

USER AND NON-USER ATTITUDES TOWARD  
PUBLIC FACILITIES

ATTITUDES OF USERS AND NON-USERS  
TOWARD PUBLIC FACILITIES  
AND SERVICES

by

LISE CURRIE

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AUTHOR: Lise Currie, B.A. Hons. (Geography)

SUPERVISOR: Dr. M. J. Dear

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## ABSTRACT

Our study is concerned with the problem of locating public facilities. We suggest that public facilities and the services therein generate locational impacts which can be best elicited through a behavioral approach and more particularly through attitude theory.

In this framework of analysis, we postulate two alternative hypotheses in an attempt to circumscribe the essential dimensions of impact of public facilities and services. We suggest that either different kinds of externalities are imposed upon the users and the non-users of public goods or the impacts generated by public goods are essentially the same. In the latter case, they are evaluated differently and given different psychological weights. The attitudes developed through the evaluation of public goods are found to be the best indicators of the extent and intensity of their impacts. While attitude formation is a multidimensional process involving tangible and intangible elements we show that the resulting attitudes are largely dependent upon locational factors and distance relationships.

In order to evaluate the attitudes of users and non-users we develop a Semantic Differential scale relating the characteristics of public services to the attitude system of individuals.

Finally, we give the attitude score a "utility" interpretation placing the analysis in a planning context: that of environmental satisfaction and conflict situations due to the location of public facilities.

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## TABLE OF CONTENTS

	<u>Page</u>
CHAPTER 1: INTRODUCTION .....	1
1.A.1. Impacts of public services .....	2
1.A.2. Conflict .....	3
1.A.3. The concept of utility .....	4
1.B. Research objectives .....	6
CHAPTER 2: ANALYTIC APPROACHES TO PUBLIC FACILITIES ..	8
2.A. The provision issue .....	8
2.B. Origin of public goods .....	9
2.C. Classification of public goods .....	11
2.D. Current analytic approaches to policy-making and location of public services .....	14
2.D.1. Analysis of demand and consumer choice.	14
2.D.2. The programming approach .....	18
2.D.3. The political Models of provision of public goods .....	19
2.D.4. The behavioral approach .....	22
CHAPTER 3: POTENTIAL CHARACTERISTICS FROM ATTITUDE STU- DIES .....	24
3.A. Space perception studies .....	24
3.B. Attitude theory: nature, formation and functions of attitudes .....	28
3.C. Relevance of attitude theory to the study of pu- blic facilities .....	32
3.D. Impact Analysis .....	34

CHAPTER 4: MEASUREMENT OF ATTITUDE TOWARD PUBLIC FACI-	
LITIES .....	48
4.A. Empirical evidence related to the study of im-	
pacts of public facilities .....	48
4.B. Utility functions of users and non-users ....	55
4.C. Analytic approaches .....	60
4.C.1. methodological considerations .....	60
4.C.2. semantic differential as the chosen	
approach .....	69
4.D. Survey instrument .....	75
CHAPTER 5: CONCLUSION .....	81
1. summary of results .....	81
2. evaluation of progress .....	83
3. future research .....	85
BIBLIOGRAPHY .....	90

## CHAPTER I

### INTRODUCTION

Urban residents experience different environments in the city. These behavioral settings give rise through their forms and symbols to the unique phenomenological links between the individual and reality, and between the individual and society. In various contexts, these important relationships have been abstractly described by concepts such as "utility" (Bentham, 1931), urban "amenities" (Atkisson and Robinson, 1969) and "environmental quality" (Cox and Dear, 1975). Geographers and planners have recognized the significant role of various environments as sources of stimuli and welfare.

In this paper, we argue that, among the various factors contributing to environmental quality, public facilities and services have significant impacts on the creation and distribution of amenities in the city. For example, conflicts over the location of public goods have been well publicized, especially in the case of expressways. We know that many social and political forces intervene in the process of conflict resolution. We maintain, however, that the mechanisms entering into play are more subtle and intricate than those generally assumed. In the literature, the explanation of the conflicts over the provision of public goods is in terms of the power structure of the parties involved. We want to go beyond this and identify the intrinsic sources of conflict residing in the individual himself and his dealing with other individuals and his environment. That is, we want to look at the primary conditions, environmental and psychological, which give the public good the status of "amenity" and determine the level and intensity of this amenity for a group of individuals.

A study of the characteristics of public facilities and services<sup>I</sup> will provide us with the means to evaluate the most relevant physical attributes of these public goods. In relating the attributes of public goods to particular attitudes that individuals develop toward them, we will have identified the most significant impacts of public services and understood their relationships to conflicts over provision of services.

This approach, drawn from a behavioral framework, is relatively new to planning theory and attempts to bring a new dimension to public goods analysis and conflict resolution.

The traditional discussions regarding the provision of public goods have been mostly concerned with legitimization of public goods and location-allocation problems. Although these approaches deserve attention in certain planning contexts, they invariably ignore the impact dimension of public goods and their distributive consequences. We assert that impacts of public goods ought to be better understood in order to distribute more equally urban amenities.

#### I.A.I Impacts of Public Services

Many public services impose various kinds of externalities upon the residents of the area where they are located. An external effect is said to result if the allocation of resources of one agent affects the utility of another. For example, an urban expressway may be seen as a positive externality for a region as a whole but be perceived as a negative externality by those who live near it. In any locational conflicts, the externality issues may involve different dimensions including jurisdictional and administrative spillover effects, locational impacts and compensation issues. Some of these issues have been

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I. In this paper, the terms 'facilities' and 'services' will be used interchangeably. Facilities and services will refer to the entity composed of a facility (as a physical structure) and the services provided therein.

discussed in the literature on provision of public goods. For our purposes, however, two important types of impacts (external effects) are distinguished: direct and indirect impacts. Direct impacts are felt only by those people who directly utilize a public service, that is the user population. They are therefore consumption-related effects.

Public services may also produce indirect impacts which represent the side-effects of public activities. They are generally associated with the characteristics or attributes of a facility's output and particularly affect non-users. These impacts can take a variety of forms. Some examples are air pollution (from say a sewage plant), and property value increase from public park provision. The demarcation between direct and indirect impacts is not so clearly determined in reality. It is important to recognize that both users and non-users may be influenced by a service's indirect effects. An indirect impact for the consumer of public housing may be, for example, the stigma attached to residing in these public facilities. The incidence of direct and indirect impacts may thus significantly affect a program's utilization by users, and attitudes of users and non-users toward the service.

#### I.A.2 Conflict

Given that externalities are imposed upon users and non-users of public goods, they are likely to generate conflicts in relation to provision and location of these goods. On one hand, conflicts generated through the consumption process are generally internalized by the agency or organization providing the services. Users as a group rarely are seen to enter in direct conflict with the provider of the service they consume. The conflict remains usually at an individual level and is resolved through 'voicing' mechanisms. On the other hand, locational conflicts evolving from the presence of externalities on non-users of public goods appear to be related to environmental

quality issues and to the satisfaction which residents experience in different environments of the city. A high quality environment results from a net balance of positive externalities and is reflected in an increase in property values. Property value issues appear to be among the most important tangible elements in residents' opposition to the location of certain public facilities (Dear, 1975a, Crawford and Wolpert 1974, and Gingell and al 1975). Intangible elements of a more 'psychological' nature, such as fear for personal security, are involved in residents' attitudes toward so-called "noxious" facilities.

The actual role and importance of tangible and intangible objections to public facilities are still unclear as conflict generators. It has been observed that as a conflict matures, tangible objections frequently replace intangible ones since it is essential for the opposition's arguments to be defensible in public debate (Dear and Fincher, 1975b, p.8). Objections such as "it will attract undesirable people" is likely to be replaced in an overt conflict situation by a more 'objective' argument such as "property value will decline". Clearly, this attitude transference obscures the understanding of the real causes of conflict and of the true impacts of public services.

Despite these analytic limitations, there is enough evidence to show that direct and indirect effects of public services have wide welfare implications on the quality of urban life and ought to be analyzed systematically. This analysis must include direct and indirect impacts both as potential forces in locational conflicts and, as sources of attitude formation toward public facilities.

### I.A.3 The Concept of Utility

Since the externalities generated by public services affect the social and economic welfare of the population, they may be considered as utility-producers.

The use of the notion of utility in a psychological con-

text was first introduced by Bentham in 1931. The utility concept was then related to legislation and policy making with respect to the definition of social values. More specific meanings of utility have been introduced in which it refers to satisfaction and pleasure, and possesses a psychological connotation. Economists gradually stripped its psychological meaning, culminating in the work of Slutsky (1951) and von Neumann-Morgenstern (1944) in which utility became "an unobservable magnitude that was theoretically useful to postulate as a foundation for a consistent, positive choice theory" (Simon, 1974, p.64). In this theory, the utility value, or rather the marginal utility of a commodity, is defined as the largest amount of money the consumer is willing to give up for another unit of a product (Baumol, 1969, p.180). For two major reasons this definition is not applicable to the utility of public services. First, public services may benefit not only the consumer of the good but also the non-consumer. Second, the positive and negative impacts of public services cannot generally be given a monetary value that would express their socio-economic values to the residents. Monetary values can be assigned to public goods which have their equivalent on the private market; however, most public services do not have private counterparts. This approach also ignores the utility that 'non-users' may derive from the presence and location of public services.

For these reasons, we have adopted Bentham's psychological definition of the term in which utility, satisfaction, urban amenities and environmental quality are used as synonyms.

Users and non-users of public services are thus conceptualized as individuals seeking to maximize their utility, within the administrative and institutional constraints in which these public services are provided. The utility of users and non-users is a function of direct and indirect impacts of public services. The thrust of this paper is therefore to define the various dimensions of impacts of these services as they bring

satisfaction and welfare to urban residents and as they generate locational conflicts over the provision of public goods. Users and non-users' attitudes are therefore investigated in relation to the utility of public services as perceived by different individuals and groups, and as determined by a set of related environmental, economic and social conditions.

### I.B Research Objectives

This paper explores the relationship between public facility attributes and user/non-user attitudes. Theoretical and empirical evidence is examined in order to develop a methodology for specifying user and non-user utility with respect to the public services. This will allow a more precise understanding of the sources of conflict over provision and location of public services, and, hopefully, suggest a firmer normative foundation for planning studies.

More specifically, four research tasks are undertaken in this paper:

#### (1) Analytic Approaches to Public Facilities

First, we study the framework in which the problem of provision of Public Goods has been formally treated. Issues of origin, legitimization and classification of public goods are examined.

Second, the analytical approaches in which the provision, location and conflict dimensions of public goods have been analyzed, are presented.

#### (2) Potential Characteristics from Attitude Studies

This analysis focuses primarily on the range of potential characteristics (or attributes) of public services and of individuals experiencing them. We suggest that these attributes determine the conditions in which positive and negative attitudes are developed by users and non-users of these services. Utility implications are derived.

### (3) Measurement

The measurement objectives are achieved in three steps. First, we systematize the theoretical information gathered in the previous sections and formalize the relationships of users and non-users with public facilities and their utility implications.

Second, we examine the different research design which have been used to analyze these relationships. Our investigation yields a methodology which derives attitude scores from attributes of public facilities and services and which translates these scores in utility measures.

Third, we propose an hypothetical survey instrument designed to measure users and non-users attitudes toward public facilities and discuss variations in methodological tools.

### (4) Evaluation

Finally, we summarize and review critically the results of the first three tasks.

In the following text, one chapter is devoted to each of these topics.

## CHAPTER 2

### ANALYTIC APPROACHES TO PUBLIC FACILITIES

#### 2.A. The Provision Issue

The provision of public goods originates in the fundamental need for collective action to replace or to supplement the private market mechanism. The public and private sectors differ profoundly on three points related to planning and production of goods. First, whereas competition and pricing mechanisms constitute strong factors of functioning and adjustment in private economy, the public sector lacks these important indicators and is left to rely on indirect market signals such as the voting mechanism. While market indices are generally represented in dollar terms, non-market indicators are generally of a non-monetary nature. The lack of a common yardstick for comparison between say, costs and benefits of certain policies, represents a serious handicap to analysis and decision-making in public sectors of the economy.

The second element of differentiation between the private and public sectors originates from the nature of decision-making. Location and patterns of activities in the former are the products of many decentralized decision units. Location and scale in the latter, are determined by a public or semi-public process based upon a distinct political mechanism, providing a unique social dimension to it. In other words, a good is public when the mechanism for providing it invokes the intervention of the state. Following Steiner (1970,p.25) we will therefore define the public good as "any publicly induced or provided collective good". This definition clearly implies that the politi-

cal process is the ultimate mechanism which finalizes the decisions concerning the provision of public goods and services. By the very nature of political decision-making, which is based on bargaining, coalitions, transmission of information and turn-over of political leaders, we may expect the process of providing collective goods and services to generate conflicts involving social choices and values.

The third distinctive feature of the two sectors of the public economy follows from the previous observations. Public decisions focus on welfare criteria and distributive consequences, private decisions emphasize the role of individual choice, taste, utility or profit maximization. (Teitz 1971, p.35)

This last distinction is obviously the most important, since it emphasizes the redistributive role of public intervention in society. In summary, not only will objectives of public activity differ from private enterprise, but also their respective means of providing, implementing and regulating the supply of goods and services to the consumers.

## 2.B. Origin of Public Goods

Three sources of public goods are generally recognized. (Steiner 1970).

First, they derive from externalities that are not effectively internalized or marketed by the private sector, thus producing external economies or diseconomies not included in the price of outputs sold. Examples of such externalities are pollution and discharges of various noxious wastes.

Second, public goods can originate from imperfections of the private market. An efficient market mechanism supposes adequate information, sufficient competition, timely adjustments, and modest transaction costs. Their absence or their low achievement can lead the public sector to replace market determination by non-market provision. Time lags, for instance, characterizing a shift of resource in the private sector can be reduced

by public action on retraining programs, and incentives to increase the mobility of workers.

Third, public goods can also arise because of a social concern about quality of the environment. Society may choose to supplant the market solutions on redistributational grounds, on quantity and quality of goods produced, or more generally on the patterns of consumption that markets create. Public housing is an example of public intervention for distributive purposes, as well as for improvement in the housing conditions of a certain portion of the population.

Haveman and Margolis (1970, p.1-18) emphasize that studies of private enterprise since the end of the 1950s, have shown its failure to provide all necessary outputs to society. On account of such "market failure", they point out the need to develop economic criteria for evaluating public expenditures, and permitting policy analysis. They suggest, for example, the use of a "maximum net benefits criterion" which would place different equity weights on dollars of benefits and costs. Public expenditure decisions would then generate an equitable allocation of resources. It may be argued, however, that while it may be desirable to place equity weights on costs and benefits accrued to individuals and communities, their feasibility and accuracy (with respect to the measurement procedures used to derive them) cast doubt on their actual usefulness for decision-making.

