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By Kirsten Simonsen

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This paper focuses upon the daily activity patterns of individuals and households. It gives a survey of the relevant literature and discusses the possible use of activity studies. Furthermore, it treats the interrelationship between activity patterns and environment and illustrates this by a case study from a Danish provincial town.

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Introduction

Within the study of intra-urban structure and the factors influencing it, two types of studies can be distinguished:

1. macro studies generalizing the whole structure of the city
2. micro studies dealing with:
   a. specific quarters of the city
   b. the activities of the inhabitants of the city.

Of the two groups the macro studies are the most comprehensive ones, as they embody the physical, functional, and social structure of the city and the changes caused by increasing urbanization and by the technical and economic development of the society. A great number of models have been set up to explain the spatial structure of cities and to simulate their growth in different ways. As they concentrate upon the macro structure, these models cannot tell us much of the life-conditions and possibilities of the individual in our cities. The level is so aggregated that man as a human being looses his importance. The models contain explicit or implicit a number of assumptions of human behaviour with the concept of "economic man" being the most conspicouos and human beings not conceived as individuals but as groups e.g. social classes, employees, commuters etc.

Micro-level studies of the city are rather few. For many years studies of city quarters concentrated largely upon the center of the city but in the last few years an increasing number of studies of residential neighbourhoods have appeared. Only few studies have been published with the individual as the basic subject. This – focusing on the daily activities of individuals and households – will be the subject of this article. A survey of the relevant literature will be given, the possible uses of activity studies will be discussed, as well as the interrelationship between activity patterns and environment. As far as the last problem is concerned reference will be made to a case study carried out by the author on the influence of the physical environment on man's daily activities. For more details the reader is referred to: Kirsten Simonsen: Beboernes daglige aktiviteter i en dansk provinsby. Laboratorium for bebyggelsesgeografi, bygeografi og fysisk planlægning. Rapport nr. 1. København 1973.

Definition of the concept of activity

In the course of time the concept of activity has been used in different meanings, but two main approaches visualize:

basis in the performer of the activity

basis in the place where the activity is performed.

With basis in the performer, Chapin and Hightower (1965) define activity systems as those behaviour patterns of individuals, families, institutions and firms which are of importance for the spatial structure of the city i.e. they perceive the activities as the types of behaviour which are linked to a fixed location. Chapin (1965) uses a similar definition and regards activity as part of the concept of interaction which he subdivides into two components: an activity component linked to a fixed location and a communication component consisting of movements of people, goods or messages. He subdivides further the activities into three types after the performers:

1. firms – productive activities.
2. Institutions – general welfare activities.
3. households and individuals – residential activities.

The first group is defined as all the activities performed by private firms i.e. production, sale and service activities. The second group comprises activities performed by public as well as by private institutions (schools, libraries, churches etc.) and also administrative activities and public service. The third group, residential activities, comprises – although it does not appear clearly from the designation – all activities performed by families or individuals.

With basis in the place of performance, the concept of activity is used in land-use studies. Guttenberg (1959) pointed out the basic difference between classifying land-use after the economic unit (economic over-use) and after

the actual use of the single areas (activity). An example to illustrate this: a shop is an economic unit but the rooms are occupied by different activities as e.g. sale of goods, or storing. This distinguishing is necessary if a land-use study is to be used in an analysis of the intensity of use or if a measure of the concentration of people or traffic is the aim of the study. Guttenberg's thoughts are reflected in many land-use studies as for example: Jan Magnussen: Slagelse Bymidteundersøgelse (1970) where the floor space is classified according to function as well as to activity. A mixing up of the two concepts is still seen, however. In "Standard Land Use Coding Manual" published in 1965 in a cooperation between two planning institutions in Washington, activity is defined as an organizational unit performing a special function and occupying identifiable space at a fixed location.

In this context it is the definition of the activities of the individual which is of interest, and – in accordance with Chapin – I shall distinguish between activity, transportation and other communication. Chapin's demand of linkage to a fixed location will be abandoned, however, as this demand will coincide with mobile activities as "Walking" which Chapin also considers an activity. The movements are divided into two types: movements being a means to arrive at a certain place (transportation) and movements being an end in itself. An activity is thus defined as an action tied to a certain location or a movement being an end in itself.

