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DEVELOPING A PREDICTION MODEL FOR VOCATIONAL REHABILITATION
CLIENTS USING DEMOGRAPHIC, LOCUS OF CONTROL, WORK
MOTIVATION AND WORK HISTORY VARIABLES:
AN EXPLORATORY STUDY

BY

Madan Mohan Kundu

A DISSERTATION

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in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

Department of Counseling, Educational Psychology
and Special Education

1983

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ABSTRACT

DEVELOPING A PREDICTION MODEL FOR VOCATIONAL REHABILITATION CLIENTS USING DEMOGRAPHIC, LOCUS OF CONTROL, WORK MOTIVATION AND WORK HISTORY VARIABLES: AN EXPLORATORY STUDY

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The rate of successful rehabilitation is declining nationally. In this study an attempt was made to develop a prediction model relating clients' domains of predictor variables, independently and in linear combination, to outcome criteria. This diagnostic model would determine the probability of success early in the rehabilitation process, allowing counselors to plan and implement innovative interventions to facilitate successful closure.

The subjects were 115 voluntary Vocational Rehabilitation clients from Louisiana, Michigan and New York, who were ready for employment in status 20 for not more than 60 days. Five instruments were administered to elicit clients' characteristic predictors: Demographic Questionnaire, Locus of Control Scale, Modified Locus of Control Scale, Vocational Opinion Index and a Work History Questionnaire. The outcome measures, the employment status and associated characteristics, were collected from both counselors and clients six months later. Two multivariate correlational methods,

discriminant analysis and canonical analysis, were used to delineate predictive relationships.

Demographics were significant in differentiating the employed from the unemployed. Hypothesized increases in work motivation and employment for those with more internal locus of control were not supported; however, the internals obtained employment earlier than the externals. No relationship was found between work motivation measured by the Vocational Opinion Index and employment status.

There exists a significant relationship between the multidimensional aspects of pre-VRS work characteristics and post-VRS work characteristics.

The data support the notion that work experience prior to Vocational Rehabilitation significantly affects the Vocational Rehabilitation outcome. The relative contribution of each domain was examined. Before and after disability work variables in combination make the greatest contribution in both the independent and the linear model, followed by the after disability work variables. Although the before work variables were not significant with respect to the model, excluding them made the total model non-significant.

The current study demonstrated the feasibility of developing an outcome prediction model for various disability groups. The development of a generalized prediction model for all rehabilitation clients requires the inclusion of all domains significantly affecting outcome.

In memory of my father

the late Narayan Chandra Kundu

who brought me into this world to enjoy its beauty,
and who planted the seed of learning in my mind and
asked me not to fail nurturing it, even in adversity.

AND

In memory of a fatherly person

the late David Hodges Swanson

who helped advance knowledge and wisdom in this soul.

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My long-standing desire to study the impact of PL-480 Projects in India, and thereby to develop a model for the developing nations, was abandoned with the premature demise of my doctoral advisor, Dr. John E. Jordan. He was a scholar and statesman of national and international repute, my mentor, colleague and a close friend. I miss him very much.

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CHAPTER I

INTRODUCTION

Context

The passage of the Vocational Rehabilitation Act of 1920 under the Smith Fees Act of 1920 (P. L. 66-236) marked an era in the field of Vocational Rehabilitation of the United States. The act established the Federal-State Vocational Rehabilitation Program for the purpose of providing rehabilitation services to disabled veterans and persons with disabilities. The basic intent of these services was to enable disabled people to participate in society in their fullest capacity possible. The original concept and philosophy of services remain as relevant today as they were sixty years ago. However, they have passed through a number of trials and tribulations in the form of amendments, expansions, changes in the priority needs, eligibility criteria, employment and service deliveries, and outcome criteria. Over the years, qualifying disabling conditions have been expanded to include mental retardation, mental illness, severe disabilities, alcoholism, drug addiction, and most recently behavioral and character disorders.

Since the passage of the Vocational Rehabilitation Act Amendments of 1954, a growing concern has been to extend services to severely disabled persons in greater numbers, to provide comprehensive services, and to support activities of independent living. Accordingly, the Rehabilitation Act of 1973 (P. L. 93-112) extended the eligibility criteria for persons with severe disabilities who previously were denied services. Subsequently, the Rehabilitation Comprehensive Services and Developmental Disabilities Amendments of 1978 (P. L. 95-602) made provisions for independent living, non-vocational rehabilitation services, facilities for independent living and recreational activities. Rehabilitation counselors are faced with a tremendous complexity of service needs to meet the outcome criteria mandated by the act.

Rehabilitation means restoration of the residual abilities and skills through a process of gaining something new or regaining something lost. Among others, the main outcome criterion of success of vocational rehabilitation services is the placement of the client in satisfying and remunerative employment or, in other words, Status 26 closure. Status 26 closure means that the client received appropriate diagnostic services, completed an individualized written rehabilitation plan, participated in employment satisfactorily for at least 60 days and met the goal of rehabilitation services.

"Without Placement, There Is No Rehabilitation" was the theme of a conference held in 1973 (Rusalem & Malikin, 1976). The original 1920 Act designated placement as one of the major services. But it was not until passage of the 1973 Act that the importance of placement services was made explicit. Title V of the latter act, under sections 501 through 504, provided counselors with four major tools to enhance employment opportunities for their clientele. Counselor effectiveness is being judged to a large extent by the "number games," the yardstick of successful closure at Status 26.

New emphases on the outcome criteria have created strains within the Vocational Rehabilitation System. Vocational rehabilitation counselors face the challenge of serving disability groups with which they are unfamiliar. Even with the counselor's best effort, it is often impossible to place them as the severity of disability itself imposes certain restrictions for effective placement. The labor market is not yet educated and prepared to absorb them. Also, the current economic depression in the United States restricts and frustrates the counselor's work. This results in fewer Status 26 closures and more Status 08 closures (closed from referral, applicant, or extended evaluation statuses and not accepted for VR Services), Status 28 closures (closed for other reasons after Individualized Written Rehabilitation Plans were initiated), and Status 30 closures (closed for other reasons before

Individualized Written Rehabilitation Plans were initiated). Counselors need interventions that would assist them in meeting the rehabilitation outcome criteria and thus meet the challenges presented by the Rehabilitation Act.

Not only the counselor but the agency as a whole is subjected to strict accountability. The program administrator and the legislature who must approve the budget for the vocational rehabilitation program welcome evidence of increased cost-effectiveness in order to support requests for appropriations in competition with other human service agencies. Indeed, the higher standards and higher rates of effective rehabilitation are deemed urgent as a measure of counselor effectiveness as well as the effectiveness of the agency and its administrators, in order to warrant better funding in the future.

Statement of the Problem

Rehabilitation counselors working within the Federal-State Vocational Rehabilitation System have acknowledged the frustration of meeting the legislative requirement of accountability by closing their clients successfully at Status 26. Without this closure status, Vocational Rehabilitation Services are considered a failure in achieving the chief outcome criteria of the rehabilitation process.

National data from the R-300 Case Form indicated that for the Fiscal year 1972 (July 1, 1971 through June 30, 1972) there were 67,962 persons rejected by Vocational Rehabilitation Agencies (closure Status 08, 28, 30) because of the severity of their impairment. Bolton (1972) reported that in the Arkansas Vocational Rehabilitation Program approximately two-thirds of the clients who received services were successfully closed and one-third did not achieve rehabilitation status. Similarly, in the Vocational Rehabilitation Program in the State of Oregon the Status 26 closure was 67% vs. Status 28 and 30 closure 33% for the fiscal year 1978 and 1979 (Worral & Vanderqoot, 1980, 1982).

The Report of the Comprehensive Service Need Study conducted by the Urban Institute and initiated by Congress estimated that in 1975 there were 23.3 million non-institutionalized disabled (of all degrees of severity) persons of working age 18-64 in the United States. The report further stated that data from the Vocational Rehabilitation Program indicated that of roughly one million disabled people who apply for Vocational Rehabilitation Services each year, only half of them actually receive services and the other half of the applicants are being rejected as "unemployable" due to the severity of the handicapping condition and various other reasons.

The findings of the Urban Institute (1975) study corroborate the national data reported by the Rehabilitation

Services Administration (1980). The acceptance rate for rehabilitation clients to vocational rehabilitation services declined nationally over the last decade, 53.7% in 1970 to 45.7% in 1980. However, for the State of Michigan Rehabilitation Services, the converse was true. It showed a gradual increase over the same period from 61.4% in 1970 to 68.8% in 1980 (Michigan Rehabilitation Services, 1982). National data also indicate that there is a gradual declining trend of rehabilitation or Status 26 closure (for those who have been accepted for services) of 77.2% in 1970 to 64.5% in 1980. For the State of Michigan these figures were 72.9% in 1970 to 48.4% in 1980. In 1980 Michigan's rehabilitation rate was 48.4%, the third lowest in the country following New Mexico 48.2% and New York 43.7%. This significant lower rate of rehabilitation for Michigan may be due in part to the depressed economy and high unemployment rate in the State and higher acceptance rate for services. In 1981, the three lowest rehabilitation rates in the nation were New York 52.5%, Michigan 45.5% and California 42.3% while the national average was 61.9%.

The Urban Institute (1975) made a national survey of persons closed for the reason of severity in Status 08, 28, and 30 within one to two years of closure during the period from September 1, 1972 through August 31, 1973. Of those who consented to participate in the study, the most disabling conditions were orthopaedic handicaps, followed by cardiac and circulatory condition. Even though half of

them were completely independent in self-care and mobility measured by the Barthel Index, the report stated:

A disturbing finding, however, was that 57% of the younger persons (aged 16-40) were physically independent or only slightly dependent. It was not clear why people of prime working age who were physically fit had been rejected because of severity. Further analysis showed that almost one-half of these people had recent work experience and wanted to work. (p. 150)

Among the respondents 39% needed no additional services. The 61% who needed services indicated an average of three services per person. These included vocational training 21%, transportation 18%, physical therapy 10%, vocational placement 25%, vocational counseling 14%, and education 12%. Most of the services needed fell within the scope of Vocational Rehabilitation Services, yet Vocational Rehabilitation rarely provided these services (Urban Institute, 1975).

The entire rehabilitation process, from the higher administration through the counselor, is affected by the rejected severely disabled populations or eventual dropouts that require multiple services of a comprehensive nature over a longer period of time. This attrition raises the "cost-benefit" factor for Federal-State Vocational Rehabilitation Programs. The program may be ineffectively utilizing its personnel and resources. Further, the inability to serve effectively this population poses an overwhelming problem in terms of wasted potential.

The idealistic outcome criteria of Status 26 closure mandated by legislation are quite laudable but often

unattainable. The system of accountability is being criticized from many corners (Miller & Barillas, 1967; Reagles, Wright, & Butler, 1971, 1972; Lawlis & Bozarth, 1971; Conley, 1973; Thomas, Hanke, & Pool, 1976; Rusalem & Malikan, 1976) due to inherent problems associated with the dichotomous outcome criteria of successful vs. unsuccessful closure. The quantitative measures of accountability of the present system over the qualitative gain in the client have the following drawbacks:

(a) The system encourages the counselor to select a client with easily obtainable goals rather than goals which would be in the best interest of clients;

(b) To meet the "quotas" of successful closure, counselors often prematurely close cases to fulfill the "number games";

(c) The system encourages the counselor to avoid serving clients who require a great deal of counselor time and effort, for whom the probability of non-success is higher (Status 08 closure); and

(d) The system fails to reward counselors by taking into account the counselor's time, effort, and creativity (for clients who are closed at Status 28 and 30) in meeting the vocational and extra-vocational needs of the most severely disabled clients.

Since enactment of the 1973 Rehabilitation Act, the rehabilitation counselor serves a more severe and complex caseload, and coordinates a conglomerate of client services

over a more extended period of time than ever before. As a result, the number of Status 26 closures is falling nationally and the 28 and 30 closures are increasing. In general, the characteristics of these unsuccessfully closed clients are severely disabled, severe personality disorder, hard-core unemployed, less educated, public offender, emotional problem, behavioral disorder, drug addict, public assistance and welfare recipient, not motivated, too old, etc. Is it possible for the counselor to identify these potential high-risk non-rehabilitants at the time of acceptance into the Vocational Rehabilitation Services?

Counselors could use their intuitive clinical judgment to diagnose these high risk clients based on their experience in handling different types of caseload. Clinical and intuitive judgment, however, has its own drawback. It emphasizes an indepth understanding of a conglomerate of client behaviors (Rubin & Roessler, 1979). Rehabilitation counselors who spend less than one-third of their time in counseling and guidance (Rubin & Emener, 1979) will seldom achieve any prediction standard for each client by clinical and intuitive judgment. This may lead to bias. Therefore, a statistical prediction model has been favored in the research literature (Meehl, 1954, 1957; Sawyer, 1966; Miller, Kunce, & Getsinger, 1972; Bolton, 1972; Weikel & Johnson, 1974; Berkowitz, Englander, Rubin, & Worrall, 1975; Cook 1980; Anastasi, 1982).

Need for the Study

The Rehabilitation counselor in the State-Federal Vocational Rehabilitation System is in immediate need of a simple, inexpensive, instrument/tool/model which is easy to administer and capable of being used by the counselor with basic arithmetic skills to identify/diagnose the high risk, probable non-rehabilitant clients early in the rehabilitation process. The intent of developing such a model is not to screen out the high risk, probable non-rehabilitants from the program. This would be most unethical. The model would be able to identify those who may need additional help or who may benefit from increased or novel intervention and treatment strategies to prevent failures or unsuccessful closures at Status 28 and 30. Findings from this model would alert the counselor to the idiosyncratic needs, capacities, and interests of these exceptional clients, and facilitate some creative intervention.

The challenge associated with the accountability of performance of the counselor and the agency in states like Michigan, New Mexico, and New York in particular and the nation in general, and the legislative mandate of the Rehabilitation Acts for successful closure demand immediate response in the development of and validation of such devices. The major focus of this response is the enhancement of employment potential of the rehabilitation client. This concern for predicting client probability of success

in any rehabilitation program is a researchable matter, and this study is directed to that end.

Purpose of the Study

A review of literature revealed a number of studies regarding identification and prediction of success and failure for handicapped clients in vocational training and rehabilitation. Most of these studies used demographic variables such as age, sex, race, education, marital status, number of dependents, age at onset of the disability, and the type of disability to predict the rehabilitation outcome criteria of successful employment. Some studies attempted to find how the public assistance and welfare recipient, or social security disability status related to the outcome variable. Demographic variables were useful in predicting outcome for some types of handicapped populations but not for others. Using demographic variables, Aiduk and Langmeyer (1972) could not predict outcome for emotionally disabled clients and concluded that certain variables would predict outcomes for some sub-populations over others.

Some encouraging results in terms of feasibility and effectiveness of a predictive model with demographic variables are present in the literature (Novis, Marra, & Zadrozny, 1960; DeMann, 1963; Kunce & Miller, 1972; Miller, Kunce, & Getsinger, 1972; Bowmen & Micek, 1973; Anthony & Buell, 1974; Weikel & Johnson, 1974; Worral & Vandergoot,

1980, 1982). However, it seems logical to explore other domains of the independent predictor variables which have correlation with the criterion variable, in this case employment status. For a rehabilitation client to be ready for work, to obtain a job, and to maintain that job leading to upward mobility requires certain stable personality characteristics. A client with a good personal adjustment to his disability, and good intrapersonal and interpersonal abilities, enhances his employment potential.

Research literature suggests that psychometric variable(s) combined with demographic variables could possibly increase predictive efficiency of the model (DeMann, 1963; Miller, Kunce, & Getsinger, 1972; Worral & Vandergoot, 1980, 1982). Locus of Control (Rotter, 1966), a personality construct which emerged from social learning theory, was found to be useful in predicting classroom success, academic achievement, confidence, expectation, aspiration, professional achievement, intrapersonal and interpersonal adjustment, satisfaction in life and job, success in employment, etc. Research studies have proliferated with application of the Locus of Control using children, adults, aged, ethnic minorities, socio-economic classes, socially disadvantaged, emotionally disturbed, and psychiatric disordered populations. However, only a few studies have used the physically handicapped as subjects (Lipp, Kolstoe, James & Randall, 1968; Walls & Miller, 1970;

Tseng, 1970) and none have attempted to develop a prediction model using Locus of Control.

Locus of Control refers to expectancies for control over one's environment. In social learning theory, expectancies are regarded as prime determinants of behavior. All behaviors cannot be explained by reinforcement alone. Human behavior is complexly determined by a conglomerate of variables. In predicting human behavior, social learning theory requires that expectancies, reinforcement values (or need) and the psychological situations be considered. Expectancies for the outcome of behaviors are learned, and this depends upon the degree to which one perceives that one's behavior will lead to achievement of goals, reinforcement through goal achievement, and the degree of success or failure in past experiences (Phares, 1976). Lefcort (1976) stated that:

The perception of control is a process, the exercise of an expectancy regarding causation; and the terms internal and external control depict an individual's more common tendencies to expect events to be contingent or non-contingent upon their action. (p. 153)

Internally controlled individuals are those who believe that they have some control of their reinforcement and who can be and are motivated to change their circumstances. Externally controlled individuals are those who believe that their lives are controlled by chance, fate, and powerful others, do not believe they can control their reinforcement and do not try to effect change because

of negative expectancy. The usefulness of Locus of Control in predicting success of vocational rehabilitation clients seems promising (MacDonald, 1971c). Hence this study will utilize the client's Locus of Control, Internal or External, as one of the independent predictor (personality) variables and study how it is related to the criterion variable of employment status.

Another personality variable, motivation to work, often has been shown to be positively related to success in employment. However, there have been few published reports of research that investigated the relationship between work motivation and rehabilitation outcome. Internal and external attitudes refer to the degree to which an individual perceives success as being contingent upon personal initiative. The perceived payoff for initiative is the crucial element in generating initiative to work. In one sense this is formally rooted in the "Protestant work ethic." Rehabilitation clients who are motivated for rehabilitation services are more likely to be successfully rehabilitated than unmotivated clients (Salomone, 1972).

For an adventitiously disabled person, work initiative and work motivation seem to be imbedded in pre-morbid work history and experiences. For congenitally disabled, who may not have been able to explore the labor market experience with normal freedom, the influence and interaction of the family, society, and environment determine the effect of past experience and activity in the future

vocational success. The best predictor is past experience. The old adage is "success predicts success; and failure predicts failure." Previous work history and work experience help to build attitudes of competence, self-reliance, and self-direction for future vocational adjustment and success in employment.

The extent to which the client's labor market experience and his/her degree of success in jobs may predict the probable degree of success or failure in future vocational pursuits is based on: (1) the status of the job - high level vs. low level; (2) depth of involvement - apprenticeship, internship, part-time, or full-time job; (3) time spent - 18 months or more. Thus, it seems that the effect of previous work history has a multidimensional effect in terms of work experience, complexity of the task performed, training and experience required, wages and other benefits received, licensing or certificate required, and overall satisfaction in the job. Therefore, this study will analyze the client's prior work history and will attempt to incorporate it in the prediction model.

Summary

This study reflects an attempt to develop a prediction model using demographic variables and psychological variables--Locus of Control and work motivation--along with previous work history, to predict success of vocational

rehabilitation clients. It is anticipated that psychometric data combined with demographic data could possibly increase predictive efficiency of the model. The model will identify what variable or combination of variables most effectively predicts desired rehabilitation outcome. Such a development could help the counselor and the agency to identify/diagnose the high risk probable non-rehabilitants early in the rehabilitation process and afford an opportunity for the counselor and agency to plan an early intervention which would lead to successful achievement of the outcome criteria of rehabilitation and meet the legislative mandate of accountability in higher standards.

Questions to be Addressed by the Study

1. Do clients with an internal locus of control have more work motivation than clients with an external locus of control?

2. Do clients with an internal locus of control receive more jobs and obtain jobs earlier than clients with an external locus of control?

3. Do clients' previous work history and experience make a difference with respect to successful employment after receiving vocational rehabilitation services?

4. Do clients' previous work history and experience in related or unrelated occupations make a difference with respect to successful employment after receiving vocational rehabilitation services?

5. Are there any relationships among locus of control, work motivation, work history, and demographic variables?

6. Can an additive combination of predictor variables, such as locus of control, work motivation, work history, and demographic factors be identified to predict success or non-success of vocational rehabilitation clients?

Definition of Terms

Status 00. Referral: Entrance into the VR process by furnishing minimum information about an individual who may apply directly or referred to VR through various communication media.

Status 02. Applicant: The Counselor has a document signed by the individual requesting VR Services and obtained sufficient information for determination of eligibility or ineligibility for VRS.

Status 06. Extended Evaluation: The Counselor has written certificate that the severity of the disability is such that an extended evaluation of rehabilitation is necessary prior to making Certification of Eligibility or Ineligibility for VRS.

Status 08. Closed After Referral, Applicant, or Extended Evaluation: This status is used to identify all persons not accepted for VR services, whether closed from referral (00), applicant status (02), or extended evaluation (06).

Status 10. Individualized Written Rehabilitation Plan (IWRP)

Development: In this status comprehensive case study and diagnosis provide a basis for the formulation of the IWRP. The individual remains in this status until the rehabilitation plan is written and approved.

Status 12. Individualized Written Rehabilitation Plan(IWRP)

Completed: A case is placed in this status when a plan has been written and approved by the proper personnel, and necessary arrangements are made to begin services to the client.

Status 14. Counseling and Guidance Only: This status is used for those individuals having an approved program which outlines counseling, guidance, and placement as the only services required to prepare the client for employment.

Status 16. Physical or Mental Restoration: A client is placed in this status if he is receiving medical, surgical, psychiatric treatment, or is being fitted with an artificial appliance until services are completed or terminated.

Status 18. Training: The client is receiving academic, business, vocational or personal adjustment training from any source.

Status 20. Ready for Employment: The client completed all preparations for employment and is ready to accept a job but has not yet been placed or begun employment.

Status 22. In Employment: The client is in employment for a minimum of 60 days before being closed employed in Status 26.

Status 24. Service Interrupted: Rehabilitation Services are interrupted while the client is in one of the Statuses 14, 16, 18, 20 or 22. These cases are then held in this status until the client's return to one of those statuses.

Status 26. Closed Rehabilitation: Active cases closed rehabilitated must as a minimum (1) have been declared eligible for services, (2) have received appropriate diagnostic and related services, (3) have had a program for VR services formulated, (4) have completed the program, (5) have been provided counseling, and (6) have been determined to be suitably employed for a minimum of 60 days.

Status 28. Closed Other Reasons After IWRP Initiated:

Cases closed into this category from Statuses 14 through 24 must have met criteria (1), (2) and (3) above, and at least one of the services provided for by the IWRP must have been initiated, but for some reason one or more of criteria (4), (5), and (6) above were not met.

Status 30. Closed Other Reasons Before IWRP Initiated:

Cases accepted for services but did not progress to the point that rehabilitation services were actually initiated under a rehabilitation plan (closures from Status 10 and 12).

Status 32. Post-employment: Persons previously rehabilitated are placed into this status while in receipt of post-employment, follow-up or follow-along services devoted to helping the client maintain employment.

Active Caseload: The number of cases in the active Statuses 10 through 30.

Total Caseload: The overall number of cases handled by, or known to State agencies in Statuses 00 through 30.

Severely Disabled: Cases of individuals who fall into any of the four categories listed below: 1. Clients with major disabling conditions such as blindness and deafness, which are automatically included, and other disabilities as qualified, such as a respiratory disorder with sufficient loss of breath capacity, 2. Clients who, at any time in the VR process, had been Social Security Disability Insurance (SSDI) beneficiaries, 3. Clients who, at any time in the VR process, had been recipients of Supplemental Security Income (SSI) payments by reason of blindness or disability, and 4. Other individual cases with documented evidence of substantial loss in conducting certain specified activities.

Severely Disabled Caseload: The number of cases in the active caseload classified as severely disabled.

Acceptance Rate: The number of cases accepted for VR as a percent of all cases processed for eligibility. (Acceptances as a percent of the sum of acceptances and non-acceptances.)

Rehabilitation Rate: The number of cases closed rehabilitated as a percent of all cases closed from the active caseload. (Rehabilitations as a percent of the sum of rehabilitations and non-rehabilitations.)

Overview

This chapter addressed the need for a diagnostic model for rehabilitation clients in order for the rehabilitation counselors and the agency to deliver appropriate services and achieve the goal of rehabilitation. The remainder of this work will develop further in detail as outlined in this chapter. In Chapter II, the review of literature begins with the state of the art in clinical vs. statistical prediction in rehabilitation and the usefulness of predictive studies with demographic and psychological characteristics of the clients. The construct of Locus of Control has been studied extensively to determine its influence on rehabilitation clients. The impact of work motivation and work history on becoming successful in vocational rehabilitation have been reviewed. Methodology of the study is presented in Chapter III. Included in Chapter III will be discussions of sample, selection criteria, rationale, procedure, instrumentation, research design, hypotheses in testable form, and a discussion of the statistical models used for data analyses. The statistical result of the research is the topic of Chapter IV. A discussion of the results, limitations of the study, recommendations for future research and conclusions comprise the contents of Chapter V.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

One of the major functions of the vocational rehabilitation counselor is to assess, evaluate, and analyze the characteristics of the client in terms of the client's potentials and limitations. These activities provide then the basis for developing with the client a rational intervention and rehabilitation plan. In this process the counselor makes decisions on the basis of intuitive judgment and estimates the extent of the client's probability of success. Decisions based on intuitive judgment and experience have both merits and drawbacks in comparison with methods based on quantifiable data subjected to statistical analysis. This review of literature first deals with the state of the art in Clinical versus Statistical Prediction and their role in rehabilitation.

The outcome of any social, behavioral or rehabilitation intervention is a function of its participants and its internal and external social situation in which it operates (Fairweather & Tornatzky, 1977). The outcome of rehabilitation will be viewed as a function of the

characteristics of its participants, the rehabilitation clients. Characteristics which will be studied extensively include demographic variables of the client, psychological variables, and a combination of demographic and psychological variables. However, the outcome of rehabilitation and its relationship with internal and external social variables are beyond the scope of the current study.

The construct of Locus of Control, a psychological variable and a personality characteristic which emerged from Social Learning Theory, will be examined in detail to determine its impact on the rehabilitation of physically and psychologically disabled persons. An attempt will be made to isolate the role of work motivation or client motivation in rehabilitation from the complexity of vague and broad general concepts of motivation. The concept of motivation will instead be viewed from the behavioral point of view, by considering incentives and disincentives to employment that are operative in the client's environment. Finally, the classification and utilization of client's prior work history and its multidimensional impact on rehabilitation outcome will be reviewed.

Clinical Versus Statistical Prediction

Prediction is a fundamental concern for the vocational rehabilitation counselor, social worker, clinician, physician, psychologist, psychiatrist, sociologist,

educator, economist, and industrialist. Attempts are made to forecast future success or failure of academic or vocational training programs; rehabilitation programs; the availability of jobs in the labor market; the quality or quantity of work to be expected from a particular group of trained people, the handicapped, or disadvantaged; and the likelihood of parole success or violation; etc., on the basis of present information or knowledge about a person or a condition. The accuracy or precision of predictions and the ways in which predictions are made have been the center of controversy for over half a century. In this respect one especially important issue has been that of clinical versus statistical prediction.

A counselor, social worker, clinician, or psychologist makes predictions on the basis of information gathered during an interview with the client, including past history, and psychometric test scores. One formulates a tentative hypothesis and makes a reasonable expectation from one's own expertise, and an intuitive judgment is made as to how the client is going to behave in the future. This method of prediction is called clinical or the case study method. On the other hand, when the same client's pertinent information is mechanically combined for the purpose of classification, and for making a probability statement which is empirically determined from an actuarial table, frequency distribution, or mathematical equation as to how the client is going to behave in the future, this is called the

statistical or actuarial method. In a counseling situation, if the counselor forms an early hypothesis influenced by intuitive hunches, then one may look only for data that support these hunches. This could be a selffulfilling prophecy and introduce sources of error in counseling judgment and prediction. The statistical method is free from this kind of error and bias. However, if the counselor's hunches are neutrally observed, recorded, tested, and interpreted with scientific rigor, this may lead to the development of sound hypotheses and theories that will have wide application in predicting human behavior beyond the counseling or clinical setting.

Proponents of the clinical method call it dynamic, meaningful, holistic, deep, genuine, and sophisticated; its opponents call it mystical, hazy, vague, subjective, crude, intuitive, unscientific, unreliable, and verbalistic. On the other hand, proponents of the statistical method describe it as operational, objective, reliable, sound, verifiable, testable, scientific, and precise; whereas its opponents denounce it as mechanical, atomistic, additive, artificial, pedantic, static, and pseudo-scientific (Meehl, 1954). It seems there exist two warring camps poles apart, and a concerned individual may tend to bend favorably toward one camp and unfavorably away from the other camp.

