DOCUMENT RESUME

ED 036 839 CG 005 060

AUTHOR	Lubow, Bart K.; And Others
TITLE	Client Behavior in Sheltered Workshops: Two Case Studies. Studies in Behavior and Rehabilitation. Number Two.
INSTITUTION	State Univ. of New York, Ithaca. Region II Rehabilitation Research Inst. at Cornell.
SPONS AGENCY	Social and Rehabilitation Service (DHEW), Washington, D.C.
PUB DATE	26 Oct 69
NOTE	71p.
EDRS PRICE	EDRS Price MF-$0.50 HC-$3.65
DESCRIPTORS	*Behavior, *Behavior Change, *Behavior Patterns, Caseworker Approach, Mental Retardation, *Rehabilitation, Trainable Mentally Handicapped

ABSTRACT

The monograph is the second in a series entitled "Studies in Behavior and Rehabilitation" and is scientifically dependent upon the first article. The authors report observations of two case studies and list three major purposes of the analysis: (1) to familiarize individuals interested in rehabilitation with the work Behavior Observation Scheme and types of analyses possible through its application; (2) to provide insight into the relationship between work, the work setting, and the modification of client behavior; and (3) to suggest the groundwork for a more relevant method of classifying an individual's disability. The authors stressed the necessity of classifying the disability, the influence of work, work setting, and rehabilitation in changing client behavior, and directions for future research. (Author/MC)

Client Behavior in Sheltered Workshops: Two Case Studies

w, Robert P. Kimberly,
on, John R. Kimberly

Client Behavior in Sheltered Workshops: Two Case Studies

by

Bart K. Lubow
Robert P. Kimberly
William H. Butron
John R. Kimberly

This research was supported in part by Grant RD-2075-G from the Social and Rehabilitation Service (formerly VRA) of the Department of Health, Education and Welfare, Washington, D.C.

Cornell University, Region II, Rehabilitation Research Institute
Ithaca, New York
1969

Table of Contents

List of Tables

List of Figures

List of Diagrams

Preface

In early 1969 the Region II Rehabilitation Research Institute published its first monograph entitled, *A Conceptual Framework for the Analysis of Work Behavior in Sheltered Workshops.* Appearing in a series entitled "Studies in Behavior and Rehabilitation," this monograph outlined a conceptual framework and related operational procedures developed during several years of research on sheltered workshops. This monograph presented the problem of analyzing the dynamics of client work behavior in sheltered workshops as the essential problem confronting the management of these agencies.

This is the second monograph in the series. Unlike its forerunner, its focus is empirical, for we wish to provide our readers with an opportunity to evaluate the merits of the earlier monograph in light of data rather than conjecture. As the reader will see, this monograph is based on data gathered during observations of two clients. We have written this monograph, therefore, not as the end product of a new research proposal, but rather, to provide an opportunity for concerned students of rehabilitation to analyze and assess the merits of the research proposals previously offered. It seems evident to us that the concepts and methods we have proposed may best be developed in light of their empirical and practical implications. For those who may be interested, a shorter version of this monograph entitled "An Empirical Approach to Work Behavior, Interaction and Rehabilitation," appears in *Human Organization,* Winter, 1969.

The complexities of analyzing dynamic processes of adaptation to work are extensive. The analysis in this monograph is a first

step, and does not make full use of the available data. The reader will note that we have not as yet gone beyond aggregated indices and statistics of behavior. As all who are aware of issues of behavioral change (such as learning theory) recognize, the structure of behavior is obscured when frequencies of behavior are merely summed and subsequently analyzed. Lost in such analysis are opportunities to examine the ordering of behavior in time. However, our methodology provides an opportunity to examine the dynamic aspects of behavior which may, in the long run, prove to be essential for fuller understanding of the rehabilitation processes manifest in the vocational activities of sheltered workshops. To these issues we will turn in future work.

We are indebted to a number of individuals who have encouraged us at various points. Professors William Foote Whyte of Cornell and Arthur Turner of Harvard made the constructive suggestion two and one-half years ago that we place data before our readers in an effort to explicate concepts we had developed. Dr. Eliot D. Chapple, whose research over many years has focused upon issues of rehabilitation and vocational performance, commented extensively on our work at various points. We are also indebted to Dr. Chapple for contributing the foreword to this study. Finally, a number of organizations contributed to this study or the earlier developments which preceded it. To the staff and clients of the workshops where we did our field work and their executive directors, we wish to express our sincere thanks, particularly to Anthony Lombardo, Daniel Wieder, Allan J. Speiser, and Evelyn Storer, each of whose willingness to help us is hereby gratefully acknowledged. Lastly, our thanks go to Mary Jo Powell whose editorial assistance was of great value and to Patricia Lashomb who presided over the early and late drafts of this manuscript.

William H. Button, Research Director
Region II Rehabilitation Research Institute
New York State School of Industrial
and Labor Relations, Cornell University
Ithaca, New York
October 26, 1969

Foreword

It is an irony of history, in science particularly, that major breakthroughs are at once so obvious after the fact yet so frequently delayed in their coming to pass. Thus it is with the data reported on in this monograph and in the methods by which it was collected, more fully described in the first of this series, *A Conceptual Framework for the Analysis of Work Behavior in Sheltered Workshops.*[1]

It would seem a simple idea to begin an inquiry into the rehabilitative properties of sheltered workshops by examining systematically the work patterns of clients while they are at work. As the authors point out, [illegible]t of the client's time in the shop itself is spent working. But to do this requires the initial acceptance, as a working hypothesis, that "work (and its setting) may play an important role in modifving behaviors and, therefore, in the process of rehabilitation." Further, it assumes that the desired consequence of the workshop process is the achieved capacity of the client to gain a job in business or governmental organizations, and that vocational placement is the rationale for the whole process.

Such an approach should be made easier by the vast literature on how work does structure behavior, beginning with the empirical investigations at the Hawthorne Plant of the Western Electric Company in the late 20's and early 30's.[2] The most relevant of all these for the sheltered workshop was the Bank Wire Room study where an entire department (suitably scaled down) was observed over several years on a daily basis, much as an anthropologist would study the Bushmen of the Kalahari Desert or an ethologist observe groups of baboons in Africa or,—a better comparison, the rhesus macaques settled in the limited space of Cayo Santiago, a tiny island off the east coast of Puerto Rico.

---

[1]William H. Button, John R. Kimberly, Bart K. Lubow, Robert P. Kimberly, *A Conceptual Framework for the Analysis of Work Behavior in Sheltered Workshops.* Region II Rehabilitation Research Institute, Studies in Behavior and Rehabilitation, No. 1, Cornell University, Ithaca, New York, February, 1969.

[2]F. J. Roethlisberger and W. J. Dickson, *Management and the Worker* (Cambridge, Mass.: Harvard University Press, 1939).

Nor should it be forgotten that all these field studies in industry were paralleled (and preceded) by the extensive writings on work, and industrial organization, by Mary Follett,[3] Henry Dennison,[4] Henri Fayol,[5] and many others in the "organization engineering" movement of the twenties, which was intended to enlarge time-and-motion study—and industrial engineering generally—to deal with the network of interacting individuals in a work organization.

In addition, my own work, in the middle 30's, resulted, before the end of the decade, in our being able to extend the use of the yardstick of time from the elements of the job—and the activities of which it is made up—to the relations of the individuals performing it.[6] Interaction measurement made it possible to differentiate the order and sequencing between people and the durations of the various patterns which made up their adjustment (or lack of adjustment) to others. In so doing, one could differentiate individuals in terms of their idiosyncratic interactional properties. Their personalities and their temperamental reactions to those stresses which lack of adjustment produced could then be defined with precision as the presenting states which the rehabilitation process had to take into account.[7]

If work and the work setting bring about changes in the individual's capacity to adjust, in his being able to manage "social" interaction with others on the job, and, best of all, in a carry-over to his other relationships outside the shop, then the same yardsticks of how often (frequency), how long (duration) could be applied to the individual as he entered the rehabilitation process, to his progress or the lack of it, and to his ultimate potential for return to society as a productive member.

---

[3]Mary Parker Follett, *Dynamic Administration* (London: Harper Brothers, 1942).

[4]Henry S. Dennison, *Organization Engineering* (New York: McGraw-Hill, 1931).

[5]Henri Fayol, *General and Industrial Management*, trans. from French, ed. by Constance Stours (London: Pitman, 1949).

[6]Eliot D. Chapple and Conrad M. Arensberg, *Measuring Human Relations: An Introduction to the Study of the Interaction of Individuals* (Genetic Psychology Monograph No. 22) (Provincetown, Mass.: The Journal Press, 1940).

[7]Eliot D. Chapple, M. F. Chapple, and Judith A. Repp, "Behavioral Definitions of Personality and Temperament Characteristics," *Human Organization*, vol. 13, no. 4 (Winter, 1955).

x

This emphasis on the use of quantitative measurements of time durations had been remarkably expanded since those days, both in job-focused studies of selection, placement, job and organization design and their dynamics, and criteria of effective performance; it has also provided accurate methods of describing individual differences in personality and temperament both in the world of work and in their deviant manifestations in the psychiatric states.[8] Though this is relevant in considering problems such as those posed by the two mentally retarded young people who are the subject of this study, its broader significance, and this is not limited to interaction measurement alone but applies to all measurements which are isomorphic with arithmetic as in the natural sciences, lies in the utility of cardinal numbers—in contrast to those ranked in a scale (by whatever means) which are ordinal in character.

Lord Kelvin, one of the founders of thermodynamics, in an often quoted statement said, "I often say that when you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind; it may be the beginning of knowledge, but you have scarcely, in your thoughts, advanced to the stage of science, whatever the matter may be."[9]

Lord Kelvin was, of course, oversimplifying, since he took for granted that numbers were limited to those which could be combined by the laws of arithmetic; also that the operations by which the measurements were obtained described phenomena whose interdependence had been demonstrated. In recent years, some of these assumptions have been argued with, to try to justify alternate uses of numbers. Without considering the epistemological problem, natural scientists, with their primary concern for the accuracy of predictions which they can make from data obtained in conducting observations or experiments (this distinction is, of course, slightly artificial) are far happier with the results of using measurements where each unit (number) is interchangeable with, and equivalent to, the next.

---

[8]Eliot D. Chapple and Leonard F. Sayles, *The Measure of Management* (New York: Macmillan and Co., 1961).

[9]William Thomson (Lord Kelvin), and P. G. Tait, *Treatise on Natural Philosophy* (Cambridge, England: 1883).

At this late date, it is perhaps not relevant to consider why the techniques and the findings about people studied in work settings have been so late in arriving in the sheltered workshop universe. It is probable, historically, that there has been an implicit tendency to think of the workshop, first as providing an activity for those otherwise idle, and only secondarily as an instrumentality for change. In addition, the clients almost universally presented serious handicaps—physical, mental, emotional-behavioral—hence there was a natural concern with diagnostic procedures, and with counseling. From this point of view, the sheltered workshop was perhaps looked at only as a half-way, a transitional, stage in the client's progress, or as a terminal state with no exit. What he did in the shop was not made central to the rehabilitation process, the means through which changes in behavior could be demonstrably brought about. Nor did it become the basis for reliable estimates of improvement and the development of evidence for future placement based on repeatedly asking the question for each client; improvement for what, for what job, for what work setting, in what community situation?

This does not mean that concentration on vocational and aptitude testing and vocational counseling may not play an important role. What the authors of this monograph emphasize, however, is that the daily evidence of workshop performance is a major datum, largely ignored. And further, though this they do not say, with the exponential rise in the deficit in professionally trained personnel coincident with the widening scope of the rehabilitation challenge under new Federal laws, it may be time to examine whether the workshop as a rehabilitation instrumentality for producing change should not be evaluated for its relative contribution against more traditional methods of working with clients.

A secondary problem from the point of view of research, but one strongly held within the academic tradition and thus a barrier to wholehearted acceptance of a quantitative approach, lies in the assumed primacy of attitudes as against observable behavior. Although the pragmatist knows that "actions speak louder than words" and even children, in less Freudian days, used to repeat, "sticks and stones may break my bones, but words will never hurt me," the practice of evaluation has largely been based on what is said rather than on what is done. For nearly a

half century, in logic and philosophy, in anthropology and linguistics, semantic inquiry has demonstrated that the referents for symbols are to be found and validated in the behavior; further, much work has been done devoted to showing how symbols change their meaning as situations change.

To some extent, this hesitation to impute significance to quantitative measurements preferring to depend on the statements of the clients, too often taking them at face value, or at least using no systematic semantic procedures for determining their meanings, has derived from the lack of awareness of the extraordinary number of highly complex patterns of emotional-behavioral states which can now be measured. Thus, attitudes or sentiments, whatever the term preferred, are a kind of symbolic shorthand, but accurate and precise criteria for their recognition have never been defined in terms of the behavioral patterns of which they are made up.

The techniques described herein are only a partial segment of the total quantitative repertoire of interaction and activity measurements available to the rehabilitation specialist, and to the sheltered workshop. Yet their very simplicity, as described in the Work Behavior Observation Scheme, means that they can be carried out without professional training. In our own work, for nearly ten years in ward sheltered workshops at the Rockland State Hospital, with chronic, long-stay adult psychotics and, more recently, with adolescent character disorders—the so-called sociopathic or psychopathic states—we have used non-professional staff, who usually have only a high school education, to make similar observations on a longitudinal basis as well as to be responsible for carrying out far more complex and tightly programmed training (and treatment) procedures.

The importance of these very simple (and unambiguous) measurements of spatial location and distance, technological sequencing, and the durations and frequencies of work and non-work behavior and social contacts, differentiated by who initiated and who terminated them, is their remarkable descriptive power. Even without considering their extensions to a variety of clients with very different disabilities, the quantitative data bring out very clearly the significant differences between the two individuals. They make the point that the properties of the jobs

performed, and the performance itself, have important prognostic significance.

In addition, and a major focus of our own work at Rockland, it is evident that the workshop director assigned specific clients to particular types of work and work settings not merely to find something "they can do" but, more importantly, to use work in a truly therapeutic sense. One is, of course, limited by the types of jobs which one can obtain, particularly through subcontracting. Nevertheless, almost any job can be broken down into a sufficient number of steps so that the variables of spatial distance and technological sequencing—in assembling, inspecting packing, materials handling, and the like—can be combined to facilitate interaction between particular individuals or prevent it. Within that broad category of constraints, one can build up interactional habits—of initiative, of fast or slow tempo, or responding to another's action and synchronizing behavior in team operations —on the basis of diagnostic evaluation of behavioral disabilities.

For the workshop is a highly structured environment and, ordinarily, the client works there for a major part of each day. Hence the impact of therapeutic job design, aimed directly at remedying those behavioral deficiencies which are idiosyncratic to that particular client, can be continuous; it is far more powerful, in spite of traditional belief, than the 50 minute hour, once or twice weekly, of individual counseling or psychotherapy or the various unstructured and unvalidated forms of group therapy. In addition, it has the great advantage of being capable of objective design by anyone with only a modicum of sophistication in industrial operations *and* an easily obtained understanding of the behavioral variables which he is seeking to change.

In effect, what the workshop makes possible for the rehabilitation specialist is an environment where manipulation of its components has no implication of prior conceptual decisions imposed on the patient. For the criteria of success are straightforward. They are measures of job performance. Whether the learning and habituation process is successful is determined from the quantitative measurements of the patterns of activity and interaction (including work done) of the individual. If the job design is unsuited for the person's needs, performance, both work and interaction get worse. By longitudinal sampling, the need for intervention can be accurately calculated.

The authors specify the criterion explicitly when they describe "rehabilitation as the reduction of inappropriate behavioral variance." Though one has to be careful to specify the properties of "inappropriateness" in behavioral terms, it has been repeatedly demonstrated that the establishment of stable routines (even of dealing with the unexpected) is essential to job satisfaction and high performance. This does *not* mean that the job, abstracted from its interactional components as in many types of highly repetitive, assembly jobs, need only have low variance in the statistical sense. As innumerable investigators have shown, ordinarily in natural history terms and in case history after case history, a stable constellation of routines is essential to high morale and performance; instability, for technological or personality reasons within an organizational framework, is destructive. This finding can very properly be extended to the rehabilitation process, in the workshop, at least.