For Harvey (1973, chap.2), coherent social objectives involving ethical standards and social preferences must similarly be found. He strongly emphasizes the need for a generally accepted and comprehensive social welfare function against which policy decisions and results can be assessed. In the case of location of public facilities, this involves finding a locational pattern which is most efficient subject to a set of distributational constraints. Harvey and others recognize, however, that no adequate location criteria have yet been developed by location theorists or public finance administrators to deal with the dis-

tributive consequences of public sector location (Harvey 1973, p.89; Teitz 1971,p.56;and Davidoff and Reiner, 1962). In fact, society has not yet derived a workable and realistic social welfare function which can account for the locational and allocational impacts of political decisions. The definition of such a function obviously involves social judgements and choices. More importantly, it requires ways and techniques to measure and account for impacts of planning decisions. This goal is far from being achieved. The literature on public goods is marked by a paucity of essays and studies dealing with the consequences of political and locational decisions, aside from costs-benefits and similar techniques of analysis, while on the decision process itself, they abound.

## 2.C. Classification of public goods

Traditionally, public goods have been defined by the existence of "joint supply" and "non-excludability" characterizing the so-called "pure public good". (Margolis 1968; Head 1973) The joint supply characteristic suggests that once the good is provided to one person an equal quantity can be made available at the same quality for others and without extra cost. Non-excludability, on the other hand, states that if a good is provided to one person, any other person wishing to consume it cannot be excluded from its consumption. There are few examples in the real world of pure public goods, and they are most often area-wide facilities and services such as air pollution control and national defense.

It can be seen that the joint supply characteristic can be extended more generally in two specific dimensions. (Head1973) First, it can be shown that benefits from any localized service tend to diminish with distance to the input point. In effect, benefits from fire services, hospitals or recreational facilities, taper off according to the location of the facility with respect to the location of the consumer.

The second dimension suggests that in most of the cases,

the same standards of services can only be supplied up to a certain point beyond which congestion and deterioration of services will occur. More realistically therefore, we may assume no rigid geographical limit to the extension of benefits, but suppose instead that extra costs are necessarily involved if we want to extend a uniform level of service to additional consumers. Jurisdictional spillovers and organizational problems can be anticipated from such a system (Head 1973). Locational impacts therefore determine 'the externality field' of the good or services. Location and congestion factors induce impurities, so technically, most pure goods are impure. There are very few 'pure' public goods.

Impure public goods may thus be regarded as including those facilities or services which are freely but not equally available, in terms of quantity and quality, to all individuals in the urban system. (Harvey 1973, p.90)

When a collective good does not provide joint benefits to the society as a whole but is directed toward some subgroup through some recognition of need, it may be classified as a merit good (Margolis 1968 p.541).

Another class of goods, necessity goods, may be distinguished from merit goods in that they involve stated redistributive objectives. They assure a redistribution of income in kind rather than in money (Tiebout and Houston 1962).

Weisbrod (1964) suggests another kind of impure goods as a source of public intervention: the "option demand". These are the goods that a citizen might not have actually used and might never use in his life but he still requires that they be available to him, should he desire to use them. National parks and public transit systems can be classified in this category.

Because of the 'impurity' character of most public goods, benefits from their provision generally accrue to certain segments of the population. Costs are supported, however, by the population as a whole through public funding. Since the distribution of externalities is variable among the population, the provision of

public goods has been legitimized on political grounds in three principal ways: the points of view of individual utility, willingness to pay, and aggregate social welfare function.

Public goods have been "legitimized" from the point of view of "individual utility". Those who hold this view define public interest as an aggregate of the private interests of individuals in society. This approach draws an important distinction between individual wants, defined as his tastes and preferences, and his effective demand, defined by his utility function and the constraints that bind him, for instance his income. While the basic assumptions of these approaches state that collective action is required to satisfy individual demands, it must be pointed out that it does not answer the question of which public goods society should provide, and how individual preferences should be aggregated to determine if the social welfare achieved justify the cost of providing.

Public goods have been also legitimized from the point of view of the "willingness to pay" of citizens. This position establishes a shift from the unmeasurable utility to the inter-individually-comparable willingness to pay, or from a given preference for a particular good to the willingness to tolerate it and to pay for it through tax policies (Steiner, 1970 p.37). The major criticism of this approach is that it tends to reflect the status-quo in terms of the distribution of wealth in society.

A last source of legitimization is the point of view of "an aggregate social welfare function". This approach does not deny individual preferences, but assumes that citizens voluntarily yield some power of decision and implementation of social goals and values on the basis of a legitimized 'social contract'.

Assuming that everyone agrees on the necessity of aggregate social values, there remains two important questions to answer: first, how these social values are and should be articulated and second, how contending objectives are and should be reconciled. To date, political answers have been given to these problems. One of them views the political process as a mar-

ket-like mechanism implementing and facilitating urban and social activities but not reforming them.

A second one asserts that social views are so conflicting that the political process has to decide upon a public interest even discretionarily.

Contending objectives are reconciled in the political process by the application of subjective weighting schemes.

Clearly, the way the two issues of articulation and aggregation of social values have been treated in public goods literature demonstrate the lack of disposition of economists and political scientists to seek empirical answers to these problems. Two factors may explain this attitude: the subjective or 'psychological' nature of social values is one; the lack of analytical and methodological framework for their examination is a second. It is suggested that since values and preferences are fundamentally "subjective", solutions to problems of articulation and aggregation will be found in the development of realistic schemes for analyzing psychological information.

## 2.D. Current Analytic Approaches to Policy-making and Location of Public Services

We have now examined the fundamental differences between private and public goods and seen how the latter are legitimized on political grounds. Let us now analyse the most prominent models and approaches which have dealt with public goods analysis. We will examine these models with regard to their general characteristics and their usefulness in accounting for external effects of public facilities and services.

### 2.D.1. Analysis of Demand and Consumer Choice

The public facility location problem can be related to some collective demand for public goods and services. While the demand function for private goods is still difficult to estimate through observations of amounts purchased and prices paid,

the public sector lacks similar market indicators for establishing demand for public goods. Demand analysis for the private sector is based on individuals' preferences and utility functions to explain market behavior. The body of analysis of demand for public goods has similarly developed in this direction but without much success.

In effect, individual preferences over provision of public goods may be estimated but they are inadequate especially for welfare judgements involving distributional rules. Margolis and others doubt that the individualistic basis of public goods analysis contributes to the positive analysis of public services. (Margolis, 1968). Clearly the consumer approach does not resolve entirely the allocational problem specific to the public sector analysis. A consumer analysis of preferences and attitudes toward public services does, however, provide useful information on the 'perceived' utility of public services for different individuals. Information on the nature and functions of public goods may also indicate the "packageability" potential of different goods and provide internal evidence on the possible trade-offs of preferences. A better evaluation of the impacts produced by public goods could therefore lead to a better framework for making distributional decisions and allocating costs and benefits to various groups of population.

Among the new analytic trends based on an individual utility notion, two dominant approaches can be identified: the "consumer" and "client-groups" approaches to public policy.

The client approach has been developed by planners to evaluate the public services responsiveness to the needs of the users. The analytic framework offers a complement to the widely used planning standards primarily oriented toward the goals of the suppliers (Reiner, Reimer, and Reiner, 1963). Client analysis examines the existing public programs and deduces the various goal positions of sectors of the community from the behavior of people which are affected by these programs and participate in or

reject them. The analysis implicitly recognizes the diversity of aims and values among people, and the differences in expectations, preferences and behavior patterns. Since client analysis considers individual behaviors as measurable social facts, these behaviors can be aggregated by characteristics so that index of preferences and attitudes can be found in the behavior of individuals who use a facility or a service.

A similar approach, the consumer approach to public goods analysis, is to be found in Teitz's theory of public facility location. Teitz formulates a static equilibrium model using as criterion the maximization of consumption of a service. Consumption is a function of scale, presumably including quality and variety of services and the number of centres at which the service is provided implying dispersion and accessibility of supply points.

The work by Teitz(1971) and by Morrill and Earickson (1968) on the variation in the character and use of Chicago area hospitals, particularly suggests that an analytical use of a consumer demand function may be a very valuable means of understanding the way the provision of a service will affect its use. This could be done by identifying the service characteristics which would attract prospective consumers and which would encourage the increased utilization of the service.

The policy use of a consumer demand function has been supplemented for the private sector, by the development of an 'abstract' approach for analyzing goods and consumer responses to them. Instead of focusing on the traditional approach to consumer theory viewing goods as the direct objects of individual utility, the new consumer technology approach developed by Lancaster (1966) emphasizes the properties or characteristics of the good providing the consumer with utility. This approach facilitates the evaluation of various substitution or complementary goods as the basis for their relative attractiveness. "The simplest consumption activity will be characterized by joint output ...and the same characteristic may be included among the joint out-

puts of many consumption activities so that goods which are apparently unrelated in certain of their characteristics may be related in others (Lancaster, 1966 p.133-4).

Miller suggests that alternative designs for public services may be evaluated for their contributions to satisfaction on the basis of their performance on each of several characteristics dimensions. The different responses of various groups of users could be taken as differential weighting of performance with regard to the appropriate characteristics dimensions (Miller, 1974 p.7-8). The positive advantage of the model of consumer behavior developed by Lancaster lies in the association of a substantive analysis of characteristics influencing demand and an analytical treatment of consumption behavior.

The shortcomings of this approach are important with respect to potential applications to the public sector analysis. The major shortcomings originate from the homogeneity assumption that Lancaster imposes on the model to protect the "objective" nature of its structure. This assumption stipulates that the characteristics possessed by a good are the same for all individuals and are existing in the same quantities (given units of measurement) (Lancaster, 1966 p.134) The second part of the assumption seems particularly inappropriate since the characteristics of a same good are likely to be differently weighted by various individuals.

A second drawback of the approach concerns the lack of specification by the author of how characteristics or properties of goods may be revealed. This constitutes an important consideration for a potential application of the model to the public sector given the rather tangible/intangible nature of attributes of public goods.

The merit of the similar 'client' and 'consumer' approaches is undeniable. They have the great interest of bringing together the supplier and the consumer points of view. On one hand, they give the user the opportunity of expressing his satisfaction or

dissatisfaction with a service. On the other hand, they provide the agency supplying the service with the necessary information for adjusting the good to the needs and expectations of its clients. We argue, however, that these approaches do not satisfy all our expectations with respect to an analytical theory of public goods. We suggest that there is another important dimension of the problem that ought to be included in analyses of impacts of public goods. This concerns the non-user dimension of public goods.

#### 2.D.2 The Programming Approach

Probably the most important class of models which deals with locational problems are due to the "programming school" (Dear, 1974b). As Revelle, Marks and Liebman (1970) note, the mathematical programming approach is predominantly concerned with the private sector location models. In these models, the objective of location decision is the minimization of costs or maximization of profit for the private enterprise. This objective is usually expressed as a minimization of the sum of transportation and facility costs.

Recently, some of these models have been extended to the public sector location problem. Conceptual differences between private and public sector analysis are generally recognized but on operational grounds the two sectors are treated similarly. Hall (1973) points out that the distinction between the two is only marginally relevant to the categorization of analysis procedures since the analytical structure of public and private sector location problem are formulated identically, that is as a maximization problem. In effect, both share the objective of maximizing some measure of utility subject to a set of constraints. The substantive translation from one sector to another (e.g from private to public) is generally made by using different surrogate variables. The minimization problem of the public sector involves, as surrogate for utility, the minimization of distance travelled by clients to consume a service (Revelle, Marks, and Liebman, 1970 p.694).

Other surrogate measures include minimization of user costs or maximization of demand (Calvo and Marks, 1973 p.411), the maximization of racial integration, and the maximization of equity in the system. Even if some efforts are made toward better measurements of equity and demand, these surrogates encounter difficult problems of specification. (For attempts to quantification of these variables, see Margolis, 1968; Birdsall, 1963; and the Swedish Journal of Economics, 1971).

Despite the potential relevance for the analysis of public goods of these surrogate variables, their analytical value is limited since most optimization techniques are carried out under a single criterion. The variables taken in isolation tend to produce solutions with very narrow welfare implications.

More flexible approaches based on utility theory have been suggested in the framework of optimization models (Calvo and Marks, 1973; and Austin, Smith and Wolpert, 1970). These models offer a multidimensional view of the location problem in explicitly considering the welfare impacts of public facilities. Both the joint interests of users and suppliers are considered. A new dimension "community interest", which is introduced in Austin, Smith and Wolpert's model, is particularly relevant to our concern with measuring impacts of public services. It brings into discussion the point of view of the third party affected by the location process, that is the community which shelters the facility.

Despite an improved approach based on utility theory, the programming models are still constrained by their analytic framework. The obvious limitations of these models concern the computational difficulties of determining the optimal solution of a given problem. Even in the absence of data problems, this might well become a very complex and expensive task.

2.D.3 The Political Models of Provision of Public Goods  
Steiner's analysis of the current political approaches defines two important categories of models: the market-type analysis of

the political process, and government as "chooser of ends". In the first approach, voting is the means by which individual preferences can be communicated to the political decision body."If we assume that the tax burden of any public expenditures on each individual is known to him, and if we assume that everyone votes under simple majority rules, we can predict the outcomes of elections"(Steiner, 1970 p.46).

Downs suggests a broader model arguing that the major goal of politicians is to be reelected; the government will only be interested in maximizing its political support. The model essentially describes how a rational government behaves in a democratic state (Downs, 1957). It differs from the usual general equilibrium approach since it contains uncertainty. Many of the problems created by uncertainty relate to the cost of obtaining information. Thus, this model could be described as a study of political rationality from an economic point of view. As Downs describes it:" our model attempts to forge a positive relationship between individual and social end structures by means of a political device. Because each adult citizen has one vote, his welfare preferences are weighted in the eyes of the government, which is interested only in his vote, not in his welfare" (Downs, 1957 p.18).

Many weaknesses can be found in these kinds of models, notably that the political process is construed as a majority rule or the rule of a powerful minority; therefore, drawing welfare implications from the outcome of elections is most likely to be very misleading. A second important failure of the approach is that it is far too general to permit any meaningful understanding of specific implications of public expenditures, such as trade-offs between different alternatives. One notable model of this kind deserves special notice. Tiebout's model of "voting with the feet" finds its originality in that it emphasized the role of consumer mobility among jurisdictions as a voting mechanism, and the competitive nature of governments in the provision of public services. The model is supposedly used to demonstrate the

possibility of efficient public goods provision when consumers are mobile and local governments adaptive. In these conditions we should expect "near efficiency" and "observable regularities within communities".

If we take a closer look at the general assumptions of the model we notice that they relate to two general categories: first, the problem setting which, for instance, assumes the household has full knowledge of community alternatives in revenue and expenditure patterns; secondly, it incorporates assumptions which describe the equilibrium mechanics of the system including the assertion that consumers are fully mobile.

On the major issue of the model, Margolis (1968) comments that public goods will not be optimally supplied as a result of the competitive process of communities, since there are no political mechanisms to produce the optimal set of packages to be made available by the communities to the itinerant households. It can also be mentioned that nothing in the model deals with intrinsically spatial considerations, notably the externalities created by public goods or the jurisdictional spillovers. From the consumer point of view, we can thus conclude that a system of provision of public goods built on pure competition among jurisdictions will primarily benefit households with large consumer surplus, the ones which will be able to subsidize through their taxes the more attractive and expensive facilities. Lower income households will accordingly be excluded from their consumption and constrained to consume lower-quality goods produced in jurisdictions with less expenditure power. This would result in a decline of total welfare of the system since a proportion of communities do not possess the tax resources to support the competition of wealthier communities and produce attractive public goods packages.

