WORK: EFFECT ON NUMBER AND DURATION OF ACTIVITIES PER DAY

by

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ABSTRACT

In two studies in the 1930's statistics were generated to show how people spent their time during a twenty-four hour period. These statistics provided information on the number of activities, the duration of such activities, and the people with whom these activities took place. The method of data collection was a diary or log of activities covering a day, which was filled out by the respondent, either during the day, or from his memory of his activities of yesterday. With the lack of any theoretical schema with which to approach the problem of how people spent their time, the present research was completed to put forward a theoretical model, the assumptions of which could be verified with the data we had collected. The data consisted of the Time-Records of 308 respondents interviewed during the summer of 1965 in an industrial community of twenty thousand.

It was suggested that persons who have in common certain social characteristics will also report a similar number of activities during a day. The characteristics looked at were work shift, work status, family size, and the company size in which people work. It was also proposed that the greater the number of activities reported in a day the less the variance

of the time spent on such activities. We were able, therefore, to test five hypotheses on our data having explained our reservations of the restrictions put on the data by the Time-Record method of data collection.

Our results show that persons who work at an "off-phase" time report a greater number of activities during a day than do persons who work a normal day. The effect of work status on the number of activities does not appear to be significant. With respect to family size no significant difference was found but there was a substantial drop in the number of activities reported by families of three or four persons. We also found that the persons who work for the largest company in the community report a greater number of activities than do persons who do not work for that company. With respect to the variance of the time spent on activities, we found in three different cases that the greater the number of activities reported in a day the less the variance of time spent on those activities.

Our hypotheses derived from our theoretical schema allowed us to make certain predictions concerning the number of activities reported in a day. The findings outlined above were found to refute our predictions in that the significant differences were in the direction opposite to that of our predictions. It was therefore possible, because we had a theoretical schema, to go back to our assumptions and find out

where we had gone wrong. In changing our assumptions we will now have a greater predictive power in our theory. The changes were based on further workings with the data, especially with the information we had on the persons with whom an activity was carried out. It appeared that an assumption was incorrect. The assumption stated that activities which required a number of persons to be present would be of a shorter duration than those activities not requiring the presence of others.

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CHAPTER I

THE PROBLEM OUTLINED

Man has many conceptions of time as duration, the most standard device for the measurement of this dimension being clock time. The social scientist in his study of human behaviour has found it necessary to use the dimension of time in various ways; when observing the "structure" of a behavioural situation at a given moment in time; and when observing behavioural changes over a specified time duration. Also, given a finite duration of time, for example twenty-four hours, social scientists have tried to describe the types, durations, and intensity of activities that have been performed by specific groups of individuals, within that given time period. One of the methods used to observe and measure behaviour in a limited time period has been given the name "Time-Budgeting" by some social scientists where the measuring instrument is a diary or log of behaviours. It is this method of data collection with which this research is primarily concerned.

The question that has first to be answered, however, is why such research should be carried out. It might be stated that the social sciences are now developed to the stage that they can start to answer such practical questions as how <u>well</u> people are

spending their lives. This question is indeed important but it is so dependent on value judgements that the social sciences as such will rarely be in a position to make judgements of such a nature. The research we have carried out asks nearly the same question but without the value loading, that is: how do people spend their lives? From a methodological viewpoint, a valid, reliable, and feasible technique must be found which will allow the social scientist to portray time expenditures.

The main task is to map out what is to be measured. There are no accepted or natural units, such as single physical objects, in which to measure the quantity of most behavioural activities (Homans, 1961). However, each unit of activity takes time to perform thus allowing us a common measure for activities. Such a measure leaves open the question of the intensity of the activities and the meaning of the activities for the individuals; although of real importance these are questions that cannot, at present, be integrated into our research. Therefore, time is the concept most readily available to us and will be the main measure used in this study.

During a given time period some people will exhibit a greater number of activities, no matter how they are measured, than will other people. At the same time it can be observed that people spend different durations of time on any given activity, and many social scientists have measured such durations. Studies have been made on specific activities to look at the characteristics of persons participating in that activity and the durations

of such participation. G. A. Steiner (1963) reports that he used the diary method of data collection, in a follow-up study by The American Research Bureau, to look at the incidence of watching television. Also, many studies have been done to look at the time spent and by whom, in "voluntary organizations." See especially the work of Komarovsky (1933, 1946).

The problems on which this research is focused are of a more general nature than the problems previously studied by researchers who have focused on specific activities or on a specific moment in time. The first problem is to discover whether or not those persons who participate in the same number of activities in the same given time period are randomly distributed among a given population. That is to say, can we predict that persons who have in common certain social characteristics will report the same number of activities in the same given time period? That persons who have in common certain social characteristics tend to participate both in frequency and duration in the same activities has been already demonstrated by the studies outlined in the previous paragraph. However, to the best of our knowledge, the number of activities reported in a given time period has not been looked at with respect to groups who have in common social characteristics.

The second problem on which this research will focus is to predict a relationship between the number of activities reported in a given time period and the durations of such activities. Due to the finite quality of a day (though this is not true in

actuality, people still look upon and act as if a day is of finite duration) if a person is to participate in more activities than other people, then there will be a necessary reduction in the time spent on such activities. This reduction in the duration would be necessary if one wished to get all the activities completed in time. Both these problems are formulated into a theoretical schema from which several hypotheses are drawn to be tested on the data that were coded with these specific problems in mind.

Previous studies, to be outlined in the next chapter, have been of a descriptive nature. In contrast, we have attempted to formulate, in all its tentative glory, a theoretical schema which would act as a guide for codifying the data and for formulating the questions we wished to put to that data. The research is carried out specifically to fill the theoretical gap that exists. The problems are in the form of five hypotheses which will be drawn from this theoretical schema and tested to verify the assumptions in the schema. The main social characteristics to be looked at are: the time at which work is carried out; the degree of status at work; the size of the family; and the size of the work organization to which a person belongs. With the refutation or verification of the specific problems asked of the data then, in the space allowed, further relationships that are found in the data will be presented in descriptive form. It is hoped that these empirically derived relationships will modify and increase the predictive power of the theoretical model.

CHAPTER II

SELECTED LITERATURE

The works to be outlined in this chapter do not represent a comprehensive review of all the publications that have dealt with the concept and use of "Time-Budgeting." Four works are picked for their contribution to the ideas which are presented later in the formulation of the theoretical schema. It should, however, be noted that these publications represent almost fifty per cent of the rather scant literature at present available. A full bibliography of the publications known to us is given before the general bibliography. Also included in the reviews is a discussion of a work concerning the effects of different work shifts on non-work time. It was used to generate some of the conditions under which some of the hypotheses are tested.

The first of the two oldest and most important studies carried out was Leisure: A Suburban Study (Lundberg, Komarovsky, and McInery, 1934). The authors' technique was to request people to complete a diary of their day-to-day activities during as long a period as it was possible. One subject managed to keep a diary for a whole year, a few for seven days, but most for only a single day. The compilation of these records was done by the respondents recalling what activities they had participated in "yesterday." A

count of the number of items recorded totalled approximately 100,000 from the 2,460 persons who filled out the 4,460 diaries considered completed. (If a person completed, say, three days, then all three diaries were used.) There was, therefore, an average of twenty-two entries per day. The authors found it impossible to comply with the requirement of a random sampling of Westchester County due to refusal rates as high as eighty-five to ninety per cent. Of the total sample used, 1544, or sixty-three per cent of the respondents, were high school students who filled out the diary in the classroom setting. The scope of the findings is severely limited by the inclusion of such a large number of respondents from one setting; while at the same time another limit is the unweighted use of diaries which were completed by the same respondents over a period of time. A bias is given to those persons who persevered with the completion of their diaries.

With respect to the categorization of the diverse entries found in the diaries, the authors do not spell out, except in some footnotes[1] what criteria they used to classify the activities into the two categories of leisure and non-leisure activities. It is, therefore, difficult to make an assessment of their figures concerning the time spent on the various sub-samples they used to look at these activities. It appears[2] that leisure is split into nine categories which also include a miscellaneous category. The

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[1]George A Lundberg, Mirra Komarovsky, and Mary M. McInery, Leisure: A Suburban Study (New York: Columbia University Press, 1934), pp. 92n 94n, 99n, 102n.

[2]Ibid., Table III, p. 99.

classification, as stated by the authors, was carried out:

> . . . by considerations of what was found objectively possible on the one hand and certain practical considerations on the other. In the latter connection we had in mind the possible value of the data to educators, social workers, and other community leaders in indicating the feasibility and desirability of proposed community programs.[3]

It is this last set of criteria which could certainly bias any classification of people's activities.

It should be pointed out that the respondents in their study were asked to indicate the person(s) with whom the activities were carried out. The authors have made some partial analysis of this type of data but only with respect to those activities categorized as "leisure" activities and only by a comparison between the sexes. The remainder of the book is a catalogue of the organizations found in the community such as clubs, churches, schools, as well as the arts, adult education, and the amount of reading in the population. A good analysis is included of the suburban family and it is when looking at this institution that they make direct use of the data collected from their diaries.

The second main study to be reviewed was carried out a few years later and published under the title Time-Budgets of Human Behaviour (Sorokin and Berger, 1939). This study was to answer in purely descriptive form, seven main questions, the most important being: (1) What activities occupy a twenty-four hour period; (2) How much time is spent on each of the activities; and (3) What part of the twenty-four hours is spent with whom?