The very great virtue of the techniques herein illustrated is that they enable us to identify the individuality of the client's disabilities *and* his personality and temperamental patterns in quantitative terms. We can then apply the same yardsticks to his progress in the sheltered workshop and beyond. They are thus diagnostic, evaluative, and prognostic. In addition, since the constraints imposed by theories (and standards) of efficiency are by no means so pressing in sheltered workshops, studies carried on in the ways outlined here, and in other similar work, can provide a meaningful feedback in achieving a better understanding of the central problem of our society, namely, how man can achieve emotional satisfaction and a sense of his own worth and significance in human organizations.

What is inadequately appreciated is that technology has its own logics, the logics of efficiency. The jobs that most of us perform are designed in these terms, with the emotional-interactional components of man omitted. Until these are brought into a total system, and job design, at the highest or lowest levels, is looked at conjointly, neither rehabilitation nor the planning of society can ever hope to strengthen the potential for individuality in the human personality.

Eliot D. Chapple
November 3, 1969

Part I: Introduction

Background and Purpose[1]

For the past two and one-half years, the Region II Rehabilitation Research Institute has been engaged in the study of the organization and administration of sheltered workshops.[2] We had only been shortly into this venture when we became aware of a dilemma peculiar to workshops as a class of organizations: namely that work has two distinct sets of consequences for workshops. In one sense, work is an economic activity which means that workshops carry on many of the operations of typical business organizations. The characteristics of the economic aspects of production activities in workshops have been reported elsewhere.[3] But work has other consequences for workshops since it provides opportunities for client rehabilitation. Thus, work may also have important consequences for the modification of client behavior.

Both a review of literature relating to rehabilitation and the

---

[1]For a more detailed statement of the basic ideas in this section, see William H. Button, John R. Kimberly, Bart K. Lubow, and Robert P. Kimberly, *A Conceptual Framework for the Analysis of Work Behavior in Sheltered Workshops* (Ithaca, N.Y.: Region II Rehabilitation Research Institute, Cornell University, February 1969), Studies in Behavior and Rehabilitation, No. 1.

[2]This research is supported in part by a grant from the Social and Rehabilitation Service, U. S. Department of Health, Education and Welfare, (RD-2075-G), to the New York State School of Industrial and Labor Relations, Cornell University, Ithaca, New York.

[3]See, William H. Button, *Wage Levels in Sheltered Employment* (Ithaca, N.Y.: Region II Rehabilitation Research Institute, Cornell University, December 1967), Research Report No. 1; John R. Kimberly, *The Financial Structure of Sheltered Workshops* (Ithaca, N.Y.: Region II Rehabilitation Research Institute, Cornell University, June 1968), Research Report No. 3; Michael M. Dolnick, *Contact Procurement Practices of Sheltered Workshops* (Chicago, Ill.: National Society for Crippled Children and Adults, 1963).

research staff's own experiences in a number of workshops in Region II (formerly New York, New Jersey, Pennsylvania, Delaware; now New York, New Jersey, Puerto Rico) indicated that little quantitative analysis of client work behavior had been done. Most rehabilitation programs consist of professional evaluations based on personal interview and psychometric measurements and on therapies based on these evaluative findings. In addition, nearly all therapeutic interventions consisted of individual verbal interactions between client and professional, the goal of which was the change of the client's attitudes and emotions. Little professional attention appeared to be paid to the client in the work setting, aside from highly general comments on his behavior. There were few attempts at therapeutic manipulation of such settings to bring about change.

It became increasingly clear from our observations that research into the rehabilitation of clients in sheltered workshops had overlooked an area which might be rich in potential. It is difficult to understand the absence of research into the client's behavior in his work setting since the main portion of his day is spent working in the shop. Having no a priori grounds for asserting otherwise, we based our research strategy on the assumption that work (and its setting) might play an important role in modifying behaviors and, therefore, in the process of rehabilitation.

With these considerations providing a point of departure, a methodology, now known as the Work Behavior Observation Scheme, was developed to provide quantitative descriptions of the work and social behavior of clients and the settings in which such behavior occurs. Very briefly, our basic hypotheses are as follows: An individual is assumed to bring to the work setting a set of behavioral potentials expressed in current physiological and psychosocial states which are the result of genetic endowment and environmental experiences. In the work setting, he is exposed to a variety of factors which, in interaction with these potentials, result in the behaviors which we observe. For our purposes, the work setting consists of three interdependent elements: behavioral activity,[4] technology, and social ecology. These three elements

[4]We prefer to use the term behavioral activity, rather than behavior, because the former refers only to observable actions whereas the latter has frequently referred to attitudes and other phenomena which do not necessarily include action.

provide the referents for the observational technique which yields the data necessary to provide, we believe, a highly specific description of an individual's behavior and the setting in which it occurs. Both the methodology and the different variables considered will receive further discussion in the next section.

In order that people in the rehabilitation field might be introduced to this methodology and the types of measures obtained through its application, this monograph will present case studies of two disabled individuals who were working in a sheltered workshop during the summer of 1967. These two were selected from a larger sample of clients studied because they provide a contrast in terms of professional evaluations of their productive and social capabilities. One of our subjects had achieved a high degree of competence in aspects of daily living and, therefore, was judged nearly ready for placement into competitive employment. The other, considered unplaceable for the next few years, was incapable of maintaining an adequate level of either productive or social functioning.

Our purpose in developing these case studies is essentially threefold. First, it is hoped that this report will familiarize people in the field with the Work Behavior Observation Scheme and the data obtained through its use. In this context, the study provides new ways of describing those aspects of client behavior often discussed in a more general and qualitative way by professionals; it also offers new criteria for the diagnostic evaluation of behavior. Second, it is hoped that these two cases will illustrate something of the relationships between the behavior of the client and the social and technological environment in which he is located. Once a more detailed understanding of the factors producing behavior change is achieved, it becomes possible to design therapeutic settings within which the client can work. Such design, when based on the results of systematic research, is likely to lead to more effective use of the time a client spends working. For this reason, the two individuals in contrasting rehabilitation states were selected to highlight the potential utility of behavioral descriptions in defining the nature and extent of client disability. Certainly, two case studies cannot adequately deal with a problem of such magnitude. They can, however, serve as a point of departure for a more thorough investigation of such questions.

The remainder of this part of the monograph will be devoted

to a brief description of the Work Behavior Observation Scheme, some comments regarding the workshop in which our subjects were studied, and a qualitative description of them based on professional reports and interviews. The second part will present the quantitative findings which will constitute the bulk of the study. The third and final part will evaluate these findings and present some concluding remarks.

The Work Behavior Observation Scheme

The Work Behavior Observation Scheme is a quantitative observational technique designed to provide measures of both behavior and the setting within which it occurs.[5] Through the use of a remote-control recording device, the observer is able to record accurately the duration, frequency, and sequence of behavioral acts. Two basic classes of acts are recorded, work and interaction. A *work unit* is defined as a period of time during which the individual is performing a given task. The duration of each unit is recorded as are the periods of time separating them. These periods of nonwork, or delay, are classified by the observer as either *personal, work,* or *supply delays.* Furthermore, the number of *work cycles* completed within any particular work unit is recorded. These may then be used to compute productivity measures. Regarding work behavior, therefore, we obtain the duration, frequency, and sequence of all work units and delays while keeping records of the number of work cycles and the type of delay.

At the same time that work and non-work behavior is being observed, social behavior or interaction is also recorded. Along with the duration, frequency, and sequence of such acts, the person with whom the subject is interacting is noted. Furthermore, the observer records who is the initiator and who is the terminator of the contact, the postures of the participants, their distance from each other, and the angular relationship of their bodies. From these data the relationships between the work and social behavior observed can be derived.

The technological factors to which the subject is exposed are

[5]See, "Work Behavior Observation Scheme: Operational Procedures," appendix to W. H. Button, *et al., A Conceptual Framework for the Analysis of Work Behavior in Sheltered Workshops.*

recorded by making a detailed description of his job. The number and variety of parts, tools, machines, controls, substances, and information utilized in the completion of his task are noted. Also, a brief written description of the job serves to clarify these factors further. Finally, the job is classified as either an individual or a team task depending upon whether the subject is temporally dependent upon others for the completion of his task.

A variety of measures of the ecological relationships between the subject and other individuals are recorded. As noted previously, certain proxemic relationships, such as posture, the distance between individuals, and the degree of orientation towards or away are recorded for each social contact. Similar relationships are also recorded in a matrix at the end of the observation. This matrix is designed to measure the gross ecological relationships of the observation period. It includes all individuals within twelve feet of the subject, and all who are related to him technologically, categorized on the basis of four variables: distance (the distance between subject and other); directional orientation (the angular relationship of their bodies); posture; and work-flow relationship (e.g., independent, subject dependent upon other, other dependent upon subject, etc.). These factors provide a specific picture of the social and technological environment in which the subject was observed.

As can be seen from this brief discussion, the Work Behavior Observation Scheme provides data on a variety of factors known to be important in understanding work and related social behavior. Many lines of analysis may be pursued using these data; however we shall restrict ourselves in these case studies to considering only a limited number of questions. Not that we think other questions uninteresting or unimportant; rather available space limits the extent of the present undertaking. Future publications will fill the gaps in this study using a larger sample to focus on questions raised here.

The Workshop

During the summer of 1967, the two clients who are to serve as subjects for our case studies were working in a sheltered workshop

located in a northern suburb of New York City.[6] This workshop is an affiliate of the Association for Retarded Children in its county and, thus, mainly serves clients who have been classified as mentally retarded. The workshop, however, does serve other disability groups, most notably the mentally ill.

This workshop is characterized by the absence of rigid disciplinary rules regarding the behavior of clients. It is part of the philosophy of the executive director that the clients in the shop should neither be restricted in their opportunity to interact with other clients, nor be shielded from the unusual, sometimes bizarre, behavior which often occurs. Adjustment to others in the workshop is considered an essential part of rehabilitation; restraints which would impede this adjustment are minimized.

During the study, the workshop employed seven clerical workers and nine production supervisors. A director of rehabilitation services headed the professional staff which consisted of two rehabilitation counselors, two social workers, and a placement counselor. Administrative duties were performed by a business manager, an associate director, and an executive director. It should be noted that everyone, regardless of position in the organization, was encouraged to interact with the clients and to concern himself with their problems.

The workshop was housed in an old three story school building. The top floor contained a large workroom and most of the offices of both professionals and administrators. The arrangement of the tables and chairs in this workroom was intended to encourage interaction between clients. Clients did not sit in well defined rows limiting the extent of possible eye contact, but were distributed around tables of varying size in essentially random fashion. Thus, structured barriers to interaction were, to an extent, avoided. The major job performed in this room consisted of fastening buttons to a card and therefore we shall call it the Button Room. Diagram 1 presents its basic physical characteristics. Two more workrooms were located on the ground floor, one devoted primarily to the processing of mail, the other to a variety of assembly operations. Again, the physical layout of these rooms, presented in Diagrams 2 and 3, did not enforce severe restrictions

[6]We are indebted to all those involved in the operation of this organization over the past two years; they have been extremely cooperative and helpful.

on the behavior of the clients. In the basement were a small workroom and a cafeteria operated by the clients. No observations were made of clients working in either of these areas. The building was small enough so that there was little separation between rooms. Furthermore, the rooms were open and readily visible to anyone walking by them.

During the study, the density of clients in these rooms was relatively low. Our observations had to be made during the summer when many of the clients were on vacation. Though the

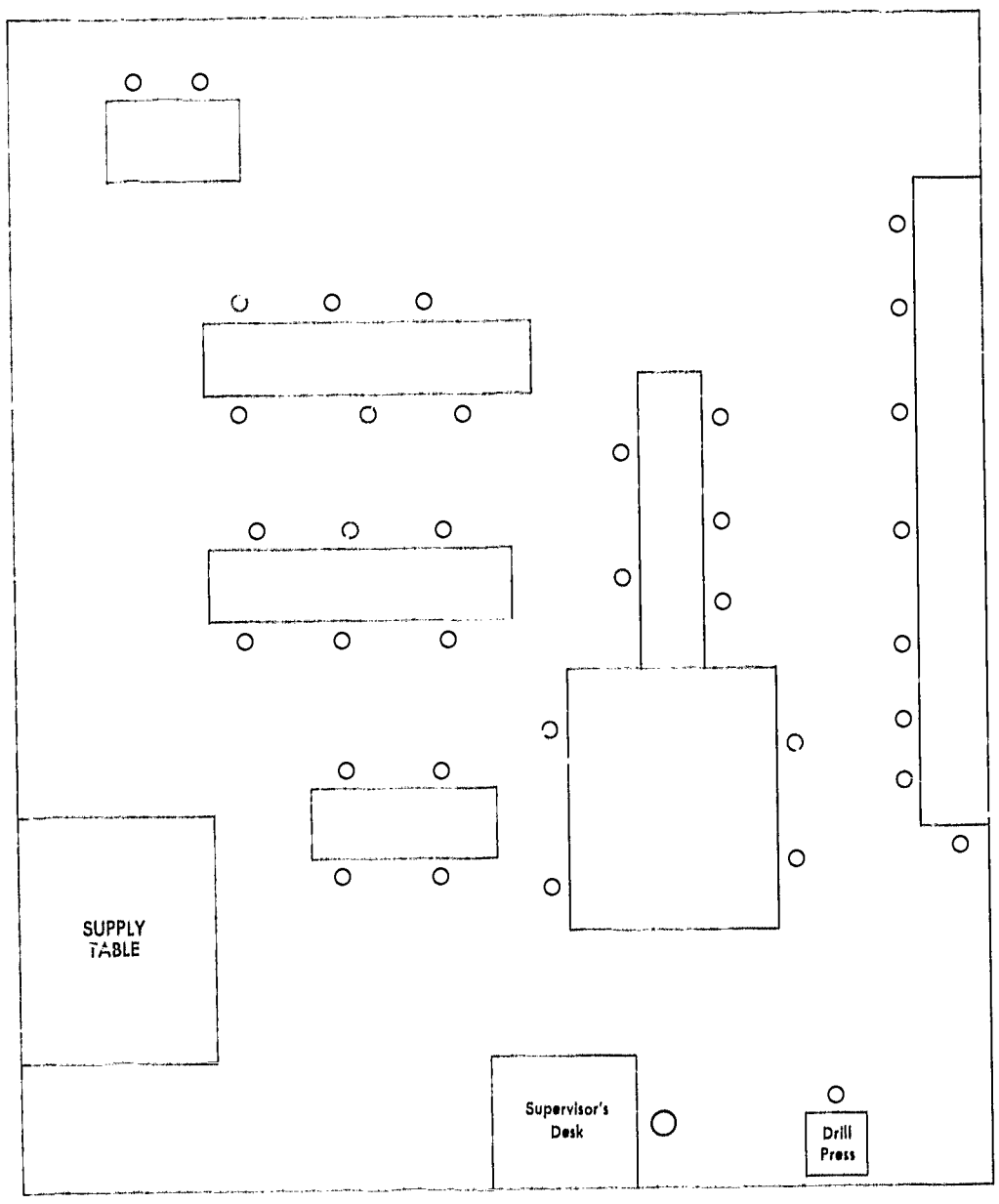

Diagram 1: THE BUTTON ROOM

workshop can and normally does serve approximately 110 clients, about 60 clients, on the average, were present during the four weeks we spent there.