Another class of models generally focuses on analysis of process, and strategy of conflict as typified by the literature by Schelling (1960) among others. Rothenberg's model can be cited as an example of this category. "The legislative process is seen

as an n-person, non-zero sum, repeated cooperative game of strategy in which no general solution exists..."(Rothenberg 1970). These approaches seem very useful with respect to the analysis of the political process but as underlined by Steiner (1970), they do not incorporate any measures of inputs into government decisions and thus are limited in their ability to predict decisions.

Since social welfare and distributional questions are the central issues of political analysis, one would expect to see some explicit discussion of locational impacts or distributional effects of public expenditures supported by empirical demonstration. It is evident that in the literature of the field, the analysis of impacts of public expenditures are almost non-existent. None of the problems which have been emphasized in planning conflicts or in daily urban experience have received the attention of political analysts. However, if decision-making and political analysis are to make sense and influence the development and distribution of resources in the city, the conceptual framework of political analysis must be substantially enlarged to include analysis of impacts and preferences. A step in this direction has been taken through a newly-developed framework of analysis described as the behavioral approach.

#### 2.D.4 The Behavioral Approach

The behavioral approach in geography has by now acquired full recognition in the field. It has been described by King (1969 p78) as "an attempt to arrive at a set of empirically valid statements about individual, group, or mass behavior which can form the postulates in a theory yielding statements of spatial structure as logical outputs". Using the behavioral approach, the first research alternative is to analyze the spatial structure of the city in terms of elements in the environment relative to the individual whose behavior is being studied. In other words, we may explain changes in urban structure with respect to changes

in spatial preferences and behaviors.

The second alternative is to regard the spatial structure as a basis from which to evaluate the impacts of externally-induced changes in the spatial structure on the spatial behavior of individuals. This is the approach that is developed in this paper.

By examining the empirical evidence available in this new research area, we observe that the behavioral approach has originally but indirectly treated externalities and impacts of public goods through a conflict situation. Effects of location are contained, for example, in the Land Use Change Model designed by Wolpert, Mumphrey, and Seley (1972). The model calculates different utility measures for individual, community and municipal government. These scores are computed on the basis of the perceived effects of land use changes relative to maximum profitability and utility values of land. Various attributes can be found to account for neighborhood changes in this context. A probability of opposition is subsequently calculated for the community and government with regard to individual action on land uses.

Another interesting model, designed by Austin, Smith and Wolpert (1970) includes external effects of public facilities as generator of conflict over location. In this model, each facility is defined as a set of characteristics producing positive and negative impacts. The information is then used to compute a probability of community opposition to the facility(ies) and the effects of such an opposition on implementation costs.

The two schemes of analysis described above, provide the framework for our analysis. Because of the inclusion of behavioral variables in their original formulation, they bring more insights on the problems of locating public facilities and demonstrate that it is both possible and meaningful to account for indirect impacts of public services. This analytic treatment of provision and location of public facilities and services has inspired the work presented in the subsequent chapters of this paper.

CHAPTER 3  
POTENTIAL CHARACTERISTICS FROM ATTITUDE STUDIES

3.A Space Perception Studies

The major achievement of behavioral studies has been to consider man as an intervening variable in analysis of spatial behavior. The "black box" concept of man has been demystified in order to account for the various irregularities in this behavior. Formal theories were incapable of accounting for anything other than the most simple deviations of actual behavior patterns from the predicted and expected ones. Marble's investigation (1959) of distance travelled for shopping and trip frequency has clearly demonstrated this point. According to theory, given the particular location of an individual relative to retail facilities and the spatial distribution of these activities, the individual's travel behavior to the facilities is expected to display predictable regularities. Contrary to expectations it is found that the actual behavior patterns are accounted for by the socio-economic characteristics of individuals, producing inequalities in their evaluation of shopping centers, quality of goods etc. A behavioral approach throwing more emphasis on underlying processes rather than of the spatial patterns that behavior produces is more appropriate.

The behavioral revolution in geography in combination with the use of quantitative methods has primarily resulted in the integration of socio-psychological variables as intervening or explanatory variables. Probably the most original development of this trend resides in the introduction of space perception. Since perception studies concentrate on the cognitive understanding that man has of his environment and on the way in which this knowledge is organized, these studies clearly have some relevance to the investigation of attitudes toward public facilities.

Downs suggests three major approaches to the analysis of geographic space perception. First, the structural approach has been concerned with the identity and structure of space. One of the basic themes in studies in mental and cognitive organization of space is that man must be able to orient himself in order to implement decisions as behavior. The numerous investigations conducted under this structural approach have produced disjointed results and have lacked adequate synthesis. Many findings are worth mentioning, however. Lynch, for example, was one of the first to explore this area of research and was concerned with orientation. He suggests that space is generally perceived as "bitty and discontinuous" (Lynch 1960). Appleyard and others (1967) studied the design of urban road-scapes in terms of their perceptions by urban residents, while Steinitz (1967) looked at the relationship between nature of the environment and its meaning for various population subgroups. His interesting results have demonstrated the congruence between form and activities. Regularities in these relationships have a major influence on the amounts and kinds of meaning that the environment transmits and which people perceive. In a more locational perspective, Heinemeyer's work (1967) in the core area of Amsterdam suggested the idea that the mental organization of space depends on the relative location of the individual. Consequently, since the image is the basis of behavior patterns, the distance and proximity variables are reintroduced in spatial analysis with a psychological connotation. Similarly, Lucas (1964) demonstrated that the spatial extent of an image depends upon the intended behavior pattern of the individual. Finally, Lee (1964) who was concerned with the neighborhood planning concept and its cognitive correlate, showed the existence of an organized socio-spatial "whole" which is brought about by a process of psychological differentiation. At a first sight, his findings contradict Lynch's suggestion that space is discontinuous. The differences in results might, however, be explained by the fact that the investigations have been carried out at two distinct spatial scales: one at the city scale, and the other at the neighbor-

hood scale.

The second approach to spatial perception has been defined by Downs (1970) as the evaluative approach. It is concerned with evaluation of the environment according to the spatial images it invokes, and seeks to relate this evaluation to decision-making and therefore to behavior. An implicit assumption of this approach is that the perceived world is one of the most important elements which individuals use in making a decision and performing a behavior. Investigation of the factors which people consider important about their environment, and how they are employed in decision-making activities reduces to discovering the salient attributes of the environment for an individual and the particular weights that he attributes to them in implementing behavioral decisions. Downs (1970 p.80) suggests that the image can be usefully interpreted in terms of decision theory as " the utility of various environmental states and the probability of their occurrence ". (See for example, Whyte, 1964, Burton and Kates 1968, and Saarinen 1966 on hazards perception).

The third type of study that has been undertaken has been summarized under the heading of preference approach (Downs 1970). This work has emphasized the preference relationship of an individual for any given environmental stimuli. That is, given a set of spatially differentiated objects, how do people assess these on a preference scale in relation to some specified behavior objective. Gould (1966-67) and Whyte (1967) have particularly contributed to the development of this approach in measuring preferences of individuals for areas in the United States and other countries. In addition Wolpert (1965) used the concept of preference in his studies of migration.

We could not, however, conclude this summary of perception studies without noticing some of their limitations and future prospects as a guide to the investigations of attitudes toward public facilities. As any new advance in research the first steps are hesitant and diffuse. The current state of research in

geographic space perception does not contradict the rule. In fact, until recently, no attempt has been made to systematically conceptualize the problems that were being examined; neither were the hypotheses clearly stated before investigation. The approach was merely inductive.

Another limitation of this work can be found in the lack of explicit correspondence between concepts used in geographic space perception and psychological research. In earlier work, very few efforts were made to relate the geographic concepts to their equivalents in psychology. Even if the behavioral approach in geography begins to borrow theories and methods from psychology, there is still some unnecessary divergence at the conceptual level. We can use the theoretical framework conceptualized by Downs to illustrate this point. Downs' schema contains various notions which can be compared to some psychological concepts, notably beliefs, intentions and attitudes. Attitudes, for instance, are only vaguely alluded to in an implicit discussion of the relation between attitude theory and his schema but they are never clearly compared (Downs, 1970 p.89-90). This situation extends even further the already large list of redundant psychological concepts, and obscures unnecessarily the understanding of man's behavior. An attempt to remedy this situation would certainly facilitate progress in research.

There are, however, many positive reasons for looking at space perception studies with respect to the problem of understanding attitudes toward public facilities. These interests come from two fronts: first, despite different semantics, there are very close conceptual similarities between 'attitude' and 'perception' as used by psychologists and geographers respectively. Second, in perception studies, these concepts are studied in relation to locational and distance variables. A similar relationship attitude-distance arises in the investigation of attitudes toward public facilities.

With respect to the similarities between attitude and

perception it can be seen that the notion of attitude which is the key concept of this study can be usefully compared with that of an image (improperly termed perception by geographers), since both are thought to be largely determined by the individual's value or belief system. (Downs and Stea, 1973; Fishbein and Ajzen, 1975). For example, Kates (1962, 1967) investigated mental images in measuring belief systems. On the basis of the responses, he was able to infer why people choose to locate in potentially hazardous areas, and what patterns of attitudes they develop. In looking similarly at many spatial behaviors, it became increasingly evident that behavior is largely dependent upon an attitude, or a set of attitudes, which in turn originate from the individual's value system.

These concepts seem therefore particularly useful for understanding the reaction of residents toward the location of public facilities and services.

### 3.B Attitude Theory

It must be emphasized that there exist many working definitions of attitudes. Fishbein and Ajzen (1975 p. 1-10) show that the definition of attitude as a "disposition to respond in a consistently favorable or unfavorable manner with respect to a given object" can be interpreted in many ways. The lack of convergence in definition and interpretation reduces the potential comparability of empirical results and their cross-validation among investigators. In the following section, we will therefore attempt to describe the alternative definitions of the concept.

The concept of attitude can be theoretically investigated from many viewpoints regarding source, development, functions or attitude change. We will focus on some of these notions in the following.

### The Nature of Attitude

Three major features are generally recognized as characterizing attitudes. These are first, that an attitude is a state of readiness (or a disposition) which leads an individual to perceive objects and people around him in certain ways, and to make certain interpretations and categorizations rather than others. Second, it assumes that attitudes are learned and that they develop through experience. Third, it implies that attitudes have motivational qualities and can lead a person to seek (or avoid) the objects about which they are organized. These generally accepted implications of the concept of attitudes have been followed in many attempts at systematization.

Many social psychologists have attempted to define the various psychological components involved in studies of attitudes, especially the distinctions between beliefs and attitudes. The traditional approach has generally attributed the cognitive aspects or the central values of life to beliefs, whereas the affective and motivational aspects (likes and dislikes) fall in the realm of attitudes. According to Katz (1960 p.163-204) and others, attitude includes both the affective or feeling component of liking and disliking, and the cognitive or belief component. Perhaps the clearest accounts of the nature and components of attitude is given by Krech, Crutchfield and Ballachez in 'The Individual in Society' (1962). They define attitude as "an enduring system of positive or negative evaluation, emotional feelings and pro and con action tendency with respect to a social object" (see p.137-179).

They stipulate three main components of attitude that Rosenberg and Hovland (1960) have usefully summarized. These are the cognitive component which includes the individual's beliefs or values in life; the affective or feeling component which corresponds to liking or disliking of an object; and the action tendency component which defines the readiness to behave in a certain way with respect to a certain attitude.

Two analytical approaches are usually used to translate these concepts into operational schemes. One emphasizes the explanatory or structural value of attitude whereas the other focuses on its predictive value. Specifically, the structural approach (which is taken in this study) deals with the cognitive and affective components, whereas the predictive approach focuses on the relationships between affect (or attitude), intentions and overt behavior. Evidently, individual's attitudes are best analyzed and predicted in relation to a simultaneous examination of the three components.

We may further suggest that attitudes will influence an individual's social actions differently according to three primary factors which relate to

1. to the three attitudinal components: affect, cognition, and behavioral intentions.
2. the nature of the particular attitude system used in a specific situation.
3. the nature of the over-all attitudinal pattern of the individual (Halloran, 1970 p.23).

The complexity of the components, the consistency, cluster tendency or interconnectedness of the attitudinal pattern will determine the impact and intensity of attitudes. Accordingly, much more emphasis must be given to the full social context and, to all those social and environmental factors which give rise to particular attitudes.

#### The Formation of Attitude

A better understanding of the concept of attitude might be achieved by examining the process from which an attitude originates. Halloran (1970) has suggested three main sources of attitude which are drawn from a social-psychological orientation. An attitude may originate either from a direct experience with the objects and situations, either from implicit or explicit learning from others, or from personality development. Whatever

the direct or indirect nature of the experiential situation, the individual is seen to internalize the controlling elements of his social, cultural and spatial environment in the form of attitudes, beliefs and values. The stable attitudes that an individual develops over time may be seen closely related to the socialization process beginning in childhood. This socialization process mainly involves the learning of attitudes and values from other individuals in society through identification, imitation or coercion. Because society is not very integrated and is relatively differentiated, it has also proved useful to use the concept of reference groups to explain attitude formation. (Sherif, 1957 p.260). The significance of factors such as primary group relationships, pressures from the group to conform, common experiences and common exposures to information, and the tendency to look for the like-minded, are necessary in order to understand how certain attitudes prevail in certain groups of individuals. We must also recognize that the individual will not only identify with membership groups but also with any external groups with which he might relate in terms of aspirations, future goals, status and prestige.

#### The Functions of Attitudes

The functional approach deals with the motivational base and the conditions of change of attitudes. The major functions that attitudes perform for the individual can be classified in four categories (Katz 1960). First, the utilitarian or instrumental function of attitude implies that attitude will develop favorable or unfavorable attitudes in relation to the objects or persons which they associate with satisfaction and dissatisfaction, approval and disapproval.

A second function that attitude perform for the individual is called the Ego-Defensive function. It describes a person's attempt to protect himself or herself from acknowledging both the unacceptable truths about himself and certain harsh realities in the external world. Since the individual's ego-defensive

attitude originates from internal conflict and insecurity, the objects and situations to which they are attached mainly serve as convenient outlets for their expression.

Some other attitudes may have a value-expressive function. These attitudes are formed by the individual to express his system of values in given environments or situations. This function may also be derived through identification with a reference group. With respect to the social norms in group membership, Herman Turk (1965) has suggested that internalized norms are most often looked at in relation to their social function in self-control, but they might more justly contribute to social order by their function for the control of others.

Finally, the knowledge function relates to an individual's attempts to give meaning to his world in the seeking out of certainty, consistency and stability. As he needs standards and frames of reference, the acquisition of knowledge will often take the form of taking easy, suitable stereotypes.