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[3] Ibid., p. 89.

Their sample was drawn from the Boston area and was split into two sub-samples: the seventy-three respondents who completed schedules for at least four weeks, and the 103 respondents who completed schedules for at least two weeks. The respondents were:

> . . . relief workers under the Works Progress Administration or as white-collared unemployed in Boston and its vicinity. . . . . predominately female, white, single and of long residence in and about the city of Boston.[4]

Approximately 100,000 schedules were distributed of which 10,000 were completed while only 4,000 to 5,000 were used in the study. The instructions were to complete the schedules the same day and preferably as soon as possible after the activity was completed. Five minutes was taken as the smallest time period to be recorded. Sunday, Tuesday, and Saturday were sampled in equal proportions.

From the schedules used in the study the authors classified the items on the schedules into fifty-five categories of behaviour. The criteria used to form these categories were that

> The classification had to be detailed, yet manageable. . . . . (and) was made principally according to the overt behaviouristic nature of the activities.[5]

The authors list the fifty-five categories and each of the items used by the respondents, which are included in each of the categories. This information is very useful in that we now have

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[4]Pitirim A. Sorokin and Clarence Q. Berger, Time-Budgets of Human Behaviour (Cambridge: Harvard University Press, 1939), pp. 7-8.

[5]Ibid., pp. 27-32.

explicit knowledge of the way each of the response items was actually categorized; although, the criteria used can only be inductively arrived at. On examination of the fifty-five categories the authors decided to combine them into eight broad areas, two of which, for example, were: activities directly satisfying physiological needs, and activities of economic and chore nature. A list is given of all the categories that are put into each of the eight areas but no criteria are given as to why and where each category fits. However, the authors do explicitly point out that categories can, and have been, placed into more than one area, and therefore there is some overlapping.

The task the authors then set themselves is to look at each of these eight broad areas and to answer, using summary statistics, the questions they set out to study. A wealth of statistics is presented as well as a summary of the relationships between such variables as age, sex, day of the week, and the information that they had gathered with respect to with whom an activity occurred as well as the respondents' motives for carrying out that activity. A final chapter deals with their question of how well people feel that they can predict their behaviour for the next day.

This study is very valuable due to the specific inclusion of the method Sorokin and Berger used to classify such diverse material into fifty-five categories of activity. The statistics of the frequency of behaviour, the social contacts of behaviour, the motives of behaviour, and the predictability of future behaviour, all give a realistic description of day-to-day

behaviours. The scope of the interpretations is limited due to sample restrictions but the sample over different days of the week gives the reader a fuller idea of daily variations in behaviour. The data given are extremely useful and are almost the only statistics that can be used for comparative purposes, due mainly to the full publication of the items in their behavioural categories. However, it should be noted that there is a complete lack of any theoretical statements. There is instead, a small effort to state in their summary of the study a few empirical generalizations they feel would be useful in suggesting further research.

The next appearance of "Time-Budget" studies is in the period following the Second World War. A report appeared on the findings concerning the work and leisure activities of dairy farmers (Ross and Bostian, 1958). In their study Ross and Bostian collected in all 2,617 recorded diary days with the main emphasis of the study being on how to fit the activities into the two categories of "work" and "leisure." Again, no explicit criteria are given to the respondents as to how to classify their behaviour, but they were requested to indicate if they felt that an activity was either a leisure activity or a work activity. It is, therefore, with the criteria used by the respondents, that the authors place activities into their two categories. The use of this study is limited but the authors do point out for the first time, the problem of participating in more than one activity at the same moment in time. This problem is raised but not dealt with in their findings.

The most recent use of "Time-Budget" methods to be discussed here is a report of a second study of Westchester County which was set up to be comparable to that done by Lundberg et al (1934). The author (Foote, 1961) set out to show some of the inadequacies of the Lundberg study. He used log sheets on which the minimum time period was five minutes and which also included a space to indicate with whom the activity was carried out. As with the study by Sorokin and Berger (1939) the respondents were asked to complete the logs as the day progressed. The effect of this procedure was to ensure that the logs represented "today" data exclusively and the average number of entries per day was found to be seventy-two. This number can be compared with the Lundberg study which used "yesterday" data where the average number of entries was twenty-three per day. We have no way of knowing that these figures are comparable because neither set of authors has stated their methods of classification; this is especially true of the study by Foote (1961) because, to the best of our knowledge, the findings have not been published. However, it is obvious that he has demonstrated that there is a great loss of detail in a record when we rely on recall for the completion of diaries.

The final work to be reviewed does not use the diary or log method of data collection but still touches upon the problem of time and its uses. The study (Blakelock, 1960) was carried out to research the consequences of shift work for the choice of activities outside of the work setting. The author drew his sample from workers who were employed by a large oil refinery. He suggests that specific segments of time vary in their liquidity

by the extent to which the available time can be "exchanged" for activities. Utility theory from the field of economics is seen to be relevant. Blakelock argues that some parts of the day, especially 5:00 p.m. to 10:00 p.m., have a greater liquidity value than do others, in that this time can be exchanged for many activities. Therefore, persons who are on shift work are often deprived of the parts of the day which have the greatest liquidity. These persons do not, therefore, participate in many activities such as voluntary organizations.

The empirical findings of this study are very useful but the theoretical formulation put forward is weak in that we find it hard to conceptualize time as a commodity, nor can we see how time as such can be exchanged for anything. Rather it would be more useful to view activities as differing in their flexibility due to the number of persons required to be present at a given moment in time so that that activity can in fact take place. Together with the flexibility of an activity we can look at the ranges of time at which an activity can be performed. If work is a comparatively inflexible activity, then other activities must be foregone if participation in work is to be accomplished. In terms of exchange then, we must look at the mechanisms which affect a person's choice to exchange, not time for an activity, but rather one activity for another.

In the Time-Budget studies just reviewed, there was very little theoretical preparation of either the collection or the coding of data. It appears that the authors were interested in obtaining as complete and accurate a statement as possible of

just what people do during a specific time period. To criticize the early works because they produced only statistics of a descriptive nature would be unfair. The authors pioneered in a field where little information was available around which they could build a theoretical framework. However, the latest work by Foote (1961), even though only a preliminary report, gives no hint that he has progressed any farther and produced some theoretical formulations. It appears that Foote (1961) has concentrated his efforts on looking at the methodological problems inherent in the diary or log as a technique of data collection and it is to this subject that we turn in the next chapter before outlining a tentative theoretical schema.

CHAPTER III

METHODOLOGICAL PROBLEMS

It has been stated in the first chapter that the social scientist must devise some technique which can be used to portray time expenditures over some specified time duration. Virtually all the studies which have attempted to do this have used some type of diary or log as the most useful instrument for collecting such data. The review of these studies has not focused on the main reason why so few studies of this nature have been carried out. The problem which we will now tackle lies in the method of data collection and the instrument of collection.

The first main barrier to be overcome in using the diary method is that of obtaining a sample from some specified population, such that the sample may be considered a random sample. In this respect the hurdle that has to be overcome is that of respondent co-operation. There appears to be a great reluctance to keep a diary which stems from the necessity of sustaining some minimal amount of effort over a considerable period of time. In normal social surveys a ten per cent refusal rate is often regarded as acceptable. However, in requesting people to fill out a diary of their activities, the refusal rate soars to nearer eighty to ninety per cent. This figure is mentioned by

Foote (1961) and is borne out by the number of completed diaries returned to Sorokin and Berger (1939). Foote (1961) also reports a study done by a commercial survey firm in Toledo in 1958 (unpublished) where again the refusal rate was staggeringly high.

It hardly needs to be pointed out that such a refusal rate plays complete havoc with any sampling methods. Also, if people are going to be asked to complete a diary then two calls must be made: first to distribute and explain the diary technique; and second, to pick up completed diaries. Both these drawbacks affect this method of data collection due to the large cost involved with often little return. To overcome such costs a method can be used where only one call on the respondent is necessary and therefore a preferable method in terms of time and money.

However, with the one-call technique, we again run into further drawbacks. Foote (1961), in comparing his study with that of Lundberg et al (1934), shows the superiority of making respondents fill out a diary during the day of the activities they are to record, rather than asking them to recall a previous day's activities. As has been pointed out, the comparison of the number of entries on the diaries in the two studies shows a substantial loss when memory is relied on. The one-call technique has to limit itself to collecting data which has been recalled and we can expect a subsequent loss of detail. The present research used the one-call interview technique, thus alleviating the problem of random sampling. The Time-Record we used was an integral part of a larger questionnaire and was filled out by the

interviewer as the respondent recalled his activities of a specific past day. The loss of detail from the reliance on memory will, therefore, have a definite effect on the data we collected. We are unable to compare, at the present, our data with that of either Foote or Lundberg because we have no statistics on the number of entries per Time-Record.

