulation level dependent variable. The analysis revealed that the social group variable significantly correlated with participation for all four activities. Both the independent and dependent variables were at the same level of discourse, and logical and meaningful empirical relationships resulted.

The fourth model type in their study explored the social aggregate variables, sociodemographics, and the social action variable, the social group, simultaneously with a subpopulation dependent variable. In this model the
social aggregate variables were at a different level of discourse than the dependent variable, while the social action variable was at the same level of discourse as the dependent variable. It would therefore be anticipated that the social group variable would make a significant contribution to the R-square values of the model vis-a-vis the social aggregate variables. For all four activities, a significant contribution to the R-square resulted when the social group was included in the analysis.

Later Christensen (1980), utilizing path analysis, examined the contribution of the social group variable, a subpopulation independent variable, and age, a population independent variable, for explaining participation among fishermen. The study examined two alternative specifications of the social aggregate and social action systems by constructing path analytic models. In one path model the social group variable was primary and the explained variance attributable to age was the secondary independent variable. In the other path model, the social aggregate variable, age, was primary and the social group was the secondary independent variable. For the first path model the social group variable was found to be empirically 150 percent more important than age when explaining participation among fishermen. For the second path model, the social group variable was observed to be seven percent more important than age. In both path models, the social group variable which was the independent variable at the appropriate level of discourse demonstrated greater empirical utility than did age which was the independent variable at the inappropriate level of discourse.

The third study on the role of the social group variable by Dottavio et al. (1980) was a replication and extension of Field and O'Leary's (1973) paper. They utilized population and subpopulation level independent variables to analyze subpopulation level participation variables for 12 outdoor recreation activities. The authors observed that those equations which included only independent variables at the inappropriate level of discourse had lower multiple R values than those equations which included the social group variable which was at the appropriate level of discourse. Finally, when Dottavio et al. did a stepwise regression analysis, they found that the social group variable was the dominant predictor in 21 of the 24 equations.

Taken as a whole, these three studies suggest that the level of discourse theory offers guidance for modeling participation in specific leisure activities. In general, the models in these studies which did not mix levels of discourse produced stronger empirical results than those which did mix levels of discourse. Furthermore, when social aggregate and social action variables were combined together in an analysis, the social group variable which was at the same level of discourse as the dependent variables, out-performed the socio-demographics which were at a different level of discourse.

Discussion

A major analytical focus within the participation literature has been the combination of social aggregate and social action components into the same prediction equation. Together, the analysis of the primary data set and the
social group literature suggests that there are two possible ways to formulate these equations so they are consistent with the level of discourse theory.

The first approach is to utilize variables which are all at the population level of discourse. Social aggregate variables such as sociodemographics or general psychographics can be utilized with a social action and participation variable at the population level of discourse. An example of a social action variable at the population level of discourse is the dummy variable—do any members of your household participate in the activity? Other closely aligned variables at the population level of discourse which would tap into the social dimensions of leisure were discussed by Burch (1969) in his study on camping styles. For instance, Burch measured the number of significant others who participated in the activity. Both participants and nonparticipants in the activity could have identified the number of their close friends and/or family members who participated in the activity.

An alternative approach for formulating social aggregate and social action equations would be to utilize social aggregate, social action, and a participation dependent variable which are all at the subpopulation level of discourse. An example within the literature of social aggregate variables at the subpopulation level is Driver's (1977) recreation experience scales which were utilized by Buchanan et al. (1981) to explore social groups and the meanings of outdoor recreation activities. Other social aggregate variables at the subpopulation level are activity specific psychographics. The standard social action variable could then be combined with the social aggregate variables at a consistent subpopulation level of discourse.

By formulating social aggregate and social action system models so that all the variables are at the same level of discourse, the models are more isomorphic to reality, and therefore their empirical utility could be expected to increase. Furthermore, such models would provide an unbiased test for evaluating the relative empirical utility of social aggregate and social action variables for explaining participation. Current formulations frequently do not provide such an opportunity since the social aggregate variables are restricted in range reducing their empirical utility.

The constraints that the level of discourse theory places on studies utilizing several levels of analysis are suggested in the above discussion of social aggregate and social action system models. Individual, group, and organizational characteristics might usefully be incorporated into the same model if all the variables vary, and only vary, over the same set of objects. Hopefully, these guidelines will aid leisure researchers in constructing models which logically relate two or more analytical systems.

When decision makers desire information about participation, or when scholars explore basic questions about leisure behavior, they need to be cognizant of the relevance of the level of discourse theory to model building. If engagement and nonengagement in the behavior are the focus of the investigation, then population level independent and dependent variables should be adopted. For instance, if the equitable distribution of leisure services is a concern to the decision maker, it might be necessary to gather information on participation and nonparticipation together with such characteristics of the popu-
lation as gender, age, education, income, housing density, and geographic distribution of services within the community. However, when a decision maker is concerned with the efficient management of leisure services, an investigator should employ subpopulation level independent and dependent variables. Subpopulation independent variables which might be included in such a study include the social group, travel distance of users, and activity specific information such as the tennis psychographics reported in this study.

On occasion, a decision maker or researcher might wish to address problems which when modeled produce situations in which it is impossible to identify independent variables which vary, and only vary over the set of particulars specified by the dependent variable. An investigation concerned with satisfactions among only frequent participants in an activity would be difficult to model because of the paucity of predictor variables which can meaningfully be restricted over this selected set of users. It is unlikely that any independent variables could be employed which would be at the same level of discourse as the dependent variable. As this hypothetical situation indicates, there may exist problems for the decision maker which cannot be optimally modeled because the more restrictive the generalized set of particulars of the dependent variable, the more restrictive the independent variables must be if the model is to be consistent with the level of discourse theory.

In conclusion, this paper has indicated at least three ways in which the level of discourse theory helps to structure scientific investigations. First, it forces the researcher to identify concretely the set of generalized objects under investigation. Second, evaluating the level of discourse for the dependent variable offers the researcher a logical procedure for constructing an inventory of independent variables from which it might be possible to describe the underlying causal structure of the phenomenon under investigation. Third, although the level of discourse theory does not offer prediction of the magnitude or direction of the relationship between variables, the empirical validation of a model is often enhanced when variables are drawn from the same level of discourse.

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