### 3.C Relevance of Attitude Theory to the Study of Public Facilities

The preceding section has presented a formal view of attitude. When one attempts to relate these notions to public facilities, they might not seem as relevant to the measurement of attitude toward public facilities as they might appear for the measurement of social attitudes. This is because the concept of attitude has been most widely used in relation to the measurement of attitude toward 'people' (for instance ethnic group), or attitude toward social realities such as crime and divorce. With the exception of market research, we may say that all the literature on attitude measurement is oriented toward the problems and concepts related to these particular issues. For our purposes we may have to define the characteristics and properties of public facilities in other terms. But the conceptual approach will be similar.

In fact, every facility possesses a set of attributes or characteristics which make it more or less desirable and more or less functional and satisfying. Because these attributes are 'perceived', elements from the individual's physical, social and psychological environments are likely to be reflected in their evaluation. The attitude concept as described in psychology seems to offer important potential for understanding the processes involved in attitude formation toward public facilities. It also appears useful in describing the differences in perception and evaluation of public facilities within and between groups of users and non-users.

Another variable which is, however, completely alien to the psychological field may play a significant role in the attitudes endorsed by individuals toward public facilities. This variable may not so much influence the formation of attitude, as it may affect the intensity with which an attitude is held. This is the locational variable. It is suggested that the spatial relationship between the individual ( particularly for the non-user) and the object (a public facility ) is a major element in the formation of attitude toward that facility. Accordingly, it may be assumed that the relative location of the individual with respect to the facility will contribute to the creation of a gradient of perception which will be proportional to the distance between the individual and the facility. Theoretically, we would therefore expect the intensity with which an attitude is held to be related to spatial relationships. Accessibility and proximity are thus likely to be important perceptual factors for users and non-users of the facilities.

We may therefore suggest these three elements which would be relevant to our analysis: attributes of the service, client characteristics or socio-psychological variables, and locational or spatial interactions.

### 3.D Impact Analysis

The central distinction that has been chosen between 'users' and 'non-users' of public facilities is not accidental. It finds its justification in the nature of the definition of public facilities. In the first chapter, we observed that very few services are in fact 'pure' public services in terms of providing equal availability, quality, and quantity of a good to all individuals. Besides the variation in the factor-need, the distance element generally makes the service more accessible to certain users rather than others. That is to say that even if certain facilities might be theoretically defined as universal, in fact, they are particular or 'impure' largely because of the factor location. The fact that public facilities clearly distinguish between users and non-users also determine clearly differentiated modes of interaction with the facilities. Since the user takes advantage of the direct utility that is involved in consuming a service, his utility with respect to the public service is derived from more direct sources. The user's utility cannot, however, be solely described by the satisfaction derived from consumption since other factors are likely to create particular conditions for the consumption activity. These factors may be defined as the externalities that are accompanying this consumption process. They may be related to service, client, or accessibility characteristics. Accessibility can be described as the cost of overcoming distance, of using time, and the like to obtain resources and welfare services (Harvey, 1973 p.57)

Since the non-user cannot profit from the direct benefits of consumption, besides the psychic benefits (Margolis, 1968) derived from sharing the utility of users, his utility with a public service is most likely to be different from that of a user. We suggest that the utility of the non-user is the result of a complex cognitive process involving the evaluation of the indirect impacts of public services. These impacts are also thought to be related to service and client characteristics. Spatially,

the impacts are related to proximity rather than accessibility factors. By proximity, we mean the effects of being close to something people do not make any direct use of (Harvey, 1973 p.57).

In attempting to define the particular utility functions that best describe the user and non-user's attitude toward public facilities, two alternative approaches may be suggested.

In the first approach, two different utility functions, derived from different psychological factors, may exist: one for the user and one for the non-user. This would imply that the utility and therefore the attitudes taken by both groups of users and non-users arise from two different cognitive structures, and therefore from two different sets of attributes of evaluation of public facilities.

In the second approach, the two groups have a similar utility function where the same factors of evaluation are weighted differently. This would suggest that users and non-users display similar attitudes which originate from corresponding cognitive structures and corresponding sets of attributes of evaluation.

Empirical evidence to date has supported the first approach. With respect to the form and content of their respective utility functions, only the first case will be systematically considered since the second is merely a composite of the first.

Before the public facilities can be related to the attitudes that we assume taken by users and non-users, it is useful to describe them in terms of their objective characteristics.

### The Factors Related To The Services

#### Service Characteristics

The service characteristics primarily relate to the functional role of the facility. In this respect, the facilities can be distinguished by type and scale. In relation to

type, it will suffice to consider one major differentiation which has been suggested by Dear (1974b). This fundamental distinction may be established between the 'immobile' facility where consumption takes place in the facility itself, from the 'mobile' facility where services are taken to the consumer. The first category includes such facilities as a public high school, a library, and a park; the second, fire, ambulance and police services.

In the present context, the development of a more detailed typology of public facilities is not necessary. Only these two types will be retained as major distinctions between the facilities. These are 'Service' (immobile) and 'Dispatch' (mobile) types.

Scale constitutes a second element which structurally characterizes the facilities. There exist many ways to define this 'physical' dimension of a facility. A simple distinction which satisfies all descriptions along the spectrum of large-scale to small-scale is not easily derived, however. The most common approach uses surrogate-variables which can be expressed in absolute or relative terms. Examples are the number of users in a certain unit of time, the number of services offered by a facility in proportion to another of the same type and function, or the number of employees of a facility.

From a user point of view, these variables may have a certain significance in terms of indicators of service range (opportunities) and service quality. The association of a measure of service with a measure of utilization (for instance the number of users relative to the number of services offered) may constitute an even more accurate view of reality as the user may perceive it. It combines a measure of opportunity with a measure of service quality. For example, opportunity decreases as a waiting list becomes longer.

The elements of scale that influence non-users are more likely to relate to factors that can be considered as secondary

with respect to the service and its function. We may then think that non-users might evaluate the service scale in terms of number of users who drive or walk to the facility. Yet, the non-user resident may distinguish between the exogeneous and endogeneous spatial origin of the users of a facility. The surrogate in this case might be the proportion of users from the neighborhood relative to the proportion of users from outside.

Type and Scale, as can be seen, may then have an influence on individual's perception and evaluation of any public facilities. Other contextual factors of a physical nature may also influence this evaluation.

#### Spatial characteristics

Every facility possesses spatial characteristics which can be defined objectively, such as accessibility and proximity.

From the point of view of the service, maximizing accessibility implies a careful analysis of demand and market potential.

From the user standpoint, however, it means the distance (absolute or relative) that the user will be willing to travel to consume the service. The measure of accessibility thus relates to the utility of the service for the user at various distance gradients. The ambiguity of this question can, however, easily be seen. The measure of accessibility used by one user is likely to be quite different from that used by another user. Besides indicating a measurable spatial demarcation (in physical distance or travel time), it usually reflects certain psychological trade-offs corresponding to the needs and abilities of individuals to consume the service. Two simple examples will illustrate this point. Jurisdictional and administrative rules permitting, parents may be willing to drive their children to the next closest school if they are not satisfied with the local public school. An alcoholic may wish to protect his anonymity in seeking treatment in a center located away from his neighborhood.

The amount of accessibility that a user will demand for patronizing a facility might also vary according to his evalua-

tion of the role that the facility perform in the satisfaction of his needs. The need itself may even not exist; if a resident for instance, possesses a large backyard behind his house, he might not feel the need of a park in the neighborhood. He might even be indifferent to its implementation at a distance he would otherwise have considered as very accessible. The intensity of the need is then seen as capable of influencing the distance and the quantity of physical and psychological efforts that an individual will accept to invest in consuming a service.

The concept of proximity may apply to both users and non-users. Intuitively, the neighboring situation with a facility is likely to be more relevant to the non-user than to the user. It may be suggested that externalities produced by a facility may be felt more by non-users living at proximity of a facility than by users who benefit directly from the presence of the facility. Empirical evidence is, however, needed to confirm this hypothesis.

Since the attitude that a user might develop toward a facility he uses is likely to be more tolerant of the impacts created by the facility than the non-user, we may then discover completely different distance functions reflecting different externality fields for a same facility.

More will be said later about the hypothetical distance decay functions describing the spatial impact of any facility as they are perceived by users and non-users. For now, it suffices to recognize the fundamentally distinct standpoints of users and non-users with respect to perception and evaluation of externalities.

#### Human Characteristics of Services

One more class of variables must be considered with respect to the structural definition of public facilities and services. These concern the human variables of a service. They describe the social, and cultural composition of clients and personnel of a service. The number of users or the number of employees in each

of the relevant categories are examples of such specification. Such factors may be related to some particular attitudes of users or non-users, they may be of great explanatory significance. When linked with the psychological theories discussed at the beginning of the chapter, they become very meaningful in the following respect. The social and ethnic or racial composition of a service may, for example, encourage the members of a particular group to patronize one facility rather than another on the basis of 'human' similarities. These observations may particularly apply to services as school, community centers and hospitals, that is, to services which might be described as 'highly personalized'.

The human composition of the users themselves may similarly constitute an important dimension in the formation of non-users' attitudes toward public facilities. If residents happen to hold prejudices toward any given social group, these values will probably be reflected in their perceptions and evaluations of the facility. Such human variables may then be considered as potential explanatory variables of attitudes held by both users and non-users toward public facilities. With respect to users, the human characteristics of a facility may create conditions that may inhibit or encourage utilization by certain segments of the population. Non-users may similarly be affected by the conditions of utilization that prevail in a facility including clients characteristics, category of need and related variables.

### The Individual's Environment

The behavioral environment which supports the individual's spatial activities primarily describes the sets of relative conditions which prevail between the individual who perceives and the geographical environment. Among the sets of relative conditions which might be of some relevance for this investigation, three sets have been retained for analysis. These are the sets of spatial, social, and psychological conditions, in terms of which individuals develop their systems of attitudes.

### Spatial conditions in which attitudes are developed

The problem must first be placed in a spatial context that describes the objective and subjective environments in which individuals directly or indirectly experience public facilities.

The objective space for users and non-users represents the sets of lines, nodes, and surfaces that every citizen can generally identify in his neighborhood and in his city. (Horton and Reynolds, 1971). The objective space may further be defined with respect to more evaluative relations such as rent surfaces, values of properties, differential densities and the like. These objective values may have significant relevance for the understanding of the context in which attitudes are formed.

The objective environment in which the individual behaves may, however, be highly deformed or changed by the perception process and by the cognitive evaluation of the information contained in this environment. It has been suggested that the quality of the forms that the residents are accustomed to seeing influence the amount and kind of meaning which the environment transmits and which people acquire. (Thouez, 1975). It seems reasonable, therefore, to think that the residents of neighborhoods in poor physical conditions, or in other neighborhoods might psychologically distort the objective conditions existing in their environment in order to make them more acceptable. Of course, it is very difficult to estimate accurately the extent to which these psychological adjustments influence the attitudes taken by the residents living in non-satisfying environments. More empirical investigation on this question is necessary. We suggest, however, that these psychological biases may affect the tolerance levels of these residents toward noxious facilities. According to this hypothesis, these residents would tend to support better the negative externalities created by the public facilities located in proximity to their residence. This attitude could be explained by the adjustment that has already occurred for the residents who had to support other kinds of externalities

present in their environment, notably, non-stimulating surroundings, mediocre quality of structures and services, and non-conforming land uses. In this context, a facility that may be perceived as noxious by some groups of residents living in better neighborhoods may be positively received by others, notably by those residents in deteriorated environments. Evidence for such an attitude is presented in Dear (1974b) in relation to the locational impacts of mental health centers, and in Gingell (1975) in a similar study involving a set of various public facilities.

In other cases, the type of environment in which users and non-users live may reflect the individuals' systems of values and their environmental preferences.

The quality of the immediate environment might then be used as an indicator of wealth and of living conditions of individuals located in different neighborhoods. Correlated with attitude scores, these indicators may reveal some interesting relationships between residents' attitudes and the environment in which these attitudes are potentially developed.

#### Social Conditions of Individuals

The social conditions of two groups of users and non-users may or may not differ from each other. In each case, they will influence the attitudes that residents develop in general, and more particularly their attitudes toward public facilities.

Attitude theory suggests that the social and cultural factors that are proper to each individual or group seem to be the most important variables which may be used to discriminate within and between groups of users and non-users.

The individual's social and cultural affiliations in association with the reference groups with whom he identifies might profoundly influence the values and attitudes that the residents will display toward certain public facilities. For instance, a group of users who are members of two different social groups, say a group of highly educated users as opposed to a group with lower education are likely to evaluate the facilities on very different grounds. The first group might consider efficiency most im-

portant , whereas the second group might judge the economic quality more relevant.

We can expect the non-users to follow similar patterns of differentiation. Certain social groups might be willing to tolerate controversial facilities more than others. They may also be forced by their lack of social cohesion to accept a facility creating negative externalities. The strength of a social group in controlling its environment might also be very much class-based and determine the intensity of reaction toward controversial facilities that is, the major dimensions of conflict. Social differentiation has become much more subtle and spatially segregated. Most often the culture and life style of an individual or a group constitutes the only means of social differentiation. Life cycle is another example of a social process used to discriminate among groups of residents and households. Here, the focus is upon the distinction between the young and the aged, couples with children and couples without children and the like.

Since the social attitudes that individuals hold may to various degrees reflect one's group affiliation and support (Sherif, 1957) the application of relevant social indicators to measures of attitudes might reveal certain attitudinal patterns connected with social differentiation. They may show, for instance, that some attitude toward a facility hold for certain groups of residents with certain social qualities but not for others. Social indicators may only have a descriptive value in relation to a given attitude but still they may bring insight about the potential causes of differentiation in attitudes among individuals of different social backgrounds.

The determination of the extent and intensity of impacts created by a public facility is thus likely to be a function of both the attributes of the facility and the characteristics of the group(s) evaluating it. An example of the differences in perceived utility of a facility might be found between families with children, and other family groups. The first group would probably

be more sensitive to certain classes of attributes which could constitute a threat for the children as facilities generating traffic in a neighborhood. Alternatively, different groups of residents might not perceive this particular effect or might see it as minor.

We have assumed in this section that the utility function derived from a dichotomized group of users and non-users would display the most significant differences with respect to attitudes toward public facilities. On logical grounds, this assumption is easily defensible. It might occur, however, that for certain groups of society and for particular environmental conditions, the dichotomy user/non-user does not account the most for the observed attitudes but another classification of residents or a utility function weighted differently. A more descriptive classification might be based on some other criteria of social differentiation, for instance racial criteria or stages in life cycle.

The other alternative that has been mentioned already would be that social factors would account for within-category differences, that is for variations found among users as for the variations found among non-users.

With respect to attitudes toward public facilities, we have described how an individual member of any social group might be influenced by the social values and norms of his reference group in taking on particular sets of attitudes. In this respect, attitudes investigated at the group level might help to understand the attitudes which are observed for individuals.

However, a close relationship between individual's attitude held by the group as an aggregate is not necessarily guaranteed. It might even not exist at all.