It is also necessary to point out that when using the Time-Record method some activities will never be recorded. There are two main reasons for these omissions. First, respondents will be unwilling to tell an interviewer, or record themselves on a diary, certain activities which are felt to be either of a private nature, such as sex or defecation, or activities against which severe social disapproval will be given, for example, illegal acts. The time spent on such activities has to be accounted for and must therefore get shunted into other categories, probably "loaf around, smoke, or relax," for example. Second, a day can be seen as possessing an infinite number of parts depending on how one wishes to partition it. Usually these parts are defined as divisions of time, hours or minutes. It is rare that a study will be done of actions which take less than one minute. As in the previous studies we have reviewed we used five minutes as the smallest interval of time. Therefore, we have a loss of all activities which take less than five minutes and at the same time we have in some cases prolonged the durations of activities or in some cases protracted the durations of activities. Thus an activity of a six-minute duration was probably recorded as five minutes and an activity of eight minutes was probably

recorded as ten minutes. The effects of both these two major problems on the accuracy of a Time-Record cannot be measured but we should be fully aware of them.

Another problem to be overcome is the manner of how activities are to be recorded on the Time-Record. That a Time-Record should be simple to complete and clearly laid out as to the time intervals, the space for the description of the activity, and the space for the inclusion of with whom the activity was carried out, is a real necessity. The clarity of the measuring instrument is doubly important if the respondents themselves are to complete a Time-Record as a diary, with clear instructions given as to how to indicate the duration of an activity. This latter point is important to ensure that there is no ambiguity when the durations are tabulated. The main problem concerning the recording of activities is, however, whether or not each activity is to be described by the respondent as he sees it and wishes to describe it, or whether the respondent should be required to describe his activities in a pre-categorized form only.

It can be argued that any description of an activity is in fact a classification, but there is a difference between a respondent describing his activities in his own terms and describing his activities using only categories given to him by the investigator. It would seem at present impossible to deduce a priori a set of categories from some theoretical principles. As in the studies outlined in the previous chapter, categories are arrived at by inductive investigation of the data collected. The difficulty with this latter procedure is that of reliably

classifying diary entries written by respondents or Time-Record entries written by the interviewer, and to obtain comparability between studies.

However, as Foote (1961) has pointed out, successive studies which keep the method of categorization open and use the inductive method of classification, will in fact allow for a greater refinement in future studies such that comparability will be increased. It should also be noted that the appearance of new activities and the decrease in the occurrence of old activities will be overcome. If the question of using pre-categorized activities is foreclosed then we lose over a period of time those new activities that have appeared in the meantime and keep those activities which have become obsolete.

Even with all the methodological problems which we have outlined above, the Time-Record does have certain characteristics which recommend its usefulness as a measuring device. First, the Time-Record requires of the respondent considerable discipline in entering in the correct place the unit of activity. In this respect the respondent is required to reconcile the time spent among various activities either when he constructs the diary, as the day progresses, or when the day is reconstructed from memory. Therefore, the accuracy of the durations of the entries is greatly increased over the technique of asking the respondent to recall the duration of time spent on selected activities. Second, the Time-Record allows the researcher to study the sequence of events and the respondent's grouping of events. With the inclusion in the data of with whom the activities were carried out,

the researcher has at hand a method of seeing how activities and persons become synchronized during a given time period. This aspect would be of great interest, and seems to be the reason why Foote (1961) chose husband and wife pairs to keep his diaries in the setting of the family. Third, the Time-Record allows for the possibility of indicating whether or not more than one activity was taking place at the same time and how certain activities can overlap several other activities. All of the simultaneous activities will, of course, not be listed but at least some inclusion will occur, a fact which in itself is of interest.

In this chapter we have tried to raise some of the methodological problems which occur when a diary or Time-Record is used to collect data. Some of these problems affected the collection of data used in our research. How some of these problems were tackled will be outlined in a later chapter dealing with the collection and codification of data. Even with the number of problems to overcome, it is felt that the diary method of data collection is useful in providing answers to basic questions concerning the occurrence and nature of day-to-day activities.

CHAPTER IV

A THEORETICAL SCHEMA

We have indicated in previous chapters that little has been done in the way of providing a theoretical formulation with which to study the diverse materials gathered when using a Time-Record as the method of data collection. It is necessary, therefore, to have a theoretical schema from which conclusions are drawn by means of logical deductions.[1] With the predictions deduced from the theory we may test if the theory can be corroborated. If this should not be the case the examination of the empirical generalities in the data should allow us to throw up new and tentative theoretical ideas. These new ideas will then modify the theoretical schema which will allow for the formulation of new singular statements which can be verified or falsified by new data. The schema outlined below takes the form of a set of definitions followed by certain postulates from which are drawn five empirical hypotheses identified with a set of working definitions.

Definitions

Definition 1: Time is equated with clock time.

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[1] Karl Popper, The Logic of Scientific Discovery (New York: Harper and Row, 1965), p. 33.

The interviewer when asking the respondent to answer the question concerning the Time-Record was instructed to use the following words: "I'd like to take a record of what you did in the last twenty-four hours, starting about . . . o'clock." Also, the Time-Record was split into five-minute segments and the hours of the day were marked at the left hand side of the record. For these reasons it is felt that respondents used the clock to aid them in placing their activities in appropriate order.

Definition 2: A duration is an extension over clock time. A duration will be used to refer to a segment of time and will be a measure of the length of time spent on an activity.

Definition 3: A moment is a point in time. It refers to a specific instant either during a duration or as a point at the start or finish of a duration.

Definition 4: An activity is a behavioural event whose duration has been reported by a respondent.

Definition 5:1 All activities are bounded. They occur for a duration with an upper and lower bound which defines the domain of these activities.

Definition 5:2 An activity is more bounded the more exact its domain.

Definition 5:3 An activity is less bounded the less exact its domain.

Definition 6:1 An activity is limited when it can only occur due to the behaviour of more than one participant actor at the moment the activity is engaged in.

Definition 6:2 An activity is more limited the greater the number of participant actors required.

Definition 6:3 An activity is less limited the fewer the number of participant actors required.

The concept of limitedness is used to point to the necessity of synchronizing the behaviour of people in order that an activity can be carried out. It is felt that this synchronization affects the exactness of the boundaries of the domain of an activity.

Definition 7:1 An activity is constrained when it is both bounded and limited.

Definition 7:2 An activity is unconstrained when it is only bounded.

Definition 8: An individual has knowledge of an activity when it is a part of that person's preference order.

Definition 9: An individual's preference order is his ranking of known activities at a given moment.

We are here referring to either an explicit or implicit rank based on a person's needs which stem from physiological, psychological, and sociological forees. It is virtually impossible to separate these forces for a given activity at a moment in a duration.

Definition 10: The status of an individual is his evaluated rank and subsequent position in a prestige hierarchy.

Definition 11: Discretion is the degree of ability to choose at a given moment the activity to be participated in.

This concept will be used to represent the idea that discretion increases the awareness of the constraints on activities and the number of activities in a preference order.

Definition 12: Differentiation is the amount of contact with individuals of various statuses.

It is felt that contact with persons of different status will affect an individual's knowledge of alternative activities.

Postulates

Having outlined the concepts to be used in the theoretical

framework, it is now possible to turn to a series of postulates which in turn allow for the formulation of hypotheses which can be tested by the data available to us.

Postulate 1: An individual will participate in activities in accordance with his preference order.
At a given moment in time it is postulated that an individual will wish to participate in the activity that is at the top of his preference hierarchy.

Postulate 2:1 The higher an individual's status the greater his differentiation.

Postulate 2:2 The higher an individual's status the greater his discretion.

Postulate 3: The greater an individual's differentiation or discretion the greater the number of activities he has knowledge of--the greater his awareness of the constraints on activities--and the greater the number of constrained activities in his preference order.

Postulates 2:1, 2:2, and 3 are the link between status, the differential awareness associated with status, and the knowledge of the number of possible alternative activities available at a given moment. Also, together with the difference of knowledge, there will be a difference in the awareness of the properties, such as boundedness or limitedness, of activities.

Postulate 4: The more limited an activity the more bounded and therefore the more constrained that activity.

Postulate 5: An individual with a greater number of unconstrained than constrained activities in his preference order will participate in a greater number of unconstrained activities than constrained activities.

Postulate 6: Unconstrained activities will be of a longer duration than will constrained activities. Activities that require other persons to be present will have boundaries that are better defined than will unconstrained activities.

Postulate 7: The shorter the duration of units, in a given time period, the greater their number.

Postulate 8: In a social organization of which a person is a member, the greater the number of persons of equal status the less a person's differentiation.

Working Definitions

It is necessary now to define the terms which will be used in the subsequent hypotheses so that the assumptions in the theoretical framework can be tested on the data. Many of these working definitions are taken from the questions and subsequent coding of answers in the section of the questionnaire prior to the Time-Record.

1. A unit. A unit is an activity that has been reported by a respondent and as such a unit has the following properties.

   First, a unit has a duration of a minimum of five minutes and a possible maximum of twenty-four hours. Second, a unit has been reported by at least one respondent for at least a duration of five minutes. Third, when the name given to an activity differs within and between respondent's reports, but the meaning of the behaviour reported is judged to be equivalent, then the unit and the activities name(s) are taken to be the same. (A further explanation is given in the next chapter on the method of coding.)

2. Work. Work is defined as the participation in an occupation outside of the dwelling unit and for which a form of remuneration is received for the use of time as labour. This definition does not include moonlighting or work taken home. All respondents in the sample were working. The details of the sample will be outlined in the next chapter.

3. Normal work time. Normal work time is defined as a response to four questions (see Appendix A, questions 6, 19, 87, 89`,[2] which were coded to make a category

[2]Appendix A is an abstract of questions coded from the interview schedule excluding the Time-Record.