Activity systems

Chapin and Hightower define activity systems as the behavior patterns that are of importance for the spatial structure. To be so, the patterns must show a certain regularity in occurrence and distribution of the different activities in time and space which means that changes in the spatial structure of the city imply changes in the composition of the systems.

The activity systems might be considered components of more comprehensive interaction systems in the city. Chapin (1965, p. 224) states five items which a system of this kind should comprise:

1. metropolitan area interaction
2. the activities component of interaction
3. some form of continuing inventory
4. interaction systems of recurrent nature and with tendencies to cluster into spatial patterns
5. patterns of interaction of community-wide significance.

These five items seem to be neither equal nor specifically well-defined, and Chapin does not attempt at linking them together. They may be regarded as – even a somewhat fragmentary basis for others to build upon.

Several attempts have been made to set up dynamic interaction systems for cities, and Webber's model (1964) deserves special mention. Webber states that interaction takes place at two different levels: one linked to the city region and involving movements in space (urban place-level), and another level exceeding the boundaries of the region and being less dependent on distance (urban realm-level); he advocates that with the increasing use of telecommunication the "urban realm"-level will become of increasing importance. At the spatial level he regards the city as an interaction system consisting of three components: the interaction patterns of individuals, the physical structure, and the localization of the activities. These components are tied together by a number of interrelations which he calls dependency ties; they make the system functionate but their character has not yet been sufficiently clearified.

The above should show how activities can form part of a greater dynamic system; the examples are few, but here may also be mentioned Meier's communication theory and Lynch-Rodwin's "theory of urban form" although they give the activities a more subordinate place.

Individual and household activity patterns

In the definition of the concept of activity and activity systems great importance has been attached to the spatial aspect. Furthermore, the activities contain a temporal aspect, which is indicated thereby that they are generally measured in time use. This aspect might – according to the applied time scale – be devided into different levels. Chapin (1968) identifies four "time-scales" – the daily, the weekly, the seasonal and the life sequence. The daily and weekly sequences have later been combined to one (Chapin and Logan, 1969), as it has proved difficult to keep them apart. As examples of activities on different scales, work, shopping, or hobby on day/week scale can be mentioned, holidays at seasonal scale, and change of residence on life scale.

The division resulting in three scales does not mean a total splitting up, however, as the single levels – only indicating man's behaviour different time-scales – are interrelated. An example of this vertical relationship is the influence of the daily activities on the choice of residence. But not only the daily activities are considered decisive for the migrations of families. One has to distinguish between:

1. The decision to move where dissatisfaction with the access to different functions might be of influence, but as advocated by Rossi (1955) the decision is usually taken because of new space requirements arisen by changes in the family life cycle.
2. The choice of a new dwelling where factors as size and location – and thereby also the activity patterns of the household – are of importance.

The working place is often referred to as determinating for the residential localization. The most well-known is Alonso's model where the localization of a household at a given income-level as well as its satisfaction are regarded as functions of its space requirements, of distance from

the center (where all places of work are supposed to be situated) and of its consumption of other goods. Wingo works with still more simplified assumptions with only two independant variables: use of space and distance to work. In return, he has refined the measure of distance by using road distance and transportation expenses.

The studies referred to above exemplifies how the different time scales are interdependant. Before discussing a single scale, the decision to perform a certain activity will be treated briefly.

The process of decision – making behind human activities is so complicated that it is difficult to recognize without comprehensive psycological insight; but when studying activities it will undoubtedly be fruitful to get an idea of how the decision arises. Chapin (1968) regards the process as a system consisting of three components:

- a motivation component related to the value system of the individual
- a choice mechanism
- an activity as the "output" of the system.

The motivation component consists of the conscious or the unconscious needs of the individual, and he considers "security, achievement, and status" to be the most important needs. The needs for security – the fundamental ones – might e.g. be needs for permanent employment or for access to social institutions, i.e. conditions which make it possible to maintain a reasonable standard of living. The needs for achievement and status are interrelated but might be defined as the need for getting personal satisfaction and for reaching a certain social position respectively. This division of supplementary needs, as they are called by Chapin, might seem incomplete as "the need for obtaining personal satisfaction" may be extended endlessly and thereby looses practical importance.

The "input" in the choice mechanism is the above needs which might be modified by the relative importance attached to them by the individual and also by the constraints laid upon them by his environment and the social organization.