The "polarizing" effect (Gough, 1962) of clinical versus statistical methods may have originated from, or at least have some parallelism with, the concept of the study

of the individual case and the study of the general case. Windelband (in Allport, 1937), a German philosopher proposed this sharp distinction to separate the idiographic and nomothetic disciplines; and later on Allport (1937, 1940, 1942, 1946, 1955, 1962) brilliantly expanded the concept in the United States. Idiographic pertains to or involves the study of cases or events as individual units, with a view to understanding each one separately, individually dealing with structural patterns; whereas nomothetic study treats cases or events as whole, universal, and with a view to formulating general laws. Another distinction between the two terms is that the idiographic approach deals with individuality or intra-individual comparisons whereas the nomothetic focuses on individual differences or inter-individual uniformities. In other words, the former tends to emphasize particularization and the latter is associated with abstractions and generalization (Luchins & Luchins, 1965).

In the study of human psychology and behavior this dichotomy is too sharp. In the clinical situation, diagnosis, prognosis, and therapy are idiographic. However, these rest intimately upon a knowledge of the common factors; for example, behavioral or pathological disturbance is determined by the nomothetic science of behavioral, social, environmental, and psychological knowledge or concepts. A holistic study of the individual is neither exclusively idiographic, nor exclusively

nomothetic. It occupies an "intermediate position," and seeks an equilibrium between the two extremes (Allport, 1937).

Similarly, in the clinical and statistical methods of prediction there is a continuum between the two extremes. When to use the clinical method or when to use a statistical method depends solely upon what one wants to predict, on the basis of what kind of information, data, and situations. Whether a clinician or a statistician would do better in making a particular kind of prediction is an empirical question. Clinical and statistical dichotomy is mainly a methodological one and it is often difficult to specify clearly where one method is overlapping with the other. The relative efficacy of both methods is a debatable issue as to any given prediction situation; that is, which method is more accurate, more efficient, more precise, and more informative in a scientific way.

Clinical versus statistical debate started when Viteles (1925) and Freyd (1925) exchanged views on the general issues of predicting job success. Lundberg (1926) published a paper on case work and the statistical method; and his contentions were:

...that the assumed opposition or incompatibility between these two methods is illusory for three principal reasons: (1) the case method is not in itself a scientific method, but merely the first step in scientific method; (2) individual cases become of scientific significance only when classified and summarized in such forms as to reveal uniformities, types, and patterns of behavior; (3) the statistical method is the best, if not the only, scientific method of classifying

and summarizing large numbers of cases. The two methods are not, therefore, under any circumstances opposed to each other, nor is one a substitute for the other. (p. 549 in Gough, 1962)

The clinician's side of the controversy appeared in the field with the publication of Allport's book on Personality in 1937 and was expanded upon by Murray (1938) and Sarbin (1941). Allport distinguished three levels of predicting human behavior: first, when people are viewed en masse, and only the average behavior is of interest (like some other men, group); second, when based upon knowledge of human nature in general (like all other men, universal); and third, for the study of the individual (like no other men, idiosyncratic). Allport's (1942) monograph gave a good boost in favor of the case study or idiographic point of view and criticized the actuarial method. He cited the deficiencies of the actuarial method--that it: (1) fails to distinguish between frequency of recurrence and the causation of the recurrence; (2) assumes the same meaning (and hence the same causal value) for all persons; and (3) is unable to deal with latent (unmanifested) trends. Holt (1962) stated that following Allport (1942), Dymond (1953) attempted to bolster and Hoffman (1960) attacked the contention that clinical prediction must be superior to statistical procedure as the clinician uses idiographic methods, which alone are appropriate to individual predictions.

The publication of the book, Clinical versus Statistical Prediction by Meehl in 1954 brought the issues

in prediction into the limelight. He developed the formal and empirical analysis of the prediction problem in good foundation. He classified the distinction between the methods of prediction and kinds of data used in making the prediction. Given any set of data, how may it best be treated so as to yield accurate, meaningful prediction? He evaluated the efficacy of prediction from 20 studies which compared the validity of the two methods. These studies predicted three main types of criteria: (1) success in some kind of training and schooling, (2) recidivism on parole or probation, or (3) recovery from a major psychosis. The results were overwhelmingly in favor of the actuarial methods. "... in all but one ... the predictions made actuarially were either approximately equal or superior to those made by a clinician." Again he stated, "In about half of the studies, the two methods are equal; in the other half, the clinician is definitely inferior." (p. 119)

A few years later, Meehl (1957) added seven more titles to his list of comparative researches and found, out of 27 studies, 17 showed a definite superiority for the statistical method; 10 showed the methods to be of equal efficiency; none of them showed the clinician predicting better. Meehl's (1965) review of available research reaffirmed his earlier contention. Out of 50 studies examined, about two-thirds favored statistical prediction and the remaining one-third showed no significant

difference. Based on his findings, he concluded earlier (Meehl, 1957):

I have reservations about some of these studies; I do not believe they are optimally designed to exhibit the clinician at his best; but I submit that it is high time that those who are so sure that the "right kind of study" will exhibit the clinician's prowess, should do this right kind of study and back up their claim with evidence. Furthermore, a good deal of routine clinical prediction is going on all over the country in which the data available, and the intensity of clinical contact, are not materially different from that in the published comparisons. It is highly probable that current predictive methods are costly to taxpayers and harmful to the welfare of patients. (p. 272)

Meehl's conclusion from his review is that clinical prediction is an expensive and inefficient substitute for statistical predictions, and one that keeps the clinician from being a better clinician and using his talents constructively in clinical activity. Meehl's conclusion has been validated by the findings of Dawes and Corrigan (1974) and Goldberg (1970). In an attempt to improve clinical inferences Goldberg (1970) commented that the use of judgmental models is less costly than the use of human judges. After a clinical expert has derived his model he is free to perform other activities. A statistical model of a clinician's own behavior usually will yield more valid predictions than does the clinician himself and it will reduce the influence of random procedural errors.

Holt (1958) expressed his concerns that clinicians do have justified grievance against Meehl, and felt that the evidence in favor of the statistical approach may be a

function of the experimental design, in which the clinician is in a disadvantaged position. He suggested a comparative study which would simultaneously predict the same criteria for the same data by clinicians and statisticians who have gone through the same preliminary steps.

In order to carry out Holt's suggestion and accept Meehl's challenge, Grebstein (1963) studied the relative accuracy of actuarial prediction. Three groups of judges were categorized on the basis of their education and experience as sophisticated, semi-sophisticated, and naive judges in a clinical judgmental task of judging intelligence quotients from Rorschach Psychograms. The following findings are noted: there was no significant difference between the judgments of the sophisticated group of judges and the multiple regression equations; the accuracy of clinical judgment was not demonstrated with increase in clinical experience; and the average error rate was higher among the judges than in the multiple regression equations. One of the methodological drawbacks that might have counted in favor of the sophisticated judges was that the judges kept the psychograms for several days, and the judges had been instructed that their findings would be compared with the multiple regression equations. This might have motivated the judges to take more time to predict than they usually do to make judgments in the clinical setting.

To explore further the accuracy of the clinical judges, Goldberg (1965) compared the diagnostic judgments

of 29 clinical judges and a series of linear regression analyses in a neurotic-psychotic continuum from Minnesota Multiphasic Personality Inventory profiles. Comparisons of validity coefficients showed that the statistical formula exceeded the best clinical judges and an empirically derived linear combination of scores yielded the highest validity coefficient.

Educational and vocational counseling is future oriented. Counselors do make judgments, decisions, or predictions about their clients' probable success or failure in different educational and vocational pursuits. The accuracy of a counselor's decisions and predictions contributes to effective counseling. Williamson (1939) emphasized the clinical art of diagnosis with a view to making a good prognosis of students' merits or abilities. The inductive and deductive process of building a model of the person, the decision maker from whom predictions are made, is emphasized by Super, Crites, Hummel, Moser, Overstreet, and Warnath (1957) and Goldman (1961).

Among other roles and functions, the counselor is also a predictor. The question arises as to how efficient the counselor's predictions are and whether counselors should make predictions. Watley (1966a, 1966b, 1968a, 1968b) in a series of studies compared counselors' predictions of educational outcome to predictions by regression equations. The counselors varied greatly in their skills in prediction; and their training and

experience made no difference. Counselors who lacked confidence in prediction were more often correct than counselors who typically expressed most confidence in their judgment. This experimental evidence convincingly supports the superiority of statistical methods.

Holt (1958) argued that no systematic study has been done to show the forecasting skills of the clinicians and that the clinician has not been given the same initial validation experiences as enjoyed by the statistician or the equation. The statistical method is first developed on the same kind of sample and against the same criterion that is used in the comparative studies of predictive methods. The clinicians, on the other hand, made their predictions with such experience. Typically clinical judges made predictions without having had any planned validation experience with the criterion prior to the competitive studies. McArthur (1954) and Allport (1962) suggested that the training of the clinician may improve the predictability of the clinician.

Watley (1968a, 1968b) conducted such a study to test whether clinical judges could improve their predictability while he provided the group of judges (who participated in the earlier studies) with immediate feedback training, the previous prediction results, the correlation coefficient between the judges, and the outcome of the criteria. No evidence was obtained to show that previous prediction experience and the feedback information the

judges received aided in producing accurate judgments. This finding does not support Holt's (1958) claim, McArthur (1954) and Allport's (1962) assumption that the clinician can effectively compare, integrate, and evaluate data to produce meaningful associations useful for prediction.

Behavioral prediction requires a sound integration and synthesis of a number of variables and their interactions. The question is how it is humanly possible for a counselor or a clinician to integrate and synthesize a number of client variables--case data, psychometric scores, variables of the labor market, and many other environmental factors?

The process of weighting the fragmentary scores, of confronting one bit of evidence with another and finally synthesizing what one knows in order to discover the personal pattern is exceedingly complex. (Allport, 1937, p. 19)

Using better controlled procedures and more clinically relevant criteria, Sawyer (1966) analyzed 45 prediction studies which show an apparent superiority for mechanical modes of both data collection and combination. He also suggested that the clinician was more likely to contribute to the field of prediction by observation than integration.

Clinical versus statistical prediction is an artificial rivalry, in that the two methods are complementary. The statistician gets the basic information on which to determine the relative weights in the regression equation from the clinician. The clinical case study is superior where satisfactory tests are unavailable. Also, the

clinical method is better suited than the statistical method to processing idiosyncratic events whose frequency is too low to allow the development of a statistical formula of any value. In the arena of multi-dimensional human behavior, different "rare events" occur which have little substantial effect upon the en masse, and thus little importance in statistical prediction. So, there remain a vast multitude of clinical decisions for which no formulas or equations have yet been developed (Anastasi, 1982). Meehl (1957) published an article under the title, "When Shall We Use Our Heads Instead of the Formula?" There is not one answer to Meehl's question; rather one has to shuttle back and forth on the continuum of two extremes as the situation demands. The present state of the art in the clinical versus the statistical approach was summarized by Anastasi (1982):

The clinician (counselor) should utilize all the objective test data, norms, regression equations, and other actuarial strategies applicable to the particular situation, while supplementing this information with facts and inferences attainable only through clinical methods. (p. 492) (Parenthesis is mine)

Upon reviewing 477 rehabilitation research reports of 1954-1973, the importance of statistical prediction in rehabilitation emphasized by Berkowitz, Englander, Rubin and Worrall (1975) in their book, An Evaluation of Policy Related Rehabilitation Research: "If we can forecast outcome with 10% more accuracy than we are doing now, both the

savings in costs and the benefits to clients and society would be substantial." (p. 125)

Prediction of Rehabilitation Outcome Using
Demographic Variables

Since the inception of the Vocational Rehabilitation Program, the task of the counselor and agency has been to determine a reasonable expectation that the client will benefit from vocational rehabilitation services and that these services would achieve successful employment and closure. The task is indeed complex for the counselor to identify early in the process the client who would become a successful rehabilitant in the rehabilitation process. Rehabilitation research has attempted to find a means for the counselor to predict rehabilitation outcome using client characteristics in the biographic and demographic domain.

DeMann (1963) used 20 biographic factors of closed cases of rehabilitants and non-rehabilitants from the St. Paul district office of the Minnesota Division of Vocational Rehabilitation. The factors identified were related to rehabilitation outcome by multivariate predictive analysis using linear discriminant functions. Seven biographic factors found to be significantly related to rehabilitants over non-rehabilitants were: age at disablement, age at acceptance, type of disability, level of education, source of referral, source of support, and

home ownership. More rehabilitants owned their home, received no public or private relief as source of income, were referred by educational facilities, were younger, had a disability that occurred before 30, were high school graduates and suffered from pulmonary tuberculosis. Identification of the non-rehabilitants was possible with 65% accuracy in experimental and cross validation groups and suggested the use of psychological or cognitive factors for more accurate prediction.

Ehrle (1964) attempted to classify vocational rehabilitation clients in terms of success-failure and to construct an expectancy chart to indicate probability of success of future rehabilitation clients based on biographical data and to devise an instrument. He randomly selected an equal number of employed and unemployed clients of the Missouri State Department of Vocational Rehabilitation. Biographic data were quantified and combined. A cutting score was used to yield a maximum discrimination between the employed and unemployed for both the criterion and validation groups. The percentage of correct classification and expectancies of vocational success were predicted better by the 20 variable key than the 86 variable key. Results were reported that the variance between criterion subgroups could be maximized for classification purposes and that scores could be derived to classify clients, and could be combined to establish expectancy charts. The expectancy charts were useful to determine an

index of an individual's rehabilitation potential, to guide in planning individual services, counseling, and to suggest the probability of success.

The prediction studies described earlier used a conglomerate of client variables and also used sophisticated statistical procedures on small samples. Kunce (1971) warned that this may lead to "statistical overkill" or "statistical underkill." Statistical overkill occurs when a sophisticated statistical procedure used on a small sample yields highly significant but non-generalizable findings. Conversely, statistical underkill is also possible: Wallis and Bozarth (1971) attempted to develop and evaluate a weighting system for outcomes using a large sample of 9,286 Illinois vocational rehabilitation clients composed of status 26 closures and closures above status 07. Variables were weighted and combined in two ways. System I utilized four variables: age, education, type of disability, and type of previous services. System II utilized a finer discrimination of age and education. Results concluded that this complex weighting system for rehabilitation was not superior to an unweighted system.

As the complex weighting system could not predict outcome, Kunce and Miller (1972) studied a simplified prediction using a common sense approach based on an earlier study by Kunce and Worley (1970). Twelve variables were used to determine an index score on a sample of 6,099 clients and cross validated on 3,935 clients who were

closed by two different Mid-western state agencies. The index scores were found useful in describing caseload difficulty, assessing client's strengths and limitations, developing a rehabilitation plan, counseling, and identifying barriers to employment. The variable clusters that accounted for the three outcome criteria were the following: (1) rehabilitation outcome - race, number of dependents, employment at acceptance, and social security disability status; (2) work status at closure - age, employment at acceptance, welfare status, and social security disability status; and (3) earnings at closure - age, education, earnings at acceptance, and welfare status. Across the three outcome dimensions the following findings are important to note: public assistance, age, and earnings at acceptance were the crucial elements that differentiated the rehabilitants from the non-rehabilitants. These findings are in agreement with the findings of DeMann (1963). His study recommended the use of other assessment variables (e.g., psychological tests), and the elimination of some less effective biographical variables to obtain a more accurate index score.

The studies reviewed showed that demographic and biographic variables are useful in outcome prediction. However, using biographic and demographic variables Aiduk and Langmeyer (1972) could not predict employment success of an emotionally disabled sample. Variables used in the study were age, sex, education, source of referral, closure

status, age at referral, and diagnostic (primary) disability (psychosis, neurosis, alcoholism, behavior disorder, mental retardation, and epilepsy). One of the drawbacks of the study was the inclusion of status 08 (rejected) as one of the three closure statuses. Of the samples under study, 94.7% of the population were closed at status 08 and most of them were social security recipients at referral. Omitting the social security cases and keeping the 08 status did not improve prediction. The inclusion of status 08 clients in Wallis and Bozarth (1971) may entail the same drawback.

The Aiduk and Langmeyer (1972) study was in complete disagreement with prior studies of an emotionally disabled sample. The limitation of the study could be eradicated by using personality measures, as they argued that Perlman and Hylbert (1969) developed a prediction model using five demographic variables and the Minnesota Multiphasic Personality Inventory (MMPI) scales on an emotionally disabled sample to identify potential dropouts in vocational training. Keep in mind that the outcome dimension was different. One may conclude that biographic and demographic variables are useful in predicting outcome for some sub-populations but not for others. DeMann (1963), Ehrle (1964), Wallis and Bozarth (1971), and Kunce and Miller (1972) used mixed disability samples, whereas Aiduk and Langmeyer (1972) used specific disability as the basis for their study.

Miller, Kunce, and Getsinger (1972) analyzed data on hearing-impaired clients by three different methods: clinical, statistical, and a combination of both in order to improve predictability. A feasibility index was determined on 12 variables for each client by using a simplified prediction method proposed by Kunce and Worley (1970). Employability judgments made by counselors comprised the clinical judgment measure. The feasibility index scores were not related to employment judgments. However, employability judgments were related to all five long-term employment outcome criteria. Improvement in predictability occurred in four categories of hearing-impaired clients when the feasibility index scores and employability scores were combined. Direct implications of clinical judgment (employability) and statistical procedure (feasibility index scores) for effective delivery of client services and program management were emphasized. To improve predictive power, use of personality tests to measure other behavior dimensions and selective weighting of the most appropriate variables were suggested.

Numerous studies were reported in the research literature on predicting the rehabilitation outcome of either post-hospital employment or recidivism of psychiatric patients (Fairweather, Simon, Gebhard, Weingerten, Holland, Sanders, Stone, & Reahl, 1960; Fairweather, 1964; Lorei, 1967; Arthur, Ellsworth, & Kroeker, 1968; Anthony, Buell, Sharratt, & Althoff, 1972). However, there was a lack in

identifying the factor(s) that contribute(s) to post-hospital employment and recidivism. A deficiency in using correlational statistics rather than testing specific hypotheses was an additional issue. Buell and Anthony (1973) tested specific hypotheses by multiple linear regression analysis using 10 demographic characteristics of 78 discharged psychiatric patients. The 10 demographic variables accounted for 53% of the variance ($r=0.72$, $p < .05$) in post-hospital employment. When employment history was deleted from the model, a major decrease in variance occurred. This suggests that one variable, employment history, accounted for the major amount of variance in post-hospital employment. Further analyses revealed that those who became employed full-time (a non-schizophrenic diagnosis) tended to be married, white, and more skilled. Similarly, a significant portion of variance in recidivism was accounted for by the demographic variables attributed to one characteristic, number of previous hospitalizations. Patients who had been hospitalized before tended to repeat that history.

Lorei and Gurel (1973) predicted the post-hospital employment and readmission of 957 schizophrenics from a Veterans Administration Hospital using 20 background demographic characteristics. It was hypothesized that pre-admission work history, and patterns of hospitalization be related to post-hospital work and re-admission within a nine month follow-up period. Correlational analysis of a

20 predictor set yielded a multiple correlation of 0.52 with weeks of work ($p < .01$) and 0.23 ($p < .01$) with re-admission. Use of regression statistics indicated that work experience five years prior to admission to hospital was the most useful predictor of post-hospital employment and re-admission. This finding is in agreement with the findings of Buell and Anthony (1973).

Anthony and Buell (1974) replicated their previous study on 79 psychiatric patients released from the same hospital the following year. The original study, the replication, and the study by Lorei and Gurel (1973) consistently found the most useful single predictor of post-hospital employment to be employment history. With regard to recidivism, the results of the three studies indicate that number of previous hospitalizations is the single best predictor of recidivism at 6 months (Buell & Anthony, 1973), 9 months (Lorei & Gurel, 1973) and 12 months (Buell & Anthony, 1974). However, multiple linear regression analysis comparison of recidivism at 6, 9, and 12 months yielded a small amount of recidivism outcome variance by the number of previous hospitalizations. So, predicting recidivism from the number of previous hospitalizations and other demographic data should be done with great care.

Prediction of likelihood of success of rehabilitation clients using statistical techniques is too sophisticated for counselors to use. Worrall and Vandergoot

(1980, 1982) developed a table of positive and negative regression weights representing various client characteristics on 18 categories of disability types, four categories of age grouping, three levels of education, and one level each of sex, race, marital status, number of dependents, public assistance, and work history. Regression weights were estimates of the incremental contribution to the probability of success. During the intake interview, the counselor can add and subtract the regression weights in a worksheet from the table as per the client characteristics and arrive at an estimate of probability of successfully achieving the outcome criteria by the client.

Worral and Vandergoot (1980) used 6,263 closed cases of Oregon Vocational Rehabilitation clients during the fiscal year 1978. The model used a multivariate design to assign weights based on actual program data in line with Miller and Barillas (1967), Lawlis and Bozarth (1971), and Bolton (1972); but not in an arbitrary fashion suggested by Kuncce, Cope, Miller, and Lesowitz (1973), and Weikel and Johnson (1974). A linear regression or a linear probability model was used to forecast outcome criteria. Outcome was correctly predicted for 63% of the cases, which is close to the observed probability of success in the program (66%). Also, the model predicted that 42% were likely to be closed unsuccessfully, which is an increase in prediction over the observed probability of 33%. It suggests the model can predict the unsuccessful cases better than chance.

Prediction models have been often criticized due to lack of cross validation over time in order to demonstrate the consistency of the model and to determine improved prediction over the base rate of the outcome criteria (Berkowitz, Englander, Rubin, & Worral, 1975; Bolton, 1972; Cook, 1980). Worral and Vandergoot in their original study met the above requirement. They wanted to test the cross validation over time (Worral & Vandergoot, 1982). They have replicated the previous study on 6,224 subjects closed during 1979 in the same agency and added three more predictor variables to the model, as the literature suggested: referral source (Bolton, 1972; Bonge, 1975), time in certain statuses (Cooper & Greenwood, 1975; Goldberg & Johnson, 1980), and training and other service provision factors (Flynn, 1975; Kunce, Miller & Cope, 1974; Growick & Stueland, 1979).

In the replicated study, the age range 26-34, marital status, work history, and the disability type--psychosis and drug abuse--were significant using a t value of 1.96 at the .05 level. The cross validation results on successful closure were 65% in 1979 compared to 63% in 1978; and on unsuccessful closure 45% in 1979 compared to 42% in 1978. Adding further variables to the model did not improve the predictive usefulness; however, regression analysis indicated the following: referral from a hospital tended to be unsuccessful; three of the four training variables related to success were significant, with the strongest

being on-the-job training. Predictive power of the model appears to be stable over a two-year period. The authors suggested that psychological variables should be included and that the model should be tested in another state in order to improve the predictive validity. Hence, this study will add the Locus of Control construct as a psychological variable to test the predictive ability of the model in the states of Louisiana, Michigan and New York.

In summary, the predictive studies in rehabilitation using demographic variables are useful. The variables found significant in prediction were age, education, sources of referral, sources of support at referral, marital status, and employment history. Most of the studies used samples composed of all disabilities (DeMann, 1963; Ehrle, 1964; Wallis & Bozarth, 1971; Kuncie & Miller, 1972). Goss (1968) and Bolton (1972) suggested to partition the mixed disability to categorize the disability type to improve the predictive accuracy of each sub-group sample. Accordingly, sub-group samples were utilized in various studies: emotionally disabled (Aiduk & Langmeyer, 1972); hearing-impaired (Miller, Kuncie, & Getsinger, 1972); psychiatric (Buell & Anthony, 1973, 1974); schizophrenic (Lorei & Gurel, 1973); finally Worral and Vandergoot (1980, 1982) analyzed data using 18 categories of disabled samples.

Wallis and Bozarth (1971) failed to predict by using a complex weighting system. Similarly, Aiduk and Langmeyer (1972) could not predict the outcome of an

emotionally disabled group. The significance of work history on future vocational aspiration was equivocal as confirmed by many studies (DeMann, 1963; Kuncce & Miller, 1972; Buell & Anthony, 1973; Anthony & Buell, 1974; Lorei & Gurel, 1973; Worral & Vandergoot, 1982). Buell and Anthony (1973) first used multiple regression analysis over simplified correlational analysis to show the evidence of unique variance contributed by each demographic variable. Most of the studies recommended use of psychometric measures of client behavior and stability in areas of personality and adjustment as independent predictor variables which might increase predictive ability in the outcome domain.

Prediction of Rehabilitation Outcome Using Psychological Variables

Predictive studies using demographic variables recommended the use of psychological variables to increase predictive efficacy. A linear combination of demographic and psychological variables may have some incremental effect in the outcome domain. However, the literature review revealed that some studies depended only on the psychological variable to predict outcome.

Drasgrow and Dreher (1965) used a psychometric measure, the Minnesota Multiphasic Personality Inventory (MMPI), to differentiate between successful and unsuccessful emotionally disabled rehabilitation clients. They

found that the unsuccessful group had five times as many "sick" as "passable" profiles and the successful group has three times as many "passable" as "sick" profiles.

Lowe (1967) wanted to predict the ability of psychiatric patients to become gainfully employed after hospitalization using the three most frequently used psychological tests, the Wechsler Adult Intelligence Scale (WAIS), the Minnesota Multiphasic Personality Inventory (MMPI), and Rorschach Ink Blot Test. The three tests measured three broad areas: ability, objective personality, and subjective personality. No significant relationships between psychometric scores and employment outcome were found. He explained that the general psychological tests of ability and degree of adjustment are important to vocational adjustment, but the tests were not good predictors of these psychological attributes. Whether or not one secures employment upon leaving the hospital or mental institution is determined by psychological differences in motivation, temperament, degree of social responsibility, and social maturity is yet to be seen.

The importance of diagnostic categories in evaluating psychological data was emphasized by Goss (1968). Subjects of the study were 98 male neuro-psychiatric patients of a Veterans Administration Hospital accepted for a vocational rehabilitation program. Data were compiled from the Work Values Inventory (WVI) and comparisons were

made between success versus failure in obtaining employment after discharge from the hospital. Predictive accuracy in outcome criteria for psychiatric patients was found to vary with each diagnostic category: alcoholics, anxiety-depression, and schizophrenic. In each category prediction was higher than the combined population prediction rate.

Goss (1969) followed up his earlier hypothesis and investigated the utility of a personality inventory, the Edwards Personal Preference Schedule (EPPS) need scores in differentiating the 58 neuro-psychiatric patients with vocational rehabilitation outcome criteria. The analysis was performed on the total population in success-failure criteria and for the following diagnostic sub-groups: (a) alcoholics (ALC), (b) anxiety-depression (A-D), (c) patients with physical disability (P-D), and (d) schizophrenics (SCZ). The model predicted above the base rate of success for all populations and the predictive accuracy increased when the results were specifically related to particular sub-group populations. It seems that Goss's sub-grouping made each group of subjects more homogeneous. The prediction gain was possible due to the relationship of fairly homogeneous groups and the gain in behavior-specific criterion information.

The limitation and usefulness of the EPPS in diagnosing or differentiating alcoholics from non-alcoholics in the outcome domain was noted by Pryer and Distefano (1970). Forty-five male alcoholics differed from 45 male

non-alcoholics (psychiatric) vocational rehabilitation clients on only two of the EPPS variables, affiliation and succorance. The EPPS need scores failed to discriminate between the alcoholics who were successful in a vocational rehabilitation program and those who were not.

Promise of the predictive model espoused by Goss (1969) based on diagnostic grouping and a specially weighted scoring technique with the EPPS was followed by Distefano and Pryer (1970). They tested 47 male and 64 female psychiatric patients upon admission to a vocational rehabilitation program at Central Louisiana State Hospital. Male-female subjects were sub-grouped as schizophrenic, neurotic, personality disorder, organic brain syndrome, and others. Follow-up of these clients on subsequent success and failure criteria between the outcome groups in either the male or female sample was not statistically significant between any of the EPPS scales and vocational success. Evaluation of Goss's model using sub-group populations with the EPPS did not improve predictive accuracy in forecasting the vocational outcome.

Prediction of job success following heart attack using the MMPI was reported by Gresset (1969). A significant but negative correlation was found between the Hypochondriacal scale and employment status four months after heart attack, among a group of 40 male cardiac patients.

Flynn and Salomone (1977) studied the ability of the MMPI to predict rehabilitation outcome among multidisabled clients. Of these 128 successful and 128 unsuccessful who were closed for more than one year were assigned randomly to each sample, and cross-validation was performed. The MMPI data were obtained from client's case files. Results provided no strong support for the routine use of the MMPI in forecasting rehabilitation outcome with multidisabled clients. It was suggested that the MMPI's contribution to predictive accuracy, even if it is small, may be combined with the other independent predictors.

Results of the predictive studies using only psychometric measures are mixed. Lowe (1967) using three psychometric measures failed to predict the outcome of psychiatric patients. Goss's (1969) idea of partitioning the population and analyzing the data for each sub-group to reveal the degree of relationship with the outcome criteria is an important one. Analysis of total sample may obscure the unique difference or characteristics of the sub-group. Analysis on sub-group population was emphasized by Bolton (1972). The usefulness of the EPPS in diagnosing or differentiating the alcoholics from the non-alcoholics in terms of predicting outcome was questioned by Pryer and Distefano (1970) and Distefano and Pryer (1970). Using the MMPI, Lowe (1967) and Flynn and Salomone (1977) found no strong support for the routine use of the MMPI or any other psychometric measures. These studies suggest that psycho-

metric measures along with client characteristics on biographic and demographic variables may improve predictive ability. A review in that direction follows.