"steady day shift."

4. Off-phase work time. Off-phase work time is defined as all replies to the four questions mentioned with respect to normal work time, which were coded other than the category "steady day shift."

5. Status at work. Status at work is defined with respect to the number of persons supervised. Those persons who supervise at least one person are seen as having superior status. Those persons who supervise zero persons are seen as having inferior status (see Appendix A, question 25).

6. The family. The family is defined as the household in which a person lives. This definition includes persons in the household who would not be part of the nuclear family. The size of the family, then, is the number of persons living in the household in which the respondent lives (see Appendix A, question 99).

7. The largest employer. The largest employer is defined as the company which employs the greatest number of persons in Millport, the town where the sample was taken (see Appendix A, question 19).

8. The ranges of durations. The range of a duration is seen as the difference in the number of five-minute

segments between the maximum and minimum number of time segments reported for any given unit.

Hypotheses

From the stated postulates and the working definitions we are now able to specify five hypotheses which we can test against the data collected.

Hypothesis 1. Respondents who work at an 'off-phase' time will report a fewer number of units in a day than will respondents who work at a 'normal' time.

'Off-phase' respondents will have 'knowledge' of a greater number of 'less limited' units than 'more limited' units.

With their greater 'knowledge' of 'less limited' units they will have a greater number of 'unconstrained' than 'constrained' units in their 'preference orders.' (Postulate 4.)

With a greater number of 'unconstrained' units in their 'preference orders' they will participate in more 'unconstrained' than 'constrained' units. (Postulate 5.)

'Unconstrained' units will be of a longer 'duration' than will 'constrained' units. (Postulate 6.)

A greater number of units of a longer 'duration' than of a shorter 'duration' will be reported in a day.

The longer the 'duration' of units the fewer units reported in a day. (Postulate 7.)

Hypothesis 2. Respondents who are of 'superior' status will report a greater number of units in a day than will respondents of 'inferior' status.

Respondents of 'superior' status will have greater 'discretion' (Postulate 2:2) and greater 'differentiation.' (Postulate 2:1.) The greater their 'discretion' and 'differentiation' the greater the number of 'constrained' than 'unconstrained' units in their 'preference orders.' (Postulate 3.) With a greater number of 'constrained' than 'unconstrained' units in their 'preference orders' they will participate in more 'constrained' than 'unconstrained' units. (Postulate 5.) 'Constrained' units will be of a shorter 'duration' than will 'unconstrained' units. (Postulate 6.)

A greater number of units of shorter 'duration' than of a longer 'duration' will be reported in a day.

The shorter the 'duration' of units the greater the number of units reported in a day. (Postulate 7.)

Hypothesis 3:1 The greater the 'family size' to which a respondent belongs the greater the number of units reported in a day.

The larger the 'family size' the larger the number of different statuses. But the fewer the persons of equal status, the greater a family member's 'differentiation.' (Postulate 8.)

The greater the 'differentiation' the greater the number of 'constrained' than 'unconstrained' units in respondents' 'preference orders.' (Postulate 3.) (Continued below.)

Hypothesis 3:2 The greater the 'family size' the greater respondents' 'knowledge' of 'more limited' than 'less limited' units.

Respondents with a greater 'knowledge' of 'more limited' units will have a greater number of 'constrained' than 'unconstrained' units in their 'preference orders.' (Postulate 4.)

Hypotheses 3:1 and 3:2 With a greater number of 'constrained' units in their 'preference orders' they will participate in more 'constrained' than 'unconstrained' units. (Postulate 5.)

'Constrained' units will be of a shorter 'duration' than will 'unconstrained' units. (Postulate 6.)

A greater number of units of shorter 'duration' than of a longer 'duration' will be reported in a day. The shorter the 'duration' of units the greater

the number of units reported in a day. (Postulate 7.)

Hypothesis 4. Respondents who do not work for the 'largest employer' will report a greater number of units in a day than will respondents who do work for the 'largest employer.'

The larger the employer organization, the greater the number of persons of equal status and the less the 'differentiation' of respondents in that organization. (Postulate 8.)

The less the 'differentiation' the less the number of 'constrained' than 'unconstrained' units in their 'preference orders.' (Postulate 3.)

With a greater number of 'unconstrained' units in their 'preference orders' they will participate in more 'unconstrained' than 'constrained' units. (Postulate 5.)

'Unconstrained' units will be of a longer 'duration' than will 'constrained' units. (Postulate 6.)

A fewer number of units of longer 'duration' than of a shorter 'duration' will be reported in a day.

The longer the 'duration' of units the fewer units reported in a day. (Postulate 7.)

Hypothesis 5. The greater the number of units reported in a day the less the 'ranges' of the 'durations' of such units.

'Constrained' units will be of a shorter 'duration' than will 'unconstrained' units. (Postulate 6.)

The greater the number of units reported in a day the shorter the 'durations' of those units. (Postulate 7.)

The shorter the 'durations' of units the less the 'ranges' of those units as 'constrained' units.

The above theoretical schema has been outlined in a formal manner so as to clarify the concepts used. In this schema the word derived is perhaps incorrect due to the fact that some of the postulates do not take on the strict form that they should; that is to say, the relationship in the postulate can never be empirically tested. In this schema some of the postulates could be tested empirically but at present, due to the lack of empirical findings, the postulates have to remain as assumptions.

In this chapter we have outlined in a formal way a theoretical schema consisting of theoretical definitions, postulates using the theoretical definitions, a set of empirical definitions, and five hypotheses. The outlining of these hypotheses and working definitions allows us to move to the topic of the sample used to collect the data with which these hypotheses are tested. At the same time we will outline the methods of codification of the diverse materials that have been collected by the method of the Time-Record.

CHAPTER V

DATA COLLECTION AND CODING

The data used to test the hypotheses outlined in the previous chapter were collected for a research project carried out by M. Meissner during the summer of 1965. The subject matter of the research was ". . . the uses of leisure time in an industrial community."[1] The community, "Millport," is dependent upon a concentration of industrial operations (plywood, pulp, paper, and saw mills, together with logging and a deep-sea port through which most of the industrial products are moved).

With respect to the interview schedule a pretest was made by students during the winter of 1965 in the city closest to the university. Only adults who were presently working were picked at random from the city directory. A similar sampling method was used in Millport where a random sample of working adults was drawn from the Millport directory which had just been published after an enumeration in December and January of 1964-1965. However, because of the size of a single company in the community two samples were drawn in such a way that for every three employees

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[1] Martin Meissner, "A Study of Work and Social Participation in an Industrial Community, Preliminary Report," (mimeo.; Vancouver: Department of Anthropology and Sociology and Institute of Industrial Relations, University of British Columbia, 1967).

of this large company one person was selected who was not working for that company. This purposeful oversampling of company employees meant that the sample contained a large majority of men, manual workers, and employees paid an hourly wage. Very few women and self-employed people were interviewed; and none of the young, the old, or women who were only housewives. From the 462 persons in the sample 308 interviews were completed, or two-thirds of the total sample. The reasons for the loss in the sample were: a fifteen per cent loss due to refusals, a three per cent loss due to inaccessibility, and a fifteen per cent loss due to respondents no longer meeting the sample criteria, i.e., dead, moved, out of town, or now not working.

During May of 1965 further pretests and revisions of the entire questionnaire were carried out in Millport such that the five student interviewers underwent extensive training in the field. Altogether the final interviews were preceded by five series of pretesting. During the last pretest it was found that the best method of approaching respondents was by sending a letter and then calling at the respondent's home. This method of approach was used in the final interviews. Nearly all the interviewing was completed by July of 1965 and the coding of the main body of the interview schedule was completed by the spring of 1966. When card punching had been completed the coding error had been reduced to below the two per cent level.

The part of the questionnaire to be used in this research is the Time-Record which took approximately a sixth of the ninety minutes which was the average length of time per interview. The

Time-Record (see Appendix B) was a log, written by the interviewer of the actions of the respondent, in the respondent's terms, during a twenty-four hour period which had to be the last full working day prior to the interview. It should be acknowledged immediately that the interviewer is depending on the respondent to recall his previous actions and as we have already pointed out in a previous chapter dealing with the uses of the diary method, our data suffer due to the loss of detail when memories are used.

We must also at this point state that these are secondary data collected prior to the formulation of the theoretical schema outlined in the previous chapter. The pitfalls of secondary data are many but in this case several have been overcome and avoided in that the data were given to us uncodified. The problem and the main theoretical ideas in the schema were drawn up prior to the coding of the Time-Record. It was felt that if the research were to have been started from the beginning without the presence of data, then a similar type of questionnaire would have been used. However, the expense of collecting such data outweighed the restrictions which had been placed on the data. These restrictions stem from the format of both the Time-Record and the rest of the questionnaire which had been administered to a sample randomly drawn from a specified population.

The two main restrictions are: first, the lack of detail in the Time-Record which it is felt was due to the overall length of the whole interview schedule; and second, the lack of detail which has been recorded of respondents' activities while at work.

Codification of the Time-Record

The Time-Record (see Appendix B) was coded by the writer during a two-month period in the summer of 1966. The coding was carried out in the following manner. First, a random sample procedure was started noting down from the Time-Records sampled all the items of behaviour reported by the respondents in their terms. This sampling of the completed Time-Records was continued until no new activities appeared as the sample was increased. This fact did not mean that all activities had been discovered prior to the full coding job. However, it was found that during the coding only five new categories of activities were made.