The activities are "the output" resulting from the process. They may further function as "feedback" by influencing the individual's relative weighting of the needs and thereby influence the choice mechanism.

A similar, but more simplified concept of the process is found with Westelius (1968), who also stresses the importance of the temporal aspect. He considers the individual's movement pattern as the result of a number of latent needs accumulated in time. He applies this viewpoint to form a hierarchy of the activities performed out-of-home, and groups them after their ability to release each other so that the activities most restricted in time and space govern the moving pattern of the individual, because they can be combined with the more free activities when possible.

The constraints involved in Chapin's choice mechanism

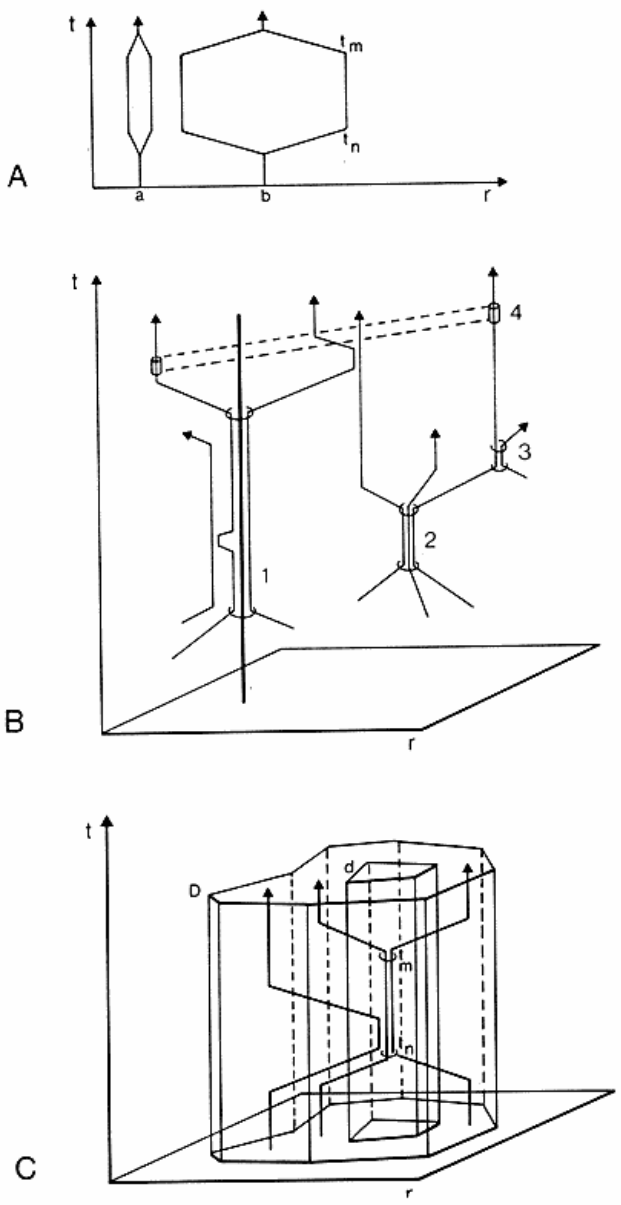

Fig. 1. Hägerstrand's time-geographical model.
Fig. 1. Hägerstrands tidsgeografiske model. Kilde: T. Hägerstrand: Konturerne av en tidsgeografisk samhällsmodel. SOU 1970:14.

A. Time/space prism for a day for an individual spending the time t_n–t_m at his place of work. A mobile person (b) gets a more free choice of place of work than a less mobile person (a).
A. Tids-/rumprisme for en dag for et individ, der skal tilbringe tiden t_n–t_m på en arbejdsplads. En mobil person (b) får friere valg af arbejdsplads end en mindre mobil (a).

B. The coupling into bundles of the individual-prisms. 1, 2, and 3 are tied to the place, 4 represents telecommunication.
B. Individ-prismernes sammenkobling til »knipper«. 1, 2 og 3 er stedbundne, 4 repræsenterer telekommunikation.

C. Hierarchy of "domaines" in relation to the individual-prisms.
C. Hierarki af »domæner« i relation til individ-prismerne.

are also found in Hägerstrand's time-geographical model (1969, 1970) where they are treated in their spatial and temporal aspect. He groups the constraints into three big families:

- capability constraints
- coupling constraints
- authority constraints.

It is common for the three groups that the single individual can only slightly influence them.