Marilyn

Marilyn, a five foot three, 145 pound, 26 year old white girl, is one of three retarded children in a family of four boys and four girls. Her father is a lawyer working for the United States government, while her mother is at home. Marilyn is the third oldest

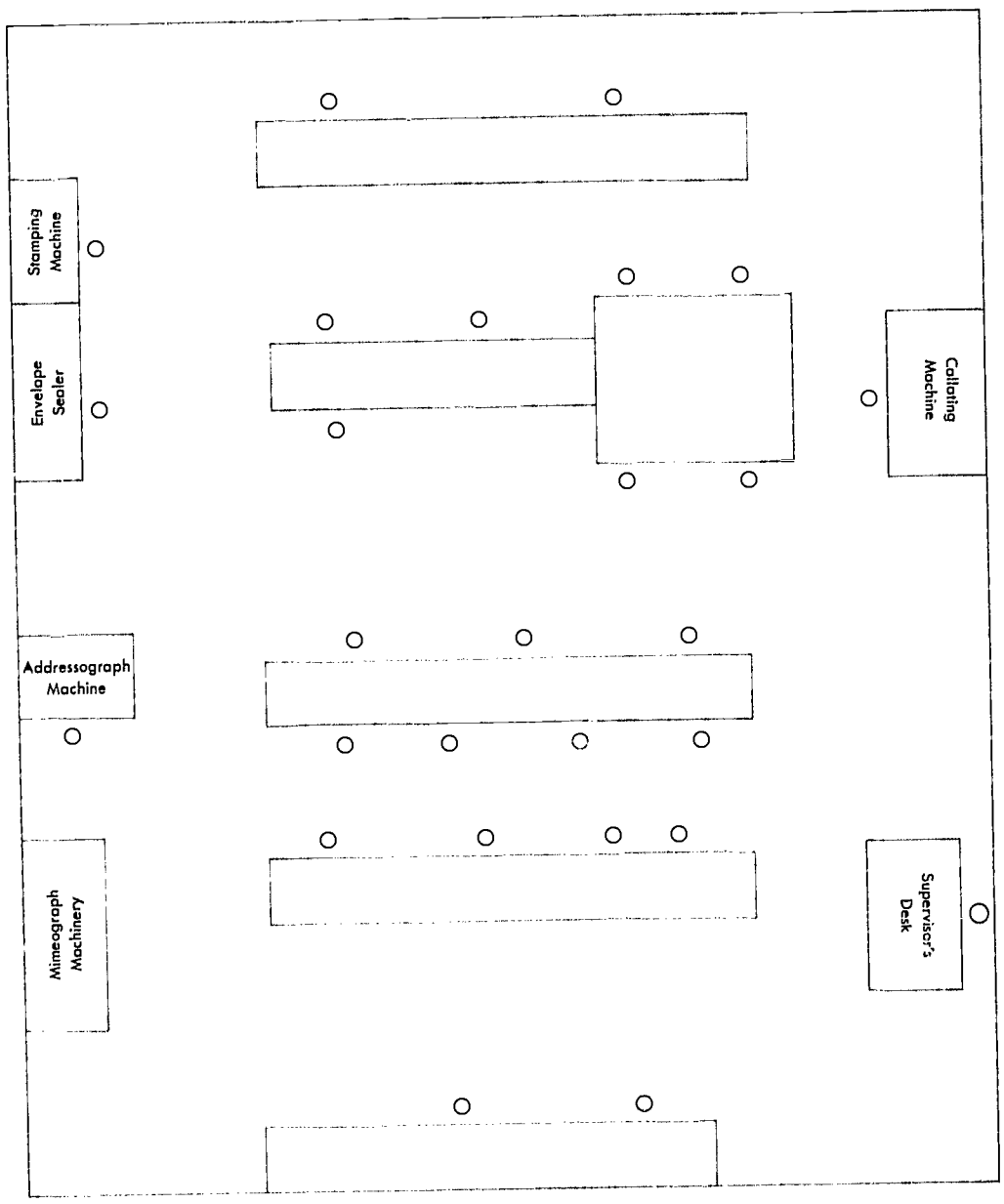

Diagram 2: THE MAIL ROOM

child in the family; she has a younger brother and a younger sister who are also retarded. Her other brothers and sisters have all completed their higher education, except for the youngest who is still in high school.

Marilyn has phenylketonuria (PKU), an inherited error in amino acid metabolism, producing mental retardation if the appropriate treatment is not administered during infancy and childhood. Marilyn's brother is similarly affected by PKU, but her sister's retardation appears to be due to a pressure on the

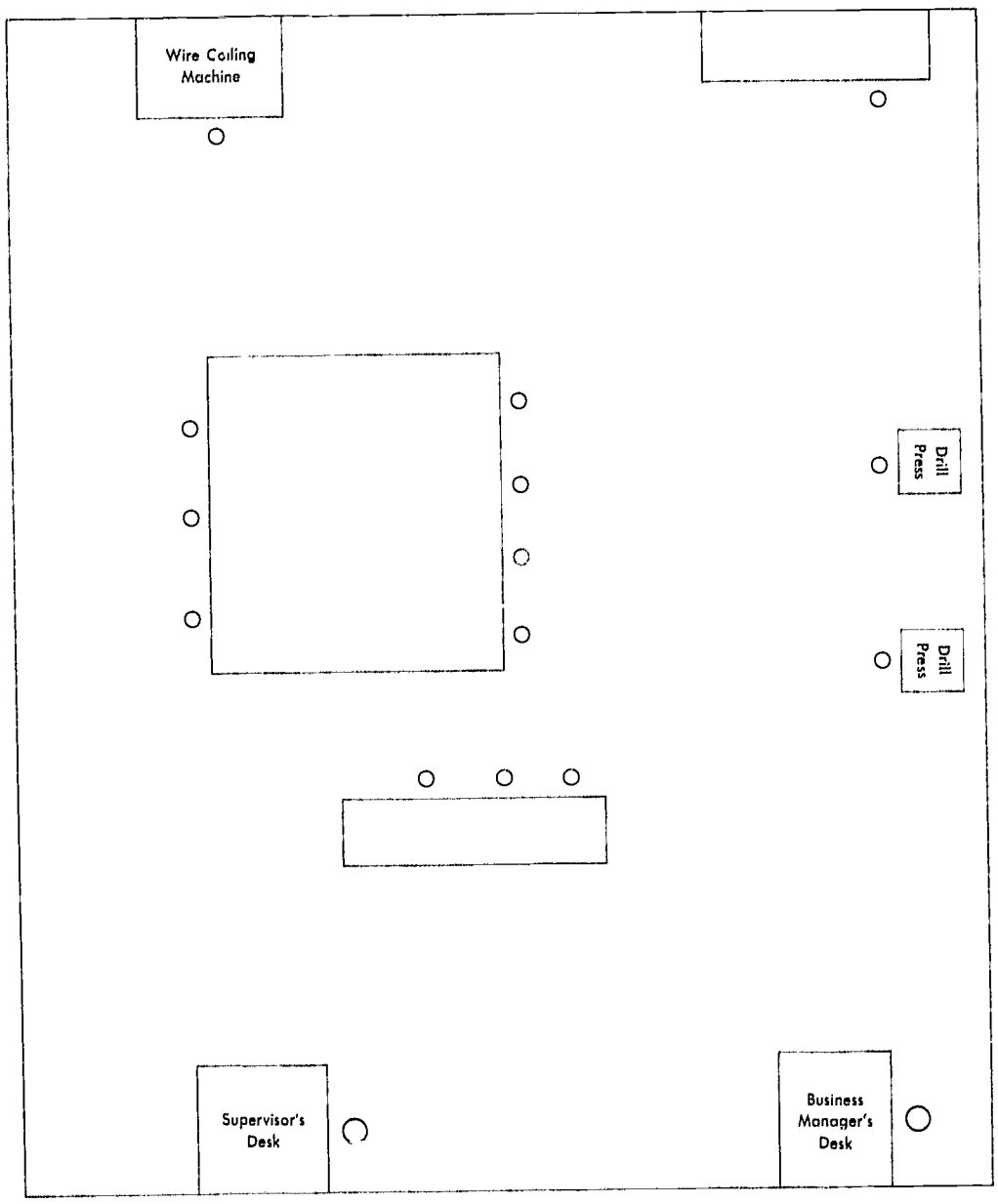

Diagram 3: THE ASSEMBLY ROOM

brain. Marilyn's primary disability has been described as a permanent cerebral dysfunction (mental retardation) which could, however, be improved by treatment.

Standard psychological evaluations of Marilyn's disability have been difficult because her speech and ability to communicate are limited. Apparently her simple perceptual processes, as indicated by the Wechsler Intelligence Scale for Children (WISC), are adequate. However, the more complex functions of abstraction and generalization are impaired. She seems to have some blocking due to sensitivity to failure, but this factor appears to be only of secondary importance in determining her level of performance. Marilyn's test results were as follows:

Columbia Mental Maturity Scale	IQ — 52
Vineland Social Maturity Scale	SQ — 44
WISC: Performance	IQ — 57
Verbal	IQ — Invalid
Rorschach	Invalid

Since the age of twelve, Marilyn has taken part in formal programs for the mentally retarded. For four years, she attended private schools after which she participated in a public school program for five years which consisted of part-time schooling and part-time working in a sheltered workshop. At the age of twenty-one, Marilyn was accepted as a full-time client at the workshop. After a seven-week evaluation period, she had thirty-six weeks of Personal Adjustment Training (P.A.T.).

Marilyn's performance during this period indicated a good adjustment to the workshop environment according to professional evaluations. Her production abilities increased demonstrably, reflected in pay increases from 13 cents to 24 cents per hour during P.A.T. Marilyn also began to improve her work habits. She became less distracted by events going on around her and, therefore, she gradually increased her ability to work for longer periods of time; she also became capable of maintaining a fairly even level of production. However, she still functioned best when assigned to an isolated place with a minimum of distraction.

Psychosocial evaluations during Marilyn's adjustment period emphasized a tendency to talk and giggle to herself. In addition, she would blush, giggle, avert her face, and become flustered when spoken to by an authority figure; although she was apparently accepted by the other clients, she chose to remain essentially

isolated. She did, however, show some behavioral improvement during P.A.T. The occasions when she would withdraw and exhibit inappropriate behavior became less frequent and less likely to disturb her work.

At the present time, Marilyn continues to work at the workshop and is expected to remain there for at least several more years.

Allan

Allan is a mentally retarded white male who was twenty-three years of age at the time he was observed. The youngest child in a family of three, Allan lived alone with his mother, his father having died when Allan was thirteen. Allan attended public schools until 1960 (he was sixteen then) at which time he was dropped for "being below trainable and probably having a degenerating process." It was at this time that Allan was referred to the workshop as a possible client.

A battery of tests was administered prior to entering the workshop's evaluation period, the results of which were as follows:

a) Intelligence

Full Scale WAIS (Wechsler Adult Intelligence Scale)	— IQ of 61
Verbal Scale	— IQ of 66
Performance	— IQ of 58

b) Academic Achievement — Tests 1, 2, 5, and 6 of Stanford Achievement Elementary Battery

Test	*Grade Equivalent*
1. Paragraph Meaning	2.2
2. Word Meaning	2.4
5. Arithmetic Reasoning	2.4
6. Arithmetic Computation	2.9

c) Routine Clerical Potential — Failed to achieve 1st percentile rank in the Minnesota Clerical Test

d) Manipulative Dexterity—Crawford Small Parts Dexterity Test

1. Part I (fine, tweezer dexterity):	20th percentile
2. Part II (finger and fingertip dexterity):	30th percentile

Qualitative descriptions of Allan based on this testing experience characterized him as an extremely immature boy, functioning optimally and evenly at the level of the simple mental

retardate. It was noted also that Allan stuttered in speaking. He was described as having excellent concentration and very good energy and drive, being particularly neat in his work habits. It was thought that he would be capable of entering competitive employment after some time in the workshop had increased his capacity as a worker and helped him achieve a higher level of maturity.

After several weeks of evaluation in the workshop, Allan began an extended period of personal adjustment training covering some fifty-two weeks. During this time he began to progress as a worker, a fact reflected in an increase in average hourly earnings from $.18 to $.30 to $.45 over the first two months. His ability to speak and relate to others began to improve. However, his extreme immaturity was expected to require a minimum of one or two years in the shop.

Allan's progress within the workshop continued over the next few years, though not as rapidly as hoped. Part of the problem was at home where his mother was unable to reinforce what he learned in the workshop, or to discipline him. He expressed no desire to leave the workshop for an outside job. It was thus assumed that Allan was quite secure in his position there and was afraid to leave.

In September 1967, Allan was given a job tryout by a firm producing electronic equipment. Initially he was to do simple work such as cutting paper to size, eventually moving up to other types of jobs such as soldering. Allan's first reaction was to return to the workshop, but the job placement counselor convinced him to give the job a chance. After a while, he began to enjoy the work and expressed no desire to return to the shop when seen by the counselor during follow-up. Though there have been occasional periods of discontent and tension, due mainly to his immaturity, Allan has adjusted well to his job and takes great pride in it. He had been working there for a year at the time this was being written.

Part II: Quantitative Analysis of Behavior

Introductory Remarks

The greater part of this section will be devoted to an analysis of both Marilyn and Allan using observations from the summer of 1967. We will discuss each subject separately to achieve a clear picture of each and then compare them to indicate implications for future research.

These data were derived from a number of fifteen-minute observations of each subject.[7] Fourteen such observations of Marilyn were completed during the summer, seven in the period July 19 through 21 and seven more during the week of August 7 through 11. Allan was the subject of twenty observations, all during the two-week period beginning August 7 and ending August 17. (Marilyn's unexpected absence during the final week of observations led to the difference in the number of samples taken of each.) The time of day at which the observations were made was randomized to avoid the systematic bias which might result from repeated sampling at the same time.

[7]In order to avoid ending observations in the middle of any particular behavioral act (and hence getting an inaccurate record of what occurred) the observers were not rigidly restricted to fifteen minutes. As a result, the length of the observations tends to vary but always around the fifteen minutes used as a guideline. (The mean length of Marilyn's observations was fifteen minutes, thirty-six seconds; the standard deviation being one minute, twenty-eight seconds. Allan's observations averaged fifteen minutes, one second in length with a standard deviation of fifty seconds.) Various frequencies have been standardized to the fifteen-minute period in order to adjust for the effects of the varying observation lengths.

It is important to emphasize that the total body of data on Marilyn and Allan represented observation of an on-going situation; it was not experimental research. The researchers did not attempt in any way to alter or vary the settings or the behavior of those they observed. At the time, we were interested in testing our particular approach to the study of client behavior and evaluating its applicability. We had not yet addressed ourselves to particular questions or problems, for to do so would have been somewhat premature. As a result, the data presented in the following sections will be mainly descriptive; it can provide a basis for posing questions (rather than answering them) and pointing out possible areas of future research.

Marilyn's Behavior

A) *The Work Setting and Types of Jobs*

Before focusing on Marilyn's behavior, we should discuss the particular situation in which she was observed and the types of jobs she performed. These data derive from those parts of the Work Behavior Observation Scheme concerned with social ecology and technology.

The setting within which Marilyn was observed was relatively constant. She worked only in the Button Room and her particular work situation changed only once. In all but one observation, Marilyn sat at a table that was placed against a wall with a window in front of her. Several other clients were also seated at this table, most facing in the same direction as she and one at an angle to her. Immediately in back of her were clients working at another table. Within her immediate vicinity, therefore, there were individuals at both sides, at an angle to her, and in back of her, but none face-to-face.

The general setting within which Marilyn was observed may be examined quantitatively by studying the distribution of individuals in space. Table 1 presents statistics regarding this distribution.