With the list of the behaviours noted from the random sample it was necessary to make a code manual which could be used to code the behaviours so as to produce the greatest reliability. The criteria used to place reported behaviours into code categories was that of Sorokin and Berger;[2] that of equating events which appear to have the same behavioural content. As has been previously stated in defining a unit of behaviour when the name given a behaviour differs within and between respondents' reports, but the meaning of the behaviour is judged to be the same, then the unit and the name are taken to be the same. For example, "in bed" and "asleep" were taken to denote the same behavioural event and were categorized under the same unit headed "sleep." By this means we were able to overcome differences in wording in the respondents' reports.

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[2] Supra, p. 8.

Two problems arose in the sample used to make the code manual. The first was that in many cases respondents ran together the activities associated with "getting up" and "having breakfast." We therefore had to produce a unit into which both these activities could be put if they were not separated on the Time-Record. This is the only case where activities of a multiple nature occurred where we were unable to code into separate units as we would have wished. This trouble is a specific case of the more general problem of the codification of activities that occur at the same moment in time. When units of a multiple behavioural nature were made it was decided that all units would be of a mutually exclusive nature. A respondent either "watches T.V." or "eats" but never both at the same time except in the case of multiple units. In such a case a respondent will be coded in the multiple unit but not in the two single units. For example, a respondent is either coded "watches T.V. and eats," a multiple unit, or "watches T.V." and "eats," two single units, but never both the latter two and the first unit. Therefore, units as coded are mutually exclusive, and this allows for a check of the coding of a Time-Record because all the time spent on the units should add up to 288 five-minute segments or twenty-four hours. The categorization is then a code of the number of five-minute segments reported for the behavioural units, and there is no measure of intensity or value of a unit implied.

In filling out a Time-Record, the minimum time segment being five minutes, interviewers were asked to place a line on the left-hand margin beside the time at which an activity was

started. It was therefore a simple but arduous task to count the number of five-minute time segments between the start of an activity and the start of the next activity. In such a way the whole Time-Record could be coded with respect to time and the figures added up to ensure that the total was 288 five-minute segments, which equalled the whole day.

The code manual (Appendix C) was worked out from the sample of behaviours which has been collected from the sample of completed Time-Records. The research advisor and his research assistant aided the writer in making up the code categories using the behavioural criteria outlined previously. Two sub-samples of ten Time-Records were coded independently by the writer and the research assistant using the code manual, and then each sample was exchanged and coded again. Any differences in the coding were noted and the ambiguities clarified. The units, ninety-two in all, were then arranged in order so that they followed, as best as possible, the order in which they would seem to appear in everyday life. Also, activities were identified as having taken place in or around the home, at work, and elsewhere. For the actual order of units see Appendix C.

The ninety-two units were then given boxes on a code sheet so that the first two boxes (three for "work" and "sleep") were used to indicate the number of five-minute segments a respondent reported for a unit. A third box was used to code "with whom" the unit was carried out. In the cases of "visiting" or "being visited" two boxes were used to indicate "with whom" the visiting was done and "to whom" the visit was made, and

vice-versa for being visited. Respondents were given a score of zero if they did not participate in a unit. Also several units such as "T.V.," "shopping," and "driving to and from" were coded into more than one unit and we had, for example, "T.V. I" and "T.V. II." The reason for making these separate categories is so that we can indicate in the third box that when watching T.V. a respondent may have been in the company of his wife but that later in the day he again watched T.V. but this time in the company of a friend. By having these two or more units of the same activity we are able to make a greater differentiation of of with whom an activity occurred. However, a problem arises when attention is paid to with whom an activity occurs. If a person watches T.V. with his wife twice during a day then he will have his entire T.V. watching time coded under "T.V. I." If he were to watch T.V. first with his wife and then later in the day with a friend, then his times will be separately coded in both "T.V. I" and "T.V. II." The effect of this coding is to distort the number of units a person reports in a day. The error occurs in four of the units.

The coding onto code sheets was carried out by the writer during a three-week period ending in mid-August. Each code sheet was checked to ensure that the total number of time segments added to 288 five-minute segments. The data were transferred from the code sheets to a set of data cards, four cards per respondent. A complete run of distributions was made on each unit so that coding errors could be eliminated. Of the 308 respondents there were no adequate Time-Records for seven

respondents: two were of questionable quality and no Time-Record was completed for the remaining five. Therefore we used 301 Time-Records to test our hypotheses.

The Statistical Centre for The Social Sciences (U. B. C.) developed for us a programme (MEIBUL) to provide the following statistics: for each unit - the number of respondents who report that unit; the total number of time segments spent by respondents on that unit; the standard deviation; the variance and the maximum, minimum, and range, of time segments spent on that unit. Also, the programme furnished us with a distribution showing the number and proportion of respondents who report N number of units. The programme was adapted so that certain records could be excluded. This exclusion allows us to generate the statistics mentioned above for sub-samples which meet stated conditions from other records representing the whole of the questionnaire. These statistics can then be used for comparative purposes. The programme also gave a weight of four to respondents who did not work for the large company in Millport, thus ensuring that the two samples which were drawn from the community as a whole represented the true proportions of the population.

The data then consist of a weighted sample of 506 respondents from a sampling universe of 8,210 presently working adults recorded in the Millport directory. The activities of these respondents on their last working day prior to the interview were coded into ninety-two behavioural units. Each unit has the property that it represents an activity which has occurred and been reported as having a minimum time duration of five

minutes. Each of these units is mutually exclusive such that when the time spent by a respondent on all the units he reports has been added together the number of five-minute time segments will equal one day. A programme was obtained so that the necessary statistics could be generated to obtain a measure of the number of units a respondent reported as well as the duration of such units. With these statistics we are now able to turn to the test of the five hypotheses that we have previously outlined.

CHAPTER VI

RESULTS: TESTS OF HYPOTHESES

According to Hypothesis 1, persons on day shift will report a greater number of activities than persons not on day shift. The total sample of 502 respondents has been dichotomized into persons who work on day shift (341) and those persons who work on other shifts (161). A distribution for each of the sub-samples gave us the number of persons who reported N number of activities. From these two distributions we computed the mean number of units reported by persons in each sub-sample. The t statistic was computed to test for the level of the significant difference between the two means. Our results are shown in Table 1.

TABLE 1

MEAN NUMBER OF REPORTED UNITS BY WORK SHIFT

	Work Time		
	Normal	Off Phase	t
Mean number of Units	15.21 (341)	16.06 (161)	.001

From Table I it can be seen that our hypothesis is not confirmed and that there is a significant difference in the opposite direction to that we had hypothesized. We find that those persons who work at an off-phase time report an average of .85 units more in a day than persons who work at a normal time.

Work Status

Our second hypothesis predicted that persons with high work status will report a greater number of activities in a day than will persons of low work status. The test is shown in Table II together with the resultant statistic.

TABLE II

MEAN NUMBER OF REPORTED UNITS BY WORK STATUS

	Work Status		
	Superior	Inferior	t
Mean number of Units	15.27 (209)	15.57 (293)	insig.

With the statistics in Table II we find that there is no significant difference between the two sub-sample means and that the effect of work status on the number of units reported is small. However, we wish to point out that again we have the data showing that our prediction is in the wrong direction because those persons with superior status report an average of .3 units less in a day than persons of inferior status.

Family Size

Our third hypothesis was that as the family size increased so would the number of activities reported in a day. We again used the mean number of units reported in a day by members of families of different sizes. In this case our sample was divided into six sub-samples covering the family sizes of one to six or more persons in the family. The means and the F variance ratio statistic to test the significance of the differences between the means are given in Table III.

TABLE III

MEAN NUMBER OF REPORTED UNITS BY FAMILY SIZE

	Family Size (number of persons)						
	1	2	3	4	5	6	F
Mean number of Units	15.78 (37)	15.69 (82)	14.76 (68)	14.78 (133)	15.48 (102)	15.31 (80)	insig.

In Table III we find that there is no consistent pattern and that there is no significant difference between the mean number of units reported by the six family sizes. However, we would point out that there is a substantial drop in the mean number of units reported by family sizes of three and four persons. These are the groups of persons which could be considered the nuclear family. The overall trend seems to be that of a decrease in the number of units reported the greater the size of the family, the opposite direction to that we had predicted.

Company Size

In our fourth hypothesis we had predicted that persons who worked for the largest employer would report fewer activities than would persons who did not work for the largest employer in the community. Our sample was, therefore, dichotomized into persons who did not work for the largest employer (268) and persons who did (234). The mean number of activities reported by each of the two sub-samples, together with appropriate t statistic, are given in Table IV.

TABLE IV

MEAN NUMBER OF REPORTED UNITS BY EMPLOYER SIZE

	Employer Size		
	Not Largest Employer	Largest Employer	t
Mean number of Units	15.19 (268)	15.74 (234)	.05

The statistics in Table IV show that our hypothesis is disproved and that there is a significant difference in the opposite direction to that which we had predicted. We find that those persons who worked for the largest employer report an average of .55 units more in a day than persons who did not work for the largest employer.