The 'Social' group may also be differentiated from the 'Psychological' group. That is, in the first case the group may endorse a social attitude which has arisen from the evaluation of social attributes of the perceived objects (e.g. public facilities). This may occur in the case of a community seeking to

control the externalities that provoke negative alterations of property values. This attitude would be taken at the social group level. The second case of a psychological attitude may derive from the evaluation of psychological attributes. A group life style may be one such psychological attitude displaying a certain stability over time. This attitude would reflect the relatively homogeneous systems of values and preferences existing among residents. In the case of the psychological group, the attitude is not as clearly socially-based even if there exist social correlates, but it is more individually-determined.

This brings forward the relevance of the psychological analysis to the study of attitudes toward public facilities. Since attitudes are psychological in nature, the contextual psychological variables proper to the users and to the non-users are likely to be most significant for an understanding of the formation of attitude toward public facilities.

#### Psychological variables in Users and Non-users' Attitudes

A very large number of psychological variables could be relevant in explaining the contextual conditions leading to the formation of users and non-users attitudes. It is not intended here to review them all. In any cases, it would not be possible, in the absence of clear empirical evidence to determine the exact nature of these psychological variables and their actual relevance to our theoretical problem. We will therefore focus our attention on two principal sets of conditions which are believed to be important in the analysis. These conditions implicitly account for other related psychological elements. They will be referred to as the 'stable' and 'situational' factors of an individual's psychological space.

The perceiver's stable characteristics are composed of all aspects of his personality, attitudes, memories. They constitute in fact, an important portion of the individual's stored information which is the accumulation and evaluation of previous

experiences, emotions, etc. For any individual, this information generally yields to the development of stable sets of attitudes and beliefs which in turn are likely to dictate rather predictable sets of attitudinal responses. It is generally accepted that the content of an attitude is provided by the culture in which the individual participates (Halloran, 1979 p.29). Other systems may be much less stable and the response-sets much more unexpected. In any case, individuals are endowed with psychological predispositions which may have variable influences on their perceptions and evaluation of new attitudinal objects.

Since most of these past or new attitudes are learned in one way or another, two factors are likely to have a major impact on formation of attitudes toward public facilities. Besides personality development, the factor experience is likely to be the more significant with respect to users and non-users' perceptions of the facilities. We already described above two major types of direct and indirect experience including learning processes. In fact, the two types might include a very large selection of learning and experiential situations from (1) direct experience including trial and error (2) perception (3) perceptual observations of another's responses (4) perceptual observation of the outcomes of another's explorations (5) verbal instruction about responses to stimuli to (6) verbal instruction about the characteristics of objects (Halloran, 1970 p.29).

The classification of residents with regard to experience may be useful in differentiating the distinct knowledge that users and non-users have of a public facility. Some types of experience may be unique to one group or another or common to both of them. Direct experience is, for the user, assumed to be the principal means of evaluation of a public facility. Perception, as opposed to direct experience, would appear to constitute for non-users the most important framework of reference in evaluating public facilities. The other processes may be common to both users and non-users. Both groups for instance may learn a-

bout certain attributes of facilities through verbal transmission of information from an individual to another, or through evaluation of another person's response. These traits generally represent the outcome of personality development. They may be relevant to our problem in two principal ways: as determinant of life styles, and as determinant of individual's most psychological characteristics like introvert and extrovert personality types. These last traits may be thought, however, to be implicitly contained in the first category (life style). The role of life style and personality development in individual's utility function are immediately apparent. They refer to the most fundamental expectations that individuals possess about their environment, their goals in life, and their aspirations. Life styles may explain the differential evaluation which is assumed to exist within and between users and non-users.

Yet, a second category of psychological conditions to which users are exposed are likely to be very important in the formation of attitudes toward public facilities. These are what may be called the situational factors. The situational factors refer to the particular needs or motivations according to which individuals develop attitudes. In this context, need is equated with demand. Felt need may be different from real need (Bradshaw 1972 p.73). The felt need is limited by the perceptions of the individual, but perceptions may be reciprocally influenced by the individual's needs. For the user, utilization of a facility or service is an expression of need and other motivations. The needs can therefore be directly answered by ways more or less chosen by the individual. Depending on the type and regulations of the service, the user will patronize the facility which provides the greater satisfaction or utility. A facility will also possess variable importance for each user depending on the intensity of need and the frequency of utilization. This may differentiate the users' perception of a facility and bring some users closer to non-users' attitudes in the formation of their attitudes toward

that facility.

For the non-users, needs and motivations with respect to the public facility location problem may be mostly identifiable through the attitudes and behaviors that individuals perform in conflict situations. However, attitudes are not necessarily converted into overt behavior, adding to the difficulty of determining users and non-users needs and motivations.

As total satisfaction may be difficult to achieve with public services, for some users, the negative impacts or externalities which are attached to the facility may be traded-off against satisfaction of needs, resulting in a greater acceptance of this facility. Yet it may happen that a non-user or a neighborhood as a whole voluntarily support some disutilities by tolerating facilities provided for the needy of the community. Under this assumption, it may be suggested that the social importance or the "psychic benefit" (Margolis, 1968) of the facility for the non-users generates more positive evaluation of the facility and greater tolerance from the community as a whole. In this respect, appropriate educational programs are likely to influence the levels of tolerance of the community receiving the facility. Community education may particularly be important for these facilities which are aimed to satisfy the needs of controversial groups of users like drug addicts. In this sense, since the motivations of non-users are not dependent upon the need for consuming the public service, their motivations are likely to be of a different nature than those of users and to lead more readily to locational conflicts and opposition to the planned services. These motivations and attitudes of users and non-users are precisely what empirical investigations of attitudes toward public facilities attempt to uncover.

## CHAPTER 4

### MEASUREMENT OF ATTITUDES TOWARD PUBLIC FACILITIES

Chapter three examined the fundamental concepts of attitude theory in relation to public services external effects. These effects were shown to generate from users and non-users positive or negative attitudes toward public facilities. External effects were associated with neighborhood conflicts over the provision and location of public services.

This chapter will attempt to systematize the previous findings in the light of the hypothetical attitudinal differences that were suggested for users and non-users of public facilities. Our ultimate goal is to propose a meaningful utility function for each of these groups.

This will be done in three steps. First, we will present a sample of characteristics (or attributes) of public facilities which are thought to be most commonly used in attitude formation toward public facilities. Second, we will examine the different research designs which have been used for measuring and analyzing attitudes. Finally, we will illustrate the necessary requirements for a measurement tool in presenting a survey instrument designed for the measurement of attitudes toward public facilities.

#### 4.A Empirical Evidence Related to the Study of Impacts of Public Facilities

Empirical work in the area of impact analysis of public facilities illustrates the relevance of socio-economic and spatial variables in understanding the locational problems generated by the provision of public services.

### Consumption-Related Variables

In nearly every cases, the effects of geographical or psychological distance are overwhelming. Dear (1974b), Miller (1972), and Schneider (1971) illustrate this assertion in their respective studies of health facilities. For Schneider, the drawing power (P) of a hospital is a function of proximity to its market (N), its size (S), and measure of hospital attractiveness  $P = f(N, S, A)$ . Miller presents the basic model from a consumer point of view where demand ( $Q_{ij}$ ) is expressed as a function of characteristics of service ( $W_i$ ) and characteristics of consumers (size of population in area j ( $P_j$ ) and its demographic characteristics ( $X_j$ )). Thus,  $Q_{ij} = f(P_j, X_j, W_i)$ . Dear, presenting an alternative model of hospital utilization (U) incorporated the two previously mentioned variables, client characteristics (C), and service characteristics (S) as well as a variable related to the facility location (L). Thus,  $U = f(C, S, L)$ . Dear provides a useful description of the "distance" relationships which may isolate a client from the service. These considerations include: first, a locational variable which is a simple physical distance, second, a measure of relative distance expressing a range of "intervening opportunities" such as the anonymity provided by a service located outside one's neighborhood, third, factors generating social distance such as referral problems, cultural and racial differences and fourth, administrative and jurisdictional barriers placing another kind of constraint on service utilization. These four categories may be seen as illustrating the client's total utility/disutility in relation to utilization of public services. This last classification by Dear parallels Fauteux's (1975) notion of "psychological accessibility" and Harvey (1973) and Williams (1970) discussions of "access". By the inclusion of non-locational variables, this approach enlarges the notion of accessibility to describe more accurately the consumption aspects of public services.

Findings that the characteristics of clients and services

are more important than distance or accessibility in explaining utilization (Miller, 1974), or that operating policies seem to have a disproportionate impact upon service utilization rates, may then be explained (Dear, 1974b). A notion of "relative separation" best accounts for these particular non-locational variables. Similar conclusions on utilization of health facilities are described in Morrill and Earickson (1968), Schneider (1971), and Miller (1974).

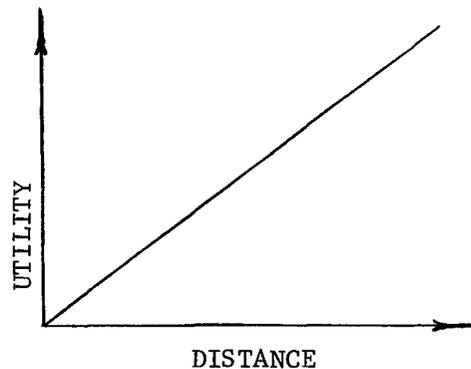
#### Non-Consumption Related Variables

Empirical evidence concerning non-users' perception of public facilities brings another dimension to the analysis. This dimension reflects the indirect impacts of public services and the positive or negative attitudes that they generate. Clearly, the intensity of an attitude is related to the extent to which residents of an area approve or oppose in one way or another the location of a public facility in their neighborhood.

Findings from empirical studies attest to the presence of indirect impacts ( or externalities ) associated with the location of public facilities. Gingell et al. (1975) found that "noxiousness" was the most significant dimension for explaining attitudes toward public facilities. This dimension is thought to reflect impacts on property values, and the benefits or deterioration (psychic or material) of the social and environmental neighborhood conditions. Similar results are described in Fincher and Dear (1975). In nearly all the studies examined, the perception of positive and negative effects of public facilities is seen to be a function of distance.

For non-users, the empirical evidence available on impacts of public facilities seems to indicate a general trend toward 'increased desirability' or utility of public facilities with distance. A study by Gingell et al. (1975) shows that for almost every facility that has been evaluated by the residents of two neighborhoods, the "perceived" impacts of each facility (negati-

ve impacts) decrease with distance from the residential location of respondents. There are, however, some exceptions notably, park, day care center, and post office. which for at least one group of respondents display a different behavior of the utility curve. If we assume the results of this study to be generally true, we notice that the variable form of the utility function of public services very nearly is a linear function of distance. For example, the utility functions for parks, community recreation centers, hospitals and fire station are approximately linear. In these cases, utility increases with distance from the facility.

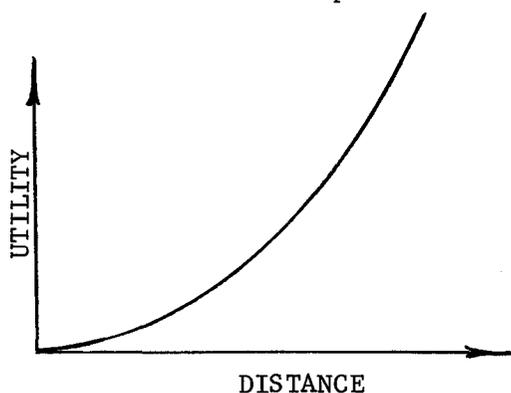


It must be noticed, however, that the same function does not necessarily describe the utility of the two groups of residents simultaneously. For instance, the degree of desirability of each facility, reflected by its rating on a desirability scale may also differ from one service to another. For instance, park is slightly more desirable with distance for one group whereas its desirability decreases with distance for the second group of respondents.

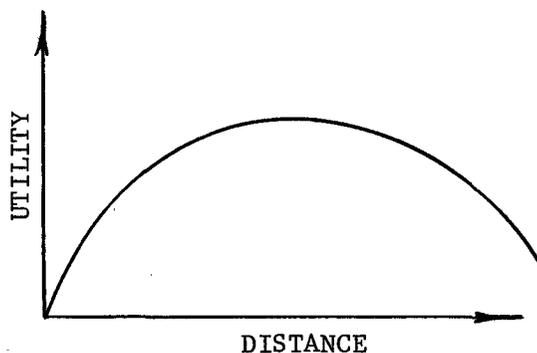
The linear negative relationship may also be encountered as in the case of day care center, post office and police station. (This function holds for only one group of residents). In these cases, utility seems to slightly decrease with distance and this makes sense with respect to the types of facility concerned.

Utility and distance in the cases of fire station, hospital, public high school and drug referral center are approximately exponentially related. This functional relation describes

the strong impact of the facility when located in very close proximity to residences and the rapid attenuation of the impact with distance.



A last possible form that the utility function may take is the polynomial function as represented by park, and public high school. Utility is greater at an intermediate distance from private residences. Too close or too far reduces its desirability.



A utility function of users with regard to accessibility preferences is likely to display as much variation as non-users utility functions. The relationships expected to appear are those reflecting a decrease of utility with distance from the service. As for the non-user, the utility function of a user may be expressed as a function of the distance he will be willing to travel to obtain a public service.

One area where impacts of public services have been studied is "property value". The effects of public services on property values are difficult to evaluate since they do not only reflect physical deterioration of neighborhoods but also other

kinds of neighborhood changes, for instance social changes. Some empirical studies have proved this point. In a study by Sherer and Coughlin (1972), residents of a neighborhood appear to perceive differentially the effects of a municipal park on property values. In effect, nearly 40% of all respondents stated that the value of their house or their rent was affected by the presence of a park in the neighborhood. This can be considered very significant since it appeared that many of the respondents lived at considerable distance from the park where the value of the park is most likely to have minor effects. 72% of the respondents similarly thought that, in general, people living right to the park paid more for their houses or rents. The "perceived" nature of the beliefs about property values impacts seems to have been confirmed by the finding. These results suggest that, in this case, the impacts of the service on property values are perceived as occurring but are not real. House value as estimated by the respondents was not correlated with distance from the park but was correlated with other variables (higher income, SES, lower average age of the family, lower frequency of use and fewer children.)

Another analysis made by Hammer, Horn and Coughlin (1971) of effects of a large park on property values seems, to contradict the previous results. Their work was, however, concerned with a somewhat different issue. The investigators were specifically concerned with the determination of the location rent due to the closeness of the park relative to total land value. Their results indicate a substantial difference in location rent with distance from the park. At 100 feet, 34% of rent accounts for proximity to the park. At 1000 feet, 11% and at 2,500, it accounts for 5%.

Their results are, however, hard to analyze for two reasons. The investigators used dummy variables in their regression analysis to isolate and control the extraneous effects that socio-economic status and other related variables might have on

the analysis. Since these other variables could have explained perhaps better the results, no complete reliance can be given to the findings. The second uncertainty comes from the distance range considered (100 to 2,500 feet). We can easily argue that the impacts of a large park probably extend much beyond these spatial limits.

With respect to the apparent contradiction in the findings of the two previous studies, Dear (1975) who investigated the locational impacts of mental health facilities indicates a similar ambiguity. Though it would seem intuitively correct to assume that property values increase or decrease with distance to a facility, "it is not at all clear whether it is attributable to the presence of the facility or to wider market conditions" (Dear, 1975).