Prediction of Rehabilitation Outcome Using
A Linear Combination of Demographic
and Psychological Variables

In reviewing prediction studies using demographic characteristics in predicting outcome criteria, it was suggested that the degree of predictability may improve with the inclusion of some psychological measures. Psychological measures can delineate the client's state of psychological adjustment. The personal adjustment of the disabled individual is to a large extent a function of premorbid personality and integration with the new condition. Intrapersonal and interpersonal adjustment along with acceptance of disability are the crucial elements of success in vocational pursuits.

Ayer, Thoreson and Butler (1966) combined 14 MMPI scales with 10 demographic variables and used multiple regression analysis to predict success of 79 clients from a division of Wisconsin Vocational Rehabilitation. The study predicted three outcome measures: occupational level, upward mobility, and closure status. The multiple correlation coefficient for each of the three regression equations approached 0.67 at the .05 level of significance. The age at onset, age at time of application, type of disability,

and education were significant for one or more of the criteria. Results indicated positive beta weights for age at time of application, intelligence quotient scores, and the masculinity-femininity (Mf), psychopathic-deviate (Pd), and correction (K) scales of the MMPI. Marital adjustment was found to be an indication of the level of personal adequacy, dependability, interpersonal relationship adequacy, willingness to assume responsibility, and motivation to occupational advancement. Prediction of occupational level suggested that physical disability tended to be from a higher occupational level than emotional disability. Higher occupational level jobs demand a higher degree of individual adjustment and interpersonal relationship adequacy. This corroborates the findings of Aiduk and Langmeyer (1972) as they could not predict the success of emotionally disabled populations. It seems likely that emotional disability imposes a certain adjustment problem in achieving outcome criteria. The review of the characteristics of two client categories, psychiatric and schizophrenic, will follow.

In prediction studies, a conglomerate of client background variables are used. Heilbrun and Jordan (1968) concluded that research "may ultimately have to consider a substantial number of factors concomitantly before a real breakthrough in the prediction of rehabilitation outcomes can be effected." (p. 216) Perkins and Miller (1969) showed a sound possibility of using multiple variables in predic-

tion. Multivariable studies using sophisticated statistical procedures but inadequate measures may show no relationships that are nominal, but consistent and pervasive (Kunce & Worley, 1970). Gunderson and Arthur (1969) showed that predictions based on simple counting diagnostic yes or no answers on number of questions are as effective as complex weighting system.

Using variables reported in the literature as being related to outcomes, Kunce and Worley (1970) used a simplified prediction technique as proposed by Gunderson and Arthur (1969) to predict occupational adjustment of psychiatric patients. Twelve variables representing personal history, maladjustment, intellectual functioning, and personality were selected from the client data obtained from the MMPI, the Circular Pencil Mazes and the WAIS. Twelve questions were formulated from the variables and an affirmative answer reflected the client's personal strength on that variable. The employment outcome criteria were positively related to education ($\phi=0.22$), verbal I.Q. ($\phi=0.25$), performance I.Q. ($\phi=0.19$) and mazes ($\phi=0.20$). Isolating single predictor variables showed nominal relationships; however, a simple cumulative index was positively related to employability. The applicability of the simplified procedure and the validity of the cumulative index procedure were tested on three different groups: 118 disabled adults, 344 culturally disadvantaged,

and 590 workshop clients from three different parts of the country; and comparable results were obtained.

The relationship of certain demographic variables and personality variables to success in vocational rehabilitation was studied on an orthopaedic sample by Gilbert and Lester (1970). They attempted to develop a personality-based technique to assess rehabilitation potential of the client. Two scales of the MMPI, Hypochondriasis (Hs) and Depression (D), were significantly related to the outcome. Scores on the two scales indicated better adjustment for the rehabilitation group. The degree of adjustment, both intra-personal and inter-personal, to their own disability perhaps may be the factor that reflects a level of motivation on the part of the client which ultimately leads to vocational success. Literature review substantiates studies on client motivation (Barry & Malinovsky, 1965; Rothney, 1970; Lane & Barry, 1970), but none studied the interface relationship between client motivation for rehabilitation services and rehabilitation outcome.

Salomone (1972) investigated client motivation as determined by the counselors along with demographic variables and personality characteristics measured by the MMPI. Clients (66 male and 52 female) had been closed by two agencies, the Minneapolis Rehabilitation Center (MRC) and the Division of Vocational Rehabilitation (DVR). Of these, 97 were closed by the latter as either employed or unemployed. The sample consisted of 82% physical disabilities

and 18% diagnosed as having emotional or mental problems. The relationship between client motivation for rehabilitation services and subsequent outcome was significant only with the DVR outcome criteria. The other part of the study assessed the motivated and unmotivated group on the MMPI profiles by a multiple discriminant analysis which yielded a generalized Mahalanobis D^2 statistic to test the significance of the difference between the two group profiles. The shapes of the profiles for both groups were similar, but the distance between scale means was not significant. Serious limitations of the study are apparent, e.g., sampling bias, unreliable measure of motivation by the counselors, and difference in case closure criteria by the two agencies. However, there is evidence to support that clients who are motivated for rehabilitation services are more likely to become rehabilitated than unmotivated clients.

In summary, the psychometric measure of personality used as a psychological variable was reviewed in 15 prediction studies. Twelve studies used the MMPI and 3 used the EPPS. The limitations of the EPPS in predicting outcome domain were noted earlier. Use of the MMPI was found useful in 9 studies, while findings of 3 studies (Lowe, 1967; Salomone, 1972; Flynn & Salomone, 1977) could not support the significance of using the MMPI. Salomone (1972) suggested looking closely at the client motivation dimension besides personality. Clients who are motivated

are likely to become more successful than unmotivated clients in the labor market. Flynn and Salomone (1977) advocated that "we believe that the most promising research leads may be found from environmental contingencies that support and maintain successful vocational adaptation." (p. 14) The concept of the Locus of Control construct derived from social learning theory was advanced by Rotter (1954, 1966). Internal and external control attitudes of an individual are attributed to the nature of reinforcement, and perceived payoff is based on past experience with the environmental contingencies. Some light on vocational adaptation may be shed from the study of relationship of Locus of Control (MacDonald & Hall, 1969; Tseng, 1970; MacDonald, 1971c; MacDonald & Hall, 1971; and Worrall & Vandergoot, 1982) and motivation to work (Benson & Whittington, 1974; Andrisani, 1977; Bolton, 1980 and Worrall & Vandergoot, 1982).

Locus of Control

The concept of Locus of Control derives from Rotter's social learning theory (Rotter 1954, 1955, 1960). The Locus of Control construct first came into prominence with the publication of a monograph by Rotter in 1966. Since then Locus of Control has generated a substantial amount of research supporting its validity as a psychological construct. There are now five major reviews (Rotter,

1966; Lefcourt, 1966a, 1966b; Minton, 1967; Joe, 1971). There are 13 measures of Locus of Control and five bibliographies. Throop and MacDonald (1971) listed 339 published and unpublished works through 1969; MacDonald (1972) and MacDonald and Davis (1974) reported 135 and 273 references in 1970 and 1971 respectively; Thronhill, Thronhill, and Youngman (1975) computerized 1200 published and unpublished references through 1972; and Prociuk and Lussier (1975) reported 277 studies published in 1973 and 1974, of which 69% of the empirical studies used the Rotter Internal-External scale. By now, the number of studies using the Locus of Control construct may exceed 3,000.

Locus of Control (LOC) is defined as the degree to which a person perceives desired reinforcement as contingent upon his own behavior. Internal control refers to the perception that positive or negative reinforcement following some action or event is contingent upon one's own behavior or one's relatively permanent characteristic. On the other hand, external control refers to the perception that positive or negative reinforcement followed by some action or event is not entirely contingent upon one's own action, but is the result of luck, chance, fate; or reinforcement may be perceived as under the control of powerful others and unpredictable because of the complexity of forces surrounding the individual.

Rotter (1966) explained,

The effect of a reinforcement following some behavior ... is not a simple stamping-in process but depends upon whether or not the person perceives a causal relationship between his own behavior and the reward. (p. 1)

When the reinforcement is seen as contingent upon one's own behavior, that occurrence will increase an expectancy for the future in order to receive anticipated reinforcement and this would be internally controlled. On the contrary, when the reinforcement is seen as not contingent upon one's own behavior then the expectancy of reward will not increase, and motivation in this case would be externally controlled. Therefore, one's expectations or beliefs that reinforcement is dependent upon one's behavior will depend upon an individual's previous reinforcement history (Rotter, 1966).

Locus of Control, a personality characteristic, measures individual differences of generalized expectancy across situations. The construct has been used in investigating learning, creative thinking, achievement, aspirations, adjustment in life, satisfaction in work and such demographic variables as sex, socio-economic level, ethnic identification, minority and disadvantaged status, diagnosis and treatment of psychopathology.

In the area of achievement behavior, Coleman, Campbell, Hobson, MacPortland, Mood, Weinfeld, and York (1966) reported evidence indicating a relationship between internal control and achievement amongst a variety of minority groups. This finding was supported by McGhee and

Crandall (1968), Lessing (1969), and Hunt and Hardt (1969), all of whom reported a positive association between internality and achievement behavior. Hjelle (1970) could not support evidence indicating LOC as a determinant of academic achievement.

LOC was used to investigate ethnic and socio-economic class difference. Rotter and Battle (1963) and Shaw and Uhl (1969) demonstrated that children from lower socio-economic levels have higher external orientation than children from higher social class levels. Feather (1968) found females score significantly higher in external control. Coleman et al. (1966) and Lefcourt and Ladwig (1965a, 1965b) found that blacks and other minority members were more externally oriented than whites. This was supported by Scott and Phelan (1969) as the unemployed blacks and Mexican-Americans were more external than unemployed whites. Indians were the most external in attitude.

In the area of cognitive activity and LOC, internals, seek more information relevant to their personal conditions than externals. Seeman and Evans (1962) reported that among tuberculosis patients, internals sought more information about the disease and concomitant effects than externals. Similarly, among reformatory inmates, internals exhibited greater learning about the attainment of parole than had externals (Seeman, 1963). Phares (1968) study compared internals and externals in their tendencies to use information for decision making. He concluded that internals are

more likely to make use of information, that externals are equally aware of, and that, therefore, internals should have a greater potential for effectiveness in their social environment. A study focusing upon attentiveness, Lefcourt, Lewis, and Silverman (1968) reported that internals spend more time deliberating about the decisions in skill-demanding tasks than chance-demanding tasks, while externals exhibited the contrary.

Studies reporting the relationship between LOC and adjustment have shown that externals score higher on anxiety measures than internals (Platt & Eisenman, 1968; Hountras & Scharf, 1970) and externals tend to be more debilitated by anxiety (Finch & Nelson, 1974; Shriberg, 1974). Using the level of aspiration paradigm, the relationship of I-E to the coping of success and failure, Efran (1964) found that internals tended to repress failures more than externals. Internals blame themselves for their failures and try to do something about it more than externals who are not likely to blame themselves for their failures.

Locus of Control and Physically Disabled

Optimally, a rehabilitation client will take full advantage of the numerous rehabilitation services and utilize them to his/her best interest. In practice, the client's degree of adjustment to the disability will determine the effective utilization of rehabilitation services in achieving the rehabilitation goal.

MacDonald and Hall (1969, 1971) investigated the perception of disability by the non-disabled. Non-disabled externals felt physical disabilities to be more debilitating than internals. But in real-life situations it was diametrically opposite. Using a perceptual defense paradigm to measure denial of disability, Lipp, Kolstoe, James, and Randall (1968) compared a group of disabled and non-disabled in the perception of disability. Physically disabled subjects demonstrated more extreme differences in perceiving slides of disabled people than did normal subjects. Physically disabled externals had significantly lower recognition thresholds when presented with slides of other disabled persons than more internal disabled subjects. The disabled externals were less denying of disability than disabled internals. These findings are in agreement with Efran (1964) that disability is unacceptable to the disabled and defended by the use of denial by internals. This study offers a direction for vocational rehabilitation clients; the less one denies one's disability, the more successful the adjustment to the disability and in turn, the more successful will be the rehabilitation outcome. Moderately denying disabled persons are more rehabilitated than either the low-denier or high-denier. Successful rehabilitation is contingent upon acceptance of and adjustment to the disability.

Wedland (1973) tested a sample of musculoskeletally impaired persons and found that individuals who had been

disabled less than one and a half years were significantly more external than subjects disabled for three years or longer. Individuals with recent onset of disability would have significantly higher external scores than those with long-term disability. Walls and Miller (1970) compared perception of the disability by rehabilitation and welfare clients. Rehabilitation subjects tended to perceive disabling effects as more seriously debilitating than welfare subjects. Perhaps the disabilities of rehabilitation subjects were either emotional or internal in nature. Older clients perceive some disabilities as more debilitating than younger clients. The study recommended that rehabilitation counselors and social welfare workers should take into account the client's LOC and perception of disabling circumstances in order to formulate appropriate plans for client services.

Houston (1972) investigated the differential influence of internal-external beliefs in reaction to stress. Glass and Singer (1972) emphasized the implication of I-E beliefs to a number of psychological dimensions on "perceived control." Glass (1977) studied the relevance of I-E beliefs on Type A and Type B behavior pattern. Type A individuals appeared to be internal but struggled and tried to develop coping strategies for uncontrollable stress. Those who continually attempt to master stress are prone to coronary heart disease. Cromwell, Butterfield, Brayfield, and Curry (1977) conducted a well controlled study of

personality characteristics in relation to stress, heart attack and recovery. Coronary patients were more external than the medical controls; internality was associated with high anxiety and externality with undesirable physical symptoms. Internals were more cooperative in response to treatment demands, and left the hospital earlier than externals. The findings of Glass (1977) and Cromwell et al. (1977) suggested that I-E beliefs may have implications of physiological adaptive response to stress within the cardiovascular system (Strickland, 1978). Ledom (1978) compared 20 subjects with significant coronary atherosclerosis and 20 medical control subjects and found no significant relationship between LOC and coronary prone behavior scores. The mean LOC values were internal direction for both groups and the groups did not differ in LOC values.

LOC orientation of a hemophilic group were studied by Bruhn, Hampton, and Chandler (1971), who found that the hemophilic group was more internal than normal controls. However, within the hemophilic group, a borderline severe hemophilic was significantly more external than either a mild or severe hemophilic. This study suggested that the borderline severe hemophilics tended to view their conditions as unpredictable, hence externally oriented.

Goldstein (1976) compared a group of long-term hemodialysis patients with a group of non-hemodialysis patients. The hemodialysis samples had higher denial and external scores than the non-hemodialysis control sample. Poll and Kaplan

De-Nour (1980) investigated the relationship of LOC and adjustment of a group of chronic hemodialysis patients in Israel. Negative correlations of high significance were obtained in LOC and compliance with the diet and acceptance of disability. Internal patients adjusted and adapted better than external patients. No correlation was found between LOC and number of years on dialysis.

The foregoing reviewed studies attempted to investigate the relationship between LOC and the reaction to a specific physical disorders or physical disabilities in general. However, the severity of the disability, age at onset, economic and social status of the disabled person, and a host of other psychological and environmental variables all interact complexly on the disabled person. Although physically disabled internal adults initially respond to disability with anxiety, denial, and concern, they tend to know more about their difficulties and exert an influence to adjust and cope with the problem more than the externals. Phares, Ritchie, and Davis (1968) commented that even though the behaviors of the internals are disruptive, internals more often than externals take steps to work on the problem posed by the negative personality interpretation and in the long run internals are better off in coping with their problems and achieving their rehabilitation goals. Lack of disturbance in behavior and less anxiety on the part of the externals indicate a feeling of being unconcerned or passive towards their disability which

in the long run may lead to more severe disability and adjustment problems.

Locus of Control and Psychological Disorders

In the previous section, the relationship between LOC and physical disability was established. The population of clients served by the State-Federal Vocational Rehabilitation Program comprises physically disabled as well as psychologically disordered, including mentally ill, mentally retarded, emotionally impaired, psychiatric, neurotic, personality disorder, alcoholic, and drug addict. In this section, the relationship between LOC and psychological or pathological disorder along with its implications for successful rehabilitation will be reviewed.

Inferring from the past review it would seem logical that psychologically disturbed individuals will have greater external orientation. While this is the fact for some psychiatric populations, it is a paradox for alcoholics and drug addicts. Studies investigating maladaptive or dysfunctional populations show that there is a relationship between externality and psychiatric patients (Cromwell, Rosenthal, Shakow, & Zahn, 1961; Shybut, 1968; Harrow & Ferrante, 1969; Smith, Pryer, & Distefano, 1971; Palmer, 1971; Duke & Mullins, 1973; Lefcourt, 1976). Lottman and DeWolfe (1972) found that process schizophrenics were more external than reactive schizophrenics. The fact that process schizophrenics were more external may be due to

their poor premorbid adjustment patterns and a prior history of failure and social inadequacy. In the process-reactive dimension, Fontana, Klein, Lewis, and Levine (1968) reported that schizophrenics who wished to impress others were "healthy" and more internal than those who wished to prove they were "sick."

The LOC construct accounted for a large percentage of the more extreme behaviors manifested in severe forms of mental illness. The relationship between depression and externality was supported by much empirical research (Abramowitz, 1969; Goss & Morosko, 1970; Lefcourt, 1976). External expectancies were more strongly related to a measure of chronic depression than to temporary depressed mood (Strickland & Hale, 1975). Williams and Nickels (1969) indicated that externality was directly related to suicidal behavior. Lambley and Silbowitz (1973) could not predict the contemplation of suicide behavior by the Rotter I-E scale.

So far, the review of the empirical research reports a relationship between beliefs of external control and severe psychological disorders; however, these findings are contradictory for alcoholics and drug addicts. Surprisingly, alcoholics score significantly more internally than Rotter's (1966) general norms reported by Goss and Morosko (1970). Oziel, Obitz, and Keyson (1972) replicated the Goss and Morosko (1970) study and measured the generalized perceived LOC and transformed specific LOC with regard to

drinking behavior. Results supported the earlier study and found that alcoholics as a group perceive themselves as being in control of their behavior in general and drinking behavior in particular. Gozali and Sloan (1971) disputed the findings of Goss and Morosko, who failed to find a significant relationship between I-E scores and MMPI subscales among alcoholics. O'Leary, Donovan, and Hague (1974) replicated the Goss and Morosko as well as Gozali and Sloan to clarify the ambiguity. Results could not support Gozali and Sloan (1971) but validated the findings of Goss and Morsoko (1970).

One may expect that drug addicts would be more external. However, they were similar to alcoholics. Berzins and Ross (1973); Calicchia (1974); Smithyman, Plant, and Southern (1974) found that drug addicts are more internal. It seems that the behavior of the alcoholics and drug addicts is paradoxical in nature. Goss and Morosko (1970) explained that alcoholics are aware of their control expectancies and they use alcohol as a means of altering feeling states. Another explanation forwarded by Phares (1976) is that alcoholics have a history of being attracted to group meetings and organizations, being quite glib and articulate, which reinforce the arousal of confidence, personal control and optimism.

Fontana et al. (1968) reported schizophrenics who wished to impress others with their good adjustment tended to score more internally than those who wished to create a

bad impression. Internal control response on the I-E scale by alcoholics and addicts may resemble the same behavior pattern. It seems both alcoholics and addicts have an earnest desire to impress others. Berzins and Ross (1973) suggested:

...that internal control can additionally be conceptualized as a consequence or by-product of substance abuse. Perhaps a term, such as, "pseudo-internality" should be used to distinguish drug-engendered internality from its conventional, socially learned counterpart.
(p. 90)

Changes in Locus of Control

LOC measures a generalized expectancy regarded as influencing a wide range of human behaviors. Lefcourt (1976) pointed out that an individual's LOC is inferred from momentary expression of one's sense of causality and it may be relatively stable/consistent at different points of time. However, the expressions of causal expectation are referents of the LOC construct but not the construct itself. The I-E scale is an instrument in social learning theory to elicit expressions of belief which are indicative of causality. As the LOC influences a wide range of behavior, it is indeed necessary to understand the condition(s) that affect the changes of internal and external orientation: under what circumstances and to what extent. Changes in control expectancies could be achieved through natural, accidental, or deliberately contrived events (Lefcourt, 1976; Phares, 1976).

The natural source of change in causality is associated with advancing age. Wolk and Kurtz (1975) reported a high positive relationship between internal control and adjustment to aging. Palmore and Luikart (1972) found that LOC is a determinant of life satisfaction. Internal and external beliefs can be influenced by elements in an individual's life which relate to variations in uncertainty, unpredictability, and lack of control (Kiehlbauch, 1968; MacArthur, 1970; Eisenmann, 1972). Kiehlbauch (1968) found that reformatory inmates were more highly external upon admission, and shortly before release, than during the intermediate period of their stay. This represents a curvilinear relationship with the length of stay in the reformatory between the I-E scores and anxiety scores. The initial period of helplessness with the new environment, and the anxiety and uncertainty of coping with the outside world immediately before their release made them more external. However, the intermediate period represents a coping with the environment, abiding by the rules and regulations of the prison, and a sense of belonging with other prison inmates made them comfortable, hence internally focused.

The goal of counseling and psychotherapy is to help the client learn to effect a degree of control over one's own life events and contingencies. A vast number of research studies across a number of treatment modalities where LOC has been used as a criterion outcome measure

indicate that individuals do become more internal as a result of counseling or therapy (Smith, 1970; Gillis & Jessor, 1970; Dua, 1970; Kilman & Howell, 1974; Eitzen, 1974; Lewis, Dawes, & Cheney, 1974; Schallow, 1975). Smith (1970) found that LOC scores declined from the external to internal significantly after five weeks of crisis intervention therapy, as patients adopted more effective coping techniques by restoring a sense of self-control. Similarly, Dua (1970) reported an improvement of interpersonal skills with the increase of internality from the pretreatment LOC score in an action-oriented therapy.

Masters (1970) presented a case report where the strategy was the reconstruction of causality by altering the patient's perception of control. He suggested action for exerting control over the patient's source of conflict. It seems that a sense of personal control can be an integral component of counseling or therapy. Parks, Becker, Chamberlain, and Crandall (1975) eliminated self-defeating behavior and change in LOC. Majumder, Greever, Holt, and Friedland (1973) examined the use and expansion of an I-E counseling technique on a group of disadvantaged youth and showed a significant increase in internality after six weeks compared to youths who were not counseled.

The effect of treatment experiences upon LOC of alcoholics was examined by Oziel and Obitz (1975). The clients entering a detoxification program were classified in three groups according to their degree of prior

experience in treatment. Increased internality tended to be associated with larger amounts of prior exposure to treatment for alcohol abuse. O'Leary, Donovan, Hague, and Shea (1975) emphasized adaptive function in a six-week treatment program for alcoholics to help identify contingencies that contribute to and maintain their drinking behavior. They were encouraged to make necessary changes in personal and social areas to increase adaptive functioning. LOC was found to increase in internality after therapeutic intervention. In a follow-up study, O'Leary, Donovan, and O'Leary (1976) again found an increase in internality as a function of treatment for alcoholism. Marlatt and Marques (1976) increased internality and decreased excessive drinking of 41 heavy social drinkers by three different forms of relaxation treatment: meditation, progresssive muscle relaxation and quiet reading periods.

Internals manifest greater resistance to persuasion and conformity pressure (Gore, 1963; Crowne & Liverant, 1963; Strickland, 1965) while externals exhibit compliance to and dependence on perceived authority, suggestibility, attitude change and conformity (Ritchie & Phares, 1969; Strickland, 1970; Biondo & MacDonald, 1971; Doctor, 1971). This suggests that the internals may progress in therapeutic intervention which is less directive (e.g., Rogerian, non-directive style), minimal control and structure (Dua, 1970; Kilmann, Albert, & Sotile, 1975), whereas the externals may progress from structures (e.g., Ellis, directive style)

intervention within a controlled space-time format (Johnson & Croft, 1975).

From the review of studies it is convincing that LOC as a mediator of generalized expectancy of behavior in different situations can be altered by various environmental forces. An increase in internality orientation does occur as a result of counseling, therapy, or training intervention and establishes a relationship between increased effectiveness and shifting perception of personal control, and a greater potential for power and efficacy in mastering the environment by controlling the environmental contingencies. The rehabilitation counselor deals with various types of physically disabled and psychologically disordered clients. It is indeed imperative for the counselor to have a close look at the usefulness of relatively simple and easy to interpret personality constructs across types of disabled clients in their adjustment toward their disabilities, in order to provide adequate and appropriate information, counseling, treatment, training and intervention. A sound adjustment to the disability and to the environment is a prerequisite to successful rehabilitation. the control orientations of vocational rehabilitation clients give a direction not only to the client in diagnosis but also to the counselors to plan appropriate client services. The LOC construct can guide counselors in delineating the client's forces of orientation and dynamics in a

more positive direction in achieving goal directed behavior by the client.

Generality-Specificity and Unidimensionality-Multidimensionality

The Locus of Control (LOC) construct is a generalized expectancy and affects human behavior in a wide range of psychological situations. An individual may manifest a number of specific or circumscribed beliefs about LOC, each of which may be more applicable to some specific situations than to others. An individual's high score on an internal direction for a particular aspect does not mean that he will have the same high internal score in other situations. For example, one may be highly internal in achievement orientation but external in interpersonal relationships. It seems that the Internal-External Locus of Control (I-E LOC) does not possess complete generality like any other variable. This means that "its effects on behavior are not uniform and invariant across all situations." (Phares, 1976; p. 45-46)

The general measure of Rotter's 29 item I-E scale allows description of an individual's "average" LOC attributes across situations. The construct may make a sound prediction for an individual's general orientation, but may fail to predict in any specific situation or specific expectancy. Therefore, the I-E scale is not unidimensional, but rather multidimensional, in character.

Rotter (1966) recognized the multidimensionality of the I-E scale as composed of one general factor and many additional factors of only few items. The small amount of variance associated with the additional factors was not sufficiently reliable to construct sub-scales that can hardly have any predictive validity.

Hersch and Scheibe (1967) noted that people who scored higher on external often exhibit greater variance in behavior than do people who scored strongly internal, and suggested that the externality should further be differentiated. Gurin et al. (1969) studied race relations and the I-E construct. The motivational dynamics of people disadvantaged by minority and/or economic status may have a difference in significance in internal and external direction. The assumption in internal belief represents a positive affirmation when associated with success, a feeling of competence. The internal orientation may have negative implications when associated with failure and may lead to self-blame and self-derogation. The relationship between personal adjustment the I-E control is curvilinear.

On the other hand, internal-external bases of control are generally equated with skill vs. chance. This may hold true for those who are in an advantaged position in the social structure. The disadvantaged, disabled, handicapped, low income group, and the minority group experience obstacles that have nothing to do with chance

factors. For example, the circumstances of the labor market, hiring or firing practices, and non-availability of transportation to conduct a job search, all reduce the probability of getting a job. Similarly, racial discrimination and class-status obstacles may be perceived correctly by the minorities as external but not a matter of randomness, chance, or luck. Psychological and sociological analyses of minority groups have made a distinction between "individual blame" and "system blame." It can have a damaging and devastating effect on the minority group members when they practice excessive self-blame or blame of one's group by an internal orientation. Merton (1957) pointed out the social dysfunctionality of such beliefs for minority group members:

when people subordinated in a social system react with invidious self-deprecation rather than against the system, they accept a rationale for the existing system that serves to perpetuate their subordinate position. (p. 34 in Gurin et al., 1969)

Gurin et al. (1969) factor analyzed Rotter's scale to determine the motivational dynamics of I-E control dimensions and found evidence of two factors: Factor I, control ideology--beliefs about how much control most people in our society possess; and Factor II, personal control--the control that one can exert in his own life. In other words, rejecting the notion that success follows from luck, chance, fate, or accepting the traditional Protestant Work Ethic. Joe and Jahn (1973) presented similar data with regard to the personal control and social system control factors.

Varimax rotation of 23 item factor analyses yielded two factors: Factor I--a belief concerning the felt mastery over the course of one's life, Factor II--a belief concerning the extent to which individuals can exert impact on political situations (Mirels, 1970). Similar findings have been reported by MacDonald and Tseng (1971) and Abrahamson et al. (1973). A refinement of the meaning and measurement of LOC through modification and addition of new items of the independent factors of the I-E construct was attempted by Reid and Ware (1973). The evidence of three factors of I-E based on multiple regression analysis were presented.

Collins (1974) converted the 23 forced-choice items to a 46-item Likert agree/disagree format and constructed 42 new items. In the modified version, an individual may achieve an external score based on the following four factors: (a) the world is difficult, (b) the world is unjust, (c) the world is governed by luck, or (d) the world is politically unresponsive. Similar findings have been reported by Kaemmerer and Schwebel (1976) and Zuckerman and Gerbasi (1977).