The capability constraints are the limits caused by the individual's physiological necessities as sleep for a certain length of time, meals at regular intervals, and also by the capacity of the tools he can command. As to the last-named, especially the means of transportation decide the range of man in time and space. On the basis of these limits and the fact that people normally stay for some time at the place (f.inst. the place of work) to where they have been transported, Hägerstrand sets up his time-/space prisms for the daily activities of the individual (fig. 1A).

The coupling constraints arise because it is necessary that individuals, tools, and materials are bound together at given places at given times. Places of such activity bundles can be places of work, shops or public means of transportation. A condition for an individual to participate in a coupling is that it takes place inside the day prism formed by the capability constraints (fig. 1B).

The authority constraints Hägerstrand calls "the time-geographical aspects of authority" i.e. the time-space entities inside which things are controlled by given persons or given groups – by Hägerstrand called "domains". As examples might be mentioned firms, townships, counties or states, and as shown in fig. 1C these form hierarchies.

Hägerstrand's time-geographical model consists of a combination of these three types of constraints which form the limits inside which an individual may satisfy his needs.

Conclusively it can be stated that the activities of individual on different scales are called forth by an accumulation of his different needs combined with his degree of information of the environment and followed by a relative weighting of the needs; the access to realize the needs will be limited by a number of constraints which may be of physical kind and/or forced upon people by the society.

Movement and activity studies

Planners show an increasing interest in obtaining a better knowledge of the activities performed by individuals: how they use their cities and how the environment influences the activity patterns, however, the research made so far on cities has reflected this interest only to a small extent. The literature on the daily activities of man falls into three groups:

1. treating the spatial aspect only – the pure movement studies.
2. treating the temporal aspect – the pure time-use studies.
3. comprising elements of both aspects.

The first two groups being by far the most comprehensive ones.

The movement studies may further be divided into analyses of all types of travels – especially traffic analyses – and analyses of trips with certain purposes as e.g. commuting or shopping.

The most important tool in traffic analyses is "origin-destination" studies, where the journeys are classified according to place of origin, and to place of destination, and where length of journey and means of transportation are registered. An example hereof is seen in "Egnsplanrådets Trafikanalyse" from 1967 (a Copenhagen regional planning board). Another use of "origin-destination"-analyses is seen in e.g. Foley's (1952) investigation the importance of Central Business District based upon the population stream flowing to it. It is quite evident that these types of investigations study what people do, with no interest in why they are doing it.

The place of destination which has attracted most interest is the working place. The journey to work was the first to be studied and a great deal of investigations deal with this subject. Presumably because it is the most frequent type of journey, but also because it is concentrated on certain times of the day and can thus be used to show the peak-loading on traffic systems. Commuter investigations deal partly with distances and means of transportation, partly with commuter groups defined by variables as age, sex, profession or socio-economic status.

Shopping journeys have also been considered of special interest. Journeys with the purpose of shopping or getting a service of some kind have been studied in many different types of investigations – from macro studies e.g. delimitation of hinterlands to investigations of consumer behaviour at micro level. Of the last type Nystuen's analysis of shopping trips (1959) is of special interest because he investigates how different shopping activities are combined with each other and with other activities and he thus treats different elements of the individual's activity pattern. In addition Nystuen relates the shopping behaviour to the retail locational patterns of the city.

It is a common feature that movement studies do not investigate the movements with the individual as the basis but rather out of consideration for traffic or trade interests. Accordingly, they do not discuss the individual's total behaviour pattern but only single elements of it.

Pure time-use studies are studies of the daily use of time for different activities regardless of their localization. Most studies of this type are found in the sociological literature. A Danish example is Kühl, Koch-Nielsen and Westergaard: "Fritidsvaner i Danmark", Socialforskningsinstituttet 1966 (Leisure Time Habits in Denmark. Institute of Social Research). One purpose of this investigation ordered by Radio of Denmark was to analyse the

habits of radio listeners and TV viewers. Naturally a great deal of it is devoted to the interest shown in different types of transmissions, but the analysis was extended to comprise other leisure time activities. It is purely descriptive and tells of the different population groups' ways of spending their leisure hours; more detailed conclusions of the results of the analysis are not drawn.