Table 1 indicates that the average number of people within twelve feet of Marilyn was approximately seven or eight. This figure varied little, the standard deviation being less than two. The distribution of the distances of these people from Marilyn, as seen in Table 1, was not very unusual, but the distribution of

Table 1. Distribution of Individuals in Space in Relation to Marilyn

	Total Number of People	*Percentage of People*	*Average Number of People Per Observation*
I. General			
A. Number of people within twelve feet	106		7.57
B. Number of walk-in's[a]	14		1.00
C. Number of walk-to's[b]	0		0.00
II. Distance			
D. Within three feet	24	22.6	1.71
E. Three to seven feet	36	34.0	2.57
F. Seven to twelve feet	46	43.4	3.29
III. Directional Orientation			
G. Face-to-face	4	3.8	.29
H. Back-to-back	25	23.6	1.79
I. Side-to-side	48	45.3	3.43
J. At angles	13	12.3	.93
K. In column	16	15.1	1.09
IV. Posture			
L. Sitting	101	93.3	7.21
M. Standing	5	4.7	.36

[a]A walk-in is defined as anyone who is greater than twelve feet from subject and not technologically related to him, and who walks over to subject and has a social contact with him.

[b]A walk-to is defined as anyone who is greater than twelve feet from subject and not technologically related to him, and whom subject walks over to and has a social contact with.

people by directional orientation was somewhat curious. Marilyn was not face-to-face with anyone (except in one observation when she was so related to four people). This, of course, resulted from her sitting at a table which was against a wall. This unusual distribution in which she had no direct eye contact with other workers, was quite important, not only for her behavior, but also for certain problems which those in sheltered workshops may encounter in planning rehabilitation strategies. As noted in the descriptive section on Marilyn, she was judged to work best in an isolated setting, free from too much distraction. The average

situation described by the figures in Table 1 represents such a setting. However, part of her rehabilitation must necessarily involve learning to function in varied settings, some of which may be highly distracting. Those in the workshop who are concerned with the rehabilitation process must attempt to determine when it is best to place her in such settings. That is, they must determine the *sequence of therapeutic interventions* most appropriate to the needs of the client. Furthermore, they must consider the consequences to other clients of placing Marilyn in a potentially disruptive setting. Little research has been done to provide guidelines or answers to these problems. We believe that the types of analyses which are possible through the systematic observation of client work behavior will prove useful in this regard.

Finally, as regards the posture of those around Marilyn, Table 1 shows that in most cases those people within twelve feet of her were seated, indicating an absence of mobility, or at least movement, by those around her. It should be noted that Marilyn herself was always observed sitting, although those supervising production in the Button Room did not demand this working posture. Lack of movement, at least on Marilyn's part, is further shown by the fact that, although others (normally supervisors or professionals) came over to interact with her, she never left her work station to speak with anyone.

Marilyn worked on two different tasks during the course of our study.[8] The first was a rather simple assembly of wicks used for roadside flares. This assembly process began with tearing two pieces of chemically impregnated material from a master sheet. The master sheets had been stamped so the tearing was relatively easy. Any excess material was then removed from these pieces, and a lengthwise slit was made in each by ripping along a previously stamped line. Finally, the two pieces were interlocked by joining them at the slits. This task was fairly simple, requiring only three parts (the master sheet and two wick halves) to complete a cycle.

The second type of job on which Marilyn worked consisted of fastening buttons to cardboard with a piece of wire. This involved

[8]For a discussion of the types of jobs found in sheltered workshops, see William H. Button and B. K. Lubow, *Production Systems in Sheltered Workshops*. (Ithaca: Region II Rehabilitation Research Institute, Cornell University), forthcoming.

lining up the buttons so that the eyes on the back were facing the same direction; placing the card over the buttons so that the aligned eyes extended through holes in the card; and, finally, threading a wire through the eyes and bending the ends to fasten securely. Sometimes the number of buttons on a card changed. Marilyn was observed working on button cards requiring 2, 3, 4, 7, and 8 buttons. As the number of buttons increased, the complexity of the task increased, especially since it often required the use of more than one wire. Three parts were included in the button card assembly—buttons, wire, and card. The number of parts ranged anywhere from four to eleven. The button job, in terms both of the variety and number of parts required and of the nature of the manipulations, may be considered more complex than the wick assembly. In neither of the tasks performed was Marilyn dependent upon other clients to complete her work, since these jobs did not lend themselves to a division of labor.

The types of work Marilyn performed point out, once again, the importance of sequencing to the rehabilitation process. If type of work affects client behavior (as we suspect it does), then knowledge of the impact of various jobs on client behavior becomes crucial to the formulation of strategies designed to induce behavioral change. Furthermore, decisions concerning the most appropriate job for a client at a particular point in time must be made with such information. Some jobs, for example, may be helpful in creating good work habits but may have negative consequences for the client's social behavior. Given the limited technologies of most workshops, a detailed understanding of various jobs, coupled with consideration of which aspects of a client's behavioral repertoire need development first, appears essential if we are to make the most of the time the client spends working.

B) *General Characteristics of Marilyn's Work Behavior*

Data from the Work Behavior Observation Scheme provide a variety of measures for describing an individual's work behavior. Table 2 presents some general characteristics of Marilyn's work behavior.

The first variable presented in Table 2 is particularly important in the analysis of work behavior. A work unit is defined as the length of time a person is observed working at a particular

Table 2. Marilyn's Work Behavior: General Characteristics

	Mean Frequency Per Observation /S.D.	*Mean Duration All Observations /S.D. (in seconds)*	*Mean % of Total Time Per Observation /S.D.*
A.			
1. Work Units[1]	—	36.32 /153.24	69.90 / 17.93
2. Delays in Work	16.88 / 13.26	16.69 / 36.19	30.11 / 17.93
a) Personal Delays	16.21 / 13.84	14.18 / 30.15	24.54 / 19.65
b) Work Delays	.12 / .32	137.2 /137.87	2.84 / 8.48
c) Supply Delays	.55 / 1.01	44.2 / 48.50	2.73 / 6.06
			Mean/S.D.
B.			
1. Percentage of Possible Time Working[2]			72.20 / 18.65
2. Percentage of Time in Purposive Work Behavior[3]			72.60 / 18.47
3. Percentage of Possible Time in Purposive Work Behavior[4]			75.0 / 19.31

[1]Longest work unit was 8 minutes and 32 seconds.

[2]$\frac{\text{Total Time Working}}{\text{Total Time Observed less Work Delay Time}}$

[3]$\frac{\text{Total Time Working Working plus Supply Delay Time}}{\text{Total Time Observed}}$

[4]$\frac{\text{Total Time Working plus Supply Delay Time}}{\text{Total Time Observed less Work Delay Time}}$

task before delaying. The length of an average work unit is, therefore, a measure of an individual's ability to sustain his work functioning.

Marilyn's average work unit was 36.3 seconds in duration (A-1, Col. 2). This measure can often be a function of events external to the individual and hence not an accurate depiction of work behavior. Such would be the case if the person stopped work because of a lack of materials (we define this event as a work delay) or stopped to engage in some purposive work activity other than his assigned job, such as cleaning around his work station (we define such an event as a supply delay). This, however, was not true in Marilyn's case. Her work was seldom interrupted by

work delays, which normally occur when a person is part of a work flow, or by supply delays, as Table 2 reveals. (See A-2-b, A-2-c, Cols. 1, 2, and 3.)

Therefore, Marilyn typically worked for short lengths of time separated by personal delays, that is, non-work not connected with the availability of material objects necessary for the completion of the task and which are not spent in some other purposive work activity. These delays averaged 14.2 seconds. For some reason, Marilyn did not keep working for extended periods of time. The constant interruptions in her work was part of the problem which confronted those concerned with her rehabilitation.

We may gain a further understanding of Marilyn's work behavior by looking at the distribution of the durations of her work units (Figure 1). The extreme skewness of this distribution (a preponderance of short units and a relatively small proportion of long ones) shows that she did not typically sustain her work activity. 79 percent of her units were less than 36 seconds in duration, with only 10 percent being greater than 60 seconds.

Table 2 shows the percentage of time Marilyn spent working at her assigned task (A-1, Col. 3). Marilyn spent an average of 69.9 percent of the time on her assigned task, which means that she delayed approximately 30 percent of the time. It is necessary in describing a person's work behavior to account for both the amount of time in which it was impossible to work (work delays) and the amount of time in which the person was engaged in purposive work behavior not associated with the particular task assigned to him. Variables B-1, B-2, and B-3 present these adjusted figures. Since she did not have many work or supply delays, these figures do not vary greatly from the 69.9 percent of time spent working on her assigned task. At most, Marilyn worked, on the average, only 75 percent of the time she was on the workshop floor.

C) *The Effects of the Job*

The average duration of Marilyn's work unit given in Table 2 was computed by averaging all such units independent of the observation. However, if there were varying conditions across observations which affected her work behavior, it would also be necessary to compute an average of the average work unit for

6 units = 240 seconds
with mean = 315 seconds

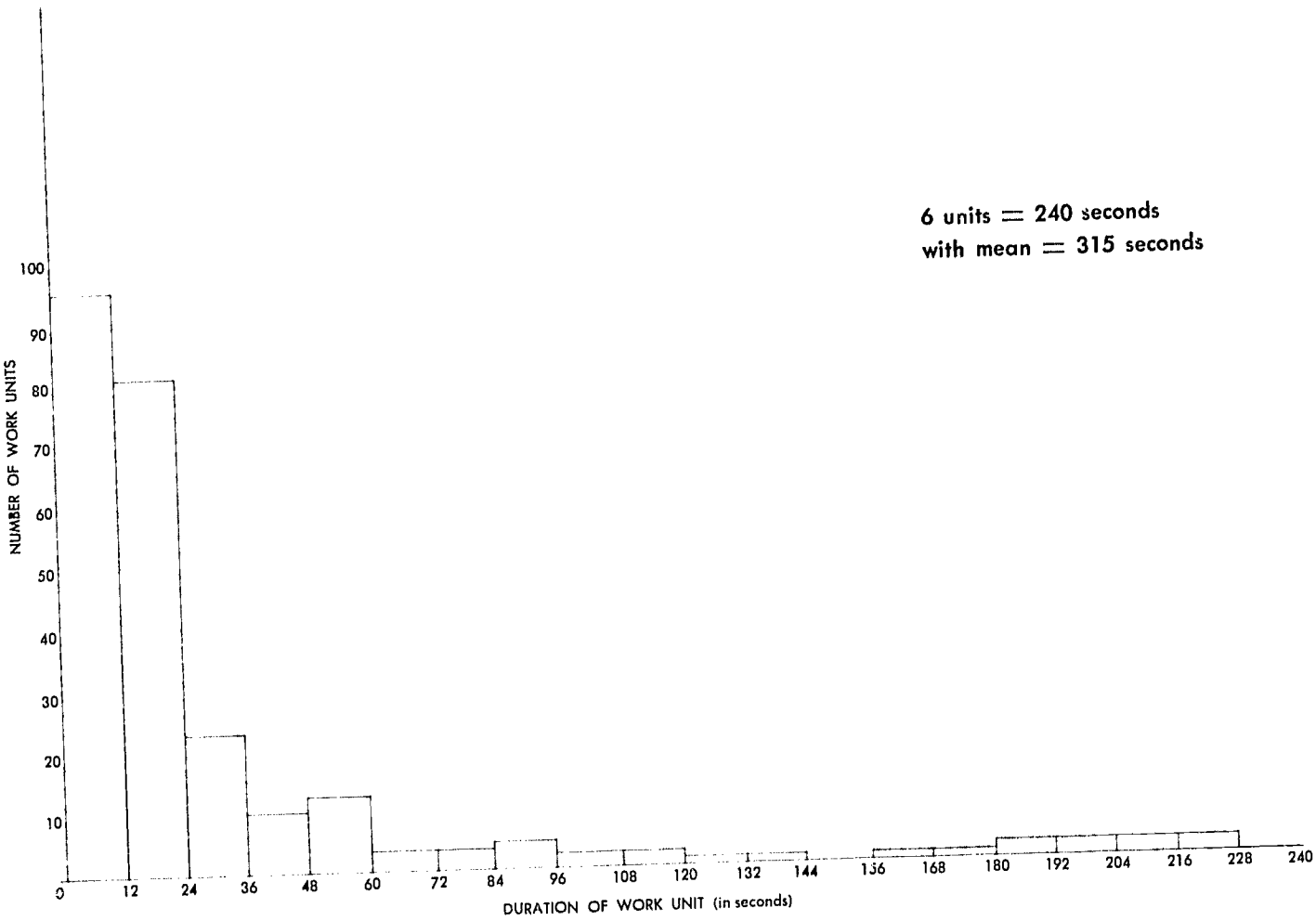

Figure 1. Frequency Histogram of the Durations of Marilyn's Work Units

each observation. This average of averages of Marilyn's work units equaled 70.4 seconds, considerably more than the 36.3 seconds previously discussed. This figure indicates that her work behavior varied across observations. We are, therefore, left with the problem of determining, if possible, the variables which might account for these differences.

Marilyn's social setting would not have a varying effect on her work behavior since it was, for all intents and purposes, constant throughout the course of the observations. She did, however, work on two different types of jobs, the wick assembly and the button assembly. Analysis of Marilyn's work behavior by the type of job she was performing reveals some rather interesting relationships. Table 3 presents comparative statistics for the observations when Marilyn was working on the wicks and the observations when she was working on buttons.

It is obvious from looking at Table 3 that Marilyn's work behavior differed on these two jobs. While working on the wicks, she had long work units with relatively few personal delays. Furthermore, she was observed to have spent over ninety percent of her time engaged in some purposive work activity. With the buttons, however, her work units were much shorter, approximately one-sixth the duration of her units when working on the wicks; and she delayed constantly. Consequently, Marilyn spent only 61.8 percent of her time in purposive work behavior when she was working on the buttons.

Table 3. Characteristics of Marilyn's Work Behavior by Job Performed

Variable	*Wick Assembly*	*Button Assembly*
1. Length of work unit	135.1	21.1
2. Percentage of time working	81.4	61.8
3. Percentage of possible time in purposive work behavior	92.6	61.3
4. Length of delay	31.6	14.3
5. Length of personal delay	16.1	14.0
6. Percentage of time delaying	18.7	38.7
7. Percentage of time in personal delay	7.3	30.8
8. Number of delays per observation	5.4	25.5
9. Number of personal delays per observation	4.1	25.3

It appears, therefore, that the particular job that Marilyn was performing affected the quality of her work functioning. Wick assembly is described above as the less complex of the two jobs since it requires fewer parts and manipulations to complete any one unit of production. One might postulate from this a negative relationship between the increased complexity of the job and Marilyn's ability to perform it. Perhaps the requirements of greater concentration and precision, plus the increased number of inputs (i.e. stimuli) into her cognitive system resulting from the greater number of parts and manipulations, served to disrupt her ability to work.[9] It may also be that the totality of the wick assembly was easier to perceive than that of the button assembly and that this might have some effect on her behavior.[10] Numerous other hypotheses may be proposed, including a mere "affinity" for one of the jobs.[11] Since these remain untestable for the moment, we leave hypothesis generation to the reader; we can only say that the job on which Marilyn was working seemed to have an important effect on the nature of her performance. This has important implications for any attempted therapeutic manipulation of her job. Once the effects of various jobs on her behavior are known, the workshop staff should be able to place her on tasks which will make positive contributions toward her achievement of a higher level of work functioning.

In discussing the effect of these two jobs on Marilyn's work behavior, we have tried to be cautious in asserting that it was only the job which had an effect and no other variable. It is worthwhile to point out that all observations of Marilyn working

[9]Psychologists have frequently noted that increasing the number of stimuli decreases rates of learning. This has important implications for Marilyn's behavior, for on one level her work in the shop is an attempt at learning productive work behavior (compare this to our discussion of the importance of sequencing on page 17. See, in this regard, Dael Wolfle, "Training", *Handbook of Experimental Psychology*, S. S. Stevens, Ed., (New York: John Wiley and Sons, Inc. 1951), pp. 1267–86.

[10]Effects similar to this are proposed by Baldamus in his discussion of traction. See W. Baldamus, *Efficiency and Effort* (London: Tavistock Publications, 1961), especially pp. 62–63.