To focus upon multidimensionality within the LOC measures, Reid and Ware (1974) followed-up their previous study with others and found that the responses to items related to beliefs about control of impulses, drives, and emotions were independent from either personal control or social system control factors of the I-E scale. On the other hand, the differences between items of control

attributed to self and to others were not found as reported by Gurin et al. (1969). Some validity data for the use of separate factors were reported which supported the contention of multidimensionality and its utility.

Bar-Zohar and Nehari (1978) proposed a multidimensional structure consisting of three dimensions: behavioral outcome, control ideology, and situational contents, with each dimension consisting of five factors: effort, ability, objective obstacles, powerful others, and chance or luck representing a continuum of internality to externality. This Multidimensional Locus of Control Inventory shows promising reliability and is only moderately correlated with Rotter's scale. The linkage between the I-E continuum and the multidimensional locus of control, and with their differential weights could provide an integrated approach to examine the perception of locus of control in a more definitive way.

Locus of Control and Rehabilitation

The construct of LOC as an important rehabilitation variable has been substantiated by Lipp et al. (1968); MacDonald and Hall (1969, 1971); Nemerofsky (1970); Tseng (1970); MacDonald (1971c) and Andrisani (1977). Lipp et al. first uncovered the relationship of LOC in the perception of disability by the disabled as well as non-disabled and substantiated that I-E orientation is an important determinant of reaction to disability. A significant

relationship between I-E control dimension and impact of disability was reported by Nemerofsky (1970).

MacDonald (1971c) first reported that I-E control is a potentially important variable in rehabilitation by investigating the attitude toward and reaction to disability by three major disability classes: physical disability, emotional disorder, and socially disadvantaged. He explained the contributions of an internal LOC to expectancy for success:

Locus of control is not a motivational variable but rather an expectancy variable. Findings that persons do not try to improve their conditions because of negative expectancies do not indicate that those persons do not want to improve their conditions. A large number of the victims in our society are motivated to improve their living conditions, but they have low expectancies for success--often realistically. Motivation coupled with positive expectancy equals optimism; motivation coupled with negative expectancy equals despair. (p. 115)

MacDonald suggested the promotion of internal LOC by various remedial programs.

Tseng (1970) investigated the relationship of I-E LOC on a sample of 95 male and 45 female vocational rehabilitation clients and found that internally controlled subjects achieved significantly higher levels of job proficiency, personal quality, training satisfaction and employability. Poll and Kaplan De-Nour (1976) studied the vocational rehabilitation of 40 chronic hemodialysis patients in Israel. LOC correlated significantly with vocational rehabilitation. It was found that 75% of the

internals were working compared with only 38% of the externals.

Several studies using non-disabled samples established the relationship between LOC and reactions of employees to work characteristics (Kimmons & Greenhaus, 1976), task characteristics and work attitudes (Dailey, 1980; Knopp, 1981), occupational structure (Eichler, 1980), job involvement and moderator of role perception/individual outcome relationships (Batlis, 1980). Andrisani (1977) in a National Longitudinal Survey for black and white young men and middle-aged men provided considerable support that I-E attitudes are strongly related to a number of aspects of labor market experience for the disadvantaged.

Strickland (1978) in a review commented that research on the I-E variable and psychological and/or emotional difficulties is much more extensive than that on the I-E variable and physical disability. Similarly, the search of literature reveals only a few studies devoted to investigation of this relationship with vocational rehabilitation clients. Since Tseng (1970), no study has reported on the work attitude, work characteristics, work satisfaction, and work behaviors of vocational rehabilitation clients. Hence, this study will investigate the relationship of generalized I-E control expectancies as well as specific expectancies of labor market experience of vocational rehabilitation clients in the states of Louisiana, Michigan, and New York.

Work Motivation

The predictive studies reviewed earlier appear to be extremely valuable in attempting to isolate some of the factors associated with successful rehabilitation. The concept of "motivation," "client motivation," or more precisely the client's "work motivation" is one of the most essential factors of successful rehabilitation. If the successful outcome is characteristic of the motivated client, then the ability to predict outcome early in the rehabilitation process is a necessary step towards diagnosing the un-motivated, non-motivated, or high-risk client. Rehabilitational efforts could then be directed to develop motivation or to motivate the client towards goal direction.

Motivation was defined by Lane and Barry (1970):

as the hypothetical process descriptive of the interaction of all possible stimuli (variables, experiences, etc.) which influence the differential energizing of responses, thus making some responses dominant over other possible responses in the same situation (p. 6)

Behavior then can be viewed as a function involving the interaction of an individual and his environment. By observing the changes in behavior, the presence or absence, increase or decrease of motivation can be determined. At any point in time, an individual's behavior is dependent upon four interactive factors: (1) abilities, skills, and knowledge; (2) inner personality variables; (3) physiological condition; and (4) external situation--environmental

factors. The first three can be termed intrinsic and the last one as extrinsic factors influencing motivation. The variables or factors that are composed of intrinsic and extrinsic mode of motivational dynamics are not entirely independent. They overlap as well as interact in a sophisticated fashion to create a complex interaction of organism-environmental factors (Pervin, 1968).

In concluding their review on client motivation in rehabilitation, Barry and Malinovsky (1965) commented that the concept of motivation is too broad, too complex, and too vague a construct to be useful in rehabilitation practice. In a survey of 280 rehabilitation counselors, 43% of them attributed client's failures to "lack of motivation" or labelled difficult clients as "unmotivated." The need for understanding the motivation of rehabilitation clients, especially their motivation to work, has been emphasized as one of the most pressing problems faced by rehabilitation counselors (Thoreson, Smits, Butler, & Wright, 1968; Zandy & James, 1979). One of the major reasons cited by counselors for unsuccessful closure of vocational rehabilitation clients is lack of motivation. However, nobody can be properly described as "unmotivated." It may mean that the client's goals and aspirations are not congruent with the counselor's. If there is congruence between the goals of the client and the goals of the counselor or of the rehabilitation process then the probability is higher that the counselor will find the client to be

more motivated and willing to work with him (Tichenor, Thomas, & Kravetz, 1975). Rehabilitation clients who were judged as motivated by a panel of rehabilitation experts were more likely to be closed "employed" status 26 than those judged unmotivated.

The concept of work motivation derives from the concept of general motivation from psychology and is much more complicated than a simple ordering of persons on a motivated-unmotivated continuum. Cook (1982) reviewed various work motivation models and suggested that the models developed by industrial psychologists and rehabilitationists have more direct application to vocational rehabilitation. Vinacke (1962) defines motivation as the condition responsible for variations in the intensity, quality and direction of on-going behavior. This definition is well accepted by the industrial psychologist and suggests that work motivation consists of those things or processes (intrinsic or extrinsic) that are independent of, but interact with, a worker's level of aptitude, skill, and understanding of job task (Campbell & Pritchard, 1976). Individual differences (abilities, skills, motivation) and environmental rewards (increasing or decreasing monetary reward) do affect work motivation (Landy & Trumbo, 1980).

In rehabilitation, which deals with various types of physically, mentally, visually and socially handicapped persons, the problem is not motivation, but changing the clients' perceptions of themselves and their environments.

Somatopsychologists maintain that when one limits the importance of physique, holds a wide range of values, limits disability to the impact of actual impairment, and emphasizes personal intrinsic values while limiting external comparative values (Wright, 1960), one has achieved an optimal adjustment to disability which best leads to vocational adjustment and goal directed work behavior. The identification of realistic goals is an important motivational variable in vocational rehabilitation. Goals with positive valence attract and goals with negative valence repel. Goals can be enhanced by association with some incentive, such as monetary reward.

McDaniel's (1976) Decision-Making Model, a motivational model, has direct application to rehabilitation. According to this model, client participation in any rehabilitation task depends upon three factors:

1. The client's subjective estimate of the probability of a successful outcome or chance of success.
2. The utility of personal value of task performance and outcome.
3. The client's subjective estimate of the costs or efforts involved.

He represented these three factors in an equation:

$$\text{Motivation} = \frac{P(O_s) \times U}{C}$$

Motivation is equal to the estimated probability of successful outcome multiplied by task utility and divided by perceived costs. Using this model, a counselor can

determine the likelihood of successful outcome for a client and can estimate a client's level of motivation in various rehabilitation tasks.

Work motivation can be understood by analyzing the development of work personality as a result of interactions with the environmental demands of job setting, such as performance of some task, ability to get along with peers and supervisor, conforming to certain work rules, and maintaining a minimum standard of quantity and quality of work. Work personality develops through a process of internalization of cultural demands for activity, productivity and achievement (Neff, 1977).

Traditionally, motivation has been viewed as some hidden, internal structure. The job of the rehabilitation professional is to determine the amount of internalized motivation and how it could be reorganized. Fordyce (1976) criticized the traditional viewpoint as it imposes the responsibility for rehabilitation on the client, not on the treatment environment. It is the Behaviorist view that motivating behavior can be changed, increased, decreased, and/or taught, and that work-related behavior can be maintained by changing the environmental contingencies, for example, by changing the philosophy, principles, and systems of treatment and training facilities.

Walls, Masson, and Werner (1977) report that vocational rehabilitation clients and/or their families are eligible to receive one or more of 76 Federal assistance

programs. Vocational rehabilitation counselors find it discouraging to work with public assistance recipients as their success rate is lower. A primary reason for client failure in rehabilitation is the work disincentive often cited by rehabilitation counselors. The guaranteed benefit and the loss-benefit rate are variables that influence the choice to work or not to work. Money is a powerful motivator; however, the degree to which financial disincentives act as motivational barriers to work depends upon the amount of non-work-contingent income associated with disability (Neff, 1977).

Just as financial aids act as disincentives or barriers to work, functional limitations associated with physical impairment and prejudicial attitudes of employers also act as barriers. Therefore, the motivational dynamics of a client could be understood by analyzing the importance attached by the client to work-related goals and incentive conditions that enhance or impede movement towards obtaining and retaining a job. The concept of Job Readiness Posture (JRP) advanced by Associates for Research in Behavior, Inc. (1973) addressed these issues.

Job Readiness Posture is "... a term used to define an individual's attitudes, perceptions and motivations as they impact on his [or her] ability to obtain and maintain a job." (Buros, 1978) In a broader sense, the Job Readiness Posture is "the set of attitudes, motivations and perceptions that permits an individual to accept and work

within the constraints established by a work environment." (Transition to Work III, p. 2) The JRP helps in understanding the factors that facilitate or inhibit the transition of a successful trainee from training status to work status. The successful transition depends upon obtaining and maintaining a regular job after a training program and is based on the following three factors:

Adequate vocational skill training: A person must possess sufficient skills for an entry level position in the labor market.

Adequate placement opportunities: There must be a job available in his locality utilizing the skill for which he was trained. Training a person in an obsolete or non-existent job or skill will end up in one's failing to get a job.

Appropriate Job Readiness Posture: A person must have the motivation, desire, and attitudinal skills to obtain and retain a job. The success or failure of vocational rehabilitation clients in their vocational pursuits depends upon an adequate presence or absence of these factors. The goal of any training program is to improve and strengthen the individual's JRP. When a person with poor JRP enters a vocational skill training program, the training curricula should be designed to facilitate development and internalization of an appropriate JRP. The concept of JRP is measured by the instrument called, the Vocational Opinion Index (VOI).

The Vocational Opinion Index (VOI) is designed to assess three psychological dimensions of the Job Readiness Posture which consists of three factors:

- I. Attractions to work - overall, benefits to children, benefits to worker, better life style, and independence;
- II. Losses associated with work - overall, personal freedom, time for family; and
- III. Barriers to employment - medical, child care and family, new situations and people, ability to get and hold a job, transportation.

Measuring the three psychological dimensions generates a profile and can be used to designate a trainee as either

- I. A Worker
- II. A Non-worker with predispositional problems, or
- III. A Non-worker with attitudinal problems.

An analysis of the reasons or problems associated with a non-worker JRP is made. From the detailed diagnosis of a non-worker JRP, the counselor and the training staff can develop a remedial prescription in order to help the trainee to develop an appropriate JRP. If a non-worker JRP is not addressed during the training program then there is a probability that the individual will not obtain and retain a job after training. The JRP score has been shown to relate to work status after a vocational training program more than 90% of the time (Benson & Whittington, 1974).

Upon failing to predict outcome, Lowe (1967) and Flynn and Salomone (1977) suggested that future research should look closely at the behavioral outcomes of the client. Ability and degree of adjustment as a measure of the client's behavioral outcome is a vital factor in vocational adjustment (Fordyce, 1976). The degree of adjustment reflects a level of motivation on the part of the client which ultimately leads to vocational success. Clients who are motivated for rehabilitation services are more likely to be rehabilitated than unmotivated clients (Salomone, 1972). For a rehabilitation client to be successful in the labor market requires a certain standard of appropriate attitude, perception and motivation. The VOI measures these components of the client's behavioral outcome in relation to work. Thus, this study will incorporate the concept of Job Readiness Posture as a measure of the client's motivation for work.

Work History

The rehabilitation client's prior work history may reveal certain factors, concerns, or issues associated with adjustment to the world of work. Previous work history and work experience may reflect the client's nature and type of vocational development, vocational adjustment, work personality, and commitment and motivation towards the development of a stable career pattern. Characteristics such as

vocational development, vocational adjustment, work personality, and career pattern should be viewed within a developmental context, recognizing the fact that there is a process which evolves over time and can be studied from one's history of work. Roe's Personality Theory of Career Choice (Roe, 1957) was formulated from the study of work history of eminent scientists.

In predicting the psychiatric outcome of mentally ill patients, Buell and Anthony (1973) found employment history to be a significant predictor of post-hospital employment and recidivism. When employment history was deleted from the model, a major decrease in variance occurred. It suggests that one variable, employment history, accounted for the major amount of variance in post-hospital employment. They concluded that the best predictor of ex-psychiatric patients' future behavior is their past behavior.

Lorei and Gurel (1973) predicted the post-hospital employment and readmission of 957 schizophrenics from 20 demographic characteristics. Regression analysis revealed that the extent of work experience in the preceding five years was the most useful predictor of post-hospital employment and recidivism. This is in agreement with the findings of Buell and Anthony (1973).

Anthony and Buell (1974) replicated their previous study. A significant amount of post-hospital employment variance was accounted for by employment history. The

original study, the replication, and the study of Lorei and Gurel (1973) consistently found the most useful single predictor of post-hospital employment is employment history. In their replicated study, Worral and Vandergoot (1982) found a work history variable to be a primary indicator of success of vocational rehabilitation clients.

The characteristic of work history is defined by Tiedeman and O'Hara (1963) as:

- a. the kinds of position held;
- b. the sequence in which one holds these positions, with reference to some "levels" factors such as ability, responsibility, or socio-economic status; and
- c. The amount of time spent in each position.

Work history is a reflection of work adjustment. Important factors include whether one holds a job for a long time or many positions for a short time at the same level, moves from lower to higher level jobs or higher to lower level jobs, or is unemployed for sometime. Work history appears to encompass multidimensional factors and its impact on a future occupation is complexly determined.

A stable pattern of work history helps in building an attitude of competence, self-reliance, and self-direction for future vocational adjustment, aspiration and success in employment. Mischel (1968) pointed out that "the best prognostic index of future adjustment generally is previous adjustment." (p. 38) However, the actual impact of prior work history on future success of vocational rehabilitation

clients may be not as simple as Mischel concluded. The type of disability often imposes functional limitations that may completely interrupt the history of career pattern or work pattern. Also, the age of onset of disability is another crucial factor. One who is disabled congenitally or in early childhood is restricted in the exploration of his environment with normal freedom. The disabled person who has worked may differ significantly in the pursuit of an occupation in comparison to the disabled person with no work history.

The relationship of work history to post-hospital employment of psychiatric patients have been demonstrated (Fairweather et al., 1960; Fairweather, 1964; Buell & Anthony, 1973; Lorei & Gurel, 1973; Anthony & Buell, 1974). Also, the role of work history as a significant predictor of vocational rehabilitation clients has been shown (DeMann, 1963; Kunce & Miller, 1972; Worrall & Vandergoot, 1982). The present study will explore this relationship a step further as to how work history and experience before disability relate to the work pattern and experience after disability. Does the disability impose, enhance, or change the occupational pattern? Furthermore, does receiving various restorative, educative, and skill training from vocational rehabilitation services have any effect in maintaining an earlier work pattern? In other words, do clients move from lower level jobs to higher level jobs,

end vice-versa; or do they maintain the same level job after receiving vocational rehabilitation services?

Summary

A client's probability of success in vocational rehabilitation embraces a conglomerate of factors and their interactions. Some of these are the client's own characteristics, while others are in the environment with which he interacts to bring success in rehabilitation. Broadly speaking, the following four dimensions independently and interactively determine the outcome of the client's vocational rehabilitation endeavor: (1) client variables, (2) counselor variables, (3) process variables of vocational rehabilitation, and (4) labor market variables. It would be realistic to study all four facets together to determine relative impact of component variables in the outcome domain. However, in the scope of a doctoral dissertation it was not feasible to consider all four facets. The major limitation of the study is that it considered only the client variables.

The extensive review of research delineates clearly the impact of client characteristic variables in rehabilitation outcome. Each study showed the influence of some variable that predicts outcome better than others. However, it was established that demographic characteristics are good predictors. Besides demographic characteristics, a

great many studies used psychological variables independently and in combination with demographic variables. It was found that adding psychological variables with demographic variables enhances the predictability of the outcome. The use of various psychological instruments to assess the clients' characteristics has been studied. The complexity of administration and interpretation of the MMPI, the EPPS, and other psychometrics rules out their use by rehabilitation counselors. The Locus of Control construct, on the other hand, measures individual personality differences, and the LOC scale is easy to administer and interpret. It provides a means for rehabilitation counselors to check clients' control of orientation across types of disabled clients at various points in time in the rehabilitation process. The LOC construct also serves as a guide for adjustment and improvement toward their disabilities by providing appropriate information for counseling, treatment, training, and other intervention. The LOC has been used extensively with psychological and emotional disorders but rarely with the physically disabled. No one other than Tseng (1970) has used LOC to predict the outcome of rehabilitation clients which provides the rationale for inclusion of the LOC in this study.

Another psychological variable, work motivation or motivation for work, has been shown to be related to success of rehabilitation. Rehabilitation clients who are

motivated are more likely to be successfully rehabilitated than unmotivated clients. Motivation is a complex phenomenon. However, the behavioral determinants of motivation that are in the client's environmental contingencies were suggested to be considered. Financial disincentives resulting from various public assistance programs often act as barriers to work. The concept of Job Readiness Posture, a set of client's attitudes, perceptions and motivations and its impact in the world of work, seems useful in delineating a worker JRP from a non-worker JRP, by considering motivating factors based on individual perception of relative pay-offs, losses and barriers associated with working.

The best predictor of rehabilitation success is past experience. The client's prior work history, experience, and level of satisfaction is a reflection of his work attitudes, motivation and competence; vocational development, adjustment and adaptation. The significance of work history in rehabilitation outcome has been established. However, the multidimensional impact of work history as to the status of work done, depth of involvement, time spent, complexity of task performed, wages received, requirements for training or certificate/license and overall satisfaction have not been studied. In this study, the multidimensional factors of work history and its impact on rehabilitation outcome after receiving vocational rehabilitation services will be investigated.

Overall, it does appear that predictive accuracy increases from the independent contributions made by the predictor variables that are in the domain of client characteristics. In the current study client characteristics of demography, locus of control and motivation as psychological variables, and patterns of work history will be studied to determine their individual and combined effect and interaction, and relative efficacy in delineating the successful outcome from the unsuccessful. In this context Berkowitz, Englander, Rubin, and Worral (1975) commented "If we can forecast outcome with 10% more accuracy than we are doing now both the savings in costs and the benefits to client and society would be substantial." (p. 125)

CHAPTER III

METHODOLOGY

Introduction

The previous chapters noted the need for further research in developing a prediction model for vocational rehabilitation outcome. It has also been suggested that the inclusion of psychological variables would enhance the predictive ability of the model. Theory and research on internal-external locus of control, work initiative, and work motivation as psychological variables of behavioral determinants, along with the multidimensional impact of work history have been reviewed. The potential positive effects on outcome domain have been noted. Now, it seems reasonable to study whether the introduction of psychological and work history variables has any impact on the prediction model.

In this chapter the design and implementation procedure for the prediction model will be considered. The sample selection, instrumentation, research procedure, hypotheses, research design and method of analysis will follow.

Sample

The subjects of this study were vocational rehabilitation clients who had completed all pre-placement services and training. These clients were ready for employment and already placed in Status 20 or soon would be. Clients who met the following criteria were selected for the study:

a. Clients in Status 20, ready for employment, who at the time of administration of the questionnaire were not more than 60 days in Status 20; or

b. Clients who were at the end of their training program, including on-the-job training, and would be placed in Status 20, ready for employment; and

c. Clients who met one of the above criteria and volunteered to participate in the study.

Rationale

The rationale for selecting the subjects as Status 20, ready for employment was two-fold. First, Status 20 clients were considered a unique baseline for data collection. A common criterion was that all clients received pre-placement services appropriate to their handicapping conditions, and according to the resources of vocational rehabilitation agencies. Secondly, these clients were on the verge of initiating their employment search, and this was an appropriate time to determine their locus of control orientation, work initiative and work motivation. Are they

job ready? Do they possess enough or appropriate skill training, job seeking preparation and behavior? Could factors be identified which could be related to their actual success or failure in landing a job?

Procedure

The proposal of this research was developed in consultation with the Deputy Director, Management Services and Supervisor, Program Evaluations of Michigan Rehabilitation Services (MRS) beginning January, 1982. A formal proposal was submitted to MRS for review in June, 1982. After review and several conferences a few modifications in selection of sample and procedure were implemented at MRS's request to make the study feasible. At the same time, the Human Resources Center (HRC) in New York was also engaged in a national study with similar research through a grant from the National Institute of Handicapped Research. It was planned that we would collaborate in our research to cross validate each other's model in different states to improve the predictive ability of the model (Appendix A). The HRC had obtained approval of the Council of State Administrators of Vocational Rehabilitation's (CSAVR) Committee on Research for the project implementation in Michigan (Appendix A). However, due to various constraints at MRS the project could not be implemented in the State of Michigan as planned and future prospects were in question.

The CSAVR approval cleared the way for other State Directors to approve and implement the research project in their States, should they choose to do so. The Research Director of Research and Training Center, Stout Vocational Rehabilitation Institute, University of Wisconsin-Stout, Menomonie was contacted to explore the possibility of implementing the project in the State of Wisconsin. He forwarded the proposal to the Vocational Rehabilitation Agency, State of Wisconsin (Appendix A). They had many similar requests within the State that they could not accommodate. Finally, the State of Louisiana approved the project. The Executive Director, Division of Vocational Rehabilitation forwarded the administrative agreement to utilize vocational rehabilitation services to implement the research project (Appendix A). The Program Supervisor has been assigned to coordinate the study with 10 district offices and the facilities throughout the State.

A proposal of the research project was submitted to the University Committee on Research Involving Human Subjects, Michigan State University to meet the Federal Policy on research with human subjects in order to protect adequately the rights and welfare of the subjects in the study. The approval of the Committee is in Appendix A.

Data Collection in Louisiana

A copy of the abstract and procedural guidelines concerning client selection, client contact, testing room,

and possible problems for clients to respond to paper-pencil tests was forwarded to the Program Supervisor for review and transmission to the district supervisors and counselors. The counselors contacted their eligible clients and requested their voluntary participation in the study. A schedule was prepared to visit the district offices in October, 1982 to collect data. This had to be cancelled due to an insufficient number of clients who had moved to Status 20 and who were less than 30 days in that status. Only 25 clients volunteered and four district offices either did not have any client in Status 20 or were not willing to cooperate. Therefore, the subject selection criterion was changed by extending the allowable time in Status 20 from 30 days to 60 days, in order to add a significant number to those who had already agreed to participate. In reality that was not the case. Another schedule was made to collect data in November, 1982 and data were collected accordingly.

On the first day of data collection at the New Orleans district office, none of the clients who volunteered and agreed to participate showed up for testing. If this would be the case in other district offices then the study would have to be aborted or the number of subjects would be very small. Hence, it was decided to use a captive population of vocational rehabilitation clients at the training facilities. These clients were at the end of their training program and would be looking for employment (Status 20). A breakdown of participating clients from the district offices

and training facilities is shown in Table 3.1. Whereas it was expected that there would be at least 45 clients, only 9 or 20% of the volunteered clients showed up in 7 district offices; and the remaining 54 clients were from the various facilities.

At each district office and facility, the researcher met with the supervisors, counselors, training and placement staff for 15 to 20 minutes to describe the research in brief, to answer questions, and to encourage cooperation. A standard procedure was followed for the Introduction to the Counselors and Supervisors (Appendix-B). In view of the smaller return rate at the district offices, a request was made to contact the clients who failed to appear and other eligible clients. The directions for administration of the instrument were explained and a sufficient number of instruments were provided. Three districts provided 15 subjects of which four had to be rejected, since one was deceased and others did not meet selection criteria.

The researcher met the clients and gave a brief introduction about the research, emphasizing the importance of their participation and cooperation. A standard procedure was followed for the Introduction to the Client (Appendix B). The clients read and signed the Consent and Release of Information Form (Appendix C) before the instruments (Appendixes D Through I) were administered. The instruments were checked individually for errors, omissions

TABLE 3.1.--Number of Clients Who Agreed to Participate,
Number Rejected and Sample from District Offices
and Training Facilities in Louisiana; and
Training Facilities in Michigan and New York

<u>Louisiana</u>			
<u>District Offices</u>	<u>Participated</u>	<u>Rejected</u>	<u>Sample</u>
New Orleans	0	0	0
Metairie	2	0	2
West Bank	3 +2*	0	5
Houma	1	0	1
Baton Rouge	1	0	1
Hammond	1 +4*	-2*	3
Shreveport	1 +9*	-2*	8
<u>Training Facilities</u>			
Delgado Rehabilitation Center, New Orleans	4	0	4
Goodwill Rehabilitation Center New Orleans	5	-3	2
Holman Vocational Center, New Orleans	7	-1	6
Greenwell Springs Hospital (Alcohol, Drug, T.B., and Psychiatric)	7	-1	6
Southeast Louisiana Hospital, Mandeville (Psychiatric)	7	-4	3
Veterans Administration Medical Center, Shreveport (Alcohol)	9	0	9
Louisiana Technical Institute, Monroe (Corrections)	<u>14</u> 77	<u>-14</u> -27	<u>0</u> 50
<u>Michigan</u>			
State Technical Institute & Re- habilitation Center, Plainwell	29	-7	22
Professional Job Club Develop- ment, Inc., Lansing	34	0	34
<u>New York</u>			
Human Resources Center, Long Island	9	0	9
Total:	149	-34	115

* Tested by the counselors

or double responses. It took 45 minutes to 90 minutes to respond to the instruments.

Data Collection in Michigan

In December 1982, MRS encouraged the researcher to collect data under some restricted conditions from two sources, the State Technical Institute and Rehabilitation Center (STIRC) at Plainwell, Michigan and Professional Job Club Development, Inc. in Lansing, Michigan.

The STIRC is operated by MRS and offers vocational and technical training to handicapped adults of the State in 12 different trades. Fifty percent of the trainees represent severely disabled clients. The success rate of the graduates of STIRC during 1981-82 was 62%. Out of 49 clients graduated in December, 1982, 28 participated in the study two days prior to their graduation. The remaining 21 left the center for on-the-job training leading to a job or already had a job in different parts of the state or the country. These clients representing 43% of the graduates were mailed a packet consisting of a letter from the Principal, Consent and Release of Information Form, the instruments, and a self-addressed stamped envelope. Only one responded. One of the major drawbacks was that due to administrative difficulties at MRS, the counselors of these clients could not be contacted to obtain some demographic and follow-up data. This information could only be obtained from the clients and records at the MRS state office.

Professional Job Club Development, Inc. is a private agency engaged in intensive job search programs. The counselors at the Lansing District Office refer their clients for a two to four months training program to improve job-seeking skills. These clients may not be representative of the client population in the Lansing district office. These clients lacked skills and/or behavior relevant to job-seeking. Not all clients attend this special program. A total of 34 clients were tested and four were rejected as they did not meet the criteria of sample selection.

Data from New York

When it appeared that it would not be possible to collect data from Michigan and Wisconsin, the Human Resources Center (HRC) in New York collected some data for this project. The HRC is a private training facility for vocational rehabilitation clients in Long Island, New York. It is also a regional Research and Training Center. For their research HRC used the Demographic, Modified Locus of Control Scale and the Vocational Opinion Index. However, for this project they used all five instruments with 9 subjects. There were some missing data in demographic and follow-up variables as they used a different format on those two instruments.

Follow-up Data

Follow-up data were collected after six months from both the counselors and the clients to determine client employment status, the dependent variable measure of the study. In Louisiana, data were collected by telephone from the State Office of Vocational Rehabilitation. Counselors reported data on all 50 clients from the available information on clients' case files; however, only 31 clients could be contacted. A considerable attempt has been made to locate the clients in different states based on available forwarding telephone numbers. Some clients were called in three different states and for some as many as 10 calls were made.