Clearly, the impacts of public services on property values must be further investigated since it is the most important issue in residents' opposition to location of public facilities. Gingell et al. (1975) have suggested that the impacts of a facility on property values may be the most important dimensions of evaluation of the 'desirability' of public goods in residential neighborhoods. Crawford and Wolpert (1974) elicited similar objections to the siting of mental health centers. These objections include property value decline, danger of physical harm, neighborhood stigma, and the argument of traffic congestion.

The issue concerning the relationship of distance and impacts of public facilities on property values is certainly not resolved. In the light of the mixed evidence so far produced, we suggest that these diverse results cannot be dissociated from the prevalent socio-economic conditions in each neighborhood. Thus, perception of spatial impacts may greatly vary across individuals and groups. The function describing the spatial decline of impacts of the facilities may not be continuous with respect to the individuals' perceived evaluation of the facilities. Each facility may have a unique decay function and a unique distribution of costs and benefits that are likely to be created by its

location.

#### 4.B Utility Functions of Users and Non-Users

Attitudes of users and non-users of public facilities may be best understood in relation to the utility values that the facility bring to the neighborhood. We suggest in this paper that users largely perceive the facilities through their consumption activities. This includes the perception of externalities (direct and indirect) that are created by the service especially in relation to consumption. Attitudinal patterns which are likely to be formed in this context should then theoretically reflect the consumption conditions and the levels of satisfaction achieved.

On the other hand, we suggest that non-users' attitudes may be better understood in relation to the indirects impacts (externalities) of the facility outside the consumption activities themselves. These impacts may be conceptualized as the perceived outcomes for the individuals of the location of a facility which has a particular set of attributes. Acceptance and tolerance of a facility by non-users would then be subordinated to the cognitive and affective appraisal of this impact.

The kind of attributes that may contribute to users and non-users' utility appear to be both of a descriptive and inferential nature as theory and empirical results have demonstrated. Direct experience with a given object results in the formation of beliefs (and attributes of the facilities) which are more of a descriptive nature. (Fishbein and Ajzen, 1975). A person may perceive that a given object has a certain physical or structural attribute. For example, he may hear the noise of cars, or he may see the appearance of buildings. However, individuals clearly form beliefs that transcend directly observable relationships. These beliefs may be called inferential beliefs. In making use of previously learned relationships or formal coding systems (referring to logical rules) one can form beliefs about unobserved characteristics or dispositions of an object (Fish-

bein and Ajzen, 1975). For instance, the observation that a person drives an old car leads to the inference that this person is poor; and to see smoke leads to the assumption of fire. The distinction between descriptive and inferential beliefs is often, however, very difficult to draw. We use this classification merely to show the distinct cognitive content among attributes of public facilities but obviously, no clearcut distinction can be made.

The little empirical work that has been done in measurement of attitude toward public facilities provides some guideline for a qualitative analysis of the perceived attributes of public facilities. It must be emphasized, however, that few of these studies have drawn a distinction between users and non-users of public services which we will attempt to do.

The hypotheses that will be made here with respect to attitudes of users and non-users and their respective utility functions are obviously preliminary. But hopefully, they will prepare the grounds for empirical investigations, so much needed in this research area.

The most difficult part of the analysis of public facilities involves defining the relevant attributes that users and non-users will use to evaluate public facilities. These attributes were previously related to need and impact of a facility. An attribute will therefore be considered 'significant' if it contributes in one way or another to the attitudes that individuals hold toward a facility and to their satisfaction derived from it.

The attributes which contribute to the user and non-user utility function(s) are contained in the following figure.

Figure Attributes of Users and Non-Users Utility Function(s)

<u>USERS</u>	<u>NON-USERS</u>
demographic characteristics	demographic characteristics
age, sex, race, education, family size	age, sex, race, education, family size

Users (cont.)

economic characteristics  
 income  
 cultural and sub-cultural  
 (life style) composition of clients and employees  
 religious beliefs  
 characteristics of need  
 type, frequency  
 psychological components  
 personality, values  
 'trade-offs of characteristics'

Service Characteristics

type: service-dispatch  
 scale: capacity-size-range of services-  
 architectural quality  
 esthetic condition  
 quality of service  
 specialization-congestion  
 administrative formalities-convenience-atmosphere  
 other users' characteristics  
 cultural, social, racial  
 religious, attitudes

Non-Users (cont.)

economic characteristics  
 income  
 cultural and sub-cultural  
 (life style ) composition of clients and employees  
 religious beliefs  
 psychological components  
 personality, values  
 'psychic benefits'

Service Characteristics

type: service-dispatch  
 scale: capacity-size-congestion  
 architectural quality  
 visibility-structural conditions (age)-appearance  
 physical (descriptive) attributes  
 traffic generator-noisy-polluted-smelly  
 users' characteristics  
 cultural, racial, social  
 attitudes

Users (cont.)Non-Users (cont.)

	inferential characteristics
	property value decline (also descriptive attribute)-stigma-safety-neighborhood deterrent
<u>Distance characteristics</u>	<u>Distance characteristics</u>
accessibility	proximity
physical-administrative-social-jurisdictional	impacts
time-cost	'distance decay function'
'distance-decay function'	
relative location	relative location
intervening opportunities (attractiveness of a service and of the neighborhood)- friendliness-anonymity	visibility-surroundings
availability of other services in the surroundings	congruence of forms and activities

Since the content of this figure is derived from the discussions previously held in this paper, there is no need to explain again the relevance of these attributes to the users and non-users' utility function(s). We will simply comment upon the most important variables in a succinct fashion in the perspective of our first hypothesis which assumes two distinct utility functions.

The analytical framework of the user and non-user utility function(s) is basically identical. The framework includes three significant contributions which should reflect the nature and form of the interaction of users and non-users with public facilities. These sphere of interaction are found at the level of the personality of the individual himself, that is the user/non-user personal characteristics. These characteristics relate to the socio-economic make-up of the individual, his cultural and religious affiliations and his psychological characteristics.

A second sphere of interaction occurs between the user and the non-user, and the public service that is used or located at proximity of the residential quarters. Since consumption is the predominant function of the service, all the major characteristics of the good are oriented toward satisfaction of clients' needs. Clients are therefore most concerned with service attributes including quantity and quality of services available to them. Various service composites could be imagined to reproduce the preferences and expectations of different clients with a public service. These alternative 'packages' would select among a bundle of attributes of a facility those expected to be available to the clients, plus the psychological trade-offs that may occur in the clients' mind. For instance, human characteristics such as cultural and religious affiliations of other users may, for some individuals, constitute important attributes influencing their consumption. Congestion and atmosphere may for other users be the most important factors in their choice and evaluation of a service. The utility function of the user may therefore be conceptualized as the difference between his expectations and the actual satisfaction that he receives from the consumption of the public good.

The non-user possesses, however, a completely different point of view, than a resident who experiences a public service through its indirect effects. The nature and intensity of these

impacts reflect the external characteristics of the goods, characteristics which may be completely irrelevant to the clients of the service. The utility of the non-user may be best defined as the external benefits received from a good which is not 'demanded'. Such benefits may be derived from tangible sources such as architectural qualities of the facilities. They may be also received from intangible sources such as atmosphere values (of a park). But the utility function of the non-user may be best conceptualized as a perceived 'surplus' between 'noxious' elements and material or psychological benefits received from a public service. The noxiousness element of the non-user utility function is therefore determinant. Physical attributes such as noise, traffic, and property values are therefore relevant attributes of evaluation. Psychological attributes such as degree of disturbance, desirability of users, fear and stigma, are also weighted against tolerance level of the non-user.

A last sphere of interaction of user and non-user with public facilities is determined by the variable distance. Physical and psychological distances influence the user's consumption ability and preferences. Proximity of the non-user's residence to the public facility is directly related to his utility function and his tolerance and acceptance of the facility in the neighborhood.

These variables are, according to our assumptions the key-elements of the user and the non-user utility with public services. They represent the tangible and intangible elements of evaluation that create satisfaction, opposition, or conflict over provision and location of public facilities.

#### 4.C Analytical Approaches

##### 4.C.1. Methodological Considerations

Many theories have been proposed in psychology to describe attitude formation. These include learning and expectancy-value theories, balance theory, the congruity principle, the theory of

cognitive dissonance, and finally, the theories of attribution. (For information about these theories and their relations to attitude, see Fishbein and Ajzen, 1975).

Among these, the expectancy-value theories have inspired most of the empirical work on attitude structure, notably in marketing research. The expectancy-value models are based on an explanatory or structural approach which deals with the cognitive and affective components of attitude as opposed to predictive studies which focus on affect, intentions and overt behavior.

Expectancy-value theories originate with Tolman (1932) who suggested that "people learn expectations". That is, the belief that a given response will be followed by some event of a positive or a negative nature.

The best-known model of this kind has been formulated by Edwards (1954). The model was designed to describe the subjective expected utility (SEU) of individual behavioral decisions. It is defined as follows:

$$SEU = \sum_{i=1}^n SP_i U_i$$

- where
- SEU - the subjective expected utility associated with a given alternative ( here a public facility )
  - $SP_i$  - the subjective probability that the choice of this alternative will lead to some outcome i ( or that a given public facility will lead to some belief i or some attribute i )
  - $U_i$  - the subjective value or utility of outcome i ( or the subjective evaluation of the belief or attribute i )
  - n - the number of relevant outcomes ( or attributes )

The SEU model can be meaningfully interpreted in terms of Fishbein's model which has been developed in a different framework: that of behavior theory. Fishbein assumes that each

evaluative reaction is associated with a hierarchy of probable responses (or beliefs) as expressed in the following model (Fishbein and Ajzen, 1975 p.31).

$$A_o = \sum_{i=1}^n b_i e_i$$

where  $A_o$  - attitude toward object (o)  
 $b_i$  - belief (i) about (o) (o = a public facility)  
 that is the subjective probability that a facility  
 (o) is related to an attribute (i)  
 $e_i$  - evaluation of attribute (i)

Finally, Rosenberg formulated a similar model using a functional approach to attitude. His model describes the notion that the cognitive structure which is associated with a given attitude is made up of beliefs about the potentialities of the object for attaining or blocking the realization of valued state. Thus:

$$A_o = \sum_{i=1}^n I_i V_i$$

where  $A_o$  - attitude toward object (o)  
 $I_i$  - perceived instrumentality of object (o) for blocking or attaining value (i)  
 $V_i$  - measure of the satisfaction given by value(i)

Despite their different theoretical approaches, the three formulations proposed by Fishbein, Rosenberg, and Edwards are remarkably similar and could be equally applied to users and non-users attitudes. The three models would require similar types of judgements, though the specific methodologies used (e.g. question wording, scales) would be slightly different. That is, given a set of salient attributes used by users and non-users to evaluate public facilities, both models would require two pieces of information : First, the extent to which the user and the non-user believe that the facility is related to, or possesses,

each attribute. Second, the evaluation of, or satisfaction they would derive from each attribute. That is, any model would weigh the attributes of objects according to the individual's evaluation of this object.

Many theoretical and empirical issues are involved in the application of these models. Lapatra (1973 p.260) is undoubtedly justified in saying that "societal problems have no real solution in a mathematical sense". Theoretical models of attitude and their associated scaling procedures constitute an accurate replica of reality only to the extent that attitudes are in fact mathematically reproducible. Within these conceptual and analytical limitations, many theoretical and empirical issues can be raised with regard to what may be best described as internal considerations of attitude modelling. Many of these reflections have originated from both marketing research and studies in psychology. (Wilkie and Pessimier, 1973; Fishbein, Ahtola, and Cohen, 1972; and Day, 1972). A useful comparative analysis is provided in Fishbein and Ajzen (1975).

Before elaborating further on these issues, it is important to clearly establish the relationships which exist between the theoretical models and the scaling procedures which are largely used to verify them.

Fishbein's model may be considered as a generalized form of expectancy-value models. Its mathematical formulation expresses the attitude of an individual toward an object (o) as a simple summation of a product  $b_i e_i$ . This theoretical definition of attitude is viewed as reflecting the individual's location on a bipolar evaluative or affective dimension with respect to some object (o).

A similar position is taken for the justification of scaling procedures (e.g. Guttman, Thurstone, Likert, and Semantic Differential). In these procedures, an attitude score is obtained for each item included in the scale, by multiplying degree of agreement and item favorableness. According to Fishbein, it can be shown that this item score is equal to the product of be-

belief about the object (b) and the evaluation of the object attribute (e); (for a demonstration of this argument, see Fishbein and Ajzen, 1975 p.81). In all the four standard scaling procedures, attitude scores are computed by taking the sum (Likert and Guttman) or average (Thurstone) over all item scores or products of b and e. Both sum and average have been used for semantic differential scales.

Although the distinction between an averaging and an additive model has been of relatively minor importance in attitude measurement, it has led to a theoretical controversy in research on attitude formation. (see Fishbein and Ajzen, 1975 chap. 6; and Day, 1972 p.280 ). In most studies, however, the distinction seems to have no bearing on the results. This may be explained simply by the fact that one is a linear transformation of the other. They may, however, produce different estimates of attitudes ( $A_o$ ) when the number of beliefs is not constant in both models. In the case of an individual holding a number of positive beliefs, the attitude score will increase with the addition of favorable beliefs in the summative model. No increase will occur, however, with the averaging model. Similarly, the addition of other unfavorable beliefs is expected to decrease the attitude score with a summative model whereas no change is expected with averaging. These expectations are justified, however, only when all beliefs are held with equal strength and when all attributes have equal evaluations, for instance + 2. With respect to these assumptions, Fishbein and Ajzen strongly underline that for the summative model to be correct implies the necessity to assess the subject's salient beliefs, those beliefs that he actually holds.

As far as empirical results are concerned, the evidence has seemed to slightly favor the additive model mainly because set size (number of attributes) is important; on many issues, however, it may be considered as inconsistent and inconclusive. This leads to the consideration of some internal issues more specifically involved in empirical application of the models.

Perhaps the most important question is whether the additive models can accurately capture the complexities of choice behavior. Day (1972 p.281) notices that no consideration is given in these models to possible interactions between attributes. He further suggests that additive models may not be appropriate when sequential decision process initially narrows the range of alternatives to a 'consideration' class satisfying some minimum standard. This might very well be the case with users and non-users' attitudes toward public facilities. It is perfectly conceivable that one unacceptable attribute judgement, such as fear of property value decline, would outright rejection and make the rest of the attributes irrelevant.

It may be suggested, however, that to know the salient beliefs of the subjects being observed may significantly reduce the danger of attitude based on consideration class judgements. A person's salient attributes about a given object may be elicited in a free-response format by asking the individuals to list the characteristics, qualities, and attributes of the object.

The major criticism of the disaggregated approach is that despite its predictive accuracy, one cannot necessarily conclude that respondents actually combine the attributes of evaluation in a linear fashion (Fishbein and Ajzen, 1975 p.159). In fact, there is some evidence that information may be combined in non-linear or configural ways (Wiggins and Hoffman, 1968; and Einshorn, 1968).