[11]Another important difference often cited in the literature on industrial sociology is monetary incentive. We can discount its importance here because the clients were remunerated on piece-rate bases which were roughly comparable for the two jobs under discussion.

on the wick assembly were made during the week in July, while those of her button work took place in August. Since these observations were made at significantly different points in time, it is possible that the differences that we observed when classifying her work behavior according to her job might also have been a function of other variables, such as some underlying biological phenomena (e.g., the time in her menstrual cycle). This could have been tested more conclusively by having her perform both button and wick assembly in both periods. The observers, however, did not attempt to manipulate the work setting in any way, and so this remains merely a suggestion for future research strategies. Records, when possible, of important physiological factors would also be beneficial to determine their effect, if any.

We leave Marilyn's work behavior for the moment in order to discuss her social behavior in the work setting. We will return to her work behavior in a later section devoted to the relationships between work and social behavior.

D) *General Characteristics of Marilyn's Social Behavior*

The dimensions of social behavior measured by the Work Behavior Observation Scheme have been outlined previously. It is necessary, however, to provide several definitions so that a better understanding of the meaning of our terms may be achieved.[12] By social behavior, we mean the social contacts that an individual is observed to have with others. An individual is said to initiate a contact when his behavior provides a stimulus to another, whose behavior is then modified in relationship to the person providing the stimulus. Thus, the initiator of the contact is the person who acts first. The duration of a contact is the length of time during which the behavior of both individuals is interdependent (i.e., for as long as each person continues to provide stimuli for responses on the part of the other). The terminator of a contact is that individual whose last unit of interaction does not constitute a stimulus for a subsequent unit from the other individual in the contact. Because of the unusually wide range of behaviors that one may observe in a workshop, records

[12]For an early discussion of the measurement of social interaction, see Eliot D. Chapple, with Conrad Arensberg, *Measuring Human Relations*, Genetic Psychology Monographs, vol. 22, pp. 3–147, 1940.

Table 4. Marilyn's Social Behavior: General Characteristics

Variable	*Mean*	*Standard Deviation*
1. Duration, all contacts	7.58	5.88
2. Time between contacts	39.04	57.14
3. Duration, all non-hallucinatory contacts[a]	8.33	5.77
4. Percentage of time interacting	11.39	9.75
5. Number of contacts per observation	13.50	8.42
6. Duration of hallucinations[b]	7.22	5.71
7. Percentage of time hallucinating	7.40	5.86
8. Number of hallucinations per observation	9.14	5.73

[a]Longest duration = 31.2 seconds.
[b]Longest duration = 29.4 seconds.

are also kept of hallucinations, periods of time when the subject is engaging in social behavior with no readily observable object or partner (i.e. talking to himself).[13] This distinction, as will be shown shortly, is particularly important in describing Marilyn's social behavior.

Table 4 presents some general characteristics of Marilyn's social behavior. From this table it can be seen that: (1) her social contacts were short in duration, averaging only 7.58 seconds in length; (2) she was engaged in some form of social behavior approximately eleven percent of the time she was observed; (3) the majority of her social contacts were classified as hallucinations.

The first two points provide only limited insights into the exact nature of Marilyn's social functioning because we do not have

[13]The operational definition of hallucination given here needs comment. In the psychological literature, hallucination is typically referred to as "a distorted registering of experience or a false perception of what is going on", R. F. White, *The Abnormal Personality* (New York: The Ronald Press Co., 1964), p. 524. We are not, however, able to infer whether a particular subject is having such a distorted experience. Our definition relates only to the *form* of the interaction. Perhaps a better name for this behavior would be monologue or auto-action. For the time being, however, we choose to call it hallucination with the hope that the reader will not only recognize the distinction that is being made between the typical usage of the term and our own meaning, but also consider the relevance of such a usage to efforts at behavior modification. For another study which operationalized hallucination in this way see, Eliot D. Chapple, *et al.* "The Measurement of Activity Patterns of Schizophrenic Patients," *Journal of Nervous and Mental Disease,* vol. 137, no. 3, September 1963, pp. 258–267.

comparable statistics on a group of "normal" people working under similar settings. The shortness of her contacts does indicate, however, that Marilyn is not completely capable of what might be considered appropriate social behavior. Looking at the distribution of the durations of her social contacts (see Figure 2), we can see that the majority of them lasted less than ten seconds. The shape of this distribution is much the same as that researchers working with contact data in other contexts have observed, namely the mirror image of a J-shape.[14] Only 12 percent of her contacts were greater than seventeen seconds in length, with the longest one being thirty-one seconds.

The most distinctive characteristic of Marilyn's social behavior is that she hallucinates frequently. Sixty-eight percent of all her observed contacts were hallucinations. It is important, therefore, to try to achieve some understanding of this unusual behavior.

Several hypotheses may be offered as to why Marilyn so frequently hallucinates. It may be that, as a result of her disability, others have tended to ignore her or reject her in social contacts. To make up for this "social bankruptcy" she may turn inward and either talk to herself or create imaginary interactive partners.[15] Or, put another way, Marilyn's previous experiences of an interpersonal nature may have been so injurious as to cause her to withdraw and maintain her social contacts within a well protected arena, namely her own personal world.

Why might Marilyn's previous social encounters have been unpleasant for both herself and others? One possible explanation is that Marilyn's interactive style may be excessively rigid and, therefore, discomforting to others. Chapple has pointed out that individuals must be somewhat flexible in their interactive patterns in order to allow for synchronization of actions between the two.[16] One way to study this flexibility is to look at the distribu-

---

[14]Edward C. Molina, "Application of the Theory of Probability to Telephone Trunking Problems," *Bell System Technical Journal*, vol. 6, 1927, pp. 461–494. Also, see A. C. Norwine and O. J. Murphy, "Characteristic Time Intervals in Telephonic Conversation," *Bell System Technical Journal*, vol. 17, 1938, pp. 281–291.

[15]*cf.* Richard Longbaugh, *et al.*, "The Interactional World of the Chronic Schizophrenic Patient," *Psychiatry*, vol. 29, no. 1, Feb. 1966, pp. 78–99.

[16]Eliot D. Chapple, "Towards a Mathematical Model of Interaction: Some Preliminary Considerations," in Paul Kay, ed., *Mathematical Models in Anthropology*, Boston: M.I.T. Press (forthcoming).

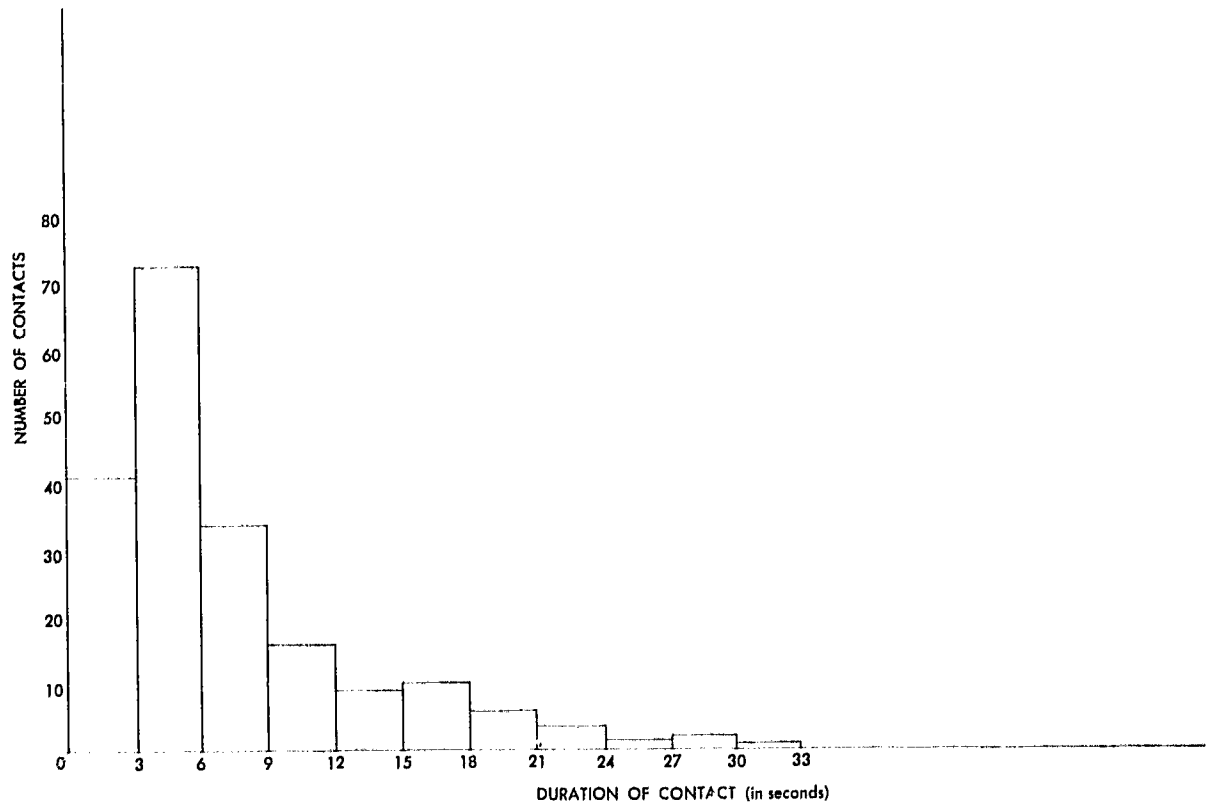

Figure 2. Frequency Histogram of the Durations of Marilyn's Social Contacts

Table 5. Distribution of Marilyn's Contacts by Initiation/Termination Type

Contact Initiated by/ Contact Terminated by		*Number of Contacts*	*Percent of Contacts*	*Average Duration*
Marilyn	Marilyn	18	9.1	7.1
Marilyn	Other	8	4.1	7.9
Other	Marilyn	31	15.7	9.0
Other	Other	6	3.0	11.0
Hallucination		134	68.0	7.1

tion of contacts by who initiated and who terminated them (see Table 5). Marilyn's contacts are conspicuous in that she is most frequently the terminator; she ended 78 percent of her contacts with others.[17] We might hypothesize from this finding that Marilyn's rigid interactive style (i.e. her lack of flexibility) creates stress for others and hence causes them to avoid her in social contexts. Furthermore, hallucination may be more compatible with Marilyn's interactive style, because it may not require any flexibility on her part.

Our discussion so far has inferred patterns of avoidance both on Marilyn's part and on the part of others. There is some evidence to support this contention. First, 26 percent of the social contacts Marilyn initiated to other clients were never responded to. This high rate of non-response to contacts initiated by Marilyn may be an indication that others are not particularly eager to interact with her.[18]

A further indication of avoidance is contained in Table 6 which presents Marilyn's contacts grouped by proxemic variables. In almost eighty-nine percent of her contacts, the bodily relationship of the individuals minimized direct eye contact. Although part of this is necessarily a function of Marilyn's work station, it seems reasonable to suggest that most individuals ordinarily turn to face the person with whom they are interacting. This changing of position to facilitate interaction was obviously not occurring.

[17]Another, more extensive body of data on Marilyn (to be discussed later) revealed an even stronger tendency to terminate contacts with others. Marilyn terminated over 95 percent.

[18]This high rate of non-response may also be interpreted in another way: It may be that others were mistaking Marilyn's initiations for hallucinations and, therefore, did not respond.

(In fact, the qualitative description of Marilyn presented in Part I noted that she frequently averted her face when spoken to.) Of the five contacts classified as face-to-face, four of them were with supervisors which fact helps to explain both their occurrence and the longer durations.

One more point should be made concerning Table 6. Eighty-seven percent of her contacts were with people within three feet of her which points out still another important characteristic of her social behavior. The potential for interaction is usually greatest among people who are close to each other. Interaction with those outside this narrow range is, to some extent, an indication of a broader scope in social behavior. Marilyn clearly did not interact outside this range.

Marilyn's social behavior, therefore, may be the result of a combination of factors: First, others appeared to avoid her as a partner in social interaction, perhaps because of her unusual behavior and rigid style. Second, the data seem to indicate that Marilyn avoided others. This avoidance may have resulted from unpleasant social experiences that she had had either when previous partners in social contacts rejected her because of her disability or when her inflexibility resulted in stress. The effect of these factors on her social behavior seems evident in the form that it took. Clearly, much emphasis must be placed on modifying these forms of social behavior if Marilyn is ever to achieve

Table 6. Distribution of Marilyn's Contacts by Proxemic Variables

	Number of Contacts	*Percentage of Contacts*	*Average Duration*
I. Directional Orientation			
a. Face-to-face	5	8.1	18.0
b. Back-to-back	35	56.4	8.1
c. Side-by-side	2	3.2	3.0
d. At angles	20	32.3	7.2
e. In column			
II. Distance			
a. Within three feet	54	87.1	7.9
b. Three to seven feet	5	8.1	17.5
c. Seven to twelve feet	2	3.2	3.0
d. Greater than twelve feet	1	1.6	2.4

the independence necessary for a job outside the workshop. Attempts to modify her present pattern of behavior might be made by placing her in a job which would involve interaction with others and a certain degree of flexibility on her part. Also helpful in this regard would be to have others interact more frequently with Marilyn. The value of such conscious interactive interventions is visible in Table 5. There it can be seen that as the extent to which the other either initiated or terminated increased, the average duration of the contact increased.

E) *Marilyn's Partners in Social Contacts*

Many interested in client behavior are concerned with identifying who the client interacts with on the shop floor. Our experiences have indicated that members of the professional or administrative staffs only infrequently interact with the clients on the workshop floor, while the degree of supervisor-client interaction appears to be quite variable, depending on the shop's philosophy and orientation, as well as its technological structure. In any case, the effect on the client of interaction with persons in various positions in the organization is not clear, although this may be important to behavior modification.

Table 7 presents data concerning the position of those people with whom Marilyn interacted. It can be seen that the majority (73 percent) of her social contacts were with other clients, as one would expect. Of particular interest is that Marilyn's contacts with supervisors and professionals were longer in duration than with clients. Were such contacts disruptive for Marilyn? Did they reinforce certain appropriate behavior (such as not turning away when interacting)? Answers to these and similar questions require more data than presented here, but let us point out some ways to answer them.

We may assess the effect of contacts with supervisors and professionals in several ways. First, we can ask how long it was after the contact ended before Marilyn had another contact. On the average, Marilyn had another contact within 8.2 seconds after interacting with supervisors, 9.0 seconds after professionals, 36.6 seconds after clients, and 42.7 seconds after hallucinations. These figures for professional and supervisory contacts are, however, somewhat misleading because of the small number of such contacts and also because many occurred in sequence, (the two

Table 7. Distribution of Marilyn's Contacts by Position of Other Actor

Classification	*Number of Contacts*	*Percent of All Contacts*	*Percent of Non-Hallucinatory Contacts*	*Average Duration*
a. Client	46	23.4	73.0	7.7
b. Supervisor	6	3.0	9.5	18.5
c. Professional	2	1.0	3.2	11.7
d. Administrator	—	—	—	—
e. Others[a]	8	4.1	12.7	4.4
f. Group[b]	1	.5	1.6	2.0
g. Hallucinations	134	68.0	—	7.2

[a]Other refers to anyone not classifiable in any of the other categories and usually refers to either a member of the clerical staff, a volunteer worker, or the observer.

[b]Group refers to contacts initiated to more than one person (i.e., set events) as in a statement like "who's got the time?"

contacts she had with professionals occurred one after the other, while three of her supervisory contacts were sequential). It is worth noting that after professional contacts Marilyn was observed to hallucinate within 7.8 seconds. Similarly, of the four supervisory contacts which did not follow another such contact, two were followed by hallucinations within 6 seconds and 7.8 seconds of the termination. While this data cannot be considered substantial enough for drawing conclusions, it does suggest directions for future analyses.[10]

A second way to assess the effects of contacts with varying groups of individuals is to consider the effects of such contacts on the work behavior of the subject. The six contacts Marilyn had with supervisors did not appear to have any unusual effect on her work behavior. In only one did she stop working in the course of the contact; she also stopped working once when the professional initiated. As we shall see in the next section, these breaks in her work are typical, for there are strong negative relationships between aspects of Marilyn's work and social behavior.