Although in his presentation and definitions Chapin emphasizes the importance of the relation between activities and urban structure, most of his empiric studies are pure time studies in which he tests the influence of different social and demographic variables on the activity patterns (e.g. sex, age, life-cycle, income, profession). Few exceptions have appeared and shall be treated later.

The most significant studies on man's daily activities considering both time and space aspects have been published in Sweden. Hägerstrand's earlier mentioned time-geographical model is being used as frame in a great research project "Tidsanvändning och miljö" at the University of Lund under the leadership of Hägerstrand. Preliminary results have been published in the periodical "Urbaniseringsprocessen".

In No. 17 (1968) Carlstein, Lenntorp and Mårtensson define 5 types of individuals and combine them to 36 household types. For some of the household types diagrams are drawn showing the household members' "day-path", i.e. surveys of the total time-use and with the spatial aspect included as time of transportation.

Lenntorp (39:1970) constructs a model for computation of alternate paths in time and space. On the basis of the physical environment (location of different functions and the transport system) and the activity programme of the individual (the desired activities with distinction between place- and typefixed activities, their duration and coordination with other individuals) the model computes the possible day-paths falling within the time prism of the individual.

Mårtensson (39:1970) whose study must be seen in connection with the above, attacks the problem from another angle. She investigates the actual distribution of 8 different functions and their accessibility under a time-geographical viewpoint. This accessibility is defined by the spatial distribution of the functions, their possible co-localization, their opening times (both time interval and time of the day) and their flow capacity. The report is a descriptive study illustrating the above-mentioned characteristics for a small town, a middle-sized town, a city center and a city suburb.

It was mentioned earlier that most of Chapin's empiric studies do not deal with the influence of the environment on activity patterns, apart from some exceptions. One of these is the investigation described by Chapin and Brail (1969). Besides the usual social variables five independent variables are chosen as indicators of the influence of the environment:

1. Access to automobiles and mass transit systems.
2. The time required to go downtown from the residence.
3. Size of the city.
4. Attractiveness of the neighbourhood.
5. The satisfaction of the individual concerning his access within the space economy.

Chapin and Brail find that these variables have less influence on the activity patterns than have the social variables, but the extent of the influence is not evident, as the variables have not been isolated.

A Danish study of activity patterns has been published by Kofoed (1972), who describes the daily activity patterns of the residents in a Danish provincial town (Odense, 160.000 inhabitants). In four residential areas – selected after type of dwellings and location in the town – 350 households' activities are described for one week. The investigation comprises: number of activities and the times of their occurrence, combination of activities and trip chains, distribution of activities on different zones of the town, and the means of transport used. This is a rather comprehensive analysis, but descriptive as it is, it does not show the influence of the single factors on the activity patterns, although it has been attempted to attain some similarity of the selected population.

The interest for an approach based on the individual and considering also the physical environment has been increasing the last few years. As outlined above the first steps have been taken towards more comprehensive analyses of this kind of problems.

Activities and land use

The spatial patterns of the functions of a city influence to a very high extent the activity patterns of the city. Thus, in relation to land use the activities may be considered the dependent variable. This relation can also be considered the opposite way, however, i.e. land use is the dependent variable showing the adaptation of the city to the residents' behaviour and as such dependent on the activity patterns. There will thus be a reciprocal adaptation process between activities and land use – a process which is susceptible to outside influence. Independent of land use, the activity patterns may change because of increasing living standard which e.g. gives people more leisure time and greater mobility, and thereby creates a demand for another city structure. The land use can be changed by private or public decisions as to localization of working places and dwellings, which immediately change the activity patterns of those implied. For the existing service functions this again will result in a new market situation to which they will adapt themselves. There is thus a reciprocal action between changes in activity patterns and in land use, because the activities rather promptly adapt a new situation, whereas (e.g. because of invested capital) the land use pattern will change more slowly.

The increasing recognization of the importance of this interaction has led to renewal of studies of land use; from mere descriptions of the use of areas and buildings, studies of the activities performed by the users are now being considered worth while. An example of this way of thinking is the division in function and activity in land use classifications mentioned in the first section, but it is still more evident from the different "definitions" of urban land use collected by Chapin (1965). He refers three different approaches:

1. the spatial distribution of city functions.
2. a two-past framework consisting of:
   a. the residents' activity patterns in the city.
   b. the adaptation of the urban structure to these patterns.
3. the individuals' value systems which regulate the space-using activities and thence the use patterns which emerge.