In effect, Wiggins and Hoffman found that the configural model as compared to the linear model slightly improved prediction for many respondents. This suggests that the linear model, despite achieving a good prediction may not provide a valid description of the inferential processes by not accounting for these variations in evaluation. Fishbein and Ajzen notice that although there exists some similarity between an expectancy-value model and a simple linear model, investigators most often overlook one important difference between the two. In the linear model, each variable is given a constant weight.

In terms of our analysis, this means that the weight that is given to a certain variable remains constant across individuals performing the judgements. Although this model appears to be similar with the expectancy-value model, the latter is not a simple linear model since both (b) and (e) are considered to be variables.

However, Wilkie and Pessimier 1973) recognize that the essence of this issue should be considered to include requirements of analysis. The proponents of disaggregation correctly underline that the identity of individual attributes is preserved in this approach such that the understanding of attitude structure is promoted. While it is possible to perform disaggregated analysis at the individual level, most analyses have used cross-sectional approaches and this can be done only at the cost of assuming respondents' homogeneity in scale measurement, in attitude dimensionality, and in functional relationships of attitudes to the evaluation of facilities. It should therefore be realized that by this approach, cross-sectional disaggregation abandons an intrinsically appealing aspect of the basic model, that is a unidimensional measure of affect which is idiosyncratic to the individual.

In this respect, the expectancy-value model still remains a better alternative to the disaggregated approach since it allows individuals to differ in the number and nature of attributes included. It should be noticed, however, that there is no absolute objection for using the two approaches for different or complementary purposes, recognizing their respective limitations.

#### The Aggregation Problem

The problem of aggregation has received some attention from decision and value theorists, and from economists, but it is still considered to be an unsolved problem.

The way we have chosen to treat the problem is to assume that we can obtain enough information about the individual's

utility, preferences, attitudes and so on, of the persons forming the social groups. We now describe three methods of aggregating.

First, ranking methods give rather crude estimates of an individual's utility function since they don't include any information concerning the strength of attitudes and preferences. This method is appropriate to the description of the attitude or utility over a set of public facilities of an individual member of a group. This may consist of the observation of a single state (e.g. the facility which is the most preferred) or it may consist of the set of all ordered pairs  $(x,y)$  of public facilities in which the individual prefers  $x$  to  $y$ ; Under certain assumptions, the latter type is found by a preference-ordering of the facilities. One must, however, go beyond that in trying to include more information related to strength of preferences and different weighting schemes for individuals in the aggregate function.

Second, the evaluation method which has been proposed in this paper provides a partial but valuable approach to obtain indications of the relative strengths of individuals' attitudes toward public facilities. For any given individuals and a given set of facilities, we are able to assign a number to each of the facilities that represents the utility (relative value) of that facility to that individual.

We wish then to associate a given value which will be the social utility of the facility for a given group of individuals (users and non-users). The simple operation of adding the utilities for this purpose is obviously incorrect. (Minas and Ackoff, 1964; and Arrow, 1963). It presupposes that the method by means of which the individual's utilities are determined is sufficiently strong to make interpersonal comparisons of utilities. On these grounds, the interval properties that are attributed to the semantic differential scale might not be generally considered as a sufficient condition for interpersonal comparison of utility, being taken to yield only ordinal data.

If we suppose that each individual in a social group has to evaluate an exclusive and exhaustive set of facilities, a number of procedures exist to represent the relative utility of each of these facilities (von Neuman and Morgenstern, 1947 chap. 1, sect. 3 ), Minas and Ackoff have promoted one of them. (1964 p.354).

We suppose in a first case that each individual is equally important. This may be expressed by linear transformation of the attitude scores over each set of relative values that an individual has given to the facilities so that they sum to some specified constant.

If, in a second case we wish to attribute to individuals' utility differential weights, the weighting system that is utilized may be either derived from a set of ratings of alternatives by a group of individuals or alternatively be a function of some social indicator as individuals' disposable income. (see Simon, 1974; and Fox, 1974)

The third method finds an aggregate impact measure. Depending on the sample design concerning homogeneity or heterogeneity of the sample population on any chosen criteria, it is possible to define for each of the different groups of the sample a unique utility function. Assuming the representability of a given subgroup, it is possible to compute the aggregate utility function of the entire population of a zone or of a defined group, as follows:

$$\sum_{j=1}^n U_{ij} = J_i$$

where  $J_i$  is the aggregate utility for a total population  $n$  for the facility  $i$   
 $U_{ij}$  is the utility of facility  $i$  for individual  $j$   
 $n = 1, 2, \dots, n$  the total population of group  $j$

Then 
$$J'_i = \frac{n}{m} \sum_{j=1}^m U_{ij}$$

where  $U_{ij}$  is the utility of facility  $i$  for individual  $j$

$j = 1, 2, \dots, m$  sample population

$n = 1, 2, \dots, n$  total population of a group

The expression  $J'_i$  thus defines the proportional utility of the  $i^{\text{th}}$  public facility with regard to the entire population of a group of residents. With the measure of aggregate impact, it is also possible to derive for each public facility various utility surfaces depending on the information that is wished to be mapped.

For different areas and for distinct subgroups of population, the surface would represent the differential utility of a public facility in relation to distance to this facility, that is the proximity to non-users and accessibility to users.

We may finally notice that the generalized utility function which may be observed for any group of individuals is likely to be 'unique' for this category of population at a certain point in space and time, even if cross-similarities may be observed in particular.

#### 4.C.2. Semantic Differential as the Chosen Approach

Although the majority of studies on attitude have obtained significant results, the correlations between estimated and observed attitudes have varied considerably (Fishbein and Ajzen, 1975; Title and Hill, 1968 p.199-214). It appears, however, that when the results have been based on beliefs elicited by subjects on some standard scaling procedures the correlations have tended to be high (.70 and over) (Fishbein and Ajzen, 1975 p.228).

If the investigator is only concerned with obtaining a measure of attitude, the existing differences among the standard scaling procedures, notably with respect to the relative weights placed on beliefs and evaluations have not prevented them from yielding comparable results. However, these differences become relevant for explaining the formation of beliefs, attitudes and for the prediction of overt behavior. These issues are involved in the theoretical controversy on the distinction between an averaging and an additive model.

Since these questions are still unresolved and since the standard scaling procedures, with the exception of Guttman scores, obtain attitude scores that are thought to reflect overall evaluative consistency (Fishbein and Ajzen, 1975 p.88), the final choice of a scaling procedure much becomes a function of the investigator's preferences of the criteria to be emphasized. For instance, in relation to the weights structure implied in each of the scale, the investigator may choose either the semantic differential or the Likert scales on the theoretical grounds that they place greater weight on  $b_i$  (belief) than on  $e_i$  (evaluation) in computing attitude scores. He may choose Thurstone scale for the opposite reasons, to put more weight on  $e_i$  rather than  $b_i$ . The Likert and Semantic differential scales seem to be more reliable as the number of possible alternative responses is increased. But the scales also possess their drawbacks. One concerns the total attitude score obtained by an individual on these scales. It is argued that these scores may not have a very

clear meaning since different patterns of responses may produce the same score. This is also true for Thurstone scale but it applies even more strongly to the Likert and Semantic differential scales since they provide a greater number of response possibilities. Overall, however, despite these observations, it has been found that summative scales like Likert and Semantic differential are somewhat more reliable than Thurstone scales (Nunnally, 1970 p.434).

The choice of a scaling procedure for the measurement of attitude toward public facilities has to be made on the basis of similar considerations. The scale has to allow for the simultaneous evaluation of a relatively large set of stimuli at a time, if stimuli are scaled. Another very important argument in the choice of a scale is that the cognitive content associated with the individual's perception of public facilities is still largely unknown. For example, little is known about the exact nature of the attributes ( or beliefs) that individuals use in their evaluation of various facilities. For these reasons and for the flexibility and characteristics of the scale itself, Semantic Differential scale seems to fit the measurement requirements.

The purpose of the semantic differential is the measure of meaning (Nunnally, 1970). The semantic differential measures connotative aspects of meaning, particularly the evaluative connotations of objects. According to Nunnally, it is probably the most valid measure of connotative meaning available. The semantic differential is usually used in summing scores over a number of scales rather than relying on a unique one, since it allows finer differentiation among persons and it tends to average out the idiosyncracies in each scale. In addition to summing scores over groups of scales, in most studies, it is also instructive to compare concepts on individual scales. To identify the major dimensions of meaning out of the set of original scales, a factor analysis is usually performed on the results. Multi-dimensional scaling could also be used to analyze data collected

by semantic differential but with a loss of informational content. Moreover, when the semantic scores are used to derive similarity measures, the approach is no longer open-ended. The data result from a pre-determined set of constructs in which the relevant attributes (the scales of the semantic differential) are provided. A strategy in which a multidimensional configuration is obtained from a free method of collecting data, and then interpreted via information from a more structured technique like semantic differential would seem to be a valuable methodology for the analysis of public facilities. This would permit the use of a multioperational approach in order to investigate the issue, and to overcome the interpretation problems usually attached to the use of multidimensional techniques of scaling.

The semantic differential also possesses its own limitations. One of them is that the meaning of the scales sometimes depends on the concept being rated. In these cases the interaction of scales with concepts places a limit on the extent to which individual scales can be interpreted in the same way when applied to different concepts. It also places a limit on the extent to which factors in semantic differential scales can be employed as general yardsticks (as a measure of evaluation) regardless of the concepts being used in a particular study (Nunnally, 1970 pp.441-443). Some of these defects can, however, be avoided if careful attention is given in choosing concepts from the same domain of content and if factor analyses are performed for any type of concepts which is to be investigated extensively.

The semantic differential scale yields for each individual an attitude score which results from the summation or averaging of all his ratings on the attributes chosen to describe the set of public facilities. Summing scores over a number of scales has important advantages, notably in permitting finer differentiation between respondents and tending to average out the idiosyncrasy in each scale.

Fishbein and Ajzen (1975 p.87) argue that across a large number of items the errors tend to cancel out and the obtained attitude score approximates the true attitude. The fact that the construction of a semantic differential scale examines the degree to which responses to one statement are consistent with responses on other statements helps to ensure both the reliability of the scale and the obtaining of 'true' scores. On this basis, we may consider the scores derived by a standard measurement procedure to have the value of utility.

If the theoretical assumptions related to the distinction between users and non-users attitudes prove to be valid on empirical grounds, two utility functions will have to be determined; one for the user and one for the non-user. Under our assumptions the users and non-users' utility functions would have different meanings with respect to the attributes that are relevant to their respective evaluation of the facilities. In these circumstances, the attitude score of a user should be interpreted as a utility measure in the market (or functional) sense since utility is derived from the characteristics of consumption goods (a set of public facilities). The user's utility function measures the performance of a facility in satisfying the needs and expectations of the user.

The attitude score derived for the non-user of public facilities possesses a different utility meaning. This utility is considered to be derived from the evaluation of the positive and negative impacts of the facility as they are perceived by the non-user of the facility.

The utility scores that are derived from the evaluation of attitudes toward public facilities (A<sub>o</sub>) lead to many possible interpretations of the results.

(1) They make intercomparison of public facilities possible. On the basis of item scores, profiles of ratings may be obtained for each stimulus (Nunnally, 1970), it is assumed that two stimuli (public facilities) are similar in meaning to the ex-

tent to which their profiles are similar. The degree to which two profiles are similar can be measured by the following distance formula

$$D = \sum_{i=1}^n d_i^2$$

where D is the distance between two stimuli ( i.e. their dissimilarity), and  $d_i$  is the difference in ratings of the stimuli on the  $i^{\text{th}}$  bipolar adjective scale. The squared differences are summated over the n scales on which the two stimuli are rated.

This formula is useful in providing an index of the degree to which the stimuli are different in meaning, it does not, however, identify the meaning of any given stimuli (facility). For such an identification of the major dimensions of meaning, a factor analysis is indicated. The resulting factor matrix can be considered as representating the correlations between the scales and the underlying factors or dimensions.

Different cognitive dimensions are expected to represent the evaluative attributes assumed to distinguish the user from the non-user utility functions. The user's utility function is likely to be primarily based on an 'activity' factor, while the non-user function is more susceptible to yield statistically strong factors of evaluation.

(2) with respect to the notion of impact or utility obtained for each facility, a unidimensional scale of public facilities could be computed from the individual's attitude scores. This also imply the definition of an aggregation function which will represent the relative utility of each facility for various groups of residents (users and non-users). The construction of a unidimensional scale could similarly be performed on sectional scores that is, scores of a single item scale or scores of a set of these item scales which have appeared particularly significant. The set of items that might be used for this purpose could be determined by factor analysis.

It must be mentioned, however, that as the size of the attributes space in which attitude scores are derived reduces so does the reliability of the results or of the inferences that are made.

A third alternative for interpreting the results, would be to use some clustering method such as association analysis, discriminant analysis, or some multidimensional techniques to investigate the possible groupings of individuals who would have the same attitudes toward public facilities (For an analysis of MDS in relation to the measurement of attitudes toward public facilities, see Fincher, 1975).

Diverse grouping strategies including agglomerative, divisive (grouping) procedures plus procedures to test already developed structures are described in Taylor and Spence (1970 pp.3-51). Correlational analyses with socio-economic data or with responses on contextual aspects of the respondent's behavioral environment may similarly be used to detect significant interpersonal relationships. These correlations may then serve for grouping individuals according to their similarities of attitudes and potential homogeneity of reactions to public facilities.

#### 4.D Survey Instrument

To illustrate the possible application of the Semantic Differential scale to the measurement of attitude of users and non-users toward public facilities, a sample questionnaire has been developed. It is designed to be both a basis for discussion and an example of a survey instrument aiming to measure simultaneously users and non-users attitudes. Survey questionnaires are generally very imperfect instruments of evaluation of psychological processes and therefore have obvious limitations for measurement purposes. One of the most important limitations concerns the impossibility of including all the possible intervening variables which contribute to attitude formation. The determination of which variables to include in the analysis thus in-

volves a very careful definition of the problem situation. In this case, it has led to a qualitative exploration (in the previous sections) of the stimuli, of the potential intervening variables, and of the hypothetical attributes which may be involved in the formation of attitudes toward public facilities. From all these considerations, we suggest a questionnaire which will test our two major hypotheses: that attitudes are formed by users and non-users in relation to two different frames of reference, one being based on the consumption process, and the other being established from the evaluation of the indirect impacts of public facilities. The second hypothesis postulates users and non-users have similar sets of attitudes but that they differ in their weightings of the attributes which they use to evaluate the facilities. The survey instrument attempts to measure the differences that have been recognized in the conceptual discussion of the previous sections. We propose, therefore, an integrated user/non-user survey instrument which allows for the expression of the two major points of view, that of the consumer of the facility and that of the non-consumer. The potential differences are reflected in the distinct attributes which are used in the questionnaire to depict the psychological distinctions between users and non-users. The attributes which have been chosen for describing non-users cognitive dimensions may generally be described as inferential, whereas the attributes of evaluation assumed to be those of users may be referred to as functional or descriptive. Part three of the questionnaire has been designed to implicitly integrate some of the intervening factors and contextual variables contributing hypothetically to attitude formation. These include issues concerning the individual's expectations and satisfactions with his actual environment, socio-economic variables and demographic information.