Mean Number of Units and Their Variability

In our fifth hypothesis we had predicted that the greater the mean number of units reported by a set of persons the less

the variability of time spent on those units. This hypothesis can be tested on the statistics which we generated to test Hypotheses 1, 2, and 4. In these three previously tested hypotheses we have three means that are greater than the means of their opposite sub-sample. We would, therefore, predict that the variability of the time spent on units in the sub-samples of off-phase work time, inferior work status, and working for the largest employer, will be less than the variability in the sub-samples of normal work time, superior work status, and not working for the largest employer. The amount of variability is measured by the pooled estimates of the variance of the time segments for all the units reported by each sub-sample. A variance ratio test was conducted and the statics are given in Table V.

TABLE V

VARIABILITY OF TIME SPENT ON UNITS BY SUB-SAMPLES

	Variance of Time Segments by Sub-Samples		
Work Shift (Hypothesis 1)	Off-Phase 682 (161)	Normal 3,553 (341)	F .01
Work Status (Hypothesis 2)	Inferior 2,266 (293)	Superior 3,083 (209)	F .01
Employer Size (Hypothesis 4)	Largest Employer 91 (234)	Not Largest Employer 4,851 (268)	F .01

From Table V we find that our hypothesis is significantly confirmed in all three cases. It appears, therefore, that the greater the number of activities reported in a day by a group of persons, the less the variability in time spent on such activities.

We have outlined without comment the results of the tests of our five hypotheses. However, before we turn to the interpretation of these results we wished to test for two biases which we felt could be present in our data. Both of these biases stem from the use of the Time-Record as an integral part of an interview schedule. Our worry is to know just how consistent a measuring instrument do we have when we ask people to recall from memory previous behaviours and how well does an interviewer elicit and record the responses.

The first bias we wish to discuss is the potential error introduced on the Time-Record by the rapport the interviewer has with the respondent. Rapport affects the degree of detail which the respondent is willing to give the interviewer and also the amount of detail the interviewer will enter on the Time-Record. We have, therefore, split our total sample into six sub-samples, one for each of the interviewers, and using the variance ratio test we were able to see if there was a significant difference between the mean number of units reported in the Time-Records completed by each interviewer. The statistics are presented in Table VI.

TABLE VI

MEAN NUMBER OF REPORTED UNITS BY INTERVIEWER

	Interviewer						
	A	B	C	D	E	F	F
Mean number of Units	13.51 (69)	15.39 (101)	15.54 (92)	16.00 (148)	16.07 (CC)	14.00 (4)	.01

With respect to Table VI, the statistics presented show that there is in fact a significant difference in the number of units which have been reported by the respondents interviewed by the six interviewers.

The second bias we wished to look at was the effect of the respondents' education on the reports recorded in the Time-Record. As the Time-Record was completed by asking people to recall their activities from the past, a substantial loss of detail would be expected. However, we would suggest that this loss in recall would be mitigated by the amount of education received, such that the greater the education, the less the loss in detail and therefore the greater the number of activities reported in a day. We therefore divided our sample into three levels of education. The mean number of activities reported by each of these subsamples, together with the F ratio test, are given in Table VII.

TABLE VII

MEAN NUMBER OF REPORTED UNITS BY EDUCATION

	Educational Level			
	Grade 8 and Less	Less than Grade 12 + Other	Grade 12 + Other	F
Mean number of Units	15.35 (163)	15.39 (213)	15.70 (126)	Insig.

We find, with reference to Table VII, that the level of education does not have a significant effect on the number of units reported in a day. However, there appears to be a small

increase in the number of activities reported as education increases. There could be a weak effect due to better memory or articulation, thus aiding the interviewer in filling out the Time-Record.

With the tests of significance which we have used, we wish to point out that often our sample sizes are large and therefore a relatively small difference between means will be significant. Also, we wished to be sure that the distributions from which the means were taken approximated a normal curve. We used a weak test, which was to see if sixty-five per cent of the respondents in each of the distributions fell within one standard deviation of the means of those distributions. We found that in nineteen out of the twenty-one cases this condition was met, thus ensuring our tests of significance were meaningful. In the two cases where our test was not met, the number of respondents in each of the sub-samples was thirty and four respectfully.

CHAPTER VII

EVALUATION: RESULTS AND THE THEORETICAL SCHEMA

We have in this research set up five hypotheses to be tested on a body of data. We find that four of these hypotheses are not confirmed, all showing directions opposite to those predicted, two significantly so. Our fifth hypothesis, which was not dependent on the direction found in the other four hypotheses, was significantly confirmed when tested on three different subsamples. We concluded, therefore, that either some of our assumptions or definitions in the theoretical framework were incorrect, or that there had been a bias introduced into our data by our measuring instrument, the Time-Record.

Before we turned to the theoretical schema we wished to look at the two variables which we introduced at the end of the previous chapter, the variables of education and interviewer. We wished to test if our measuring instrument was biased by these two factors. The effect of education appeared to be minimal even though there was a trend which appeared to indicate that an increase in education increases the detail of the Time-Records completed. However, with respect to the different interviewers, a significant difference was noted. Using the test between means

proposed by J. W. Tukey[1] we found that in fact no single interviewer accounted for the significant difference. It appeared that the effect of the interviewers was not significant with respect to the hypotheses tested due to (1) the random assignment of respondents to interviewers, and (2) the small proportion of each interviewer's respondents which appeared in each of the sub-samples. These two controls were the first set of empirical generalizations which were brought to bear on our findings.

We wished then to turn to the theoretical schema to point out, with empirical generalizations found in the data, which of our assumptions were in the first place incorrect. In carrying out this procedure we wished to demonstrate the benefit we derived from the work spent on obtaining the theoretical schema with which to look at the data. We were able with the negative findings to demonstrate that our findings were in fact negative findings and not just descriptive statistics of a selected random sample. We were also able to use such negative findings for their positive value of showing that our theory was in part erroneous. The formal schema permitted the identification of incorrect postulates and inappropriate definitions. We examined each of the hypotheses in light of the findings.

The direction of the difference in the data used to test Hypothesis 1 was opposite to that predicted, and our attention was focused on Postulate 6. This postulate stated that

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[1] G. W. Snedecor, Statistical Methods (5th ed.; Iowa: Iowa State University Press, 1956), pp. 251-254.

"Unconstrained activities will be of a longer duration than will constrained activities." With this postulate we expected that activities which were 'limited' would be of a shorter 'duration' due to the effect of having to synchronize people to be present during the activity. As we have previously stated, this is a postulate with the status of a working assumption which can be tested empirically, and it is to this test that we next turned.

In coding our data we had the information as to 'with whom' an activity occurred. However, in our classification of the 'with whom' categories the actual number of persons present was not coded, but rather the class of persons present (see page 1 of Appendix C). We had, therefore, only a partial classification of the number of persons present during activities. It was decided to split the 'with whom' categories into three: 'alone,' 'with spouse only,' and 'with any others.' This procedure gave us a weak scale of the number of persons present even though the category of 'with spouse only' was a special case of two persons being present, with all other two-person cases falling into our third category of 'with any others.' We obtained for each of the units the average amount of time--the mean number of five-minute segments reported--for each of the ninety-two units when the different number of persons was present.

We found of the ninety-two units, that as the number of persons present increased, thirty-one of the units showed an increase in the average duration of time spent on those units. Twenty-eight units showed a decrease in the average time duration, while thirty-three units showed no definite trend with respect to

the duration of time. The lack of a trend in the thirty-three units was due to either a lack of respondents in two of the 'with whom' categories or to the fact that a 'with whom' category was not applicable. The criteria for deciding if units increased were: if the average number of time segments in the category 'with spouse only' was greater than in the category 'alone' and if the category 'with any others' was greater than either in the 'with spouse only' or 'alone' categories. The criteria for the measurement of a decrease in the average number of time segments in the three categories were: if the category 'with spouse only' was less than the category 'with any other' and if the category 'alone' was less than either in the 'with spouse only' or 'with any others' categories. The difficulty we were attempting to overcome was that 'with spouse only' was a special case of a category which would include the presence of only two people.

To know the number of units which show an increase or decrease in the duration of time spent on such units was not an adequate test of Postulate 6. The relative incidence of the units as measured by the number of respondents who report the units was significant. On examination of the units which increase in the duration of time spent on them as the number of participants increases, we found that these units were reported 4,387 times. However, with respect to those units that showed a decrease in the duration of time spent on them, we found that these units were reported 1,587 times. The units in which no definite trend could be observed were reported only 153 times. Units whose duration of time increases as the number

of participants increases are of considerably greater incidence than units that indicate a decrease in the duration of time.

Our data would, therefore, disconfirm Postulate 6 as it was stated. We found that a greater number of units, which showed that as the number of participants increased so did the average duration of time spent on such units increase, were reported. Therefore, we had to reverse Postulate 6 because we found that activities which became 'more limited' and therefore more 'constrained' showed a longer 'duration' of time spent on those activities. Postulate 6 then became a working assumption which stated "Unconstrained activities will be of a shorter duration than will constrained activities." With this working assumption we were able to examine why the predictions of four of our hypotheses were in the wrong direction.