[10]See, for example, Chapple's discussion of *transient reactions* in E. D. Chapple, "Towards a Mathematical Model of Interaction: Some Preliminary Considerations."

F) *The Relationship Between Marilyn's Work and Social Behavior*

The relationship between work and social behavior is a particularly crucial one for people concerned with rehabilitation. For an individual to gain a true degree of independence in daily living, we assume that he must be able to maintain not only productive work behavior but also appropriate social relations. Furthermore, he must be capable of both simultaneously, for the work setting, as has often been pointed out by behavioral scientists in industry, is also a setting in which significant social relations are developed.[20] We feel, therefore, that an effort should be made to examine the interrelationships between these two kinds of behavior.

There are a least two major ways in which we can isolate the relationship between work and social behavior. First, we can look at each contact and consider what the client's work behavior was during the contact; thus asking whether the client was working or delaying during the contact. Second, we can compare the general characteristics of work and social behavior for each observation. That is, we can consider the nature of the client's social behavior when his work behavior was characterized by long work units, frequent delays, etc. Both methods will be used to discuss the relationship between Marilyn's work and social behavior.

Table 8 presents the distribution of Marilyn's social contacts by what we have called "contact/work relationship," meaning the nature of her work activity at the times the contact began and ended. This table shows that the majority of Marilyn's contacts began and ended in delays. This is quite revealing. If there were no relationship between her work and social behavior, one would expect that the frequency with which a contact began or ended in delay would be comparable to the amount of time observed in delay. This is clearly not the case. In discussing Marilyn's work behavior it was noted that she was observed in personal delay approximately 20 percent of the time; yet over 51

[20]The school of thought known as "human relations" has been particularly concerned with the social relations of workers. The origins of this school are found in F. J. Roethlisberger and W. J. Dickson, *Management and the Worker* (Cambridge, Mass.: Harvard University Press, 1959).

percent of her contacts began in personal delay. From this we conclude that there is indeed a relationship between Marilyn's work and social behavior, one which may be stated as follows: There is a higher probability that Marilyn will have social contacts when she is delaying than when she is working.

The figures regarding the durations of these contacts provide further clues to this relationship. The average duration of contacts which both began and ended in work is consistently shorter than those contacts in which Marilyn was delaying at some time. Contacts that began in work and ended in personal delay are especially important here for they are twice the duration of those which began and ended in work. This implies that Marilyn cannot maintain her work functioning while interacting, or at least that she has trouble doing so when the contact is relatively long.

Table 8. Distribution of Marilyn's Contacts by Contact/Work Relationship

Contact/Work Relationship	*Number of Contacts*	*Percent of Contacts*	*Average Duration*
I. Contact began in work.....	*84*	*42.6*	7.2
a. Ended in work.....	65	33.0	5.8
b. Ended in personal delay..	19	9.6	11.8
c. Ended in work delay.....	—	—	—
d. Ended in supply delay....	—	—	—
II. Contact began in personal delay	*102*	*51.8*	8.1
a. Ended in work.....	31	15.7	10.1
b. Ended in personal delay..	70	35.5	7.3
c. Ended in work delay.....	—	—	—
d. Ended in supply delay....	1	.6	8.4
III. Contact began in work delay...	*4*	*2.1*	6.8
a. Ended in work.....	—	—	—
b. Ended in personal delay..	—	—	—
c. Ended in work delay.....	4	—	6.8
d. Ended in supply delay....	—	2.1	—
IV. Contact began in supply delay.	*7*	*3.6*	4.5
a. Ended in work.....	—	—	—
b. Ended in personal delay..	—	—	—
c. Ended in work delay.....	—	—	—
d. Ended in supply delay....	7	3.6	4.5

Since her average contact duration is very short, this inability to sustain both types of behavior becomes more pronounced.

A relationship appears to exist, therefore, between Marilyn's work behavior and her contacts. We can pursue this further by considering the relationships between selected characteristics of her work and social behavior across observations. Table 9 presents a number of Spearman rank order correlation coefficients of these variables. From this table, it can be seen that Marilyn's social and work behavior are strongly related. When her work functioning is at a high level (defined by long work units, few delays, and a large percentage of time spent in purposive work behavior), she engages in less social behavior and fewer hallucinations. Conversely, when her work behavior is made up of frequent delays and short work units, she is observed to have more frequent social contacts, and, especially, more hallucinations.

This interrelationship is quite important. While we are unable to answer questions of cause and effect or to rule out the possible influence of a third variable, we were struck by the inverse relationship between Marilyn's work and social behavior and the consequences this relationship may have for attempts at behavior modification. The implications of this relationship will become clearer when we compare Marilyn's behavior with Allan's in a later section.

G) *Periodicity in Marilyn's Social Behavior*

Before summarizing our findings concerning Marilyn's behavior, we would like to mention a study conducted to discover if there were underlying rhythms in Marilyn's unusual social contacts.[21] For this purpose, an additional body of data, four times as large as that collected during the summer of 1967, was gathered for examination, and the data on social contacts analyzed for periodic activity in a manner similar to that em-

[21]Robert P. Kimberly, "Rhythmic Patterns in Human Verbal Interaction: A Case Study," unpublished honor's thesis, Princeton University, Princeton, New Jersey, 1968. For another study which showed how highly predictable certain idiosyncratic behaviors of mentally ill patients may be, see A. H. Esser, A. S. Chamberlain, E. D. Chapple, and N. S. Kline, "Productivity of Chronic Schizophrenics in a Sheltered Workshop: A Quantitative Evaluation of the Effects of Drug Therapy," *Comprehensive Psychiatry*, vol. 6, no. 1, 1965, pp. 41–50.

Table 9. Rank Order Correlation Coefficients Between Characteristics of Marilyn's Work and Social Behavior

	Number of Contacts	*% of Time in Contact*	*Avg. Duration of Contacts*	*No. of Hallucinations*	*% of Time Hallucinating*	*Avg. Dur. of Hallucinations*
Average duration of work unit	−.81	−.82	.74	−.87	−.86	−.75
Percentage of time working	−.59	−.60	−.54	−.58	−.50	−.22
Percentage of time in purposive work behavior	−.77	−.79	−.79	−.86	−.90	−.82
Percentage of time delaying	.59	.60	−.62	.46	.50	.36
Percentage of time in personal delay	.75	.75	−.67	.60	.63	.48
Number of delays	.74	.76	−.78	.79	.85	.79
Number of personal delays	.77	.79	−.73	.82	.87	.81
Average duration of all delays	−.37	−.29	.26	−.43	−.46	−.46
Average duration of personal delays	−.12	−.20	.01	−.39	−.40	−.46

n = 14
$r_s \geq .46$ significant at .05 level
$r_s \geq .65$ significant at .01 level

ployed by biologists investigating biological rhythms. The results of this investigation indicated that Marilyn had peaks of activity approximately every six minutes. Since there was no apparent environmental stimulus to cause this phenomenon, it is suggested that this periodicity reflects an underlying biological rhythm.

From a biological point of view this is not startling: all life processes exhibit a fundamental rhythmic periodicity.[22] In interaction, a six minute rhythm, as fixed as the analysis demonstrated, restricts a person's capacity to interact.[23] Certainly, an awareness of this specific aspect of Marilyn's problem is necessary for a complete understanding of her behavior and of the most effective means for dealing with it.

H) *Summary*

Before discussing Allan's behavior, let us summarize what we have learned from the preceding discussion. Regarding work behavior, we saw that Marilyn was often unable to sustain her work functioning for long periods of time, as revealed by frequent personal delays and by work units of very short duration. Furthermore, her work behavior seemed to be affected by the type of task on which she worked, though this could not be completely substantiated due to confounding variables.

Marilyn's social behavior was characterized by contacts with no regular partner. In general, these contacts were short; they reflect both a rigid style and a pattern of avoiding others. Finally, it was shown that her work and social behavior were interdependent. Periods of poor work performance, defined by the occurrence of frequent delays and short work units, were accompanied by an increased amount of hallucination.

Allan's Behavior

A) *The Work Setting and Types of Jobs*

Allan was observed working in both the Mail Room and the Assembly Room. These rooms showed a great deal more move-

---

[22]See, for example, Peter R. Marler and William J. Hamilton III, *Mechanisms of Animal Behavior* (New York: John Wiley & Sons, Inc., 1966), Chapter 2.

[23]Consider this in regard to our discussion of inflexibility in Marilyn's interactive style.

ment and activity than the Button Room, as a result of the types of work performed there and the fact that those working in these two rooms were usually asked to help in the unloading of supplies.

This mobility is revealed in Table 10 by the relatively large number of people who were observed to walk in and interact with Allan. Also, he was observed to leave his work station occasionally to speak to others. The frequency with which other clients came to speak to Allan or he to other clients becomes more pronounced when we consider that the population density of these two rooms was quite low, since a large number of clients were on vacation at the time of our observations. Finally, this mobility can be seen in the number of people who worked in a standing, as opposed to a sitting, position. Allan, too, was observed to work standing up much of the time.

Table 10. Distribution of Individuals in Space in Relation to Allan

	Total Number of People	*Percentage of People*	*Average Number of People Per Observation*
I. General			
A. Number of people within twelve feet	87		4.35
B. Number of walk-in's	19		.95
C. Number of walk-to's	5		.25
II. Distance			
D. Within three feet	17	19.5	.85
E. Three feet to seven feet	35	40.2	1.75
F. Seven feet to twelve feet	35	40.2	1.75
III. Directional Orientation			
G. Face-to-face	24	27.6	1.20
H. Back-to-back	3	3.4	.15
I. Side-by-side	22	25.3	1.10
J. At angles	16	18.4	.80
K. In column	22	25.3	1.10
IV. Posture			
L. Sitting	65	74.7	3.25
M. Standing	22	25.3	1.10

Allan performed a variety of different tasks. Several may be classified as clerical in nature; they involved the processing of mail or the sorting of bills. For example, he sorted IBM cards to be sent to various persons, placed them in envelopes, and then selected the proper address tag from a master sheet and placed it on the envelope. He also performed what may be classified as bench assembly work. This classification includes the button assembly previously discussed and a job which involved the packing of grease into cans.

Unlike Marilyn, Allan was part of a work team much of the time, in both clerical and bench assembly types of jobs. Table 11 presents the percentage of time Allan was observed on either clerical or bench assembly tasks, either as a member of a work team or an independent worker.

The work setting in which Allan was observed and his different jobs tend to reinforce a point made previously in our discussion of Marilyn. Allan, who was considered almost ready for placement in competitive employment, worked in a variety of settings, performed a variety of jobs, and was technologically related to other clients in the performance of these tasks. Thus, he was exposed to a variety of settings which provided him with numerous different work experiences such as he might find in an industrial setting. Those in the shop familiar with Allan's stay indicated that it was only after he had achieved a certain level of competence as a worker and had become more adept at handling changing situations that he was placed in such positions. Earlier attempts at placing him in variable settings had upset him (and those around him) because he was unable to cope with the uncertainty of a changing environment. This illustrates the importance of a detailed understanding of the client's behavior in determining when it is best to begin to vary his setting and

Table 11. Percentage of Time Spent on Various Jobs

	Clerical	*Bench Assembly*	*Total*
Independent	20.85	28.00	48.85
Team	10.25	40.90	51.15
Total	31.10	68.90	100.00

work. Only by studying the behavior of many clients and assessing the various effects of different work conditions can we hope to provide some systematic guidelines for more effective programming of rehabilitation strategies.

B) *General Characteristics of Allan's Work Behavior*

Because of the nature of the tasks he performed, especially those in which he was part of a work team, we have to look closely at the figures in Table 12 to get an accurate picture of Allan's work behavior. The average duration of his work units, 87.28 seconds, does not, in and of itself, reflect his capacity to work; it is affected by frequent work and supply delays which were beyond his control. We can get a more accurate description

Table 12. Allan's Work Behavior: General Characteristics

	Mean Frequency Per Observation /S.D.	*Mean Duration All Observations /S.D. (in seconds)*	*Mean % of Total Time Per Observation /S.D.*
A.			
1. Work Units[1]	—	87.28 / 92.74	79.40 / 17.49
2. Delays in Work	7.50 / 2.65	25.15 / 48.64	20.60 / 17.41
a) Personal Delays	4.19 / 3.04	9.12 / 10.79	4.21 / 4.80
b) Work Delays	.59 / 1.27	57.08 /100.2	3.61 / 8.66
c) Supply Delays	2.72 / 2.16	42.65 / 97.80	12.78 / 14.29

B.	*Mean/S.D.*
1. Percentage of Possible Time Working[2]	82.20 / 15.94
2. Percentage of Time in Purposive Work Behavior[3]	92.20 / 10.39
3. Percentage of Possible Time in Purposive Work Behavior[4]	95.50 / 4.12

[1]Longest work unit observed was 10 minutes and 57 seconds.

[2]$\frac{\text{Total Time Working}}{\text{Total Time Observed less Work Delay Time}}$

[3]$\frac{\text{Total Time Working plus Supply Delay Time}}{\text{Total Time Observed}}$

[4]$\frac{\text{Total Time Working plus Supply Delay Time}}{\text{Total Time Observed less Work Delay Time}}$

of his work behavior by looking at the percentage of time he was observed in purposive work behavior and in personal delay. These figures reveal that he worked steadily and delayed only infrequently.

The frequency of Allan's supply delays also provides some insights into his work behavior. Many of these delays occurred when he was working on a team task. For some reason, a lag occurred between the time Allan finished his task and the person preceding him finished his. As a result, Allan was often left with no work to do. During such periods, he would frequently do other jobs, such as cleaning the work table or packing finished goods into a box, which were not explicitly assigned to him. Often he would let his own work pile up, knowing that he could catch up quickly enough to avoid any problems. This fact suggests to us that Allan was flexible as a worker since he performed not only the job assigned to him, but also other tasks which he thought necessary. As a result he was observed to be working, in one way or the other, almost all of the time he was on the workshop floor.

Figure 3 is a frequency histogram of the durations of Allan's work units. This distribution is, as mentioned before, affected by the many delays which were a result of the work situation and not of Allan's ability as a worker. We may assume that the distribution would have been located more to the right than it is, had these delays not occurred. Still, this histogram does show that he worked for long periods of time without delaying.

We have been describing Allan as a relatively flexible worker. This description is further substantiated by Table 13, which describes his work behavior by the types of job performed. The similarity between his work behavior on these various types of jobs is obvious. The differences shown (such as the percentage of time in delay) can be largely accounted for by whether or not the task involved working with others; in group work, there were more work and supply delays.

One might ask if this consistency does not reveal a certain degree of rigidity in Allan's behavior. While we would tend to agree that a person can be "too consistent" to the point of being inflexible, such is not the case with Allan. The standard deviation of his work unit duration reveals that there is indeed variability in his behavior and that this variability exists across different jobs.