In Michigan, data from the counselors of the 34 Job Club clients were obtained, but similar data for the 22 STIRC clients could not be obtained as the MRS state office did not permit the investigator to contact their counselors. Among 34 Job Club clients, contacts were made with 22 clients, while two refused to talk and 10 had no phones. Similarly, out of 22 clients of STIRC, 19 were contacted and three had no phones. To clients who had no phones, a follow-up letter (Appendix J) including a Follow-up Questionnaire-Client (Appendix I) with a stamped return-address envelope was mailed. For 10 Job Club follow-up mailings, three clients responded, three letters were returned with no forwarding address, and four did not respond. Of three STIRC clients who were sent follow-up mailings, two

responded and one did not. No follow-up letters were sent to clients in Louisiana who had no phones, because most of these had left the state without a forwarding address on file.

For the nine clients in the New York sample, the HRC provided the data from the client and no data from the counselors. The New York data provided very minimal information compared with that collected from Michigan and Louisiana.

Some of the common problems encountered in collecting follow-up data from the clients were: no phone, phone disconnected with no further information, unpublished number, counselors protected privacy of client, client refused to talk, family member guarded client information, family member made a barrier to talk to client, client moved out of state, and client jailed for criminal conduct. Collecting follow-up data from the counselors was no problem at all. In only a few cases, changes in counselors, counselor overload and client's lack of communication with counselors prevented the researcher from obtaining up-dated information on client's outcome.

Instrumentation

A package consisting of the following instruments was used in collecting data: I. Demographic Questionnaire, II. Locus of Control Scale, III. Modified Locus of Control

Scale, IV. Vocational Opinion Index, V. Work History Questionnaire, and VI. Follow-up Questionnaire. The Locus of Control Scale, Modified Locus of Control Scale and Vocational Opinion Index are standardized instruments. The Demographic Questionnaire, Work History Questionnaire and Follow-up Questionnaire were devised for the purpose of this study to elicit appropriate data. The items in these questionnaires were selected on the basis of literature reviewed and the variables that were found to be effective in eliciting information in predicting the rehabilitation outcomes. No formal evaluation of individual items was made. In general, the information sought was factual in nature. Each instrument will be reported separately in the order in which it was used in the research.

I. Demographic Questionnaire (Appendix D)

This questionnaire was devised to determine the client characteristics of the predictor variables. The items were chosen on the basis of literature reviewed in Chapter II, which indicated that the following variables have a differential effect in the outcome domain and are good predictors for vocational rehabilitation clients: age, sex, race, marital status, number of dependents, education, disabilities, geographic location, sources of referral, sources of support, public assistance. A part of the information in the questionnaire was obtained from client files when they were unable, or unwilling to provide

it. The clients' signed consent was obtained for release of such information from case files.

II. Locus of Control Scale (Appendix E)

Locus of Control, a personality characteristic, measures individual differences of generalized expectancy across situations. Rotter's Internal-External Locus of Control Scale (Rotter, 1966) contains 29 items. The scale is a forced-choice self-report inventory. Internal and external statements are paired that may appear equally acceptable but differ in validity. The paired statements may both be desirable or both be undesirable. It allows the subjects to choose the one statement they believe strongly. Out of 29 items, 6 are innocuous items to disguise the purpose of the test. One point is given for each external statement selected, yielding a score of 0 to 23. The lower the score, the more internal the attitude, and the higher the score, the more external the attitude.

Internal consistency estimates of reliability of the I-E Scale ranged from 0.65 to 0.79 with nearly all correlations in the 0.70's (Rotter, 1966). Rotter contends that this is a very high internal consistency for an additive scale. The item and factor analyses support his contention. Test-retest reliability for several samples varied from 0.49 to 0.83, depending upon the time interval and sample involved (Rotter, 1966). These are similar to the findings of Hersch and Scheibe (1967).

The forced-choice technique of the LOC scale allows for control of social desirability. Studies regarding the relationship between internal-external LOC and social desirability have been contradictory. Non-significant correlations between the I-E Scale and the Marlowe-Crowne Social Desirability Scale (M-C SDS) have been reported by Strickland (1965), Rotter (1966), Tolor (1967), and Tolor and Jalowiec (1968); while Feather (1967b), and Altrocchi, Palmer, Hellman, and Davis (1976) found significant correlations. Berzins, Ross, and Cohen (1970); and Cone (1971) compared the I-E Scale scores and the Edward Social Desirability Scale scores and reported significant correlation. In Germany, Schreiber (1980) used a German version of the I-E Scale and the M-C SDS on vocational rehabilitation clients and has been able to reduce the social desirability and the I-E scores correlation to zero by using signal detection theory.

The above findings indicate that the I-E Scale is not free from social desirability as contended by Rotter (1966). However, Rotter (1975) explained some problems and misconceptions related to the construct of the I-E Scale:

Even though the forced-choice method allows some control over social desirability, it is well-known that such measures change in their relationship to social desirability under different testing conditions. (p. 62)

It may be concluded that the I-E Scale is neither entirely free from the effects of social desirability nor seriously impaired. Rotter (1975) further commented

"... the I-E scale is subject, as are all personality measures, to the conditions of testing and the known or suspected purposes or nature of the examinee." (p. 62) At least a portion of the variance associated with the I-E scale is attributable to social desirability. However, the exact amount of variance will vary depending upon the subject's perception of reinforcements from the specific testing conditions or situations.

Construct validity of the I-E Scale is indicated by the differences in behavior for persons above and below the median of the scale or from correlations with behavior criteria or mean differences in total scores between groups (Stratoudakis, 1976). A substantial number of studies reviewed in Chapter II on locus of control, its antecedents and behavior correlates, offer strong evidence of the construct validity of the I-E Scale. Discriminant validity is indicated by the low relationships with variables such as intelligence, social desirability, and political liberalism. It can also be expected that the I-E Scale will demonstrate improved predictive validity with increased reliability performance. The I-E Scale has been widely used and a great deal of validity data is reported in Rotter (1966, 1975), Joe (1971), and Robinson and Shaver (1973).

The significance of the Internal-External Locus of Control Scale to predict job proficiency, employability, and training satisfaction of vocational rehabilitation clients was first shown by Tseng (1970). The LOC is a promising

rehabilitation variable for the physically handicapped, emotionally disabled, and socially disadvantaged as emphasized by MacDonald (1971). Strickland's (1978) study supported the view of MacDonald (1971). Also, Flynn and Salomone (1977) suggested the use of behavioral characteristics that are in the client's environmental contingencies which support and maintain successful vocational adaptation. Hence, the present study utilized the concept of LOC as a psychological variable of behavioral determinants on vocational rehabilitation clients. The efficacy of the concept of LOC was used in delineating the successful rehabilitants from the unsuccessful.

III. Modified Locus of Control Scale (Appendix F)

Rotter's I-E Scale measures general expectancy across situations. The work of Crandall et al. (1965); Hersch and Scheibe (1967); Gurin et al. (1969); Mirels (1970); Reid and Ware (1973, 1974); Collins (1974); Kaemmerer and Schwebel (1976); Zuckerman and Gerbasi (1977); and Bar-Zohar and Nehari (1978) indicated that the I-E Scale is multidimensional instead of unidimensional. As a result, the attempt has been made to develop subscales by factor analysis (Gurin et al., 1969; Mirels, 1970; MacDonald & Tseng, 1971; Abrahamson et al., 1973) and by modifying Rotter's original items or adding new items (Gurin et al., 1969; Reid & Ware, 1973, 1974; Collins, 1974) to measure expectancy to a specific situation. The revised scale may

turn into a more useful tool in the research of human behavior, according to Zuckerman and Gerbasi (1977).

In an attempt to develop a sub-scale, Gurin et al. (1969) found that four items of the I-E Scale have higher correlation in predicting the I-E control dimension for minority and disadvantaged populations. They demonstrated that only four items captured the payoffs individuals ascribed to their initiative when the items were phrased in the first person.

This four item sub-scale, the investigator labelled as the Modified Locus of Control Scale. Each item consists of a forced-choice response to two attitudinal statements, one reflecting an internal attitude and the other an external attitude. The subject first chooses between the two statements on each item. Then the subject indicates how closely the forced-choiced response on each item represents his/her point of view on the issue. Is this statement "much closer" or "slightly closer" to his/her opinion? Each item bears a score from 1 to 4 on the basis of an increasingly external attitude. The four scores possible for each item are: 1 for the internal response "much closer," 2 for internal response "slightly closer," 3 for external response "slightly closer," and 4 for external response "much closer." The total score on the scale may range from 4 to 16. The lower the score, the more internal the attitude and the higher the score, the more external the attitude. For example, if one received a score of 1 on each of the 4 items

the total score would be 4. This score would suggest the person to be internally oriented.

Andrisani (1977) used this Modified Locus of Control Scale as part of the National Longitudinal Surveys and showed that they are a significant predictor of the labor market experience for young and middle-aged white and black men. This modified version of the I-E Scale was also used as part of the National Longitudinal Surveys by the Center for Human Resources Research (1979). The Modified Locus of Control Scale was administered to the subjects of the present study to find the significance in predicting labor market experience for vocational rehabilitation clients.

IV. Vocational Opinion Index (VOI) (Appendix G)

The VOI was developed by the Associates for Research in Behavior, Inc. in 1973. It measures the construct of motivation to work status after a vocational training program. The index is a measure of Job Readiness Posture (JRP) which is defined as a set of attitudes, motivations, and perceptions and its impact on the ability to obtain and maintain a job. The VOI delineates three psychological dimensions: (1) Attractions, (2) Losses, and (3) Barriers as perceived by an individual with regard to work.

The VOI consists of 55 multiple choice questions in three sections. The Personal Data Questions section consists of 13 items, of which numbers 1 through 4 are

concerned with demographic data, while the rest are related to whether the trainee currently is participating or has completed the training program. Form A is used for in-program and Form B is used for out-program. Section I has 28 items about working or about things that can or might happen when people work. The responses are scored in a Likert-Type Scale format (Likert, 1932) in five categories: strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, strongly disagree; and a weight of 1 to 5 is assigned for each response, respectively. Section II consists of 14 item statements about problems that might make it difficult for some people to get a job or to keep a job. The responses are scored in Likert-Type Scale format in five categories: extremely, very, somewhat, a little, not at all, and a weight of 1 to 5 is assigned to each response, respectively.

An Areas of Concern Sheet is prepared from the scores of the three sections of the VOI representing the three psychological dimensions of the JRP and their following respective factors:

Attractions

- A₁ = Overall
- A₂ = Benefits to Children
- A₃ = Benefits to Worker
- A₄ = Better Life Style
- A₅ = Independence

Losses

L₁ = Overall

L₂ = Personal Freedom

L₃ = Time to care for and be with family

Barriers

B₁ = Medical

B₂ = Child Care and Family

B₃ = New Situations and People

B₄ = Ability to Get and Hold a Job

B₅ = Transportation

Items 1 to 23 of Section I are used to calculate the Areas of Concern factors in Attractions and Losses. All the items in Section II and only item numbers 7 and 9 in Personal Data Section are used to calculate the factors in Barriers. The rest of the items in the VOI are for research purposes and are not calculated for preparing Areas of Concern.

The VOI could be administered on an individual or group basis. A fifth grade reading level is required to complete the VOI. It is available both in English and Spanish, and in two forms, Form A for current trainees and Form B for graduates of the training program. To derive maximum benefit, the VOI should be administered to the trainees at three points in time: (a) Intake, (b) Exit from program, and (c) Follow-up. The initial administration of the VOI provides remedial training prescriptions to assist a non-worker in developing a worker's JRP. At the

end of the vocational skill training program, the VOI is readministered to evaluate the effectiveness of the remedial prescription. The VOI is again administered to the trainees 13 weeks after they leave the training program as a measure of validation of their expected work status as indicated by both the end of program response VOI and their actual work behavior. In the current study, however, the VOI was administered to the vocational rehabilitation clients at the end of their training program to measure the clients' JRP. This was considered a measure of client's motivation to seek, obtain, and maintain employment, once they had achieved readiness for placement (Status 20).

The VOI has been designed, tested and normed nationwide specifically for disadvantaged trainee populations. The data were collected from 13 Manpower Development Training Act (MDTA) Skills Centers, on 2,000 disadvantaged trainees in 24 skill areas on the basis of availability of various skills, distribution of culture (black, white, and Spanish American) and geographical distribution. The National Study indicated that the VOI surpassed all minimum criteria of reliability and validity for a psychometric instrument; see Table 3.2. The geographic region within the United States (except Puerto Rican living in Puerto Rico), sex and skill area had no significant influences on VOI scores. This means that the VOI requires a single set of norms applicable to the entire U.S. trainee population

TABLE 3.2.--Coefficients of Homogeneity for the Vocational
Opinion Index from Transition to Work III.

SCALE	n	ALPHA*	FORM
English			
Attraction	534	0.82	A
Loss	534	0.76	A
Barrier	534	0.86	A
Attraction	494	0.79	B
Loss	494	0.76	B
Barrier	494	0.86	B
Spanish			
Attraction	161	0.76	A
Loss	161	0.66	A
Barrier	161	0.81	A
Attraction	143	0.76	B
Loss	143	0.84	B
Barrier	143	0.84	B

* An Alpha of 0.60 or greater is deemed an acceptable level of homogeneity (reliability).

(except Puerto Rico) and a robust measure of JRP (Associates for Research in Behavior, Inc., 1973).

Three types of validity data were established for the VOI. Of over 2,000 disadvantaged trainees who were asked to complete the VOI, less than one percent refused to answer. From this high response rate may be inferred the face validity of the instrument. Factorial validity was established from factor analysis of the data from the VOI, which yielded three distinct factors defined as Attractions, Losses and Barriers. Trainees' Job Readiness Posture on the VOI correlated with their behavioral work status after training over 90% of the time, an estimate of criterion-related validity (Associates for Research in Behavior, Inc., 1973).

The clients' motivation in rehabilitation, more precisely, their work motivation can be found from environmental contingencies of behavioral determinants that support and maintain successful vocational adaptation (Fordyce, 1976; Flynn & Salomone, 1977). The ability and degree of vocational adaptation and vocational adjustment reflect a level of motivation which contributes to vocational success. To be successful in the labor market, the rehabilitation client must possess appropriate work motivation. The VOI measures the JRP as motivation for work. The VOI was administered to the subjects to delineate whether the level of motivation could be utilized to differentiate between the employed and the unemployed.

V. Work History Questionnaire (Appendix H)

This questionnaire was developed to determine how previous work history relates to future employment success after receiving vocational rehabilitation services. This may or may not provide any significant difference for congenitally disabled persons and disabled persons with no prior work history. However, for disabled persons who have worked, the nature and type of work, level and depth of work may affect their pursuit of a future occupation. The significance of work history on future vocational aspirations and its impact on future employment were equivocal and confirmed by many studies (Fairweather et al., 1960; DeMann, 1963; Fairweather, 1964; Kunce & Miller, 1972; Buel & Anthony, 1973; Lorei & Gurel, 1973; Anthony & Buel 1974).

The questionnaire is intended to assess various aspects of the client's prior work history with respect to relatedness and unrelatedness of previous employment and its multidimensional impact such as level and depth of involvement, time spent, training required, certificate or license required, wages received, and job satisfactions. Also included in the questionnaire are the kinds of jobs the clients are looking for and perceptions on their degree of success in each job.

VI. Follow-up Questionnaire (Appendix I)

The questionnaire was devised to determine the dependent variable measure of the study, the employment

status at the end of six months after being placed in Status 20. Items were selected for the questionnaire, with a view to the kinds of information obtained in the Work History Questionnaire, so that a common theme of multidimensionality of work history could be compared with employment status at follow-up. For those who became employed, detailed characteristics of job obtained were recorded. For those who were unemployed, the reasons of unemployment and their future plans to alleviate the unemployed conditions were sought. A parallel form of the questionnaire was made, the Follow-up Questionnaire-Counselor and the Follow-up Questionnaire-Client to study the degree of agreement in reporting follow-up data by the counselors and the clients in terms of reliability, counselor-client confounding, and accuracy of data. The follow-up data were gathered both from the counselors and the clients by telephone interview by the researcher.

Hypotheses

The following hypotheses were tested:

Hypothesis 1: The clients with an internal locus of control will have more work motivation than the clients with an external locus of control.

Hypothesis 2: The clients with an internal locus of control will be employed and obtain employment earlier than the clients with an external locus of control.

Hypothesis 3: There will be a positive relationship between the clients' demographic characteristics and employment status in post VRS.

Hypothesis 4: There will be a positive relationship between the clients' work motivation and employment status in post VRS.

Hypothesis 5: There will be a positive relationship between the clients' prior work history characteristics and employment status in post VRS.

Hypothesis 6: A linear combination of predictor variables, such as demographics, locus of control, work motivation, and work history characteristics will be able to differentiate the employed from the unemployed clients in post VRS.

Hypothesis 7: There will be a positive relationship between the clients' prior work characteristics and post VRS work characteristics.

Research Design

The study was designed to find out the predictive relationship of various client characteristics to the outcome domain. These characteristics included demographic variables, locus of control, work motivation, and work history. "The outcome of any social model is a function of its participants and its social situation." (Fairweather & Tornatzky, 1977, p. 46) The outcome of a social model, whether it is molar or molecular, is dependent upon the

individual participant and the social context in which it operates. The outcomes for rehabilitation services are perceived generally as multivariate and changing. However, in this study, only one outcome criterion, employment status was investigated. The participant variables were client attributes, such as, age, sex, education, work motivation, expectancies, attitude, etc. The social situation variables may be classified as internal and external. Internal social variables are those intrinsic to the social model, such as, functional nature of the state vocational rehabilitation system, ethics in serving the handicapped, the role of the counselor and other process characteristics. External social variables are those that impinge upon the model by the interaction of the physical and social environment; those perceived relevant to the study include time, social climate, state of the economy, and geographical location (Fairweather & Tornatzky, 1977).

This study was conducted in three different geographical locations, a Northern, a Southern and an Eastern state when the national economy was ravaged by high inflation and high unemployment. Therefore, the impact of the external and internal social variables will have a multidimensional effect on the participant variables as well as on the outcome domain.

The main objective of the study was to predict the success of vocational rehabilitation clients from client demographic characteristics, locus of control, work

motivation, and work history variables. The design of the study was a multivariate correlational predictive study. It is a common design in field studies (Bolton, 1974). The outcome of prediction studies provides the following three types of information (Borg & Gall, 1976):

- a. The extent to which a criterion behavior pattern can be predicted;
- b. Data for theory building about possible determinants of the criterion behavior pattern; and
- c. Evidence regarding the predictive validity of the test or tests that are correlated with the criterion.

Correlational predictive studies require computing correlations between a complex behavior pattern, the criterion and the predictor variables thought to be related to the criterion. The predictor variables (independent variables) are measured sometime before the criterion behavior (dependent variable) occurs. In this study, the clients' demographics, locus of control, work motivation and work history variables represent the independent variables or predictor variables, and the employment status after six months of the study represents the dependent variable or criterion variable.

Correlations are useful to discover or clarify relationships among variables and to explore possible causal factors that can later be tested in an experimental design.

It permits the measurement and study of a great number of variables and their interrelationships simultaneously. The primary concern is to gain a better understanding of a complex behavior pattern by studying the relationships between these patterns and the variables to which they are hypothesized to be related (Borg & Gall, 1976). An associative technique of a systematic multivariate correlational method looking for predictive relationships was useful in the study.

Analysis

The basic form of data analysis for the study was to correlate each predictor variable with the criteria. When a study involving a large number of variables tries to determine their degree of predictive relationship or the degree of association, a multivariate analysis is warranted. The most appropriate multivariate correlational technique for the study was the Discriminant Function Analysis and Canonical Analysis. The Pearson Product-Moment Correlation (a parametric) and Chi-square (a non-parametric statistic) were also computed.

The Discriminant Analysis (DA) is a powerful technique to examine the difference between the two groups of rehabilitation clients, employed or unemployed with respect to several predictor variables simultaneously. The Discriminant Analysis addresses characteristics, attributes or

psychometrics which can predict or differentiate the rehabilitants from the non-rehabilitants.

The importance of the DA technique is two-fold in the study: (1) to study the relationship among the variables of the given sample and (2) to classify and diagnose for predictive purposes (Klecka, 1980). With multiple independent variables and with two groups, the Discriminant Function gives the "best" prediction by calculating the least-squares "best" composite score to maximize the discrimination between the groups. The Discriminant Function is a regression equation with a dependent variable, employment status representing the predicted group membership. The usefulness of DA has been commented upon by Kerlinger (1973): "Although discriminant analysis has not been used much in behavioral research, it has interesting potentials." (p. 650) Hence, the major emphasis on the analyses of the study using DA is to examine the underlying associative make-up of the study variables.

Another multivariate correlational technique used was Canonical Analysis (CA). When a research project is confronted with a set of independent and a set of dependent variables, CA is an appropriate statistic to use. CA uses the least-squares principle and derives linear composites for each of the sets of variables in such a way that the correlation between the two sets of linear combinations is at maximum. In other words, CA tries to seek maximum weights for the independent and dependent variables to

determine which of the independent and dependent variables are more closely associated or related. The degree of relationship or association is expressed as Canonical Correlation, R_C between these two composites. The square of the Canonical Correlation, R_C^2 , is an estimate of the variance shared by the two composites (Kerlinger & Pedhazur, 1973). CA is the generalization of Multiple Regression Analysis (MRA) to any number of dependent variables. MRA is a special case of CA. CA was used to study the underlying associative make-up of the multidimensional work characteristics of rehabilitation clients at three different periods in time: before disability, after disability and in post VRS.

The Statistical Package for Social Sciences, SPSS-6000, Version 8.3 on CYBER 750 Computer at Michigan State University was used for the statistical analysis of the data.

Summary

Samples of rehabilitation clients from the states of Louisiana, Michigan, and New York were used to study the relationship between client characteristics (demographics, locus of control, work motivation, and work history patterns) and client success in employment after receiving vocational rehabilitation services. These clients were ready for employment (Status 20) or at the end of their training program in training facilities and would be placed

in Status 20. All subjects volunteered for the study. The data were collected from seven district offices, three training centers, three hospitals in Louisiana; one training center and one Job Club in Michigan; and one training center in New York.

A total of six instruments were used to measure client characteristics. Three of these were standardized instruments and three were developed specifically for the study. The measures used in the study included: (1) Demographic Questionnaire to ascertain the clients variability in demographic characteristics; (2) Locus of Control Scale to measure the individual differences of generalized expectancy across situations; (3) Modified Locus of Control Scale to measure the individual differences of specific expectancy relevant to the initiative to work; (4) Vocational Opinion Index used to determine the Job Readiness Posture as a measure of work motivation; (5) Work History Questionnaire to study the pattern, level, and depth involved in work and its relation to future employment; and (6) Follow-up Questionnaire to determine the status of employment and its characteristics after six months of the study.

This was an exploratory predictive field study. Discriminant function, a multivariate correlational procedure, was considered the most appropriate to examine the underlying associative make-up of the study variables. The hypotheses investigated whether the characteristics of the

outcome criteria could be differentiated on the basis of the characteristics of the domains of predictors, individually or in combination. The significance of different hypotheses was explained by the Chi-square values, Correlation Coefficients, Canonical Correlations between the sets of variables, and the predictive accuracy of the discriminant function with their respective level of significance.

CHAPTER IV

RESULTS

Introduction

This was an exploratory study to develop a prediction model for rehabilitation clients, relating client predictor variables (demographic, psychological, and work history) to outcome criteria observed after Vocational Rehabilitation Services (VRS).

Two major areas were addressed in the analysis of data. The first area presented a descriptive summary of client characteristic predictor variables, including demographics, two measures of Locus of Control, work motivation, the multidimensional aspects of before and after disability work history, and a detailed outcome measure collected from the counselors and the clients.

The second area presented the formal testing of the hypotheses which were explored in the study. The test statistics and analyses used in examining the hypotheses were Chi-square, Pearson Product-Moment Correlation, Discriminant Analysis, Stepwise Discriminant Analysis, and Canonical Correlation Analysis. The rationale for the selection of test statistics and theories associated with it are also discussed.

Description of Sample

Demographics

A total of 115 vocational rehabilitation clients voluntarily participated in the study, of whom 50 were from Louisiana, 56 from Michigan, and 9 from New York. Table 4.1 is a presentation of data on the clients' demographic characteristics. The mean age of the sample is 30 with a median age of 27. The age range varies from 17 through 59. The sample appears to be largely composed of older adults. The majority, 62%, are male, 76% white, and 61% never married. About half of them, 51%, had education up to the high school level. A little more than half, 58%, had some vocational or technical training and 94% had some work experience prior to seeking help from the VRS.

The primary cause of disability was physiological for 49% and psychogenic for the other 51%. The most numerous group in the sample were alcoholics, 18%, followed by orthopaedics, 15%. Only 29% had a secondary disability, of which, once again about half were physiological and the other half of psychogenic origin. Mean age of occurrence of primary disability varied from 14 to 19 years, with the exception of learning disorder which, in most cases, were congenital.

About half of the sample lived with their parents or owned a home and the other half rented; 43% lived in urban areas followed by 33% in rural, and 24% in semi-urban areas.

TABLE 4.1.--Demographic Characteristics of the Sample

Variable	N	%	\bar{X}	SD	MD
<u>Age</u>	115	100	30	10	27
<u>Sex</u>					
Male	71	62			
Female	44	38			
<u>Race</u>					
White	87	76			
Non-white	28	24			
<u>Marital status</u>					
Married at least one time	45	39			
Never married	70	61			
<u>Number of dependents</u> <u>(excluding self)</u>					
None	80	70			
One	14	12			
Two	11	9			
Three to eight	10	9			
<u>Education</u>					
1st to 8th grade	11	10			
9th to 12th grade	59	51			
1 to 2 years of college	32	28			
3 to 4 years of college	10	9			
Graduate study	3	2			
<u>Vocational, technical or</u> <u>trade school attendance</u> <u>prior to VRS</u>					
Attended	67	58			
Did not attend	48	42			
<u>Worked any time before and</u> <u>after disability prior to VRS</u>					
Worked	108	94			
Not worked	7	6			
<u>Primary Disability</u>					
<u>I. Physiological Disorder</u>	<u>56</u>	<u>49</u>			
1. Blindness, Deafness, Speech or Hearing	5	4			
2. Orthopaedic, Amputation	17	15			
3. Back injury	12	10			
4. Cardiovascular	4	4			

TABLE 4.1.-- Continued

Variable	N	%	\bar{X}	SD	MD
<u>Primary Disability</u>					
<u>I. Physiological Disorder</u>					
5. Metabolic, Blood Malignant, Diabetic	7	6			
6. Neurological, Epileptic, Cerebral Palsy	11	10			
<u>II. Psychogenic Disorder</u>	<u>59</u>	<u>51</u>			
<u>Learning Disorder</u>					
7. Learning disabled, Slow learner	3	3			
8. Mental retardation	10	9			
<u>Mental Illness</u>					
9. Psychosis	8	7			
10. Neurosis, emotional	9	8			
11. Personality and conduct disorder	3	3			
<u>Substance Abuse</u>					
12. Alcoholism	21	18			
13. Drug	5	4			
<u>Secondary Disability</u>					
Present	33	29			
Absent	82	71			
Physiological disorder	17	52			
Psychogenic disorder	16	48			
<u>Age of Primary Disability</u>					
<u>I. Physiological</u>					
Congenital	56	49	17	16	15
Adventitious (3-52)	19	17			
	37	32			
<u>II. Psychogenic</u>					
Congenital	59	51	14	11	15
Adventitious (5-35)	17	15			
	42	37			
Learning disorder	13	11	1	2	1
Mental illness	20	17	16	11	10
Substance abuse	26	23	19	8	18
<u>Living Condition</u>					
Own/Parents' home	55	53			
Rented	48	47			
Not reported	12	-			

TABLE 4.1.--Continued

Variable	N	%	\bar{X}	SD	MD
<u>Location</u>					
Rural	35	33			
Semi-urban	25	24			
Urban	46	43			
Not reported	9	-			
<u>Source of Referral</u>					
Self and family	38	36			
Educational institutions	19	18			
Private agencies	13	12			
Public agencies	35	33			
Not reported	10	-			
<u>Employment Status at Acceptance</u>					
Employed	7	6			
Unemployed	108	94			

All percentages may not total to 100% due to rounding.

A plurality of the clients, 37% were self-referred, followed by 33% referred by public agencies. At the time of acceptance for VR services only 7 clients were working.

Psychological Characteristics

Locus of Control

Two instruments were used to measure the locus of control orientation of the clients at the verge of their embarking on employment-seeking activity. The mean score on Rotter's Locus of Control Scale and Modified Locus of Control Scale were 9.38 and 8.99 with standard deviations (SD) of 4.14 and 3.18 (Table 4.2). The mean scores on both scales were not significantly different; however, the SD's differed by almost one point.