Although the construction of analytical tools for studying the interaction between activities and land use is still in its initial stage – here Bo Lenntorp's model (1970) deserves special interest – many works point at the necessity hereof. Chapin and Logan (1969) state e.g.: 'It must be evident that land use analysis is incomplete without a concurrent activity analysis, for to ignore the interplay between the two is to enter upon policy decisions based on supply without relating them to demand aspects."

The purpose of activity studies

Knowledge of the activity patterns of individuals and households is no end in itself, it only gives us a static picture. In order to give activity studies a dynamic aspect the environmental influence on the patterns must be taken into account. In its widest sense the goal of activity studies is to recognize the interaction between human behaviour and the environment, i.e. the society and its organization, the other inhabitants of the city, the physical structure etc. In the present context the purpose is restricted to comprise the physical environment; this leads to objectives investigating partly the influence of the physical structures on the activity patterns, partly the character of the reciprocal adaptation process between activity patterns and land use.

At micro level this leads to an interest for the individual's behaviour in his every day environment, how elements hereof influence the activity patterns and how the sum of all activity patterns influence the location of the different functions. An analysis hereof can tell us something about the barriers for displaying human activities set up by the structure of the city, gives us an idea of the demand for urban facilities, and thus provides us with a tool which might be useful to establish a more equal access to the facilities.

At macro level the target is to build up models of the activity systems of households to explain the urban structure. In many models the market mechanism is the only explanatory factor. Though important enough, it must be reduced to constitute only part of the explanation and the activity systems of the residents considered an essential supplement. Other factors deserve mention, as f.inst. Park and Burgess' ecological theory and Firey's socio-cultural theory.

The objectives mentioned above are relevant both within basic research and within planning work. It will not be reasonable to make a distinction between these two as it will only be a question of operational level; if it explains parts of the city structure or function in a sufficiently operational form, any analysis of the city will be relevant for planners.

Use of activity studies in planning

Just as origin-destination investigations are useful for traffic planners, studies of activity are suited to serve a corresponding purpose for land use planners. The interaction between activity patterns and land use renders analyses hereof useful in several ways. They may enable planners to see the consequences to people's behaviour pattern caused by changes in land use and thus in advance to evaluate whether these changes are desirable or not. Furthermore, the analyses can be a tool for getting the best location of the city functions – particularly service functions and recreative purposes. With this end in mind it is necessary to know the changes appearing in the activity patterns independent of the city structure, so to say make a forecast of the activity patterns. As the activity studies are still at the initial stage, there are up till now only few attempts made as to build op methods for this purpose.

Hemmens (1966) has tried to simulate the activity patterns by a semi-Markov process, i.e. a process consisting of a chain of stages (activities) and movements between the stages; the probability that a movement goes from one stage to another depends solely on the stage just before the movement: the time used for a movement between two stages is a function of the time spent at the first stage. The probability that a movement from a given activity leads to a certain other activity, Hemmens computes on data from an empiric investigation. This makes the model less applicable for long-range forecasts, as it works with probabilities constant in time.

Chapin and Hightower (1965) applie quite another method to forecast future activity patterns. They presuppose that the increasing automation will shorten the working day. The respondents get a limited number of stamps to be posted onto a game sheet suggesting various choices open to him for spending his leisure time. Next, he is to repeat the game on the assumption that more leisure hours are at his disposal. These "games" might be applied

elsewhere where circumstances change, but a shortcoming is of course that the activities which people choose for the future might not be identical with those actually chosen under changed circumstances.

In report from "The Working Group concerning Planning Education" under the Planning Group for the Ålborg University Centre, the traditional ways of planning are treated and viewed as two main types:

1. Goal-oriented planning, starting with a goal formulation and then seeking the means to achieve these goals.
2. Prognostic planning, consisting on forecasts of the present conditions followed by a coordination of this forecasts.

Furthermore, an alternative planning method is submitted called "generative planning". This is a way of planning based on the individual. First it is tried to explain the behaviour of the individual under the present conditions. Then it is tried to recognize what values people try to materialize, and politically it is then evaluated how a free maximizing of values for all groups of population will influence society. This weighting results in establishment of the necessary restrictions and then the further planning is submitted to the local units.