13 units = 240 seconds
with mean = 337 seconds

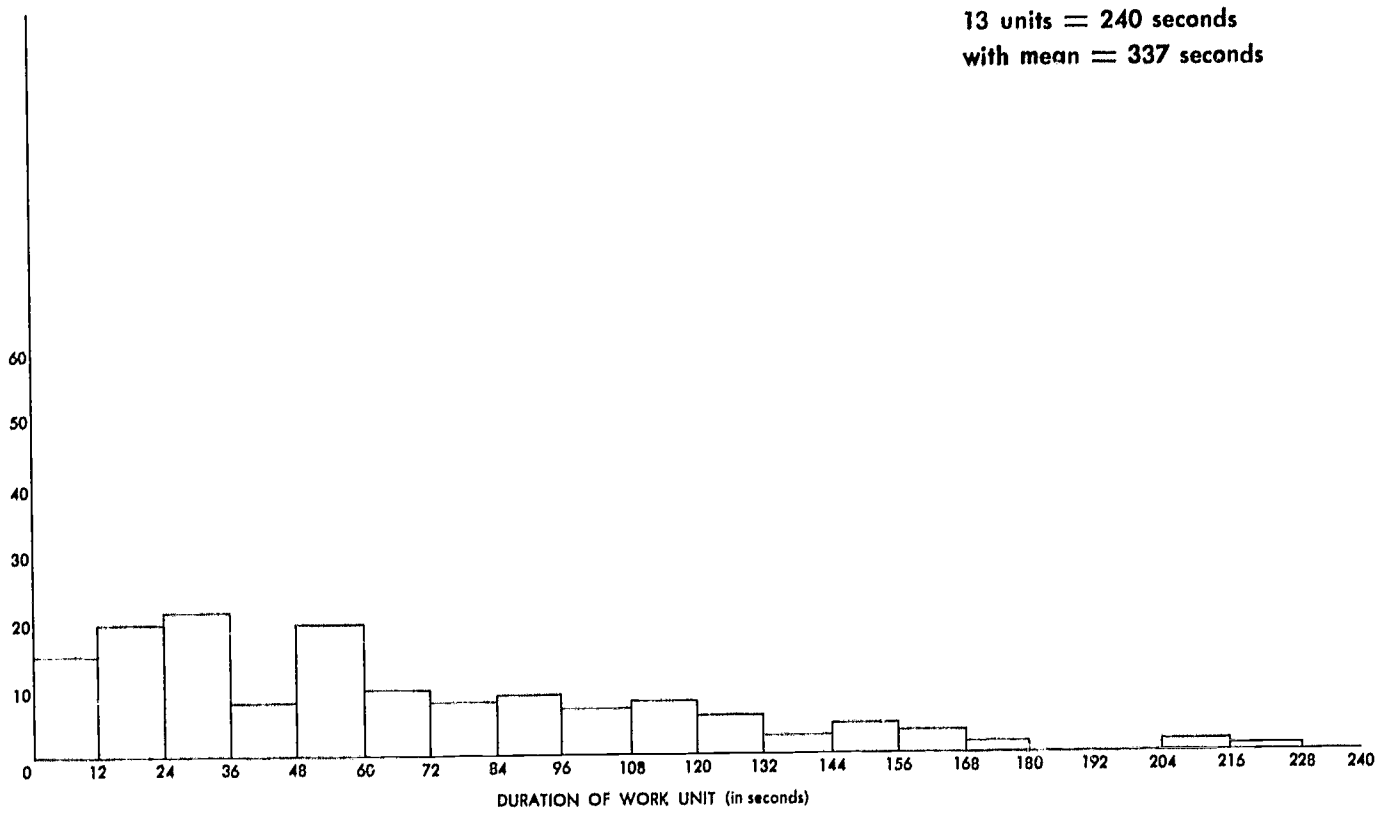

Figure 3. Frequency Histogram of the Durations of Allan's Work Units

Table 13. Characteristics of Allan's Work Behavior by Job Performed

Variable	*Clerical*	*Bench Assembly*	*Individual*	*Team*
1. Length or work unit	88.50	86.70	86.04	88.62
2. Percentage of time working	87.03	77.02	81.67	78.61
3. Percentage of possible time in purposive work behavior	96.23	95.16	93.20	97.76
4. Length of delay	14.86	29.89	22.47	30.54
5. Length of personal delay	5.39	11.66	8.68	10.65
6. Percentage of time in delay	13.05	23.82	18.87	22.31
7. Percentage of time in personal delay	3.30	4.59	6.19	2.22
8. Number of delays per observation	7.97	7.30	8.03	6.97
9. Number of personal delays per observation	5.48	3.64	6.44	1.88

It might also be asked whether a large number of supply and work delays might not reduce any "needs" that the worker has to delay be freeing him from the immediate task to which he was assigned.[24] Regarding Allan's behavior, two things may be said in this connection. First, since he often performed some other task when there was a shortage of work, he was clearly not eager to delay. Second, the number of personal delays he had when working as part of a team rather than independently demonstrate that when alone the tendency is for him to delay more frequently. However, the number of personal delays is still small and does not contradict our basic description of him.

In general, Allan appears to be quite an able worker; he delayed infrequently and often took the initiative to do tasks not explicitly assigned to him. We will get a further indication of the quality of his work functioning when we discuss the relationship between his work and social behavior in a later section.

[24]We may isolate two basic sources of such needs, namely physiological and psycho-social factors. Physiologically, the client may simply become fatigued and delay to regain his strength. From a psycho-social standpoint, these needs might reflect either boredom or a desire to interact with others. See, in this regard, Edwin E. Ghiselli and Clarance W. Brown, *Personnel and Industrial Psychology* (New York: McGraw-Hill, 1955), especially, pp. 258–267.

Table 14. Allan's Social Behavior: General Characteristics

Variable	*Mean*	*Standard Deviation*
1. Duration, all contacts[a]	8.76	7.30
2. Time between contacts	43.85	64.37
3. Percentage of time interacting	15.31	7.68
4. Number of contacts per observation	15.64	7.39

[a]Longest duration = 50.4 seconds

C) *General Characteristics of Allan's Social Behavior*

Table 14 presents some general characteristics of Allan's social behavior. As can be seen the durations of his contacts were, on the average, short. The frequency histogram of the durations of these contacts (Figure 4) is quite similar to Marilyn's and the distributions that researchers working with other contact data have observed.[25] Allan does reveal, however, an ability to sustain long contacts, since one was fifty seconds in length. Perhaps the brevity of his contacts is, at least in part, a result of his stuttering.

Analysis of Allan's social contacts along other dimensions reveals no unusual characteristics comparable to Marilyn's. For example, Table 15 gives the distribution of Allan's contacts by initiator and terminator of the contact. While he initiated fairly frequently, the durations of his contacts did not vary as a function of whether or not he initiated or terminated.

Table 16 groups Allan's contacts by proxemic variables. Again there is no unusual pattern in his behavior. He interacted much the same regardless of whether he was face-to-face, side-by-side, or at an angle with his interactive partner. While maintaining most of his contacts within a close area, he was capable of contacts with people who were more than seven feet from him.

[25]See footnote 14.

Table 15. Distribution of Allan's Contacts by Initiation/Termination Type

Contact Initiated By/ Contact Terminated By		*Number of Contacts*	*Percent of Contacts*	*Average Duration*
Allan	Allan	126	40.4	8.23
Allan	Other	78	25.0	8.99
Other	Allan	55	17.6	9.02
Other	Other	53	17.0	9.42

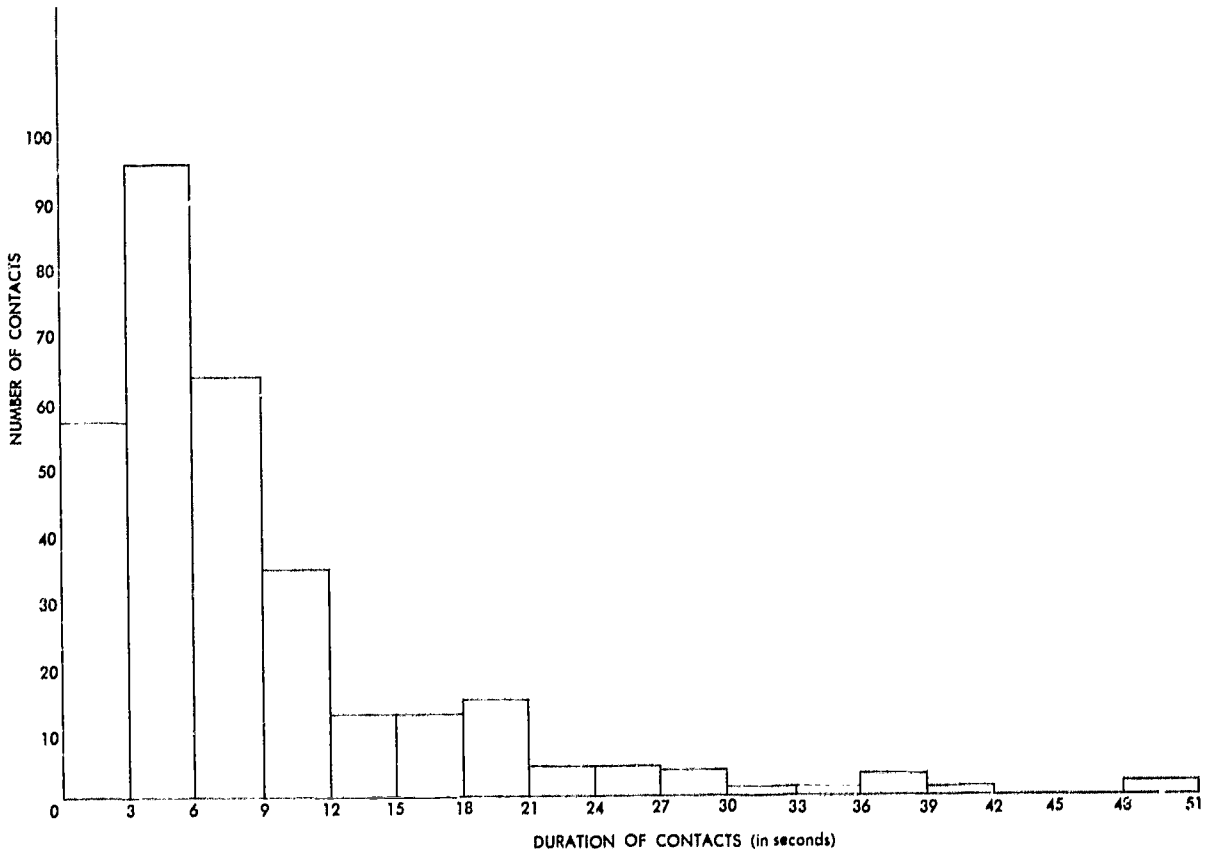

Figure 4. Frequency Histogram of the Durations of Allan's Social Contacts

Table 16. Distribution of Allan's Contacts by Proxemic Variables

	Number of Contacts	*Percentage of Contacts*	*Average Duration*
I. Directional Orientation			
a. Face-to-face	123	39.4	8.52
b. Back-to-back	—	—	—
c. Side-by-side	92	29.5	9.25
d. At angles	92	29.5	8.91
e. In column	5	1.6	3.96
II. Distance			
a. Within three feet	125	40.1	9.18
b. Three to seven feet	158	50.6	8.75
c. Seven to twelve feet	20	6.4	8.52
d. Greater than twelve feet	9	2.9	4.00

These tables do not reveal any inflexible patterns or idiosyncrasies which might be indicative of a poor level of social functioning.

D) *Allan's Partners in Social Contacts*

As can be seen from Table 17, most of Allan's contacts were with other clients. He did, however, have a fairly large number of contacts with supervisors. This might be expected for a number of reasons. First, Allan performed many different jobs. Therefore, some of his contacts with supervisors may have resulted from technological factors, for the changeover in jobs may have necessitated instruction from or discussion with supervisors. Also, Allan performed jobs which were not explicitly assigned to him and which, therefore, may have needed either sanctioning or clarification from his supervisor. This is shown in that twelve of his twenty-five supervisory contacts occurred while he was engaged in some purposive work activity other than his assigned job (i.e. while he was in a supply delay).

Moreover, supervisory contacts did not appear to have any unusual effect on Allan's behavior. On the average, he had another contact within thirty seconds after a contact with a supervisor, as compared to forty-one seconds after a contact with a client and seventy seconds after a contact with people in the "other" category. The fact that several of the supervisory contacts

2

Table 17. Distribution of Allan's Social Contacts by Position of Other Actor

Classification	*Number of Contacts*	*Percentage of Contacts*	*Average Duration*
a. Client	266	85.3	8.94
b. Supervisor	25	8.0	9.48
c. Professional	1	.3	6.00
d. Administrator	—	—	—
e. Other	19	6.1	5.72
f. Group	1	.3	4.20

occurred in sequence accounts for part of the quantitative difference. It might be pointed out, also, that Allan did not have another contact for over five minutes after his contact with a member of the professional staff. While one contact does not provide any basis for making generalizations, this suggests that further data might lead one to wonder about the relative potency of interactions with people of different positions in the organization.

Allan's contacts with supervisors did not have a disruptive effect on his work behavior. In all but one case, his work behavior remained constant throughout the contact. In that case, he stopped working on his assigned task and began to work on something else.

Because Allan was part of a work team during ten of his twenty observations, we can see the effects of various work-flow relationships on his social behavior. Table 18 indicates that Allan had a tendency to talk more frequently to those upon whom he was directly dependent than with other members of his work team. (The limited number of instances in which others were directly dependent upon Allan does not allow us to consider whether the reverse effect is operative.) This may be because the passing of work to another worker initiates activity and is equivalent to the initiation of interaction.[26] This tendency was not a result of his being physically closer to these people, since Allan's average distance from individuals in all five categories was approximately equal. While not conclusive, these data suggest that

[26]Some have suggested looking at such acts as constituting a special type of interaction. See Frank B. Miller, "Situational Interactions: A Worthwhile Concept?" *Human Organization,* vol. 17, no. 4, Winter 1958–59, pp. 37–47.

Table 18. Distribution of Allan's Contacts by Work-Flow Relationship

Work-Flow Relationship	*Number of Clients*	*Number of Contacts*	*Average Duration of Contact*
a. Other directly dependent on Allan	2	3	10.20
b. Allan directly dependent on other	15	65	9.12
c. Indirectly dependent.....	22	5	7.56
d. Other, one of several directly dependent on Allan.....	—	—	—
e. Other, one of several upon whom Allan is directly dependent.....	7	33	9.30

if varying work-flow relationships have differential impacts on an individual's social behavior, they may provide an important type of therapeutic manipulation which can be used either to teach new forms of social behavior or to modify inappropriate ones.

E) *The Relationship Between Allan's Work and Social Behavior*

As discussed previously, we assume that the individual who is able to integrate work and social behavior so that neither disrupts the other will have the least difficulty in adjusting to new situations. This may be one indicator of the degree to which a client is "rehabilitated." We shall see in this section that these two aspects of Allan's behavior are well integrated, a finding consistent with our previous descriptions.

Table 19 presents the distribution of Allan's contacts by "contact/work" relationship. From this we can see (1) there is a somewhat greater likelihood of his having contacts when in delay given the amount of time spent working versus delaying; and (2) if the contact is particularly long, it may disrupt his work behavior.

We have already seen that Allan had a higher propensity to interact while in supply delays because these may have necessitated contacts with his supervisor or even fellow workers. Table 19 does show that Allan had a somewhat higher propensity to interact when in supply delay than we would expect if these two aspects of his behavior were independent. (Approximately 18 percent of his contacts began in supply delay, while he was

Table 19. Distribution of Allan's Contacts by Contact/Work Relationship

Contact/Work Relationship	*Number of Contacts*	*Percent of Contacts*	*Average Duration*
I. Contact began in work.....	*228*	*73.1*	8.87
a. Ended in work.....	200	64.1	8.23
b. Ended in personal delay...	22	7.1	13.17
c. Ended in work delay.....	—	—	—
d. Ended in supply delay....	6	1.9	14.10
II. Contact began in personal delay	*19*	*6.1*	7.01
a. Ended in work.....	3	1.0	7.60
b. Ended in personal delay...	16	5.1	6.90
c. Ended in work delay.....	—	—	—
d. Ended in supply delay....	—	—	—
III. Contact began in work delay...	*10*	*3.2*	7.74
a. Ended in work.....	2	.6	18.00
b. Ended in personal delay...	—	—	—
c. Ended in work delay.....	8	2.6	5.17
d. Ended in supply delay....	—	—	—
IV. Contact began in supply delay.	*55*	*17.6*	9.12
a. Ended in work.....	3	1.0	16.60
b. Ended in personal delay...	—	—	—
c. Ended in work delay.....	—	—	—
d. Ended in supply delay....	52	16.7	8.69

observed in this type of delay only 13 percent of the time.) But, in general, Allan does not exhibit the rather strong propensity to have contacts while in delay which we observed in Marilyn.