In Hypotheses 1 to 4 we had used Postulate 6 to indicate the direction of the relationships we expected would appear in our data. However, we have had to change this postulate to a working assumption which we stated in the last paragraph, thus allowing us to reverse the direction of our previous predictions. We found that Hypotheses 1 and 4 were then significantly predicted in the correct direction while Hypotheses 2 and 3 were in the correct direction but not significantly so. In Hypothesis 2 we felt that the lack of distinction in our measurement of 'superior' status might have been the cause for the lack of significance. However, if we had continued to split up a sample to gain an increase in the measure of 'superior' status we would

have found ourselves using sub-samples of relatively small numbers, thus constricting the significance of our statistical tests. In Hypothesis 3 we felt that the lack of significance was probably due to our lack of distinction of the composition of the family. Our measure was of family size rather than of family composition. The large drop in the mean number of activities reported by family sizes of three or four persons would seem to indicate that the special composition of the nuclear family, rather than strictly size, affected our results. Due to the present lack of data on family composition we are unable to pursue this explanation further.

We have demonstrated that with a formal theoretical framework we were able to use the empirical generalizations found in our data to reformulate some of our assumptions. This reformulation now increases the predictive power of our theory which can now be used to look at new data. We have also shown that some of the difficulties we encountered were possibly due to our choice of the measurement of some of the conditions under which the hypotheses, derived from the theory, were tested. There would appear to be some contamination of our data due to the method of data collection but the effect was felt to be minimal. We have, however, pointed out the biases which should be taken into account when the Time-Record is used in the future as an instrument of data collection.

CHAPTER VIII

SUMMARY AND FURTHER RESEARCH

In this research we have outlined a theoretical schema from which we predicted that persons who had in common certain social characteristics would also exhibit a similar amount of behaviour in a given time period. The directions of four hypotheses were proved incorrect by our data and our fifth hypothesis was confirmed, showing that as the number of activities in a day increased there was a decrease in the variability of the time durations of those activities. We also found that as the number of persons present during the duration of those activities most often reported, increased, then the duration of time spent on those activities increased. With this empirical finding we were able to locate an error we had made in our assumptions such that a reformulation of our theory allowed us to make predictions consistent with the data. However, the revised theoretical schema can only be corroborated by new data.

Nevertheless, with our present data we feel that further empirical generalizations could be found that would help give us further indications concerning the correctness of the assumptions in the theory. For each of the sub-samples we have used to test our hypotheses, we could obtain information on which of the activities are most often reported and the number of reported

activities for the separate categories of 'with whom.' This information would verify the concepts of 'limited' and 'constrained.' Further controls on our data would allow us to see the effect of having to recall from memory events which occurred at different times in the past. This information would enable us to test if the weak effect of education was due to memory or to articulation. A second control would be to see if the day of the week that is reported on the Time-Record affects the number, type, and the 'with whom' categories of activities. Finally, the data are useful for the formulation of a problem which would look at the length of time, in a given duration, that is spent with the same category of 'with whom' even though activities may change.

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APPENDIX A

APPENDIX A

ABSTRACT OF MAIN CODE MANUAL

Question Number	Total Per Cent	Question Code
5		Interviewer number
	16	1 A
	18	2 B
	22	3 C
	27	4 D
	16	5 E
	2	6 F
6,19 87,89		Actual shift
	68	1 Steady day shift
	5	2 Steady grave-yard shift
	15	3 Afternoon and day shift alternating
	8	4 Three-shift rotation over 7-day week
	1	5 Three-shift rotation over 5-day week
	1	6 Steady afternoon
	2	7 Other
19		Where do you work?
	54	1 Not largest employer
	46	2-8 Largest employer
25		Is there anyone working under your supervision?
	59	1 None
	20	2 1-2
	7	3 3-4
	4	4 5-9
	6	5 10-19
	1	6 20-29
	2	7 30-49
	1	8 50 and more
99		How many people are living here now, including yourself?

Question Number	Total Per Cent		Question Code
	8	1	Respondent lives alone
	16	2	2 persons
	14	3	3 persons
	26	4	4 persons
	20	5	5 persons
	11	6	6 persons
	3	7	7 persons
	2	8	8 persons
	0	9	9 persons or more
114			What was the last grade you finished in school?
	3	1	Grade 4 and under (and no other training)
	30	2	Grades 5 - 8
	34	3	Grades 9 - 11
	8	4	Under Grade 12 plus other training
	10	5	Grade 12 or completed high school (and no other training)
	5	6	Grade 12 or completed high school plus other training
	9	7	Any university level education
	0	9	No answer.

APPENDIX B

TIME RECORD (a)

Starting time	Ending time	Regular work day:	Respondent's Serial No.
Day:_____	Day:_____	1 Yes	
Time:_____	Time:_____	2 No	

Time	Activity	With whom?
12		
1 AM		
2 AM		
3 AM		
4 AM		

Do you see any of the people you mentioned on any other occasions?
(SPECIFY, AND MARK BY *)

Time	Activity	With whom?
4 AM		
5 AM		
6 AM		
7 AM		
8 AM		
9 AM		

Do you see any of the people you mentioned on any other occasions?
(SPECIFY, AND MARK BY *)

Time	Activity	With whom?
9 AM		
10 AM		
11 AM		
12		
1 PM		
2 PM		

Do you see any of the people you mentioned on any other occasions?
(SPECIFY, AND MARK BY *)

Time	Activity	With whom?
2 PM		
3 PM		
4 PM		
5 PM		
6 PM		
7 PM		

Do you see any of the people you mentioned on any other occasions?
(SPECIFY, AND MARK BY *)

Time	Activity	With whom?
7 PM		
8 PM		
9 PM		
10 PM		
11 PM		
12		

Do you see any of the people you mentioned on any other occasions?
(SPECIFY, AND MARK BY *)

APPENDIX C

STUDY OF WORK AND LEISURE

CODE MANUAL (Cards 4 - 7)

Time Record

Question 88: "(IF RESPONDENT STARTED AND FINISHED WORK WITHIN THE LAST 24 HOURS:) I'd like to take a record of what you did in the last 24 hours, starting about . . . o'clock yesterday (i.e., 24 HOURS BEFORE BEGINNING OF INTERVIEW). (IF RESPONDENT HAS NOT STARTED AND FINISHED WORK IN THE LAST 24 HOURS:) I'd like to take a record of what you did during the last day you worked, starting from the time you got up."

Amount of time spent on an item of activity is coded in five-minute units. The sum for one 24-hour day is 288 five-minute units. Item 28 is not counted.

m=Multiple item, containing two or more items for each of which there is a separate code when coded singly. A multiple item is not coded elsewhere, and is counted in the sum.

"snack" includes food other than the three main meals, and/or any non-alcoholic drink.

"beer" includes any alcoholic drink.

Column #s	Code
312, 315 etc.	WITH WHOM (applies to each column under "with whom" and "to/by whom")
	0 No activity recorded
	1 Activity recorded, No Answer with whom
	2 Alone
	3 Spouse or sweetheart (if married--spouse; if single--sweetheart)
	4 Spouse/sweetheart and children/parents, plus any other (as in '3' and '5')
	5 Children or parents, plus any other (in a two or three-generatinn household: if R is a parent but not a grandparent--children; if R is a child but not a parent--parents)
	6 Household members other than spouse/sweetheart or child/parent (kin and others, i.e., other than '3', '4', or '5')
	7 Kin not in household
	8 Spouse/sweetheart and work mates, plus any other
	9 Spouse/sweetheart and any others not work mates or child/parent
	10 - Work mates, plus any others not spouse/sweetheart or child/parent
	11 J Friends or neighbors, plus any others not spouse/sweetheart or child/parent or work mate
	12 K Strangers or persons in formal or contractual relations
	13 L Any other combination
301-303	Respondent's serial number
304	Codability of Time Record
	1 Not coded
	2 Coded
	3 Coded but of limited quality

Column #s 5-min units	With whom	Item #	Item and Code	Setting	TITLE
305-306		5	Time period without recorded content, or content illegible or uninterpretable, or no answer		NOCONT
307-308		7	Odd items which cannot be coded elsewhere (list)		ODDS
309-311	312	9	Sleep (main sleeping period, not including nap, "laid down", etc.)	home	SLEEP
313-314	315	13	Get up and wash, shave, get dressed (not including a bath, second washing, or after-work shower)	home	GETUP
316-317	318	16	Breakfast*	home	BRKFST
319-320	321	19	[m]Get up etc. and breakfast	home	UP+BRK
322-323	324	22	Get ready for work, at home (not including lunch box preparation, or get up and wash, or meals)	home	WREADY
325-326	327	25	Journey to and from work I** (for II see item 64)	out	WRKTRI
328-329		28	Interruption of journey to/from work***		

* (Item 16) For workers returning from graveyard shift, record the meal following the arrival at home as breakfast unless that meal is described convincingly as a dinner or lunch, or unless the meal after a main sleep period is convincingly described as breakfast. If in doubt, judge by the nature of the activities of other household members. Not everyone, though, must have had a breakfast.

** (Item 25) If uncontaminated add time for journey to work to time for journey from work, as long as the difference between the two is not greater than two five-minute units. If contaminated, estimate. Contamination means: (a) another item intervenes and has start and end marked (in that case do not include the intervening item); (b) another item intervenes and its start and/or end are not marked (in that case use the other journey and multiply by 2 if the other journey is uncontaminated); (c) both journeys contaminated and intervening item(s) not properly marked (in that case check R's home and work locations and estimate time for one trip and multiply by two). An intervening item may be at the beginning and/or end of journey. Do not include journey to lunch and back.