The mean on Rotter's (1966) original normative sample of college students was 8.15 with a SD of 3.88 for males and 8.42 with a SD of 4.06 for females. Cellini and Kantorowski (1982) reported a generalized trend towards externality for college students. The mean score increased to 10.87 with a SD of 4.02 for male college students and 11.70 with a SD of 3.71 for females.

The sample of the current study was not college level and no normative data exist for rehabilitation clients. One would expect that the rehabilitation clients would score more externally, thus having higher mean scores. However, the sample mean was in the internal direction. This may be due to their optimistic perception about the world of work.

TABLE 4.2.--Means, Standard Deviations, Medians and Ranges
of the Locus of Control Scale (LOC) and the
Modified Locus of Control Scale (MODLOC)

Scale	\bar{X}	SD	MD	Minimum	Maximum
Locus of Control (LOC)	9.38	4.14	9.1	0	21
Modified Locus of Control (MODLOC)	8.99	3.18	8.69	4	16

Work Motivation

The Vocational Opinion Index (VOI) assesses the Job Readiness Posture (JRP) of clients' attitudes, perceptions, motivations, and its impact on the ability to obtain and maintain a job. An individual's JRP profile is composed of three psychological dimensions including 13 factors (Table 4.3). The VOI diagnoses whether a trainee is a "worker" or a "non-worker." Ameliorative interventions are implemented to address the non-worker JRP during training. In the A_1 =Overall or L_1 =Overall factor, if a trainee fell into the "-" or "+" group, it indicated that he possessed a non-worker JRP and his position in other factors in Attractions or Losses was not calculated. For example, for A_1 =Overall, there are 59 subjects diagnosed as non-worker and 56 subjects as workers. Only these 56 subjects were used to ascertain their position in other factors of Attractions. VOI criteria for classification may be appropriate for diagnostic purposes but are not suitable for the purpose of the study as a criterion measure of employment status of the client on the basis of their work motivation. In the sample, 87 clients had jobs. According to VOI criteria, this would mean that these 87 clients did not meet the criteria for the "workers" group. This suggests they had insufficient motivation to work when in fact they were employed. Therefore, the criteria of VOI to classify subjects on the factors were ignored and every one was given a chance to be classified in all of the 13 factors. In Attractions and

TABLE 4.3.--The Vocational Opinion Index (VOI)-Three
Dimensions and 13 Factors for the Sample

	"-"	"OK"	"+"
<u>Attraction</u>			
A ₁ =Overall	29	56	30
A ₂ =Benefits to Children	31	73	11
A ₃ =Benefits to Worker	26	62	27
A ₄ =Better Life Style	21	61	33
A ₅ =Independence	37	43	35
<u>Losses</u>			
L ₁ =Overall	29	61	25
L ₂ =Personal Freedom	23	62	30
L ₃ =Time to Care for and be with Family	60	23	55
<u>Barriers</u>			
B ₁ =Medical		46	69
B ₂ =Child Care and Family		82	33
B ₃ =New Situations and People		60	55
B ₄ =Ability to Get and Hold a Job		67	48
B ₅ =Transportation		95	20

Losses, the sample appeared to be normally distributed. In five Barrier factors, the sample's barriers were either present or absent.

Work History

The multidimensional aspects of work history before and after disability were recorded in the areas of complexity of the task performed (e.g., involving with data, people, things), number of months worked, wages received, and job satisfaction. Similar data were also collected at follow-up. The number of jobs held by the client before and after disability, and at follow-up appear in Table 4.4. A maximum of the 5 most recent jobs was recorded before and after disability for the analysis.

While follow-up cases evidenced close agreement between the counselors' and clients' reports, discrepancies occurred in many instances. For example, a counselor reported that a client was unemployed, while in fact the client was employed, and vice versa. The differences in counselors' and clients' reports were resolved by computing the best of both reports, designated as "best" values throughout the study.

Out of 115 clients, 64 did not work before disability whereas 24 did not work after disability. More clients worked after disability, and held about twice the number of jobs than before disability. This group may have been comprised of younger clients who became disabled at an early

TABLE 4.4.--Number of Jobs Held Before Disability, After Disability, and at Follow-up as Reported by the Counselors, Clients and Computed Best Values

No. of Jobs	Before Disability	%	After Disability	%	Follow-up					
					Counselors	%	Clients	%	Best	%
0	64	56	24	21	34	32	27	31	28	24
1	18	16	29	25	69	65	52	59	77	67
2	12	10	21	18	3	3	9	10	10	9
3	11	10	20	17	-	-	-	-	-	-
4	5	4	10	9	-	-	-	-	-	-
5	5	4	11	10	-	-	-	-	-	-
Not Reported					9		27			

age and for whom the question of working before disability does not arise. Follow-up data suggested that 77 had one job and 10 had two jobs. Overall 76% had jobs after VRS.

A comparison of mean work characteristics of tasks involving data, people, things, number of months worked, wage and job satisfaction appears in Table 4.5. All of the means on the six major work characteristics appeared similar at the three different time periods: before disability, after disability, and follow-up. Involvement with data, people, or things together indicated the level of complexity at which the worker performed. For simplicity, these functions were studied separately. Data, people, and things represent levels of complexity: data 7, people 9, and things 8 respectively. On the average, it appears that the rehabilitation clients worked more with things and data, and were least involved with people during the three measured periods of their work history.

Outcome

Details of the outcome measure for seven categories in increasing order of preferred outcome criteria are shown in Table 4.6. A summary of the employment status at post VRS is in Table 4.7. The first three categories were combined to represent the Unemployed, and four through seven to represent the Employed. At the end of the six month follow-up, 87 clients (76%) were employed and 28 clients (24%) were unemployed.

TABLE 4.5.--Comparison of Mean Work Characteristics Before Disability, After Disability,
at Follow-up and Computed Best Values

Work Characteristics	Follow-up				
	Before	After	Counselors	Clients	Best
Worker function-data	4.65	4.72	4.42	4.47	4.45
Worker function-people	7.04	7.05	6.86	7.10	7.06
Worker function-things	4.76	4.53	5.00	4.22	4.38
Number of months worked	33.53	28.79	3.76	3.25	3.57
Hourly wage received	3.95	4.40	4.70	4.37	4.67
Job satisfaction	3.83	3.93	3.67	3.90	4.03

TABLE 4.6.--Outcome Measures at Follow-up as Reported by the Counselors, Clients and
Computed Best Values

Outcome	Counselors	%	Clients	%	Best	%
1. Unemployed, not interested	15	14	5	6	5	4
2. Going for further training	4	4	1	1	4	3
3. Did not work in last six months	15	14	21	24	19	17
4. Employed, no information	7	7	1	1	6	5
5. Worked in last six months	15	14	15	17	18	16
6. Working	13	12	8	9	14	12
7. Status 26 closure	37	35	37	42	49	43
Not reported	9	-	27	-	-	-

TABLE 4.7.--Employment Status at Follow-up as Reported by the Counselors, Clients and Computed Best Values

Employment Status	Counselors	%	Clients	%	Best	%
Employed (4+5+6+7)	72	68	61	69	87	76
Unemployed (1+2+3)	34	32	27	31	28	24
Not reported	9	-	27	-	-	-

TABLE 4.8.--Sources of Support at Referral, at Testing, at Follow-up as Reported by the Counselors, Clients and Computed Best Values

Sources of Support	Referral	Testing	Follow-up		
			Counselors	Clients	Best
1. Current income	3	4	21	20	33
2. Family	54	33	17	15	18
3. Current Income + family	-	-	12	15	13
4. Current Income + family + public assistance	-	-	12	12	12
5. Public assistance	57	77	18	15	26
Not Reported	1	1	35	38	13

Another way to index appreciable outcome criteria would be to look closely at their sources of support at pre and post VRS as shown in Table 4.8. At referral, half of the sample depended on support from their family and the other half received social security and public assistance. At follow-up, more clients were living solely on their current income, or in combination with either family support or public assistance to supplement their living. A majority of the clients were living on their current income with fewer on Public Assistance.

Examination of Hypotheses

Hypothesis 1

H₀: The clients with internal locus of control will have the same work motivation as the clients with external locus of control.

Two instruments were used to measure locus of control. One was Rotter's (1966) Internal-External Locus of Control Scale (LOC) and the other the Modified Locus of Control Scale (MODLOC). The scores on both scales are continuous. Work motivation was measured by the Vocational Opinion Index (VOI) and consisted of three psychological dimensions: Attraction, Losses, and Barriers. The subjects were grouped into three categories, viz., "-", "OK", "+" in each of the 5 factors of Attractions and 3 factors of Losses. The group with "-" and "+" indicates that these

people either have too low or too high expectations for their jobs and they are not as good workers as the "OK" group. For the five Barrier factors, the subject's barriers are either present or absent. This stringent criterion would virtually categorize everyone to be a non-worker in any one of the 13 VOI factors listed. Rationally, individuals with "-", "+" Attractions and Losses for work do not possess the same problem. A positive attraction may be better than having a perception of negative attraction. Similarly, negative loss is better than having a perception of positive loss. The literature on the VOI suggests that often "-" Attractions and "+" Losses appear together on an individual's profile. Therefore, for the analysis, "+" Attractions were combined with "OK" worker group, and "-" Attractions with the non-worker group. Similarly, "-" Losses were combined with "OK" worker group, and "+" Losses with the non-worker group.

To test the hypothesis with the VOI as a categorical dependent variable, the LOC and MODLOC was categorized in three groups by applying the cutoff score of ± 1 standard deviation from the mean. The clients who fell below one standard deviation from the mean are termed as internal, clients within ± 1 standard deviation are average, and those above one standard deviation are external. The appropriate test statistic for two categorical variables is a Chi-square to determine whether a systematic relationship

exists between locus of control and work motivation. The Chi-square formula is:

$$\chi^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

where O_i is the observed frequency, and E_i is the expected frequency. The greater the discrepancies between the expected and observed frequencies, the larger the Chi-square becomes. The null hypothesis of no relationship or independence may be rejected if the Chi-square value is higher than the value expected by chance. The degrees of freedom for a Chi-square test are: $(1 - \text{no. of rows})(1 - \text{no. of columns})$, i.e., $(3 - 1)(2 - 1) = 2$. The null hypotheses were tested at the .05 level of significance throughout the study. With 2 degrees of freedom a Chi-square of 5.99 is required at the .05 level for a two-tailed test or at the .025 level for a one-tailed test to reject the null hypothesis. Tables 4.9 and 4.10 illustrate the chi-square values, degrees of freedom, and level of significance for the relationships of LOC and MODLOC with each of the 13 factors of VOI.

There appears to be a significant relationship or dependence among 3 different factors of VOI with the LOC and MODLOC respectively. The other 10 factors of the VOI appeared to be independent from LOC and MODLOC. Factors of VOI that are related to the LOC are A_2 =Benefits to Children, L_2 =Personal Freedom, and B_3 =New Situation and People; those related to MODLOC are A_5 =Independence, L_1 =Overall Losses, and L_2 =Personal Freedom. The factor L_2 =Personal Freedom was identified to be significant in

TABLE 4.9.--Chi-square Values Between the Locus of Control
(LOC) and the Vocational Opinion Index (VOI)

	χ^2	df	p	Contingency Coefficient
<u>Attractions</u>				
A ₁ =Overall	5.33	2	.06	
A ₂ =Benefits to children	6.26	2	.04*	.23
A ₃ =Benefits to worker	1.53	2	.46	
A ₄ =Better life style	1.74	2	.41	
A ₅ =Independence	2.61	2	.27	
<u>Losses</u>				
L ₁ =Overall	0.71	2	.70	
L ₂ =Personal freedom	6.07	2	.04*	.23
L ₃ =Time for family	0.37	2	.82	
<u>Barriers</u>				
B ₁ =Medical	1.02	2	.60	
B ₂ =Child care and family	1.93	2	.37	
B ₃ =New situations and people	6.11	2	.04*	.23
B ₄ =Ability to get and hold a job	4.50	2	.10	
B ₅ =Transportation	0.16	2	.92	

TABLE 4.10.--Chi-square Values Between the Modified Locus of Control (MODLOC) and the Vocational Opinion Index (VOI)

	χ^2	df	p	Contingency Coefficient
<u>Attractions</u>				
A ₁ =Overall	1.08	2	.58	
A ₂ =Benefits to children	0.21	2	.90	
A ₃ =Benefits to worker	0.50	2	.78	
A ₄ =Better life style	0.47	2	.79	
A ₅ =Independence	7.77	2	.02*	.25
<u>Losses</u>				
L ₁ =Overall	7.39	2	.02*	.25
L ₂ =Personal freedom	10.98	2	.004*	.30
L ₃ =Time for family	3.50	2	.17	
<u>Barriers</u>				
B ₁ =Medical	2.34	2	.30	
B ₂ =Child care and family	1.55	2	.46	
B ₃ =New situations and people	0.51	2	.77	
B ₄ =Ability to get and hold a job	2.16	2	.34	
B ₅ =Transportation	1.24	2	.54	

both LOC and MODLOC. It yielded the highest Chi-square value of 10.98 at .004 level with MODLOC. The Contingency Coefficient, a measure of association, provides an estimate of the magnitude of the relationship between the variables in a Chi-square table. The Contingency Coefficients for the significant factors varied from .23 to .30, which is a moderate relationship.

Hypothesis 2

H₀: The clients with an internal locus of control will neither be employed nor obtain employment earlier than the clients with an external locus of control.

The number of jobs obtained by the clients and the number of clients who obtained employment at follow-up are reported in Tables 4.4 and 4.7. The Chi-square statistic was used to determine whether a systematic relationship exists between locus of control and obtaining employment post rehabilitation services. Table 4.11 illustrates the Chi-square values of the three groups of LOC and MODLOC as the independent variable compared with the dichotomous categories of employed and unemployed as the dependent variable. It appears that obtaining employment in post rehabilitation services is independent of locus of control orientation. In comparison with LOC, MODLOC yielded higher Chi-square values. The first part of the null hypothesis cannot be rejected. The clients' locus of control orientation as measured by the LOC and MODLOC is independent of their employment status at post VRS.

TABLE 4.11.--Chi-square Values Between the LOC, the MODLOC and Employment Status After VRS.

	χ^2	df	p
<u>LOC</u>			
Employment (Counselors)	1.21	2	.54
Employment (Clients)	0.77	2	.67
Employment (Best)	1.51	2	.47
<u>MODLOC</u>			
Employment (Counselors)	2.23	2	.32
Employment (Clients)	2.59	2	.27
Employment (Best)	4.56	2	.10

TABLE 4.12.--Pearson Product Moment Correlation Coefficients of the LOC and the MODLOC with Number of Months Worked.

	r	N	p
<u>LOC</u>			
Mean Number of Months Worked (Counselors)	-.26	53	.02*
Mean Number of Months Worked (Clients)	-.12	58	.19
Mean Number of Months Worked (Best)	-.14	76	.11
<u>MODLOC</u>			
Mean Number of Months Worked (Counselors)	-.32	53	.009*
Mean Number of Months Worked (Clients)	-.28	58	.01*
Mean Number of Months Worked (Best)	-.23	76	.02*

The second part of the hypothesis investigates whether or not internals obtain employment earlier than externals. One who has been working longer during the study period of six months obtained employment earlier. Tables 4.4 and 4.7 show that 77 people had one job and 10 people had two jobs in the last six months. To equate the two groups, the mean number of months worked was computed. The rationale is to retain consistency with the mean number of months worked before and after disability. Mean number of months worked is a continuous dependent variable. Therefore, LOC and MODLOC were used here as continuous independent variables. Pearson Product Moment Correlation Coefficients of these continuous variables appear in Table 4.12.

It was hypothesized that there would be a negative relationship between the LOC and MODLOC, and number of months worked, as the internals have lower scores in LOC and MODLOC and worked more months than the externals. The result of the test hypothesis indicates that the coefficients are in the predicted direction. The magnitude of the correlations between the variables are of moderate size. The MODLOC is a preferred measure to LOC as it yielded three significant correlations in comparison to one with LOC; the magnitudes are also relatively higher than LOC. A stronger relationship could have been obtained if the follow-up period had not been restricted to six months. The second part of the null hypothesis is rejected.

Discriminant Analysis

Hypotheses 3,4,5 and 6 examined whether or not the demographic, work motivation, and work history predictor variables have any relationship to the dependent variable, employment status. Furthermore, the discriminant analysis explored how accurately the relationship can classify and determine the probabilities of group membership (employed or unemployed) and the similarity of cases within each group. Discriminant analysis (DA) is a powerful statistical technique to study the differences between two or more groups of objects with respect to multiple variables simultaneously. A brief discussion will follow on the elements of DA and then each hypothesis will be discussed based on the DA technique.

The objective of discriminant analysis is to weigh and linearly combine the discriminating variables so that the separation of the groups is maximized. The mathematical equation obtained is called a discriminant function and it is of the form:

$$D_i = d_{i1}Z_1 + d_{i2}Z_2 + \dots + d_{ip}Z_p \quad \text{Eq. 1}$$

where D_i is the score on discriminant function i , d 's are empirical weighting coefficients, and Z 's are standardized values of the discriminating variables (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975).

The maximum number of unique discriminant functions that can be derived is equal to the number of groups minus

one or equal to the number of discriminating variables, whichever is smaller (Klecka, 1980). This study is restricted to two groups of rehabilitation clients, employed or unemployed. One would expect to have only one discriminant function. The derived function would be useful in interpreting the data and classifying the subjects.

Discriminant Function: Discriminant analysis tries to seek a set of weights, v , by which to weight the scores of each individual so that the ratio of B (between-groups Sum Squares and Cross Products, SSCP) to W (pooled within-groups SSCP) is maximized, thereby maximizing the discrimination between the groups.

$$\lambda = \frac{v' B v}{v' W v} \quad \text{Eq. 2}$$

where v' and v are row and column vectors of weights, λ is referred to as the discriminant criterion. The λ can be derived using the following determinantal equation:

$$| W^{-1} B - \lambda I | = 0 \quad \text{Eq. 3}$$

where W^{-1} is the inverse of W , I is an identity matrix, and λ is the largest eigenvalue, or characteristic root of the matrix whose determinant is equal to zero. If the determinant of the matrix is zero, then it establishes the fact that the matrix contains at least one linear dependency and is referred to as being a singular matrix (Pedhazur, 1982). One eigenvalue is expected for the two groups in the study. The eigenvalue is an index for judging the

importance of the discriminant function. The solutions of these homogenous equations result in two types of coefficients: standardized coefficients and raw or unstandardized coefficients.

Standardized Coefficients: The relative magnitude of the standardized discriminant function coefficients can be used as an index of the relative contribution or importance of the dependent variable to the discrimination between the groups (Employed versus Unemployed). The sign associated with the coefficients merely indicates whether the variables are making positive or negative contributions. These coefficients are equivalent to the d_{ij} 's in Eq. 1. The standardized value of each discriminating variable (z score) is multiplied by its standardized discriminant coefficient and the resulting products are then added together to obtain the discriminant score.

Raw or Unstandardized Coefficients are not useful in comparing the relative importance of the variables since the original variables are not standardized. However, unstandardized coefficients are used in deriving the discriminant function:

$$D_i = B_1X_1 + B_2X_2 + \dots + B_pX_p + C \quad \text{Eq. 4}$$

where C is the constant and B's are the raw coefficients, X's are the values of the original discriminating variables. This function can be used to calculate the discriminant scores by adding the products of the raw coefficients with the raw values of the corresponding variables and together

with the constant C (to adjust for the grand mean): the score obtained is equivalent to the standardized one.

Centroid: The discriminant function is used to calculate the discriminant score of each subject in the groups under study. The mean discriminant score for a particular group is referred to as the Group Centroid. There will be two group centroids in the study, one for the Employed group and the other for the Unemployed group. The larger the separation between the groups, the better the classification, thus reducing the number of misclassifications.

Measures of Association: Wilks' Λ (lambda) is used to measure the association between the independent and dependent variables in the multivariate analysis. The lambda is a ratio of the determinant of two matrices:

$$\Lambda = \frac{|W|}{|T|} \quad \text{Eq. 5}$$

$|W|$ = Pooled within-groups SSCP and $|T|$ = Total SSCP. The Λ indicates the proportion of variance of the dependent variable not accounted for by the independent variables, i.e., the proportion of error variance, which may vary from 0 to 1. When $\Lambda=0$, it indicates that there is a perfect association between the independent and dependent variables. In other words, when Λ approaches 0, the group centroids are greatly separated and higher discrimination is possible. When $\Lambda=1$, it indicates that there is no association between the independent and dependent variables; the proportion of

error variance is maximal. The independent variables do not account for any portion of the variance of the dependent variable. In other words, when the group centroids are identical, there is no difference between the groups.

$1 - \Lambda = R_c^2$ is a generalization of the correlation ratio in both univariate analysis and multivariate analysis (R_c^2).

The interrelationships between Wilks' Lambda, Correlation ratio (equivalently Canonical Correlation) and the Eigenvalue can be expressed as (Pedhazur, 1982):

$$1 - \Lambda = R_c^2 = \frac{\lambda}{1 + \lambda} \quad \text{Eq. 6}$$

Test of Significance: Wilks' Lambda is converted to a chi-square to test the statistical significance of the derived discriminant function

$$\chi^2 = - [n - .5(q + g) - 1] \ln \Lambda_k \quad \text{Eq. 7}$$

which is distributed as a χ^2 with $(q-k)(g-k-1)$ degrees of freedom, where n =the total sum of weights, q =number of discriminating variables, g =number of groups, \ln =natural logarithm, and Λ_k =measure of association for the cases in group k .

In summary, there are a few indices that can be used to judge the importance of the derived discriminant function in the study.

a. Eigenvalue provides a measure of the relative importance of each discriminant function (if there are more than one).

b. Canonical Correlation is a measure of association which indicates the function's ability to discriminate among the groups.

c. The square of the canonical correlation indicates the proportion of the variance in the discriminant function explained by the groups.

d. Wilks' Lambda represents the proportion of variance of the dependent variable not accounted for by the set of independent variables: it is the proportion of the error variance.

e. Chi-square provides the statistical significance of the derived discriminant function.

Classification of Objects: The discriminant function derived in this manner can be used to classify each of the rehabilitation clients into the employed or unemployed group based upon the probability of group membership as determined by each client's values on the set of discriminating variables. Classifications are performed by deriving classification functions for each group; multiplying the classification coefficients with the raw variable values, and adding them together with a constant:

$$C_i = C_{i1}V_1 + C_{i2}V_2 + \dots + C_{ip}V_p + C_{i0} \quad \text{Eq. 8}$$

where C_i =classification score for group i , c_{ij} = classification coefficients with c_{i0} being the constant, and V 's=raw score on the discriminating variables. Under the assumption of a multivariate normal distribution the

classification scores are converted into probabilities of group membership (Nie et al., 1975).

Stepwise Procedure: In this exploratory predictive study, data were collected on variables which appear to be good discriminators on the basis of the literature reviewed. One or more of these variables individually may be a good discriminator, but when combined with other variables, may share the same discriminating information. The Stepwise procedure selects the best discriminating variables among the set of variables in the analysis whereas the Direct method allows all the variables to enter into the analysis regardless of their discriminating power. The stepwise procedure sequentially selects "the best" discriminator at each step of the analysis by choosing the variable which has the highest F ratio among those variables not in the model. A variable entered at the beginning of the analysis may be eliminated at a later step or vice versa, if in combination with other variables it loses or gains discriminating power. A reduced set of variables may predict as well as the full set. In examining hypotheses 3,4,5 and 6, initially the direct method and then the stepwise procedure was used.

Hypothesis 3

H₀: There will be no relationship between the clients' demographic characteristics and employment status at post VRS.

A list of clients' demographic characteristics and their descriptive statistics appear in Table 4.1. To study the difference between the employed and unemployed at post VRS on a set of 23 demographic independent predictor variables, a Discriminant Analysis (DA) was performed. The results of the analysis are in Table 4.13. The initial analysis was performed by the direct method, allowing the 23 variables to enter into the analysis regardless of their discriminating power. The tolerance level for variable inclusion in DA eliminated 5 variables. The discriminant function derived was based on the remaining 18 variables for the 30 subjects who had a complete set of data on those variables. After the elimination of these 5 variables, the derived function was able to classify those 30 subjects with 96.67% accuracy based on their predicted group membership as employed or unemployed. The function yielded a canonical correlation (R_c) of .80. The square of the canonical correlation indicated that 64% of the variation between the groups was explained by the function. The chi-square test for Wilks' Lambda was not significant. The magnitude of the eigenvalue indicates the weakness of the discriminant function, and as a result the group centroids are not widely separated. The null hypothesis cannot be rejected based on a limited sample and with a limited set of data.

The magnitude of the standardized coefficients indicated the relative importance of the variables in the function. Number of dependents, marital status and

TABLE 4.13.--Discriminant Analysis of Demographics by Direct Method

WILKS' LAMBDA	CHI-SQUARE	DF	SIGNIFICANCE
.36	19.16	18	.38
EIGENVALUE	CANONICAL CORRELATION		
1.74	.80		
CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS			
	<u>STANDARDIZED</u>	<u>UNSTANDARDIZED</u>	
Age	.40	.04	
Sex	-.42	-.85	
Race	.63	1.52	
Marital level	1.27	2.56	
Dependents	1.31	1.56	
Education	.97	.92	
Technical training	.14	.28	
<u>Primary disability</u>			
Physiological	.20	.40	
Age physiological	-.18	-.57	
Age Psychogenic	-.19	-.09	
Learning disorder	-.52	-1.48	
Age learning disorder	-.71	-2.28	
Mental illness	-.08	-.44	
<u>Secondary disability</u>			
Physiological	-.70	-1.63	
Living Conditions	-.27	-.52	
Geographical location	-.71	-.82	
Source of referral	.73	-.53	
Sources of support at referral	.25	-.54	
		Constant -5.58	
<u>GROUP CENTROIDS</u>	Employed=-.70	Unemployed=2.31	
<u>CLASSIFICATION RESULTS</u>			
<u>ACTUAL GROUP</u>	<u>NO. OF CASES</u>	<u>PREDICTED GROUP MEMBERSHIP</u>	
		<u>EMPLOYED</u>	<u>UNEMPLOYED</u>
Employed	23	22 95.7	1 4.3
Unemployed	7	0 0	7 100.0
PERCENT OF GROUPED CASES CORRECTLY CLASSIFIED=96.67			

education made the greatest contribution in discriminating between the groups. Other variables which proved to be useful included sources of referral, geographical location, age at the primary disability learning disorder and presence of physiological secondary disability.

The stepwise method was used on the same variables to allow for the selection of independent predictor variables on the basis of their discriminating power. Wilks' stepwise procedure was used for selecting variables which yield the smallest Wilks' Lambda or the largest overall multivariate F. The results of the stepwise selection are shown in Table 4.14. Four variables were selected which had some of the highest standardized coefficients in the model created by the direct method: race, number of dependents, secondary disability physiological, and sources of support at referral. The discriminant function composed of these 4 variables was based on 30 clients. The canonical correlation was .68. Thus the proportion of variance between the groups accounted for by the set of 4 variables in the discriminant function was 46%. The chi-square test of Lambda was significant at the .003 level. Hence, the null hypothesis is rejected and it may be concluded that there is a relationship between the demographic characteristics of the clients in differentiating the employed from the unemployed at post VRS.

During the classification phase, the function classified 33 subjects with 85% accuracy. The relative

TABLE 4.14.--Stepwise Discriminant Analysis of Demographics

WILKS' LAMBDA	CHI-SQUARE	DF	SIGNIFICANCE
.54	15.87	4	.003
EIGENVALUE	CANONICAL CORRELATION		
.84	.68		

CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	<u>STANDARDIZED</u>	<u>UNSTANDARDIZED</u>
Race	.34	.81
Dependents	.45	.54
<u>Secondary disability</u> physiological	-.65	-1.50
Sources of support at referral	.43	.90
		Constant-1.35
<u>GROUP CENTROIDS</u>	Employed=-.49	Unemployed=1.61

CLASSIFICATION RESULTS

<u>ACTUAL GROUP</u>	<u>NO. OF CASES</u>	<u>PREDICTED GROUP MEMBERSHIP</u>	
		<u>EMPLOYED</u>	<u>UNEMPLOYED</u>
Employed	24	20 83.3	4 16.7
Unemployed	9	1 11.1	8 88.9

PERCENT OF GROUPED CASES CORRECTLY CLASSIFIED=84.85

importance of the discriminators was somewhat different from that obtained earlier, as this was a completely different linear combination of the predictors: having a physiological secondary disability appears to be the most important in discriminating between the groups, followed by number of dependents, sources of support at referral, and race of the clients.

Although the first function was predicting with 97% accuracy, it was not significant. The second function has 14 fewer variables than the first one. Generally, one chooses the function with the lowest number of variables for prediction. For two groups, one may by chance predict with 50% accuracy. The second function can predict 35% more accurately than mere chance for the set of variables and given the limited number of subjects who had a complete set of data. No systematic difference was found among the clients from the three states, as both the DA and cluster analysis rejected the "state" variables.

Hypothesis 4

H₀: There will be no relationship between the clients' work motivation and employment status in post VRS.