The use of activity studies in traditional planning have been touched upon earlier, but also in generative planning they may play a significant role. This is only natural as generative planning also conceive the single human being as a central point. The first phase in the planning process contains clearly the goal of activity studies, namely to explain the interaction between activity patterns and the physical environment. The effects of the decisions taken by certain groups on the urban structure and thereby on everybody's activity pattern, constitutes an important part of the political discussion of the consequences. When optimizing the welfare of the individual is the central point in planning, it is very important that the final planning at the local level knows the kinds of dwellings and the land use patterns that will lead to an optimizing of the activity patterns for as many people as possible. To serve this purpose, Chapin and Hightower's "games" together with a great knowledge of the interactions at the micro level would be a very informative tool.

It would be exaggerated to call this method an alternative to the traditional way of planning, as it will hardly be possible to practice generative planning on regional or country basis, but it may be a very useful supplement at local level. Here the principle would mean a functioning local democracy.

Design of case study

The object of the analysis discussed here is the daily activity patterns of individuals. The composition of these patterns appears as the result of physiological, social and physical circumstances excerting influence on the individual; they may partly promote or obstruct his motivation to perform the single activity and partly restrict the actual possibilities to carry it out. Inside the physical sector these influences may lie in the localization of the urban functions, in the transport facilities available to the individual, and in his housing situation. The goal of the analysis was, therefore, to study how the physical environment as defined above influences the activity pattern of man.

The necessary data were collected during an interview investigation at Slagelse, a middle-sized Danish provincial town (27.200 inhabitants), November 1971. Five residential areas were investigated, selected after the following criteria:

1. They were to be at different distances from the town centre.
2. Both blocks of flats and single-family houses were to be contained.
3. Different housing qualities were to be represented.
4. Each of the five areas was to be physical homogeneous and well-defined.

This selection of the study areas ensures the presence of the physical characteristica necessary to fullfil the purpose of the study. The households to be interviewed were selected by random sampling in each of the five areas. The questionnaires contained questions concerning sex, age, marital status, size of household, profession and education, size and quality of dwelling, distances to different places measured in transport time as well as means of transport at disposal for the household and each member's use of them. Finally there was a time-use scheme to be filled out with all activities performed by the individual during the foregoing day, the time used for them, the place where they were performed, the transport time spent between the activities, and the means of transport applied. This time-use scheme showing the activity patterns of the individuals was the central part of the interview and was to be filled out as detailed as possible for all adult members of the family and for the children attending school. For the last-named group the questionnaires filled out were so few that it was considered not worth while working up this material. The data were collected for one of the first weekdays so the material describes either a Monday or a Tuesday. A total of 312 questionnaires were returned, distributed on 161 females, 109 males and 42 children.

The activities were then classified after two main principles: according to degree of commitment as activities performed to satisfy fundamental needs are less open to choice and therefore less dependent on the environment than the others. Furthermore, according to localization inside or outside home as this is supposed to be of importance in relation to housing conditions as well as to distance relationships. The result of this division gives a classification system containing 5 main groups and 25 subgroups:

1. *Bound in home*
   housework
   paid work/preparations
   others (e.g. meals)

2. *Bound outside home*
   work or education
   school
   others

3. *Partly bound*
   shopping or personal services
   medical services
   others

4. *Free in home*
   relaxation, resting
   radio, television
   reading
   hobbies, playing
   family-centered activities
   visits of family and friends
   others

5. *Free outside home*
   picnics, trips
   cinemas, theatres, library etc.
   evening classes and other free time education
   sport
   restaurations, cafés and similar
   clubs, unions, organizations
   visiting friends and family
   hobbies, playing
   others.

When working up the material, the main stress was laid upon the free activities as they are presumed to be most influenced by the environment. When testing the importance of the different variables to the group of individuals characterized by them, the average time spent on the activity was applied as a measure for the activity patterns of the group. The statistical method applied is a test of differences between means for uncorrelated data by using standard scores. The variables tested for influence on the activity patterns were the following:

distance between dwelling and town centre
distance to place of work
transport possibilities, defined by access to car
dwelling type
quality of dwelling
number of persons per room.