As regards the second point, Table 19 shows that contacts which began in work and ended in personal delay were longer in duration than those that consisted wholly of work. Hence, Allan's work functioning appears to be affected by contacts if they are particularly long in duration. While such interruptions are probably common to all workers, they are a somewhat more important consideration in Allan's case because the durations of his contacts are usually short; therefore, the probability that a contact will be disruptive is greater than usual. However, the infrequency with which such disruptive contacts occur would seem to indicate that, in general, Allan's work and social behavior are well integrated.

Correlations between the general characteristics of work and social behavior (see Table 20) further substantiate our contention that these two behaviors are well integrated in Allan. The only statistically significant correlations found in Table 20 indicate that as the percentage of time delaying increased (or the percentage of time working decreases) the percentage of time in contacts increased. This is to be expected since Allan had a somewhat higher propensity to interact during supply delays. (The absence of a significant correlation between the percentage of time in personal delay and the percentage of time in contact substantiates our point that the significant correlations are the result of increased contacts during supply delays.)

Table 20 lacks significant correlations, that is, does not show a relationship between Allan's work and social behavior. These aspects of his behavior appear to be largely independent of each other, in the sense that knowledge about one does not allow us to predict about the other. Most important from a rehabilitation perspective is the absence of a negative relationship (which existed with Marilyn) between work and social behavior, a relationship which would indicate a lack of integration and hence an inability to engage in both simultaneously.

Table 20. Rank Order Correlation Coefficients Between Characteristics of Allan's Work and Social Behavior

	Number of Contacts	*Percent of Time in Contact*	*Average Duration of Contacts*
Average duration of work unit.....	.13	−.06	−.05
Percentage of time working.....	.04	−.38	−.34
Percentage of time in purposive work behavior.....	−.33	−.26	.25
Percentage of time delaying.....	.17	.38	.34
Percentage of time in personal delay.	.14	.31	.20
Number of delays.....	.11	.10	−.03
Number of personal delays.....	.31	.24	−.27
Average duration of all delays.....	.12	.34	.34
Average duration of personal delays.	.22	.14	−.31

N = 20
$r_s \geq .38$ significant at .05 level
$r_s \geq .53$ significant at .01 level

F) *Summary*

Our analysis of Allan indicated that his behavior was flexible. This flexibility in his work behavior was apparent in his ability to work on different jobs at essentially the same performance level and in his ability to respond to various situational cues and take the initiative to perform tasks not explicitly assigned him. Regarding his social behavior, his ability to interact in the same fashion in various situations revealed further behavioral flexibility. Finally, we saw that his work and social behavior were independent of one another and that he was able to engage in both work and social behavior simultaneously. This is another indication of situational flexibility since it means that one type of action does not disrupt another or preclude its occurrence.

Part III: Conclusions

In the first section of this monograph, we listed three major purposes of this analysis: (1) to familiarize individuals interested in rehabilitation with the Work Behavior Observation Scheme and the types of analyses possible through its application; (2) to provide insights into the relationship between work, the work setting, and the modification of client behavior; and (3) to suggest the groundwork for a more relevant and substantial method of identifying and classifying an individual's disability. Now we shall consider our previous analysis in regard to these purposes and shall attempt to draw some conclusions from these considerations.

The Classification of Disability

In our qualitative descriptions of Marilyn and Allan, it was noted that, at least on a gross level, both clients had been diagnosed as mentally retarded. This gross diagnosis was supplemented by other evaluations, generally made by professionals in the workshop, which emphasized particular characteristics of the behavior of these two. These attempts at describing our subjects' disabilities, while correctly focusing on the individuals' behavior as a common denominator for evaluation, are conspicuous in that they are neither systematic nor consistent (i.e. do not use comparable measures) across subjects, and, as such, limit one's ability to compare individuals or, even, one individual's performance over time. Though such reports are useful in attempting to describe the behavior of clients as a relevant and substantial means of identifying disability, we would suggest that such efforts tend to be extremely inaccurate and, hence, inefficient, unless a more objective and systematic approach is used.

It is our feeling, and the underlying orientation of our research, that *disability is most usefully diagnosed and evaluated in essen-*

tially behavioral terms. This would seem especially true for sheltered workshops whose unique potential lies in their ability to develop and exercise appropriate control over changes in client behavior.

While general descriptions of disabilities, such as "mental retardation," are important, they are useful only in that they imply behavioral dysfunctions on the part of the client. The term "mental retardation," in and of itself, does little to describe an individual's disability unless it also points out what is inappropriate about his behavior; for in the long run, it is this inappropriateness which deprives that person of a normal life outside a sheltered setting. If we can accurately describe a client's behavior and point out those areas which are deficient or inappropriate, we can systematically plan rehabilitation strategies aimed at changing such behavior.

From this point of view, we can conclude that a more specific definition of rehabilitation is needed, one that will provide direction by pointing out appropriate therapies for treating disabilities. We propose, therefore, that *rehabilitation is the reduction of inappropriate behavioral variance.*[27] This does not mean that the criterion for rehabilitation is a reduction in the standard deviation of the client's average work unit or social contact alone, although this is one part of it; it does mean that rehabilitation modifies the client's behavior so that it falls within the limits that are typically called "normal." The reduction of inappropriate behavioral variance includes, therefore, the modification or elimination of abnormal behaviors (such as Marilyn's hallucinations) *as well as* the expansion of the client's behavioral repertoire (as in teaching Marilyn to be more flexible in social contacts).

In the two cases presented here, we have begun to get empirical evidence of what constitutes appropriate and inappropriate be-

[27]The use of the word *inappropriate* is made with reservations; we well recognize the philosophical questions concerning free will and conformity which it raises. While we do not intend to engage in any philosophical arguments here, two points shall be made. First, once we begin a program of rehabilitation we are assuming that some change in the client is necessary. Second, since there is a broad range of behavior which may be considered appropriate or normal, every client who is "rehabilitated" need not fit into a previously prescribed mold which robs him of his personal identity.

havioral variance. That Allan's behavior was appropriate is seen in his successful placement outside the workshop. Conversely, the prediction that Marilyn will remain in the workshop for at least several more years is evidence that her behavior is inappropriate. By comparing many more clients able to leave the workshop with those who are to remain for considerable periods of time we should be able to determine more accurately the parameters which indicate when a person has achieved an acceptable state of rehabilitation. Then through the systematic measurement of client behavior as outlined here, we can assess, in specific terms, the nature and extent of an individual's disability. This enables us to decide on the type of therapeutic intervention and study the changes in behavior as a consequence (i.e. his rehabilitation progress). Such an approach to rehabilitation, we hope, will enable those involved in this process to focus on more tangible and substantial factors in their attempts to aid the disabled.

Work, Work Setting, and Rehabilitation

As mentioned previously, we became concerned at the inception of our research with the problem of determining those factors which were of importance in changing client behavior. Such changes, when they do occur, seem most likely to be produced by one of two factors: a) the relatively infrequent, but perhaps highly potent, interactions that the client has with professionals in the workshop or b) the various experiences and activities taking place while he is working. We have, obviously, focused on the latter. This is not to denigrate the importance of professional activities to the client's progress; rather given the nature of previous research in vocational rehabilitation, we felt it important to analyze systematically the behavior of the client in the work setting.

Given our approach to the study of client behavior, let us consider the rough outline of the relationships between work and, the work setting, and the modification of behavior.

A) *Work*

Generally, work is significant as a modifier of behavior in that it provides the client with certain skills, unsophisticated though they may be, which enable him to become a productive member

of society. We can, however, through the use of the Work Behavior Observation Scheme, focus on more specific aspects than merely the learning of generalized skills. For example, we saw in our discussion of Marilyn that her work behavior seemed to be related to her job. Understanding the effects of various jobs on behavior then becomes essential for the therapeutic programming of the tasks a client performs. We may find, for example, that highly repetitive tasks involving the manipulation of only a few different parts are best for clients who are just beginning in the shop and are as yet unable to sustain their work functioning for long periods. By contrast, we may find that such jobs can have degenerating effects on the productive behavior of clients who have already made significant progress toward a high degree of competence as workers. Given such data, the workshop could more effectively utilize its repertoire of available jobs to strengthen its rehabilitation efforts.

Various types of jobs may also be selected to modify social behavior. In the studies presented here, we saw a rather strong, negative relationship between Marilyn's work and her social behavior; we suggested that certain jobs might help overcome this problem. As an example of this approach, the executive director of the workshop in which these observations were made was concerned with the inability of one client to respond to social contacts initiated by other people. In order to try to overcome this deficiency, he placed her on a job as switchboard operator which required that she continuously respond. Similar attempts have been made with other jobs, such as that of cashier, with encouraging results. In Allan's case, various work-flow relationships appeared to determine with whom he had his social contacts. The structured situational interactions and the induced requirement for spatial mobility found in many jobs should prove useful in the development of the client's behavioral repertoire.

B) *The Work Setting*

Our discussion of Allan noted that, in the early months of his stay at the workshop, he tended to become upset or distracted when placed in new settings. Marilyn also, it was observed, worked best when somewhat isolated and free from distraction. It may be necessary, therefore, to vary the setting in which the client is found more systematically, noting his progress and his

reactions to changes in his immediate environment using the criterion measures of work behavior.

The work setting of the client is particularly important to the development of appropriate social behavior. Planning the spatial distributions of individuals in the work setting can provide a greater opportunity for interaction, and hence, for the development of social relations. Furthermore, it appears likely that most individuals have what we may call "interactive styles" (interaction forms), regarding proxemic relationships. If the client is to learn appropriate patterns of interaction, he must first learn to conduct them based on his particular style. He can then expand that style to become capable of adjusting to a broader range of relations. To illustrate, it will be necessary to alter Marilyn's idiosyncratic pattern of avoiding facing those with whom she had social contacts.

This discussion has been little more than superficial, partly because so little is known about the interaction between the client's behavior and his work setting. These examples do, however, serve to point out the types of analyses that should be attempted so that a more efficient use of the client's working time may be realized. The concluding section will point out some of the questions which we will be pursuing in the future.

Directions for Future Research

Our immediate purpose in these two case studies was to introduce to people concerned with rehabilitation the types of analyses made possible through the application of the Work Behavior Observation Scheme. Our research efforts will next be directed toward answering some of the questions raised here with a larger sample of clients.

The body of data collected in the summer of 1967 is composed of two different sets of observations. One set consists of fifteen-minute samples of approximately thirty clients in two workshops over several weeks. This is the set from which Marilyn and Allan were drawn. The other set of data is made up of two ten-minute observations on each of ninety clients. Each set provides different opportunities for future analyses.

The set of data on some thirty clients will allow us to expand our detailed comparisons of a large number of individuals. These

clients were selected for this sample on the basis of professional evaluations of the extent of their disabilities. In the future, we will use these data for a more comprehensive examination of clients' behavioral characteristics, specifically for the classification of disability in behavioral terms and to define the observable criterion which differentiate those clients judged nearly ready to leave the workshop and those who will remain in sheltered employment for a considerable time to come.

With the second set of data, the types of analyses can be much more detailed. For example, we will be able to focus on the proxemic determinants of interaction to help establish some guidelines for structuring work rooms. The present report clearly shows that we consider the development of appropriate social behaviors in clients as important to their progress as the development of productive capacities. Another problem we will consider with this second set of data is the effects of various jobs on the client's work and social behavior.

In the future, we plan to apply the Work Behavior Observation Scheme to more specific problems by systematically varying certain conditions within the workshop, an approach not employed in our exploratory research. Also, we plan studies of client behavior over extended periods of time which will permit a more accurate assessment of the effect of the types of therapeutic interventions we have suggested here. Finally, because the Scheme is applicable to the analysis of jobs in competitive employment, we plan to study such jobs and attempt to relate them to the behavior of clients ready to leave the workshop. By comparing the behavioral requirements of such jobs with the particular abilities of clients, a more successful matching of clients to jobs may result.

The particular problems to which we will address ourselves in the future represent only a small fraction of the questions which need answering. That so many questions remain to be answered does not mean that rehabilitation has not made progress, but rather that the problems are extremely complex and the field relatively new. What is needed, above all, are different approaches to these problems and a willingness to experiment and innovate. Only through concentrated effort aimed at answering such questions can we achieve the knowledge necessary to aid the disabled.

Bibliography

I. Books

Baldamus, W. *Efficiency and Effort.* London: Tavistock Publications, 1961.

Chapple, Eliot D. "Towards a Mathematical Model of Interaction: Some Preliminary Considerations" in Paul Kay, ed., *Mathematical Models in Anthropology.* Boston: M. I. T. Press, forthcoming.

——— and Conrad Arensberg. *Measuring Human Relations.* Genetic Psychology Monographs. Vol. 22. Provincetown, Mass.: The Journal Press, 1940.

Ghiselli, Edwin E. and Clarence W. Brown. *Personnel and Industrial Psychology.* New York: McGraw-Hill, 1955.

Marler, Peter R. and William J. Hamilton III. *Mechanisms of Animal Behavior.* New York: John Wiley and Sons, Inc., 1966.

Roethlisberger, F. J. and W. J. Dickson. *Management and the Worker.* Cambridge, Mass.: Harvard University Press, 1959.

White, R. F. *The Abnormal Personality.* New York: The Ronald Press Co., 1940.

II. Monographs and Research Reports

Button, William H. *Wage Levels in Sheltered Employment.* Ithaca: Region II Rehabilitation Research Institute, Cornell University, December 1967. Research Report no. 1.

———, John R. Kimberly, Bart K. Lubow, and Robert P. Kimberly. *A Conceptual Framework for the Analysis of Work Behavior in Sheltered Workshops.* Ithaca: Region II Rehabilitation Research Institute, Cornell University, February 1969. Studies in Behavior and Rehabilitation, no. 1.

——— and Bart K. Lubow. *Production Systems in Sheltered*

Workshops. Ithaca: Region II Rehabilitation Research Institute, Cornell University, forthcoming.

Dolnick, Michael M. *Contact Procurement Practices of Sheltered Workshops.* Chicago: National Society for Crippled Children and Adults, 1963.

Kimberly, John R. *The Financial Structure of Sheltered Workshops.* Ithaca: Region II Rehabilitation Research Institute, Cornell University, June 1968. Research Report no. 3.

Miller, Frank B. "Situational Interactions: A Worthwhile Concept?" *Human Organization:* vol. 17, no. 4 (Winter 1958–59), pp. 37–47.

Wolfle, Dael. "Training" in S. S. Stevens, ed., *Handbook of Experimental Psychology.* New York: John Wiley and Sons, Inc., 1951.

III. Journal Articles

Chapple, Eliot D., *et al.* "The Measurement of Activity Patterns of Schizophrenic Patients." *Journal of Nervous and Mental Disease:* vol. 137, no. 3 (September 1963), pp. 258–267.

Esser, A. H., A. S. Chamberlain, E. D. Chapple, and N. S. Kline. "Productivity of Chronic Schizophrenics in a Sheltered Workshop: A Quantitative Evaluation of the Effects of Drug Therapy." *Comprehensive Psychiatry:* vol. 6, no. 1 (1965), pp. 41–50.

Longabaugh, Richard, *et al.* "The Interactional World of the Chronic Schizophrenic Patient." *Psychiatry:* vol. 24, no. 1 (February 1966), pp. 78–99.

Molina, Edward C. "Application of the Theory of Probability to Telephone Trunking Problems." *Bell System Technical Journal:* vol. 6 (1927), pp. 461–494.

Norwine, A. C. and O. J. Murphy. "Characteristic Time Intervals in Telephonic Conversation." *Bell System Technical Journal:* vol. 17 (1938), pp. 281–291.

IV. Theses

Kimberly, Robert P. "Rhythmic Patterns in Human Verbal Interaction: A Case Study." Unpublished honors thesis, Princeton University, 1968.