To study the difference between the employed and unemployed at post VRS on a set of 13 factors of VOI which provides client's JRP as a measure of work motivation, a discriminant analysis was performed. The 13 factors were treated as independent predictor variables and employment status as the dependent variable. Initially, the direct

method was used, and the results are presented in Table 4.15. Despite the absence of any missing data among the 115 cases, the discriminant function derived using 13 factors was not significant. The canonical correlation was .28; thus, only 8% of the variation between the groups was explained by the function. Wilks' Lambda was very high, .91, approaching the maximum possible remaining proportion of error variance and therefore no relationship existed between the independent and dependent variables. The group centroids were almost identical and the separation between the groups was not significant.

Next, Wilks' stepwise procedure was used and the results are shown in Table 4.16. The stepwise procedure selected 3 factors out of 13. The canonical correlation was .23, or only 5% of the variation between the groups was explained by the function. The proportion of error variance was high. The level of chi-square for Lambda was noticeably higher than the direct method, but still non-significant.

Both functions predicted the group membership with 60% accuracy, which was little better than chance. The function was not significant based on full set of data for the entire sample. Thus the VOI may have good diagnostic ability but definitely did not have predictive ability in this study. The null hypothesis cannot be rejected. And it is concluded that the clients' work motivation as measured by the VOI is independent of their employment status at post VRS. An alternate grouping of clients on the VOI scales was

TABLE 4.15.--Discriminant Analysis of 13 Factors of the VOI
by Direct Method

WILKS' LAMBDA	CHI-SQUARE	DF	SIGNIFICANCE
.91	9.06	13	.76
EIGENVALUE	CANONICAL CORRELATION		
.08	.28		
CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS			
	STANDARDIZED	UNSTANDARDIZED	
A ₁ =Overall	.52	.72	
A ₂ =Benefits to children	.80	1.38	
A ₃ =Benefits to worker	-.84	-1.24	
A ₄ =Better life style	-.17	-.25	
A ₅ =Independence	-.28	-.36	
L ₁ =Overall	-.11	-.17	
L ₂ =Personal freedom	-.71	1.04	
L ₃ =Time to care for and be with family	-.34	-.49	
B ₁ =Medical	.03	.07	
B ₂ =Child care and family	-.49	-1.09	
B ₃ =New situations and people	.14	.27	
B ₄ =Ability to get and hold a job	.25	.51	
B ₅ =Transportation	.10	.28	
		Constant	.02
<u>GROUP CENTROIDS</u>		Employed=.16	Unemployed=-.52
<u>CLASSIFICATION RESULTS</u>			
ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP	
		EMPLOYED	UNEMPLOYED
Employed	87	52	35
		59.8	40.2
Unemployed	28	11	17
		39.3	60.7
PERCENT OF GROUPED CASES CORRECTLY CLASSIFIED=60.00			

TABLE 4.16.--Stepwise Discriminant Analysis of 13 Factors of the VOI

WILKS' LAMBDA	CHI-SQUARE	DF	SIGNIFICANCE
.94	6.34	3	.09
EIGENVALUE	CANONICAL CORRELATION		
.05	.23		
CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS			
	<u>STANDARDIZED</u>	<u>UNSTANDARDIZED</u>	
A ₁ =Overall	1.00	1.72	
A ₂ =Benefits to children	-.85	-1.25	
A ₃ =Benefits to worker	.54	.80	
		Constant	.26
<u>GROUP CENTROIDS</u>	Employed=.13	Unemployed=-.42	
<u>CLASSIFICATION RESULTS</u>			
<u>ACTUAL GROUP</u>	<u>NO. OF CASES</u>	<u>PREDICTED GROUP MEMBERSHIP</u>	
		<u>EMPLOYED</u>	<u>UNEMPLOYED</u>
Employed	87	51 58.6	36 41.4
Unemployed	28	9 32.1	19 67.9
PERCENT OF GROUPED CASES CORRECTLY CLASSIFIED=60.87			

tested but did not yield any significance. It would appear that the method of grouping did not influence the VOI as a significant measure of work motivation.

Hypothesis 5

H₀: There will be no relationship between the clients' prior work history characteristics and employment status at post VRS.

To study the difference between the employed and unemployed at post VRS on a set of 24 predictor variables consisting of 12 before disability (hereafter referred to as "before") and 12 after disability (hereafter referred to as "after") work characteristics, a Discriminant Analysis was performed.

Among the number of jobs held by the client either before or after, a maximum of the 5 most recent jobs and their multidimensional work characteristics were recorded during data collection. These multidimensional aspects were: number of jobs held; hierarchy of data, people, and things; number of months worked; full-time or part-time; training requirement; certificate or license; wages received; job satisfaction; and reasons for leaving. The mean scores or percentages were calculated for each characteristic for both before and after.

The direct method yielded a canonical correlation that was high and a value of Lambda that was low, indicating that 90% of the variation between the groups was explained

by the function; the predicted group membership for the 23 employed and 4 unemployed was classified with 100% accuracy. Despite the favorable statistics, the discriminant function was non-significant, which may be an artifact of the data resulting from either a small sample size, where the number of variables was almost equal to the size of the sample. It may also be that one or more variables which were highly related contributed the same information in the linear combination, cancelling each other's effect.

The results of the Wilks' stepwise procedure are shown in Table 4.17. The stepwise Procedure selected the 7 most important variables for the discriminant function, which was significant at .004 level. The canonical correlation was .78. Its square, or one minus Lambda, indicated that 62% of the variation between the groups was explained by the discriminant function. In other words, 62% of the variation in group membership was accounted for by the 7 selected variables of the function.

The important variables that differentiated between the groups were: mean worker function data (after) and the mean number of months worked (before), followed by the percentage of full-time jobs (before), and mean worker function people (after). Two before and five after disability work characteristics were the components of the discriminant function. The after disability work characteristics contributed the most. An explanation would be that recency of work activity and behavior prior to VRS leads to success in

TABLE 4.17.--Stepwise Discriminant Analysis of Before and After Disability Work Characteristics

WILKS' LAMBDA	CHI-SQUARE	DF	SIGNIFICANCE
.38	20.47	7	.004
EIGENVALUE	CANONICAL CORRELATION		
1.59	.78		
CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS			
	<u>STANDARDIZED</u>	<u>UNSTANDARDIZED</u>	
<u>Before Disability</u>			
Mean length	1.01	.31	
Percent of full-time	-.87	-.26	
<u>After Disability</u>			
Number of jobs	-.52	-.40	
Mean worker function-data	1.36	.86	
Mean worker function-people	-.76	-.79	
Percent of full-time	.66	.02	
Mean job satisfaction	-.38	-.37	
	Constant	3.66	
<u>GROUP CENTROIDS</u>	Employed=-.50	Unemployed=2.91	
<u>CLASSIFICATION RESULTS</u>			
		<u>PREDICTED GROUP MEMBERSHIP</u>	
<u>ACTUAL GROUP</u>	<u>NO. OF CASES</u>	<u>EMPLOYED</u>	<u>UNEMPLOYED</u>
Employed	29	27 93.1	2 6.9
Unemployed	5	0 0	5 100.0
PERCENT OF GROUPED CASES CORRECTLY CLASSIFIED=94.12			

in obtaining employment at post VRS. Also the impact of the before disability work characteristics, by the same token, was no less important. The longer subjects worked and the more full-time jobs they had, that is the depth of work involvement, were the second and third most important discriminators in the function.

The discriminant function derived was based on 27 clients who had a complete set of data for all 24 variables. As variables were eliminated during the analysis in the Stepwise procedure, more clients became eligible for classification. The classification function predicted group membership with 94% accuracy for the 34 clients who had complete data on the reduced set of variables. Of the 29 who were predicted to be employed, 27 (93%) were classified accurately; 2 (7%) were misclassified. These two clients were predicted to be employed but were in fact unemployed. The 5 (100%) clients predicted to be unemployed were unemployed. The prediction rate obviously is very optimistic, as it was based on only 30% of the sample and has not been cross validated. The null hypothesis is rejected and it is concluded that there is a positive relationship between the clients' prior work history characteristics and employment status at post VRS.

The above analysis was based on a limited sample who have worked before and after disability; the discriminant function used 27 clients and the classification function grouped 34 clients. Would this discriminant function be

able to predict the employment status of those clients who either worked before or after but not both? Accordingly, further analyses were performed separately on 12 before work variables and 12 after work variables.

For the 12 before variables, both the direct and stepwise procedures did not produce any significant discriminant function. The function derived by the direct method accounted for only 12%, and the stepwise function comprising 2 variables accounted for 9% of the variation between the groups. The former analyzed and classified 46 clients while the latter analyzed 46 clients and classified 50 clients; both predicted with 60% accuracy.

For the 12 after variables, the direct method function accounted for 19% of the variation between the groups using 84 clients in both analysis and classification, and predicting with 71% accuracy. However, the function was not significant. The stepwise function accounted for 16% of the variation between the groups using seven selected variables, only 3% less than the direct method. It used 84 clients in the analysis and classified 86 clients with 71% accuracy; the function was significant at the .05 level. The results are shown in Table 4.18.

In summary, while the before disability work variables could not predict employment status significantly, the after variables could, with the combination of variables (before and after) accounting for the best overall prediction. The 7 combined variables accounted for 62% of the

TABLE 4.18.--Stepwise Discriminant Analysis of After Disability Work Characteristics

WILKS' LAMBDA	CHI-SQUARE	DF	SIGNIFICANCE
.84	13.68	7	.05
EIGENVALUE	CANONICAL CORRELATION		
.19	.40		
CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS			
	<u>STANDARDIZED</u>	<u>UNSTANDARDIZED</u>	
Mean worker function-data	-.74	-.53	
Mean worker function-people	.54	.49	
Mean worker function-things	.34	.18	
Percentages of training	.53	.12	
Mean wage	.46	.19	
Percentages of jobs left			
involuntarily	.52	.12	
Voluntarily	.78	.19	
	Constant	-4.44	
<u>GROUP CENTROIDS</u>	Employed=.22	Unemployed=-.82	
<u>CLASSIFICATION RESULTS</u>			
<u>ACTUAL GROUP</u>	<u>NO. OF CASES</u>	<u>PREDICTED GROUP MEMBERSHIP</u>	
		<u>EMPLOYED</u>	<u>UNEMPLOYED</u>
Employed	67	48	19
		71.6	28.4
Unemployed	19	6	13
		31.6	68.4
PERCENT OF GROUPED CASES CORRECTLY CLASSIFIED=70.93			

variance whereas the 7 after variables accounted for only 16%. The former predicted 94% for 34 clients versus the latter's 71% for 86 clients. As more of the sample was used, more misclassifications occurred. Rehabilitation counselors or practitioners in the field may choose either function based on what types of work characteristics or attributes a client possesses.

Hypothesis 6

H₀: A linear combination of predictor variables, including demographics, locus of control, work motivation, and work history characteristics will not be able to differentiate the employed from the unemployed clients at post VRS.

The earlier hypotheses tested the differences between the employed and the unemployed at post VRS on different domains of client characteristics. For this hypothesis, discriminant analysis was performed on 5 different combinations of variable domains to find the best prediction equation, that is, the discriminant function with a set of optimal predictors which is meaningful and statistically significant. The results of the 5 stages of linear combinations and their summary statistics are shown in Table 4.19.

In Stage I, a set consisting of 43 (V1) variables representing demographic, locus of control, work motivation, before and after work variables was analyzed. As per the rule, in Direct method, the number of variables included in

TABLE 4.19.--Summary Statistics of Five Linear Combinations

WILKS' LAMBDA	CHI- SQUARE	DF	SIGNI- FINANCE	EIGEN- VALUE	CANONICAL CORRELATION	GROUP CENTROIDS	VARIABLES	SAMPLE	CORRECTLY CLASSIFIED
STAGE I. <u>DEMOGRAPHIC + LOCUS OF CONTROL + VOI + BEFORE + AFTER</u>									
<u>DIRECT</u>									
.007	55.66	23	.0002	125.49	.99	EM -4.68 UN 24.62	V1=43 V2=23(-20)	N1=25 N2=102	66.67%
<u>STEPWISE</u>									
.001	93.26	18	.0000	781.05	.99	EM 11.70 UN-61.42	V1=43 V2=18	N1=25 N2=30	96.67%
STAGE II. <u>DEMOGRAPHIC + LOCUS OF CONTROL + BEFORE + AFTER (VOI DROPPED)</u>									
<u>DIRECT</u>									
.042	36.31	23	.0383	22.51	.97	EM -1.99 UN 10.43	V1=30 V2=23(-7)	N1=25 N2=29	93.10%
<u>STEPWISE</u>									
.003	78.17	19	.0000	326.36	.99	EM 7.56 UN-39.70	V1=30 V2=19	N1=25 N2=31	90.32%

TABLE 4.19.---Continued

WILKS' CHI- LAMBDA SQUARE	CHI- SQUARE	DF	SIGNI- FINANCE	EIGEN- VALUE	CANONICAL CORRELATION	GROUP CENTROIDS	VARIABLES	SAMPLE	CORRECTLY CLASSIFIED
<u>STAGE III. DEMOGRAPHIC + VOI + AFTER + BEFORE (LOCUS OF CONTROL DROPPED)</u>									
<u>DIRECT</u>									
.03	38.38	23	.02	27.15	.98	EM 2.18 UN-11.45	V1=41 V2=23(-18)	N1=25 N2=102	81.37%
<u>STEPWISE</u>									
.002	86.39	18	.0000	477.83	.99	EM 9.15 UN-48.04	V1=41 V2=18	N1=25 N2=29	100.00%
<u>STAGE IV. DEMOGRAPHIC + BEFORE + AFTER (LOCUS OF CONTROL & VOI DROPPED)</u>									
<u>DIRECT</u>									
.03	40.26	23	.01	32.16	.98	EM -2.37 UN 12.46	V1=28 V2=23(-5)	N1=25 N2=29	93.10%
<u>STEPWISE</u>									
.68	8.06	3	.04	.45	.55	EM .28 UN -1.48	V1=25 V2=88	N1=25 N2=88	63.64%

TABLE 4.19.--Continued

WILKS' LAMBDA	CHI-SQUARE	DF	SIGNI-FINANCE	EIGEN-VALUE	CANONICAL CORRELATION	GROUP CENTROIDS	VARIABLES	SAMPLE	CORRECTLY CLASSIFIED
<u>STAGE V. DEMOGRAPHIC + LOCUS OF CONTROL + VOI + AFTER (BEFORE DROPPED)</u>									
<u>DIRECT</u>									
.71	19.05	36	.99	.40	.53	EM .31 UN -1.27	V1=36 V2=36	N1=76 N2=76	82.89%
<u>STEPWISE</u>									
.85	10.87	6	.37	.16	.37	EM -.19 UN .80	V1=36 V2=6	N1=76 N2=90	63.33%

the analysis is two less than the number of valid cases. There were only 25 (N1) clients who had a complete set of data; thus, the analysis could use only 23 (V2) variables. The other 20 variables could not be used as they failed the tolerance test. The classification function used 102 cases and predicted group membership with 66.67% accuracy. The stepwise procedure analyzed 25 (N1) clients and classified only 30 (N2) clients with 96.67% accuracy. Both discriminant functions were significant, the proportion of variance accounted for by both functions was high, the Lambdas were low, and the centroids were wide apart. However, the first function seems not to predict as well as the second one.

In Stage II, a set of 30 variables was used, dropping the 13 factors of the VOI used in the previous analysis. In the direct method 7 variables failed the tolerance test. The discriminant function used 23 variables, based on 25 clients, and classified 29 clients with 93% accuracy. The stepwise procedure selected 19 variables, 1 more than the previous stepwise procedure and predicted with 6% less accuracy for almost the same number of clients; however, the analysis began with 13 fewer variables.

The Stage III analysis was performed on a set of 41 variables, dropping locus of control. The direct and stepwise procedures yielded significant results. The Stage IV analysis was performed on a set of 28 variables after dropping both the locus of control and the VOI. Finally, Stage V analysis was done on a set of 36 variables after dropping

the before work variables; it showed a significant gain in sample size and was non-significant in both direct and stepwise procedures. The stepwise procedure in Stages IV and V selected only 3 and 6 variables respectively which were meaningless for all practical purposes.

A comparison between Stages I, II, and III revealed that the presence or absence of the VOI or the Locus of Control Scales did not make much difference in the discriminant function. When both the locus of control scales and the VOI were dropped from the model in Stage IV only 3 variables were selected in the stepwise procedure, which were redundant. Also in Stage V, the absence of before work variables jeopardized the usefulness of the function. The Stage II analysis appeared to represent a moderate number of appropriate variables from all the given domains of predictors after Stepwise selection. Hence, the Stage II analysis will be discussed in detail: the standardized and unstandardized coefficients obtained by the direct and stepwise procedures are shown in Table 4.20 and Table 4.21, respectively.

The discriminant function derived by both procedures was significant, with canonical correlations of .97 and .99. Therefore the proportions of variance accounted for between the groups in the functions were 96% and 99% respectively. The stepwise procedure selected 19 variables representing 8 demographic, 1 locus of control, 5 before work and 5 after work variables. The group centroids were far apart and the eigenvalue was high. The classification function

TABLE 4.20--Discriminant Function Coefficients for the Stage
II Linear Combination by Direct Method

Variables	Standardized	Unstandardized
<u>Demographic</u>		
Age	-5.36	-.59
Sex	2.41	5.20
Race	-2.13	-4.96
Marital	-3.28	-6.48
Number of dependents	-2.50	-1.41
Education	-0.74	-.73
Technical training	-2.59	-5.10
Primary disability		
physiological	-10.27	-19.74
mental illness	-6.68	-17.80
Living conditions	5.07	10.45
Geographic location	-6.68	-7.56
Sources of referral	1.97	-1.50
Sources of support at referral	-1.50	-3.13
<u>Locus of Control</u>		
LOC	3.53	1.06
MODLOC	3.13	.91
<u>Before Disability</u>		
Number of jobs	1.90	1.76
Mean worker function-data	-8.38	-5.56
Mean worker function-people	2.62	2.58
Mean worker function-things	7.09	3.77
Mean number of months worked	11.55	.39
Mean wages received	3.45	2.05
Mean job satisfaction	-1.87	-1.81
<u>After Disability</u>		
Mean worker function-data	11.16	6.95
		Constant 28.20

TABLE 4.21--Stepwise Discriminant Function Coefficients for Stage II Linear Combination

<u>Variables</u>	<u>Standardized</u>	<u>Unstandardized</u>
<u>Demographic</u>		
Age	8.43	.92
Sex	5.79	12.48
Number of dependents	-3.96	-2.23
Technical training	-2.25	-4.44
Primary disability		
Mental illness	8.71	23.22
Substance abuse	-1.94	-4.05
Geographic location	10.72	12.12
Sources of support at referral	-2.90	-6.09
<u>Locus of Control</u>		
LOC	-12.84	-3.85
<u>Before Disability</u>		
Mean worker function-data	14.11	9.36
Mean worker function-people	-3.89	-3.84
Mean worker function-things	-13.75	-7.32
Mean number of months worked	-31.52	-1.01
Mean wages received	22.19	13.16
<u>After Disability</u>		
Number of jobs	8.72	6.62
Mean worker function-data	-28.30	-17.65
Mean worker function-people	9.59	9.77
Mean worker function-things	8.82	4.84
Mean number of months worked	3.36	.05
	Constant	-77.37

predicted accurately for the unemployed, but for the employed group 3 clients predicted to be employed were unemployed. The three most important variables in discriminating between the groups were the number of months worked (before), worker function data (after) and mean wages received (before). These were followed in order of decreasing importance by: worker function data and things (before), locus of control (LOC), and geographic location. The remaining variables were of lesser importance. The null hypothesis is rejected and it is concluded that a linear combination of predictors, including demographic, locus of control and work history variables were able to discriminate the employed from the unemployed at post VRS.

Hypothesis 7

H₀: There will be no relationship between the clients' prior work characteristics with post VRS work characteristics.

This hypothesis was tested by Canonical Analysis (CA). CA is a method designed to study the underlying relations between two sets of variables. The objective of CA is to derive a linear combination from each of the sets of variables by differentially weighting so that the correlation between the two linear combinations is maximized by extracting the largest source of variance. The correlation between the two linear combinations is the canonical correlation, R_c . The square of the canonical correlation

R_C^2 , is an estimate of the variance shared by the two Canonical Variates. R_C^2 is not an estimate of the variance shared within one set of variables but of that between the linear combinations for two sets of variables, which is represented by eigenvalues, and each pair of linear combinations derived are called Canonical Variates.

The number of canonical correlations and canonical variates obtainable in a given set of data is equal to the number of variables in the smaller of the two sets of variables (Pedhazur, 1982). In this analysis, there are 12 variables in set I representing before and after disability work variables (6 each). Set II is comprised of 6 similar variables based on client present occupations. One would expect to have 6 canonical correlations and six sets of canonical variates. Table 4.22 shows the order of the magnitude of the canonical correlations. The square of the canonical correlation (R_C^2) indicates the proportion of variance shared by a pair of canonical variates or its eigenvalues. The first pair of canonical variates shared about 99% of the variance; its eigenvalue was $R_{C1} = \lambda_1$. The second pair shared 94% of the variance ($R_{C2} = \lambda_2$) and so on.

When there is more than one eigenvalue, the contributions of the eigenvalues can be compared by converting the eigenvalues into relative percentages which indicate the strengths or weaknesses of the canonical variates relative to each other. From the table, it is apparent that the

TABLE 4.22.--Canonical Correlational Analysis of Before and After Disability Work Variables With Post VRS Work Variables.

NO.	EIGEN- VALUE	RELATIVE %	CANONICAL CORRELATION	WILKS' LAMBDA	CHI- SQUARE	DF	P
1	.995	26.30	.997	.000	122.583	72	.000
2	.947	25.03	.973	.003	62.776	55	.220
3	.707	18.67	.840	.063	30.267	40	.868
4	.577	15.25	.759	.217	16.760	27	.937
5	.341	9.02	.584	.515	7.286	16	.967
6	.216	5.73	.465	.783	2.688	7	.912

Standardized Coefficients for Canonical Variables of the First Set

<u>Before and After</u>	<u>Canonical Variate 1</u>
Worker function-data (after)	1.25
Worker function-data (before)	-.88
Job satisfaction (after)	.85
Job satisfaction (before)	-.82
Number of months (before)	.64
Worker function-things (after)	-.43
Worker function-things (before)	.33
Wage (after)	-.30
Number of months worked (after)	-.29
Worker function-people (before)	-.28
Worker function-people (after)	-.16
Wage (before)	.01

Standardized Coefficients for Canonical Variables of the Second Set

<u>Post VRS Best</u>	<u>Canonical Variate 1</u>
Wage	.54
Worker function-people	-.52
Number of months worked	-.44
Worker function-things	-.35
Job satisfaction	.23
Worker function-data	.15

first eigenvalue is almost five times larger than the last one. The first two are about equal but the second one is not significant.

The first pair of canonical variates are derived so as to have the highest intercorrelation possible by extracting the largest source of variance given the particular variables involved. The second set of canonical variates is derived to account for a maximum amount of the relationship between the two sets of variables left unaccounted for by the first canonical variates and so on. After the first canonical variates, the remaining sets account for residual variance, or the variance for which the preceding components or sets of canonical variates could not account. The remaining variates and their linear combinations are independent and uncorrelated.

The test of significance in canonical analysis is Bartlett's (1947) test of Wilks' Lambda (Λ).

$$\Lambda = (1 - R_{C1}^2)(1 - R_{C2}^2) \dots (1 - R_{Cj}^2) \quad \text{Eq. 8}$$

Or, equivalently,

$$\Lambda = (1 - \lambda_1)(1 - \lambda_2) \dots (1 - \lambda_j) \quad \text{Eq. 9}$$

The test of significance of Λ is the Chi-square statistic

$$\chi^2 = -[N - 1 - .5(p + q + 1)] \ln \Lambda \quad \text{Eq. 10}$$

where N =number of subjects; p =number of variables in the first set; q =number of variables in the second set; \ln =natural logarithm. The degrees of freedom associated with this Chi-square test are pq .

Bartlett's test indicates the number of canonical variables necessary to express the dependency between the

two sets of variables. The necessary number of canonical variables is the smallest number of eigenvalues such that the test of the remaining eigenvalues is non-significant. In other words, the overall test of the null hypothesis assumes that all six eigenvalues are equal to zero ($R_C^2 = \lambda = 0$) and then determines which of the eigenvalues obtainable from a given set of data are statistically significant (Pedhazur, 1982).

The first canonical correlation is significant at the .000 level with a chi-square of 112.58. The probability of obtaining this large a chi-square value is less than one chance in 1,000. The overall Lambda (λ) was tested and the null hypothesis was rejected. It may be concluded that at least the first canonical correlation is statistically significant and that there is a relationship between the clients' prior work characteristics and post VRS work characteristics. Then the subsequent canonical correlation is tested removing the preceding canonical correlation. The degrees of freedom for the chi-square test for the first canonical correlation is the product of the number of variables in both sets pq , $12 \times 6 = 72$. The degrees of freedom for the second canonical correlation, after removing the first R_C , is $(p-1)(q-1)$ or $11 \times 5 = 55$, and so on.

The first set of the canonical variates is important to this study. The loadings of the individual variables are presented in descending magnitude. These loadings or canonical weights are standardized canonical variate coefficients

($\bar{x}=0$, $SD=1$) for canonical variables in each set and an index of relative importance or contribution of the variables with which they are associated. It is not the sign associated with the weights which is important, but the magnitude of the weights. After disability work characteristics involving data were more important than working with data before disability, while working with the data was the least important in post rehabilitation work characteristics. Combined work characteristics involving people were least important, whereas people became most important in post VRS. It seems that the disability imposed restrictions in working with data and things for rehabilitants in post VRS.

Mean job satisfaction after and before disability were about equal, whereas in post rehabilitation it was relatively less important. It is conceivable that in combining before and after disability, they worked for a longer period of time than in current post rehabilitation employment. The analysis was based on 21 subjects who had a complete set of data for those 18 variables. In other words, the subjects were those who had a work history before and after disability, and were employed after VRS and had a complete set of data on these variables.

In the foregoing analysis before and after disability work variables were combined, and established a strong positive relationship with the work variables in post VRS based on the limited sample size. Before and after work variables were also studied separately with post VRS work

variables. Before disability and post VRS work characteristics did not yield any significant canonical variables. However, after disability and post VRS work characteristics yielded two canonical correlations using 52 clients. Table 4.23 shows the order of the magnitude of the Canonical Correlations. The first pair of canonical variates share 70% of the variance, the second pair 37% of the variance and both are significant. However, the first pair of variates is about two times stronger than the second pair as indicated by the relative percentages. The first pair of Canonical Variates significant to this study are listed in descending magnitude. In comparing the combined analysis with post, and after with post, it is apparent that the order of the loadings in post remained almost identical. The significant findings of the canonical analysis were similar to the cluster dimension obtained in BC TRY Cluster Analysis.

Summary of the Hypotheses Tested

The seven hypotheses tested in the study using various subsets of variables, the statistics used to test these hypotheses, the results of each hypothesis and the levels of significance are shown in Table 4.24.

Summary of Results

1. The relationship between the clients' locus of control, as measured by the Locus of Control Scale (LOC) and Modified Locus of Control Scale (MODLOC), and work

TABLE 4.23.--Canonical Correlational Analysis of After
Disability Work Variables With Post VRS Work
Variables

NO.	EIGEN- VALUE	RELATIVE PERCENTAGE	CANONICAL CORRELATION	WILKS' LAMBDA	CHI- SQUARE	DF	P
1	.707	46.87	.840	.114	97.482	36	.000
2	.371	24.60	.609	.391	42.215	25	.017
3	.233	15.50	.483	.622	21.338	16	.166
4	.128	8.52	.358	.812	9.356	9	.405
5	.067	4.50	.260	.931	3.169	4	.530
6	.000	.01	.016	.999	.011	1	.914

Standardized Coefficients for Canonical Variables of the
First Set

<u>After</u>	<u>Canonical Variate 1</u>
Worker function-data	.41
Worker function-things	.37
Wage	-.35
Number of months worked	-.25
Worker function-people	-.02
Job satisfaction	-.01

Standardized Coefficients for Canonical Variables of the
Second Set

<u>Post VRS Best</u>	<u>Canonical Variate 1</u>
Wage	-.98
Number of months worked	-.24
Worker function-people	-.23
Worker function-things	.15
Worker function-data	.08
Job satisfaction	.04

TABLE 4.24.--Summary of Hypothesis Tested

Hypothesis	Variables	Tests	Results	p
H ₁	Locus of Control orientation (LOC) by work motivation (VOI)	² x ²	Factor A2	.04
		x ²	Factor L2	.04
		x	Factor B3	.04
	Locus of Control orientation (MODLOC) by work motivation (VOI)	² x ²	Factor A5	.02
		x ²	Factor L1	.02
		x	Factor L2	.004
H ₂	Employment status by LOC	² x ²	Counselors	.54
		x ²	Clients	.67
		x	Best	.47
	Employment status by MODLOC	² x ²	Counselors	.32
		x ²	Clients	.27
		x ²	Best	.10
	LOC by number of months worked	r	Counselors	.02
		r	Clients	.19
		r	Best	.11
	MODLOC by number of months worked	r	Counselors	.00
		r	Clients	.01
		r	Best	.02
H ₃	Employment status by demographics	DA-Direct DA-Stepwise	R _C =.80 R _C =.68	.38 .003
H ₄	Employment status by work motivation (VOI)	DA-Direct DA-Stepwise	R _C =.28 R _C =.23	.76 .09

TABLE 4.24.--Continued

Hypothesis	Variables	Tests	Results	P
H5	Employment status by before and after disability work variables	DA-Direct	$R_C=.95$	.16
		DA-Stepwise	$R_C=.78$	.004
	Employment status by before disability work variables	DA-Direct	$R_C=.34$	.96
		DA-Stepwise	$R_C=.28$	.16
H6	Employment status by after disability work variables	DA-Direct	$R_C=.42$	.22
		DA-Stepwise	$R_C=.40$	.05
	Employment status by linear combination Stage II of demographic, LOC, before and after disability work variables	DA-Direct	$R_C=.97$	.03
		DA-Stepwise	$R_C=.99$	.000
H7	Before and after disability work variables by Post VRS work variables Before disability work variables by Post VRS work variables After disability work variables by Post VRS work variables	CA	$R_C=.99$	.000
		CA	$R_C=.78$	.14
		CA	$R_C=.85$	.03

motivation, as measured by the Vocational Opinion Index (VOI) was not established.