We have designed a survey instrument which provides information on four important classes of attributes of the facilities, and of the populations of users and non-users who evaluate them. These attributes concern service, external effects, control

variables, location and related issues. The response format which is proposed uses the seven-point scale of a semantic differential and multi-choice responses.

1. Service The section on service is clearly consumption-oriented. It is aimed to answer various questions related to the users' attitudes and their motivations for using particular public facilities. The items scales will specifically refer to the range and quality of services offered and to the 'amenity' aspects of utilization. The scales of evaluation should be built up in such a way that they can capture the external effects associated with the consumption of the facilities.

Example: the user is asked to evaluate on a scale 1 to 7 the facility that he is actually using. This evaluation is based on a selection of descriptive and evaluative attributes related to the consumption activity such as

high accessibility.....	low accessibility
efficient.....	inefficient
specialized.....	general
high quality (of services).....	low quality
diversified.....	undiversified
congested.....	not congested
friendly.....	threatening
personal.....	impersonal
similar ethnic background.....	mixed ethnic background
strong religious affiliations....	strong religious affiliations
appeals to one type of clients....	appeals to many types of clients

2. External Effects This section will measure the perceived secondary effects of public facilities. These effects are not consumption-related although they might influence the decision to consume a service. The section will include descriptive elements of impacts such as noise and traffic. It will attempt to elicit the principal dimensions of 'noxiousness' or 'attractiveness' of the facilities including impacts on property values.

This section will be a primary source of information for testing the hypotheses of different utility functions or different weightings of the attributes of impact for both users and non-users.

Example: the scales that shall be established for measuring externalities include attributes which are both descriptive and inferential such as

downgrade the neighborhood.....upgrade the neighborhood  
 dirty.....clean  
 neighborhood-oriented.....metropolitan-oriented  
 increase property values.....decrease property values  
 attract desirable people.....attract undesirable people  
 dangerous.....safe  
 quiet.....noisy  
 increase traffic.....decrease traffic  
 compatible with surroundings.....incompatible with surroundings  
 high visibility.....low visibility

3. Control variables and related issues This section of the survey instrument will provide the basic demographic and socio-economic information about the respondent. It will provide the basis for differentiating and grouping individuals through correlational analyses. More general questions may also be included in the questionnaire in relation to neighborhood satisfaction and potential for individual or community opposition.

Example:

- (1) How long have you lived at this address
- (2) Do you own or rent your house
- (3) Which of the following factors were most important to you when you have chosen your present residence
- (4) what level of education have you completed
  - elementary
  - some high school
  - high school-graduate
  - some university-college
  - university-college graduate



- ges. For example:
- Within 1 block
  - Within 2 to 3 blocks
  - Within 4 to 6 blocks
  - Within 7 to 12 blocks

Different distance gradients may be explored to determine the distance decay function that best fits the residents' perceptions of impacts.

Actual and preferred accessibility measures must be examined for users and non-users. This information will allow us to determine if users significantly differ from non-users on accessibility preferences. Users are likely to differ from non-users since they 'consume' the public services and expect to have them available at reasonable distances. Within this accessibility range, it is also interesting to investigate accessibility preferences among users relative to various public services. This information available for the two groups of users and non-users will bring more insight on their differential requirements and evaluations of 'accessibility' to public services. It will provide another means to test our hypothesis suggesting two distinct utility functions for users and non-users of public services. This can be done as follows:

If you are or have been user of the facilities mentioned above, please answer the following question

- (1) Hospital
- (2) High School
- (3) Public housing
- (4) Day Care Center
- (5) Community recreation center

Facility frequency for how how accessible  
used of use long was it ( miles)

- (a) What is the minimum distance that you would like to travel to use the facility ( or have liked to use ).
- (b) What is the maximum distance that you would be ready ( or would have been ready ) to travel to use the facility.

## CHAPTER 5

### CONCLUSION

#### 1. Summary of Results

This paper has concentrated on the conceptualization of the locational problem of public facilities. We have suggested those characteristics of the facilities which contribute to the creation of external effects in their neighborhoods; to the disruption of the effective allocation of resources; and to the generation of strong opposition in the communities involved.

Traditionally, analysis of the public sector has not distinguished between the motives for providing a service and the consequences of the provision of this service. We have examined the behavioral evidence of impacts of public services; these studies have concentrated on perceptions, attitudes, satisfaction, and preferences of an entire population, rather than on the demand-oriented characteristics of the location. The empirical evidence supports the view that a public facility is not only a functional reality, but also an object which evokes feelings and attitudes. Any comprehensive study must analyze both dimensions of a public facility.

A very important notion that recent behavioral studies have underlined is that public facilities are evaluated, by most of the respondents interviewed, according to their degree of 'noxiousness'. That is, facilities are perceived as desirable in a residential environment, ... as more or less conforming to the life style, expectations, or personality of the respondents. Consequently, public facilities are psychologically classified by the residents on a gradient of desirability and attractiveness. Moreover, this classification may be affected by a range

of variables like experience, need and attitudes. This complex set of relationships may generate various degrees of tolerance and satisfaction. We feel the distance factor has proved to be, in the various studies mentioned, a most significant factor in attitude formation toward public facilities. Accessibility to a facility for users and proximity of a facility from a non-user's residence have a fundamental relationship with the intensity of attitudes. The paper has shown, however, that this relationship is somewhat ambiguous and still not completely understood with regard to its real effects on, for example, attitude formation and changes in property values. The distance functions that describe the lessening of impacts, or the increase in attractiveness with respect to location of the facilities, are still largely undefined even if their directions are thought to be known.

We have suggested, therefore, a conceptual framework into which the user-non-user dichotomy naturally fits. We have proposed that an analysis incorporating the utility function approach in any of its various forms is the most suitable for this framework. A significant outcome of this approach is that it allows for the intercomparison of group attitudes with respect to a common measurement yardstick, therefore, providing a basis for computing differential distributional impacts.

We have assumed a new definition of utility which includes tangible as well as intangible benefits from public goods. Consumption of a public service is assumed to bring utility to the user although negative externalities often diminish the net benefits of consumption. Alternatively, positive or negative externalities determine the non-user's utility with public facilities. Since non-user utility is indirect, it is suggested that a negative utility balance generates conflict over provision and location of public facilities. Since the distance relationships appear so significantly related to intensity of impacts, utility is expressed as a function of objective and/or subjective distance to the facility.

We finally proposed a survey instrument which reflects not only our concept of impact of public services but also those aspects of evaluation by individuals discovered in recent research. We suggest that attitudes of users and non-users toward public facilities are based on three fundamental grounds including evaluation of service, client and locational characteristics. Empirical verification of the survey instrument should provide an indication of the validity of this assumption. It would also indicate if our hypotheses concerning different utility functions for users and non-users may be sustained and even developed further.

## 2. Evaluation of Progress

The study of the locational problems of public facilities is still in its infancy. Numerous approaches have been adopted by many researchers. Only now does it seem possible to focus on what may be the most promising notions 1. behavioral approach 2. utility function analysis, 3. externality issues 4. conflict resolution and compensation. With these ideas we can look forward hopefully to a period of rapid development in this field.

Let us review the two major problems which current techniques are now facing. Consider first, the major problem of measuring psychological variables. Given the subjectivity of the psychological observations that are required in this problem, the theoretical and analytical models which exist for reproducing the human system of thought and behavior need to be improved. Despite the arguments supporting their predictive accuracy, the simplicity of the models is a strong limitation to the observation and analysis of complex relationships. There are striking examples of the lack of accuracy of the instruments currently used to reproduce psychological realities. For example, consider the simple summation of scale scores or specification problems in the models above; or the assumptions of homogeneity among in-

dividuals in the interpretation of concepts, as reflected in the choosing of attributes in the Semantic Differential.

Another aspect of the measurement problem concerns the gathering of meaningful and consistent information in order to derive the so-called utility functions. Despite most of the conceptual emphasis of this paper, much of the feasibility and significance of the results are largely dependent upon the design of the measurement instrument and the limitation of extraneous factors which could inhibit the expression of the true attitudes toward public facilities. The task of controlling these limiting factors is one concerning the definition of the problem, the specification of the relevant variables, the development of measurement and analytic tools, and the need for comparative analysis.

One important limitation related to the construction of the survey instrument is the absence of empirical testing of the approach that has been taken and of the assumptions that have been made in this paper. In effect, without the pre-testing of the scales and questions that are used in the questionnaire, there always exists some uncertainty with regard to the true meaning of respondents' answers. That is, the investigator must be certain that subjects answer the questions of preferences, aspirations, actual satisfaction or tolerance exactly as posed to them. Verification is essential to the elicitation and interpretation of true attitudes.

The second major problem lies in the need for improved but manageable analytic techniques. The task of determining attitudes toward public facilities is particularly difficult, given the multidimensionality of the problem. In this paper, we have attempted to illustrate the complexity in showing that different elements (for different individuals) intervene in the process of attitude formation. With respect to the measurement of these elements, it is considered that the individual's attitudes and perceptions are reasonably well captured by adequately-designed measurement scales such as Semantic Differential, applied in conjunction with other appropriate analytical instruments (see Fincher, 1975)

The aggregation of information obtained still remains, however, a problem which requires more analysis on the basis of empirical data. What should be the criteria of aggregation is still uncertain. We suggest in this paper to aggregate on the basis of an attitude score based on the evaluation by the residents themselves of the major characteristics of the public facilities located in their neighborhood. This individual score does not, however, yield aggregate scores which are internally very meaningful. Most of the information about the derivation or the internal structure of the individual score is lost in the calculation of a total score which express the individual's position on a likeliness dimension. Aggregation of several attitude scores accentuates the informational loss from the original set of data. It may be argued that complementary techniques such as principal component analysis or multidimensional scaling may help us to recover the basic dimensions contained in our sets of data. As useful as they may be for interpretation purposes, they are not integrally included in the measure of aggregation itself. An argument in favor of a similar measure suggests that policy-making does not require so much individual observations as it needs aggregate and substantial measures of impact as indicators of utility, satisfaction and welfare.

There is still much room for improving the actual measures or for developing alternative approaches that will provide accurate and applicable individual and aggregate measures of impact.

### 3. Future Research

This paper has chosen to analyze the problem of impacts of public facilities from a psychological standpoint, more particularly through the concepts of attitude theory. An alternative approach which is suggested by Simon (1974) would consist of devising utility indexes from a 'social indicators' approach. The method is to choose measurable "proxies" for individual welfare<sup>1</sup>.

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<sup>1</sup>Some of these proxies are social indicators in the sense of the recent literature on that topic

The social indicators approach requires, however, that more explicit value judgements be incorporated into the design of the utility measures than in the behavioral approach. These value judgements are required in the choices of proxy and of aggregation algorithm. Disagreement with this method may stem from the explicit subjective factor introduced in the methodology. Consensus is certainly hard to reach in a political context. On the other hand, the approach has appealing features: contrary to the behavioral approach, its application to real planning situations is much more manageable both in terms of material and human resources. That is, whereas the psychological approach requires an interpersonal method of gathering information and large funds for analyzing data, the social indicator approach only needs to discover the measurable proxy or proxies which seem best to stand for one's underlying concept of utility. Another advantage of this approach is that it may yield relative interpersonal comparisons of utility.

A second issue which could be more thoroughly developed concerns the examination of satisfaction levels which are felt in different environmental settings in terms of presence or absence of various public facilities. It would be useful to relate the attitudes expressed in the questionnaire toward each facility to the level of satisfaction felt with the service offered in the area. That is, to compare actual versus ideal levels of satisfaction or to compare verbal attitude with real attitude.

A third necessary area of research which would follow from the establishment of utility functions concerns trade-off analysis. It would be useful in a policy context to know the psychological trade-offs that individuals would be willing to accept and tolerate with respect to public facilities. This would require investigating the interchangeability of attributes of satisfaction and similarly trying to define thresholds of tolerance for different groups of residents in different environmental and social contexts. Trade-off analysis in the form of a "conjoint analysis" could provide interesting insights into the

problem of public facilities. There are certain conceptual problems associated with this type of measurement. The model assumes that the attributes of facilities are independent; the same attribute should not be presented more than once and there should be no interaction effects between attributes. This assumption is entirely justified within the public facility problem. Despite its limitations, conjoint measurement procedures are experimentally very interesting for problems such as public facilities, involving some notion of individual and social utility.

A fourth issue which needs to be explored in a planning context concerns the problem of compensation. Mumfrey (1975) has presented a model to facilitate efficient compensation decisions for group losses resulting from the implementation of public facilities. His model uses distances between preference orderings as the basis for utility comparisons over individuals. A similar approach could be conceptualized to relate the attitude scores or utility measures that we have derived to distance preferences with respect to location of public facilities.

A related issue concerns the investigation of the possible modifications either of the facilities, or of the site on which the facilities are located in order to find means of diminishing the noxious effects that are generated by their location. These modifications may be structural ( that is related to the appearance and conditions of buildings ) or they may be qualitative (that is, they will create walls, or isolation effects which will affect the perceptions that residents have of the facilities ). In all cases, it would be useful in a planning context to examine if changes in forms generate changes in attitudes, and make the facilities more desirable for the residents. This issue is of particular relevance to the implementation process since it relates to the ways to ensure acceptance and collaboration of residents in the maintenance and social effectiveness of public services.

A fifth area demanding study concerns the problem of studying impacts of public facilities at the group level. What are

the characteristics of the group of residents who find themselves in conflict over the location of public facilities. A public facility may be perceived as either amenities or disamenities (e.g. positive or negative externalities) that are imposed upon residents and their environment. Atkinson and Robinson (1969) suggest that a hierarchy of needs and motivations appears to operate in our society so that as income level and economic affluence rise, individuals are motivated to satisfy new needs. Environmental expectations are thus seen to relate to income level. In our conceptual analysis, we have examined how environmental expectations are translated in the attitudes that individuals hold toward public facilities. The problem that needs to be examined more closely concerns how the different expectations, at the group level, are related to socio-economic and environmental factors. How do different expectations affect the group reactions to negative externalities generated by public facilities. More simply, for the understanding of individual attitudes to be meaningful in planning public facilities, group attitudes and their intensity must be investigated in their own rights in relation to locational conflicts. With respect to the locational problem of provision of public facilities, the significance of any findings must be assessed in relation to the other dimensions of the problem. In effect, public location requires the simultaneous solutions of (1) finance, (2) production technology, (3) quantity and quality of supply, (4) location and demand estimation, and (5) welfare impacts. Clearly, it is not easy to define the range of optimal conditions which are both feasible and equitable and future research must then be oriented toward devising global solutions for a complex problem. It must be stressed also that, within equity constraints, citizens cannot expect their governments by their intervention alone to provide public goods and simultaneously internalize all externalities.

This paper intended to examine the attitudes of residents with regard to their 'uncompromised' attitudes. Research should

now investigate further the psychological trade-offs that would lead to conflict resolution and acceptance of various public facilities in opposing communities.

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