Results

It was not the goal of the analysis to give a representative picture of the activity patterns of the inhabitants of Slagelse but to investigate how some specific characteristica of the urban environment influence the patterns. Consequently a total survey of the composition of activity patterns of the interviewed will not be given here; instead the results of testing the influence of the above mentioned six physical variables on the activity patterns shall be discussed. A variable is here considered to influence an activity when the difference between the mean values of the time spent for the activity by two groups of population is significant at least at a 5 per cent level. When evaluating the results some reservation must be taken because of the size of the population. The total sample population counts 270 individuals, but some of the subpopulations of the tests are rather small. Other sources of error arise during the collecting of data, e.g. it proved difficult to delimitate the time spent on in-home activities. Thus the group "relaxation, resting" has been overestimated at the expense of "radio, television". Furthermore, double activity was stated in some cases and it was later an estimate what to consider the main activity.

During the tests, social status and status in life-cycle were maintained constant. On the basis of the results obtained it is, therefore, possible to recognize the influence of the physical variables on the activity patterns, but not whether this influence is greater or smaller than that exerted by the individuals' social and demographic characteristics. To this problem, Chapin and Brail (1969) state on the basis of their analysis that personal characteristics of the individuals have a greater explanatory power on the activity patterns than the physical environment, but they have to make the reservation that this might be due to their choice of physical variables. The influence of the six physical variables chosen here on the activity patterns varies to a great extent. The three groups of variables can be ranked according to importance, namely:

1. the variables describing the distance relations
2. transport access
3. housing conditions.

The two distance variables are distance to town centre and distance to place of work. The importance of the "widest" of these two measures, distance to the centre, is mainly noted in the main groups of the activity classification – more time for free activities out-of-home for people living near the centre – and in the diversity of activity patterns (i.e. number of activities) which is great outside home and small inside home for those living near the centre. Distance to place of work constraints the activities outside home for three subgroups: (picnic/trip, cinema/theatre/library, and evening classes etc.). The two distance variables influence the in-home activities to be more passive in character. The out-of-home activities not influenced at all were the groups sport, restaurants/cafés and hobby/playing. All of them appeared so seldom that they were of no importance in all tests. Furthermore, visits to private homes were not influenced. This shows

that the social contact with family and friends is the last activity to be reduced when man's activities become limited in space and time. Although these two measures of distance relations in town are very simple ones, the results seem to support a hypothesis that a planning which intend to make a strong spatial separation of the different functions of the town will limit the inhabitants' possibilities to exploit actively their leisure hours. The results also show some effects on the actual activity patterns of some of the capability constraints included in Hägerstrand's time-geographical model.

The effects of access to car are weaker than those of the distance relations which they otherwise support. The influence of this variable may be weakened by the fact that three of the selected areas are localized so near the centre that the means of transportation have no influence on the accessibility to city-functions. The accordance with the effects of the foregoing variables shows that the time-geographical constraints increase with dependence of public means of transportation.

The influence of the housing conditions was still less. The main trend was more out-of-home activities the poorer the conditions (flats, low quality of dwelling, overcrowding). More detailed investigations are to be made, however, before further conclusions can be drawn as to the influence of the housing situation on the activity patterns. Kofoed (1972) found e.g. in his analysis in the Danish town Odense that the type of dwelling was of no importance.

Part of the variables of the analysis actually mirrors the social differences, as for example all variables and the access to car. The question is, therefore, whether differences in activity patterns, explained in many analyses by social status, have not rather appeared by a combination of the effects of the physical environment of the different social classes than by differences in the behavior norms of the classes.

RESUMÉ

Objektet for denne artikel er individets og husstandens daglige aktivitetsmønstre. Det er forsøgt at give en oversigt over og en diskussion af litteraturen om emnet, der her deles op i tre grupper: rene bevægelsesstudier, rene tidsforbrugstudier og arbejder, der indeholder både det rumlige og det tidsmæssige aspekt. Desuden diskuteres sammenhængen mellem aktivitetsmønstrene og individets omgivelser samt aktivitetsstudiernes anvendelsesmuligheder i forskning og planlægning.

I forbindelse med diskussionen om det fysiske miljøs indflydelse på aktivitetsmønstrene refereres en undersøgelse fra Slagelse, udført af forfatteren. Heri testes, hvordan afstandsrelationer, transportmiddeladgang og boligforhold påvirker aktivitetsmønstrene. Resultaterne af denne analyse viser, at lange afstande og dårlige transportmuligheder har en begrænsende virkning på fritidsaktiviteterne, hvorimod det er mere usikkert, hvor stor indflydelse boligforholdene har.

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