*** (Item 28) Not counted in total. If the time for the interruption of journey(s) to and from work is not marked or incompletely marked, code the result of subtracting journey to work time as estimated from total time extending from departure to arrival. Do not include estimated contaminations recorded as occurring before and/or after departure and arrival. Include the difference between journey to work and journey from work if greater than 2 units, unless there are justifications for the difference in the data. If such difference is not labelled code in Item 5.

Column #s 5-min units	With whom	Item #	Item and Code	Setting	TITLE
330-331	332	30	Before-work activities at work site (talk to fellow workers, punch in, coffee, change clothing)	Work	PREWRK
333-335	336	33	Work (not including moonlighting)	Work	WORK
337-338	339	37	Work break other than lunch (coffee, tea, smoke break) (check questions 41-42 for consistency and additional information on WITH WHOM)	Work	WKBRK
340-341	342	40	[m]Work break other than lunch and games (playing cards)	Work	BRKGAM
343-344	345	43	Lunch at work (includes eating lunch at nearby eating place that would substitute for a lunch room)	Work	LUNWRK
346-347	348	46	[m]Lunch at work and games(playing cards)	Work	LUNGAM
349-350	351	49	Journey to lunch away from work, and back	Out	LUNTRP
352-353	354	52	Lunch at home	Home	LUNHOM
355-356	357	55	After-work activities at work site (shower, washup, talk to fellow workers, change clothing)	Work	POSTWK
358-359	360	58	Moonlighting (time spent on second job(s); record separate from item 33--Work)	Work	MOONLI
361-362	363	61	Work at home (main job only)	Home	WKHOME
364-365	366	64	Journey to/from work II (see item 25)	Out	WRKTR2
367-368	369	67	Bath, second washing, shower, getting dressed, get ready for bed	Home	BATH
370-371	372	70	Supper or dinner at home	Home	SUPPER
373-374	375	73	[m]Supper and watch TV at home	Home	SUP+TV
376-377	378	76	Housework: preparing meal or lunch box, wash dishes, sewing, make bed(s) (does not include: care of children; work around house--if a man; repairs on house; furniture; car)	Home	HSEWRK

Column #s 5-min units	With whom	Item #	Item and Code	Setting	TITLE
379			Sample 1 Co. 4 Other		
380			Card number 4 (card columns 301-380)		
401-403			Respondent's serial number		
404-405	406	104	Transitions (such as getting out of the car and going into the house, getting ready to go for drive--but not dressing or washing)	Home	TRNSIT
407-408	409	107	Correspondence (writing letters, reading mail, paying bills, concerning self and family affairs, not work)	Home	CORESP
410-411	412	110	Telephone conversation at home	Home	PHONE
413-414	415	113	Care of children at home (includes baby-sitting, play with children, put children to bed)	Home	CHLDRN
416-417	418	116	mCare of children and other activity (list other activities)	Home	CHLDR+
419-420	421	119	Gardening	Home	GARDEN
422-423	424	122	Care of animals	Home	ANIMAL
425-426	427	125	Mechanics (work on car, motorcycle, boat, trailer, lawn mower.)	Home	MECHAN
428-429	430	128	Home maintenance, work or putter around the house, wash car (Does not include construction of house or furniture or a major painting job)	Home	HMAINT
431-432	433	131	Home construction at home (includes making furniture and major painting jobs)	Home	CONSTIN
434-435	436	134	Home construction out	Out	CNSTOU
437-438	439	137	Organizational activity or meeting at home (does not include entertainment or church. Check membership)	Home	INORMT

Column #s 5-min Units	With whom	Item #	Item and Code	Setting	TITLE
440-441	442	140	Organization of activity or meeting not at home (does not include entertainment or church. Check membership).	Out	OUORMT
443-444	445	143	Drive to something or from something I* (not to or from work) (for II and III see items 146 and 149)	Out	DRIVE1
446-447	448	146	Drive to something or from something II (not to and from work). (See items 143 and 149)	Out	DRIVE2
449-450	451	149	Drive to something or from something III (not to or from work) (See items 143 and 146)	Out	DRIVE3
452-453	454	152	Drive around, go for drive or ride I (for II see item 176)	Out	DRIARI
455-456	457	155	Walk to something and from something (not to or from work).	Out	WALKTO
458-459	460	158	Walk around, go for walk	Out	WLKARD
461-462	463	161	Shopping for goods and services I (not including professional services) (for II see item 276)	Out	SHOPGI
464-465	466	164	Meal or snack out (not including lunch near work place or visiting and meal)	Out	EATOUT
467-468	469	167	Beer or other alcoholic drink out	Out	EEERCU
470-471	472	170	Picnic out	Out	PCNCOU
473-474	475	173	Loafing out, sitting around, sunbathing (at lake, in hotel lobby, at street corner, drug store)	Out	LOAFOU
476-477	478	176	Drive around, go for drive, ride II (see item 152)	Out	DRIAR2

* (Item 143: WITH WHOM: if two or more trips are recorded with different categories of others, code the sum of those trips with the same category of others, and code trips with different categories of others in the sequence of the WITH WHOM code, i.e. lowest code number first, in 143, 146, 149.

Column #s 5-min units	With whom	Item #	Item and Code	Setting	TITLE
479			Sample 1 Co. 4 Other		
480			Card number 5 (card columns 401-480).		
501-503		-	Respondent's serial number		
504-505	506	204	Read book(s)	Home	RDBOOK
507-508	509	207	Read, read paper, magazines (not books)*	Home	PAPER
510 511	512	210	mRead and watch TV*	Home	READTV
513-514	515	213	mRead and listen to Radio*	Home	RD+RAD
516-517	518	216	mRead and beer*	Home	RDBEER
519-520	521	219	mRead and Talk*	Home	RDTALK
522-523	524	222	mRead and Loaf*	Home	RDLOAF
525-526	527	225	Watch TV I* (for II see item 369)	Home	TV1
528-529	530	228	mWatch TV and beer*	Home	TVBEER
531-532	533	231	mWatch TV and talk*	Home	TVTALK
534-535	536	234	Listen to radio*	Home	RADIO
537-538	539	237	Games*	Home	GAMES
540-541	542	240	000		000
543-544	545	243	Beer at home*	Home	BEER
546-547	548	246	Loaf, relax, "lay down", nap*	Home	LOAF
549-550	551	249	Talk*	Home	TALK
552-553	554	252	Snack at home	Home	SNACK
555-556	557	255	Hobby proper (other than mechanics or construction) at home	Home	HOBBY

* Each of these items may include snack.

Column #s 5-min units	With whom	Item #	Item and Code	Setting	TITLE
558-559	560	258	Active participation in organized sports	Out	ORGSPT
561-562	563	261	Active participation in unorganized sports (swimming).	Out	NORGSP
564-565	566	264	Watching organized sports.	Out	WATSPT
567-568	569	267	Hunting or fishing	Out	FISHUN
570-571	572	270	Entertainment in organization not at home (does not include church, check membership)	Out	ORGENT
573-574	575	273	Entertainment out (plant tour, carnival, parade, movies, watching accident).	Out	ENTOUT
576-577	578	276	Shopping II (see item 161)	Out	SHOPG2
579		-	Sample 1 Co. 4 Other		
580		-	Card number. 6 (card columns 501-580).		

Column #s 5-min units	With whom	To/by whom	Item #	Item and Code	Setting	TITLE
601-603			-	Respondents serial number.		
604-605	606	607	304	Being visited (plus talk or snack) WITH WHOM (in whose company R is when others visit him) BY WHOM (who is visiting R)	Home	CMPANY
608-609	610	611	308	[m]Being visited and meal	Home	COMEAL
612-613	614	615	312	[m]Being visited and watch TV (plus talk or snack)	Home	COMPTV
616-617	618	619	316	Being visited and watch TV and beer (plus talk or snack)	Home	COTVBR
620-621	622	623	320	[m]Being visited and games (plus talk, beer or snack)	Home	COMPGM
624-625	626	627	324	[m]Being visited and beer (plus talk or snack)	Home	COBEER
628-629	630	631		BLANK		
632-633	634	635	332	Visiting (includes only time spent at place visited) (plus talk or snack). WITH WHOM:(in whose company is R when he goes visiting). TO WHOM: (whom is R visiting).	Out	VISITG
636-637	638	639	336	[m]Visiting and meal	Out	VIMEAL
640-641	642	643	340	[m]Visiting and watch TV (plus talk or snack)	Out	VISITV
644-645	646	647	344	[m]Visiting and watch TV and beer (plus talk or snack)	Out	VITVBR
648-649	650	651	348	[m]Visiting and games (plus talk, beer or snack)	Out	VISTGM
652-653	654	655	352	[m]Visiting and beer (plus talk or snack)	Out	VIBEER
656-657	658	659	356	[m]Visiting and work on car	Out	VISCAR
660-661	662		360	Religion out	Out	RELOUT
663-664	665		363	Religion at home	Home	RELHOM
666-667	668		366	Music at home	Home	HMUSIC

Column #s 5-min units	With whom	Item #	Item and Code	Setting	TITLE
669-670	671	369	Watch TV II (see item 225)	Home	TV2
672-673	674	372	Professional services out (lawyer's office, Xray at hospital, dentist, doctor)	Out	PRFSER
675-678			BLANK.		
679			Sample. 1 Co. 4 Other		
680			Card number. 7 (card columns 601-680).		