2. There was no difference in locus of control orientation, a personality characteristic measured by the Locus of Control Scale and Modified Locus of Control Scale, with respect to employment status as reported by the Counselors, Clients, and Computed Best Values.

3. Clients who were internal found jobs earlier than those who had an external locus of control orientation. The MODLOC established 3 significant relationships with the Counselors' report, Clients' report and the Computed Best Values, whereas the LOC established relations only with the Counselors' report.

4. Significant differences were found between the clients' demographic characteristics in differentiating the employed from the unemployed.

5. There was no difference between the clients' work motivation, as measured by the VOI, in differentiating the employed from the unemployed.

6. Significant differences were found between the clients' combined work experience before and after disability and their current employment status (Post VRS). Before disability work experience alone could not differentiate the clients' employment status whereas after disability work experience alone could.

7. Significant differences were found in the prediction accuracy of linear combinations using subsets of

clients' demographic, locus of control, before disability work experience, and after disability work experience variables. The presence or absence of the VOI, LOC and MODLOC made no difference in the linear model. However, the absence of before disability work experience made the linear model non-significant.

8. Significant relationships were found between the client's combined before and after disability multidimensional work characteristics and post VRS work characteristics. Also, a significant relationship could not be established between before disability work characteristics and post VRS work characteristics, but was established between after disability work characteristics and post VRS work characteristics.

CHAPTER V

DISCUSSION

Introduction

This chapter will begin by discussing and interpreting the results obtained by testing the hypotheses in Chapter IV. Then, the limitations of the study will be discussed. Finally, conclusions and some implications for future research will be presented.

Discussion

The first hypothesis tested the relationship between the clients' locus of control orientation as measured by the LOC and MODLOC, and work motivation as measured by the VOI. The LOC, a personality instrument, measured the clients' individual differences of generalized expectancy across situations, and the MODLOC measured the clients' individual differences of specific expectancy related to work. The LOC has been used extensively in the research literature and has established its usefulness in predicting academic achievement, job success, intra- and interpersonal adjustment, satisfaction in life and jobs with children, adults, ethnic minorities, disadvantaged, and psychiatric patients. The

MODLOC is a short, modified version of the LOC found to be useful in predicting work related behavior specifically with minorities and disadvantaged populations. The literature suggested that the "internals" are those who can control their reinforcement; they are more motivated to change their circumstances than those externally oriented. If, in fact, the "internals" are more motivated than the "externals" then the measures of locus of control may be related to another measure of motivation, such as the VOI. The results indicated that out of the 13 VOI factors, 3 different factors were significantly related to the LOC and the MODLOC. The degree of relationship, represented by the contingency coefficients between these factors and the locus of control variables, was moderate. In comparison, the MODLOC, which measures specific expectancy related to work initiative was more highly related to work motivation than the LOC. Based on the only 3 significant factors, the overall significance of 13 VOI factors could not be generalized. The 3 significant factors may be just an artifact of the data or the statistical analysis. Perhaps the locus of control orientation and the VOI measure two different aspects of the motivational dynamics of rehabilitation clients. After a series of studies investigating the attitudes toward and reaction to disability by the disabled and non-disabled, MacDonald (1971c) concluded that the internal-external control dimension is a promising rehabilitation variable;

however, "locus of control is not a motivational variable but rather an expectancy variable." (p. 115)

The first part of the second hypothesis tested was that clients with an internal locus of control would be employed at six months follow-up and the externals would be unemployed. The literature on locus of control orientation suggested that the behaviors of the internals are achievement oriented. They seek more information, use the information gathered in making decisions, and spend more time in deliberating about the decisions in skill-demanding tasks than chance-demanding tasks. So, the internals should have a greater potential for effectiveness in their employment seeking behavior and activity in the world of work. The chi-square statistics between the LOC, MODLOC, and employment status as reported by the counselors, clients and computed best values were non-significant. This means that the clients' locus of control orientations are independent of their employment status for the sample of this study, which does not support the expected behavior of the internals. These opposing facts may be viewed from the standpoint that Rotter's 29 item LOC scale scores may manifest a number of specific or circumscribed beliefs about LOC each of which may be more applicable to some specific situation than others. Phares (1976) commented that "its effects on behavior are not uniform and invariant across all situations." (p. 45-46)

It seems that the locus of control orientation may make a sound prediction in some situations, but may fail to predict in a specific situation or specific expectancy. Table 4.2 showed that the mean scores for the sample on both the LOC and MODLOC were lower than the generalized trends reported by Cellini and Kantorowski (1982) for college students. There was no comparable norm group available for rehabilitation clients. The sample mean was in the internal direction. Three conclusions can be drawn from the foregoing facts: first, that the rehabilitation clients were more optimistic than expected in their perception about the world of work in terms of the benefits one can get from a job; second, the internality and externality may mean completely different dynamics in locus of control orientation for rehabilitation clients which require further investigation with controlled studies; and finally, the heterogeneity of the sample (115 clients from 3 different states representing 13 categories of disabilities) may have over-shadowed the effects of the internality and externality dimensions both in the first and the second hypotheses. Among these 13 categories of the disabled sample, more than 25% were alcoholics and drug addicts, and their paradoxical behavior on Rotter's scale has been observed by many. Goss and Morosko (1970) reported that surprisingly alcoholics score significantly more internally than Rotter's (1966) general norms. Oziel, Obitz and Keyson (1972) developed a specific LOC to measure the specific expectancy of

alcoholics. The substance abuse-engendered internality was distinguished as pseudo-internality by Berzins and Ross (1973). The foregoing discussions supported the notion of the findings of the first two hypotheses.

The second part of the second hypothesis indicated that internality was related to obtaining employment earlier than externality. The Pearson Product-Moment Correlation Coefficient was significant with the MODLOC and the mean number of months worked as reported by the counselors, clients and computed best values, whereas the LOC was significant only with the counselor's report. Once again, it appeared that the MODLOC was a preferred measure as it yielded three significant relationships whereas the LOC yielded only one. The magnitudes of the correlations between the variables were of moderate size, though magnitudes of correlations obtained with the MODLOC were relatively larger than one obtained with the LOC. However, the overall magnitudes of the correlations might have been higher and stronger if the follow-up period had not been restricted to six months. For many, it takes longer than six months to obtain a job in post VRS given the unemployment rate and other intervening variables of the labor market.

In this analysis, the mean number of months worked after VRS was used instead of the total number of months worked. This was done in order to use the same variables to represent length of employment period before and after

disability. The mean number of months worked in post VRS does in fact represent the total number of months for all subjects with the exception of those who had 2 jobs during the six month follow-up. The numbers of clients who had one job as reported by the counselors, clients and computed best values were 69, 52, 77; and two jobs were 3, 9, and 10 respectively (Table 4.4). The total number of clients employed were 72, 61, and 87 whereas in the analysis 53, 58, and 76 were used as reported by the counselors, clients and computed best values respectively. These differences in sample size were due to the individuals who were working but for whom no detailed information was available, and those closed in Status 26 as "home maker".

We have seen that the relationship of locus of control orientation to work motivation was not significant in the first hypothesis or with employment status in the first part of the second hypothesis. How is it then possible that the internals obtained employment significantly earlier than the externals? One of the explanations may be due to treating the scores on the two measures of locus of control orientation as continuous scores rather than categorical scores as had been done earlier. The continuous scores were more powerful in finding differences in the data than the categorical scores, as parametric statistics are more powerful than non-parametric.

From the foregoing analysis it appeared that the MODLOC is a superior measure of locus of control orientation

as it measures work initiative or specific work expectancy rather than the generalized expectancies across situations measured by the LOC. Generally, the internal-external orientation is equated with skill vs. chance. In the case of the disadvantaged and disabled, the handicapped experience obstacles which have nothing to do with chance, but rather depend solely upon the nature and type of disability and the restrictions it imposes, the conditions of the present labor market, geographical location, transportation, employer hiring and firing practices and many other intervening variables in the clients' environment. Andrisani (1977) used this modified version of the LOC and reported that the internal attitudes were strongly related to the number of labor market experiences for the disadvantaged. Also, this modified version (MODLOC) had a moderate relationship with the variables of the rehabilitation clients in this study. A stronger relationship could have been obtained if the samples had been more homogeneous in terms of their disabilities.

In hypothesis three, the initial Discriminant Analysis (DA) on a set of 23 demographic predictors on 30 clients failed to discriminate significantly on the outcome criterion between the employed and unemployed. The variables which discriminated the groups with higher loadings were the number of dependents, marital status, education, sources of referral, geographical location and secondary physiological disability. The Discriminant function derived using 18

variables on 30 clients predicted with 97% accuracy. Sixty-four percent of the variation was accounted for by the set of demographics in discriminating the groups. However the function was not significant. The variable-to-subject ratio may explain the non-significant result. However, the stepwise DA yielded a significant result, selecting 4 variables based on 30 clients and classifying 33 clients with 85% accuracy. The 4 variable set accounted for 46% of the variation. The reason the linear model was significant may be that the variable-to-subject ratio is much better than in the initial analysis.

The variables selected in stepwise DA and the variables with higher loadings obtained in the direct method were similar to the findings of DeMann (1963), Kunce and Miller (1972), and Worrall and Vandergoot (1980, 1982). It may be concluded that the 4 variable set discriminated the group significantly. Whether such variables as the presence or absence of any secondary disability due to physiological reasons, single person with no dependents or married with dependents, sources of support at referral from family or public assistance or social security, whites or non-whites would affect the probability of being employed versus unemployed needs further investigation. Also, the lack of cross validation is a major drawback in any predictive study. The absence of a complete set of data on a set of variables among the cases reduced the chance for cross validation by partitioning the sample.

The Job Readiness Posture (JRP), a measure of clients' attitudes, perceptions and motivation as measured by the VOI, and their impact on the ability to obtain and maintain a job at post VRS failed to differentiate the employed from the unemployed in hypothesis four. Despite having a complete set of data on the 13 VOI factors for all 115 cases, the discriminant functions derived by both the direct and stepwise procedures were not significant. This indicates either that the clients' attitudes, perceptions and motivations did not relate to their employment status or that the instrument measure something else which was unrelated to employment for the rehabilitation clients. Follow-up reports indicated that the number of clients employed were 72, 61 and 87 as reported by the counselors, clients and computed best values (Table 4.7). From this we may conclude that the JRP measured by the VOI is unrelated to employment status for rehabilitation clients.

The next question would be, what does the VOI really measure? The VOI claims that the JRP profiles are correlated 90% of the time with actual behavioral work status after training. It seems that the JRP is a good measure for diagnosing workers from non-workers who have attitudinal or predispositional problems. A remedial prescription is made for a non-worker to resolve those problems or barriers during the training program, to develop appropriate worker postures.

The inability of the VOI to relate with the locus of control construct earlier and now with motivation to work may be in part due to a methodological drawback in the study. The VOI is typically administered at the beginning of a training program to identify a potential non-worker, at the completion of the training program to evaluate the effectiveness of the remedial prescription, and at 13 weeks after a trainee leaves the program to validate the expected work status and actual work behavior. In this study the VOI was administered only once, at the end of client training or prior to his or her embarking on job seeking activity, to measure the client's JRP once the client achieved readiness for placement at Status 20. The first five of seven categories of the outcome measure (see Table 4.6) raised some doubts about the job readiness of Status 20 clients given the uncertainty of the labor market and other intervening variables. At six month follow-up, this group included those who were not interested in employment, were going for further training, did not work in last six months, were employed but no further information available, and were employed in last six months but did not want to talk about what they had been doing. The motivational dynamics of these clients are indeed very complex in the presence of financial disincentives and non-work-contingent income associated with disability (Neff, 1977). Such disincentives act as motivational barriers to work for rehabilitation clients. This corroborates the concluding remarks made by Barry and

Malinovsky (1965) in their review of client motivation in rehabilitation. They concluded that the concept of motivation is too broad, too complex, and too vague a construct to be useful in rehabilitation practice. However, research should not and cannot put an end to the investigation of a construct due to its complexity, but rather a more systematic attempt has to be made. This study was an attempt in that direction.

The VOI was designed, tested and normed specifically for the disadvantaged population and no norms or JRP profile are available for rehabilitation clients. Perhaps this is the first time an attempt has been made to determine how and to what extent the concept of JRP would be useful to rehabilitation clients. Concurrently, the Human Resources Center is conducting a National Study using the VOI. The efficacy of the VOI as a diagnostic tool in rehabilitation can be judged only after performing controlled studies following its methodological and procedural guidelines. It may be concluded that the VOI might be a good diagnostic instrument as it claims to be but surely cannot be used for predictive purposes.

Work motivation can be understood more realistically by analyzing the work personality in a developmental context, rather than from psychometric scores of paper and pencil tests. The work personality is the result of interactions with the environmental demands of the worksetting, performance of some task, ability to get along with

co-workers and supervisors, and the quality and quantity of work produced. In this study, work personality was also investigated from a different perspective by studying the various components of work characteristics such as: the complexity of tasks performed in terms of the hierarchy of data, people and things; the depth of involvement; requirements for training, certification of licensing to perform the job; wage; job satisfaction and reasons for leaving their jobs before and after disability prior to VRS. The extent to which a client's rehabilitation outcome can be predicted from their previous work history and experience was the subject matter of investigation in hypothesis five.

The clients' before and after disability work characteristics combined, were able to discriminate significantly the employed from the unemployed. Further exploration has been made to determine how the before and after work history independently can differentiate the employed from the unemployed. The before disability work characteristics independently were unable to achieve significance whereas the after disability work characteristics were able to distinguish the groups significantly. The 7 after variables selected with a stepwise procedure accounted for only 16% of the variance for 84 clients with a Canonical Correlation of .40 whereas the 7 combined variables from before and after accounted for 62% of the variance for 27 clients with a Canonical Correlation of .78. The former

predicted group membership for 86 (75%) clients with 71% accuracy and the latter for 34 (30%) clients with 94% accuracy.

The linear model failed to predict significantly with only before variables, and the after variables predicted with moderate significance; however the combined variables predicted well. Although the before variables independently were not significant, when combined with after variables they contributed the two most important variables, namely, number of months worked and percentages of full-time jobs held before disability as depth of work involvement in the combined linear model. The after variables independently were significant. The importance of the after variables may be due to the recency of the work activity and the ability of the clients to cope with and adjust to their disability to function as effectively as possible prior to seeking help from VRS.

How do rehabilitation counselors or practitioners in the field choose a linear discriminant function model to predict the employment status of those clients who either worked before or after but not both or who possess both the before and after attributes? Schematic diagrams depicting the groups of clients and the type of prediction equation one may use, are presented in Figure 5.1 and 5.2. Group I has a stable work history both before and after disability. These clients were older adults and recently the disability had imposed restrictions on their full functioning; as a

		WORKED AFTER DISABILITY		
		YES	NO	
WORKED BEFORE DISABILITY	YES	Group I N=27	Group II N=19	46
	NO	Group III N=57	Group IV N=12	69
		84	31	

Figure 5.1--Schematic diagram of client groups.

VOCATIONAL REHABILITATION SERVICES INTERVENTION				
		Group I	Group II	Group III
DISCRIMINANT FUNCTION	Total N	27	46	84
	Employed	23	36	66
	Unemployed	4	10	18
	Prediction Accuracy	100%	60%	71%
CLASSIFI- CATION FUNCTION	Total N	34	50	86
	Employed	29	39	67
	Unemployed	5	11	19
	Prediction Accuracy	94%	60%	71%

Figure 5.2.--Schematic Diagram of Client Groups and Their Prediction Rate Based on Work History.

result they were recently unemployed and sought VR services. These clients were highly motivated and probably did not receive public assistance. The prediction of rehabilitation outcome would be high for this group. These clients presented 30% of the sample and predicted with 94% accuracy.

Group II are those adults who worked before but not after disability. Prediction for this group was difficult and dependent upon: the depth of work activity before disability, the type of disability, work motivation, the waiting period in seeking VR services, and the status of public assistance. These clients represented 43% of the sample and were predicted 60% accurately, which was non-significant.

Group III included individuals who became disabled at an early age, and the question of working before disability did not arise. Either disability did not impose much restriction initially or they adjusted to it and worked for a while. But recently, the disability had become severe, resulting in unemployment and the clients sought VR services. These clients represented 75% of the sample. Prediction was possible with an accuracy of 71% for this group but this was not as good as for Group I. The outcome for Group III was predicted better than that for Group II due to the recency of their work activity.

Group IV were the younger disabled without any work experience. Accordingly, prediction could not be made for this group using work variables; however, other domains of

predictor variables such as demographic or psychometrics may be used.

The impact of before disability work history and experience may not be obvious from the statistical significance; however, it has an underlying contribution in the building of appropriate attitudes, competence, self-reliance and self-direction for future vocational adjustment. After disability work experience provides a testing ground for coping mechanisms related to disability and the ability to mobilize the maximum residual abilities. The combined work history and experience seems to serve as building blocks of a pyramidal occupational pattern for some rehabilitation clients.

The foregoing discussion centered around the prediction of rehabilitation outcome using a specific domain of clients characteristics whose ability to contribute independently in differentiating between the groups has been noted. In the sixth hypothesis all the domains or predictor variables were linearly combined in five different stages to derive the best linear prediction model. The goal was to generate a linear discriminant function with optimal predictors which was both statistically significant and pragmatically meaningful, thus to improve the efficiency of the linear model by reducing the irrelevant and non-contributing predictors without losing the predictive power of the model.

Throughout the combinations, demographics were kept constant as these are relatively permanent characteristics

or attributes of the clients. Psychological attributes, such as LOC, MODLOC and VOI were not always included in different stages to note their relative contributions. The absence or presence of the LOC, MODLOC or the VOI did not affect the model. When all were deleted, the remaining error variance was high, the model was statistically significant but practically it was not meaningful. Psychometric scores tested earlier in the study were also non-significant in discriminating the groups which may account for the situational or time specific attributes of the client. The work variables were also kept constant along with the demographics until the last stage, as they were found useful in an earlier hypothesis. Since more clients worked and held more jobs after disability than before disability (Table 4.4), the before disability work variables were deleted in Stage V. The remaining error variance was at its maximum, 85%. Similar findings were reported by Buell and Anthony (1973) with alcoholics: when the employment history was deleted from the model, a major decrease in variance explained occurred. In this study, employment history indicated two different time periods, before and after disability. One may argue that higher error variance in the model was due to the increase of sample size as a result of deleting the before work variables. Nevertheless, the Stage I and III models were significant with almost the total sample. Overall, the Stage II linear combination appeared to be the best in this

exploratory study based on a limited sample size (22%) who had a complete set of attributes across the domains of predictors in the model and in the absence of cross validation.

Finally, the last hypothesis was not concerned with differentiating the groups, but rather examined whether or not a relationship existed between the nature and types of work performed prior to the VRS with work performance at post VRS. The canonical analysis of before and after disability work variables with post VRS work variables extracted the largest source of variance, 99%. This first pair of canonical variates was significant while the remaining pairs of variates were not significant. The before work variables independently could not yield any canonical variable. The after work variables yielded two significant canonical variates. The first one accounted for almost double the variance of the second one. The proportion of variance accounted for by the first canonical variates derived from the combined work variables was greater than that accounted for by the first variates based solely on after work variables. The combined variables indicated that the rehabilitants were working more with people, less with things, and least with data whereas prior to VRS they worked more with things and data, and least with people. It seems that the disability may have imposed restrictions on the rehabilitants to work with data and things.

In summary, it appears that the work history and experience variables were the most important predictors in differentiating the rehabilitation clients in terms of employment followed by the demographics. The psychometric measures were expected to contribute in the prediction model; however, that was not the case in this study.

Limitations

The sample of the study consisted of 115 rehabilitation clients from three different states, seven district offices, five training facilities, three hospitals and one job club. The sample represented 13 categories of disabilities. The heterogeneity of the handicapping condition may have obscured finding relationships among the locus of control orientation, and work motivation and status of employment.

The subjects of the study were all rehabilitation clients who volunteered to participate. A major source of systematic bias would be the variation between the voluntary and non-voluntary rehabilitation clients. In Louisiana, when the first scheduled testing was changed due to a small sample size, although the clients agreed to participate in the second testing data, many of them did not show up in the district offices. As a result, the strategy of data collection was changed to include training facilities. This may have caused a source of bias.

The data on the predictor variables were collected during the end of November through the middle of December 1982. The clients who completed their training were placed in Status 20 just before Christmas, 1982, when the hiring for the holiday season was almost over. Generally, the clients who graduate from a training program in the spring or before the holiday season had a better chance of finding a job than those who graduated in December. Over and above, in Michigan and New York, cold and snow inhibit the clients' search for a job, and Louisiana was hit by floods in different parts of the state in early spring of 1983.

The study was conducted at a time when the national economy was ravaged by high inflation, recession and high unemployment. Michigan had the highest unemployment rate in the country. A six-month follow up did not provide enough time for some clients to find a job, given the recessionary economy and conditions of the labor market.

The dependent variable measure of the study was the clients' employment status and its associated characteristics. The follow-up data were crucial in this predictive study. Hence, the follow-up data were collected both from the counselors and clients. The follow-up data could not be collected from 27 clients themselves, and on 9 clients from the counselors, a source of limitation.

During the Discriminant Analysis, the major problem encountered was the absence for many subjects of a complete set of data on the predictor variables being studied. As a

result, in the absence of a single value or data on the set of predictors, the case could not be used in the analysis. The missing data in most cases meant that the client did not possess that attribute. This caused a poor subject-to-variable ratio which is difficult on statistics and means that some of the underlying assumptions of the analysis were not met, thus limiting generalizability.

The major drawback of the predictive study was the lack of cross validation of the present model on another sample. With a total sample of only 115 and in the presence of missing data, it was almost impossible to have cross validation, even with partitioning of the sample. Hence the limitation of the exploratory predictive study. However, no attempt has been made to analyze the data by ignoring the missing value indicators or replacing the missing values by estimation in the computer.

Conclusions

This study attempted to develop a prediction model for rehabilitation clients on vocational rehabilitation outcome using client characteristic predictor variables of demographics, locus of control, work motivation, and prior work history and experience. The demographics were significantly related to outcome, differentiating the employed from the unemployed. The contribution of the locus of control orientation and the Job Readiness Posture remains questionable. The data support the notion that the prior work

history and experiences prior to VRS significantly affect the outcome in post VRS. The before and after disability work variables in combination make the greatest contribution both in the independent and linear model, followed by the after disability work variables. The before disability work characteristics independently were found not to contribute; however, their underlying contributions to the outcome were obvious in three hypotheses.

The data support the fact that the multidimensional aspects of work attributes were the most important client characteristics in determining the likelihood of success in rehabilitation. Rehabilitation counselors should look closely at the client's work history, experience, and related activities and behavior. Those clients who possess both the before and after disability experience would more likely be successful in obtaining employment after vocational rehabilitation services than those who have only after disability work experience. For those clients who have no work attributes, the odds are that they will be tough cases for the counselors to handle.

The significance of this exploratory predictive model should be interpreted cautiously as the study used voluntary rehabilitation clients and heterogeneous disability groups. Due to a small sample size, the presence of missing values in the set of predictors in the discriminant analysis and lack of cross validation make the generalization of the model to the population of rehabilitation

clients are even more restricted. However, Klecka (1975) comments that

The statistical theory of discriminant analysis assumes that the discriminating variables have a multivariate normal distribution and that they have equal variance-covariance matrices within each group. In practice, the technique is very robust and these assumptions need not be strongly adhered to. (In Nie et al., p. 435)

The special features of this predictive study are the following: it used active rehabilitation clients; it used four different domains of clients' characteristic predictors which were studied independently and in linear combinations; work history, experience and multidimensional work characteristics were studied extensively in three different time periods; follow-up data were collected from both counselors and clients; and the best values were computed to obtain increased reliability of the follow-up data.

The study showed promise for future investigations to determine the usefulness and validation of the construct of locus of control orientation and Job Readiness Posture for vocational rehabilitation clients. Another line of inquiry may be directed to develop a prediction model on specific disability groups. Finally, a holistic study for rehabilitation would be to develop a model that can accommodate the conglomerate domains of predictors including the client, the counselor, the process and the labor market variables simultaneously. We all can look forward for that kind of complex although ideal study to alleviate the sufferings of a significant portion of humanity to whatever extent possible.

Implications for Future Research

There are several approaches which future studies might take with respect to determining the usefulness of psychometric measures on rehabilitation clients, and developing a prediction model based on client variables and other significant intervening variables that affect the rehabilitation of the disabled.

The LOC and MODLOC are simple, easy to administer, score and interpret for the counselors. The usefulness of the construct of locus of control in rehabilitation needs further validation. The MODLOC appears to be a promising instrument. These two instruments need to be used in controlled studies with homogeneous clientele to determine their effectiveness with rehabilitation clients.

The JRP profiles diagnosis by the VOI claims to be successful 90% of the time for disadvantaged populations. It might have some usefulness for rehabilitation clients. Controlled studies are necessary following the procedural methodology of the VOI to diagnose rehabilitation clients as a worker or a non-worker early in the rehabilitation process. Accordingly, the counselors can intervene and implement the remedial prescription during counseling and with the training staff at training facilities.

A systematic investigation may be made to build up a composite score or profile, using the VOI which consists of

three psychological dimensions derived from 13 factors, a diagnostic score, and another score for predictive purposes.

In order to obtain accurate and reliable follow-up data, they must be collected from as many sources as possible, keeping in mind their usefulness and relevancy. Otherwise, it provides unbalanced or biased information. When the data were collected from more than one source, such as in this study from the counselors and clients, the agreement of the counselors' and clients' report can be investigated. This would delineate the areas of agreement and disagreement. The areas of incongruency can be addressed during counseling to minimize the differences, where congruency is the goal acting as a catalytic agent which facilitates counseling to achieve goal direction.

The clients' work history variables were found to be most useful in predicting outcome in the study. However, the labor market variables play the major role in finding a job, rather than any other rehabilitation intervention variables. To determine the effect of disability on skill level, occupational pattern before and after disability, and job after VRS the McCroskey Vocational Quotient and the Vocational Diagnosis and Assessment of Residual Employability (VDARE) may be used.

The vocational rehabilitation program serves clientele with any number of disabilities or handicapping conditions. Each disability demands some unique services and needs, but there are also common needs across the types

of disability which require attention in order to be rehabilitated successfully. To develop a prediction model for rehabilitation clients, future studies should focus on a specific disability group with a large sample size, making the group more homogeneous and thus improving the predictability of the model for that group. The predictor variables that are found to be similar with various disability groups may be combined to develop a single model that can have useful predictive purposes for all types of rehabilitation clients. An alternative approach would be to study all disability types together having a large sample in each category and (a) complete set(s) of predictor data. This then allows the disability type to vary in the model, keeping the predictors constant. This would also delineate the contributions of the predictors for a disability group. The large sample size would facilitate the cross validation within and between the disability group.

The outcome of rehabilitation is complexly determined by a number of factors other than the factors of the clients. The counselor, the process, labor market and client variables all play their own roles and interact complexly: the resultant vectors determine the ultimate outcome. A study that can address all the client, the counselor, VR process and labor market variables to develop a significant prediction model would be another step in the process of solving the puzzle of rehabilitation.

APPENDICES

APPENDIX A

CORRESPONDENCE



FRANK WHITE
GOVERNOR

RAY SCOTT
DIRECTOR

STATE OF ARKANSAS
Department of Human Services

DIVISION OF REHABILITATION SERVICES
1401 BROOKWOOD DRIVE
P. O. BOX 3781
LITTLE ROCK, ARKANSAS 72203
PHONE - 371-2411

E. RUSSELL BAXTER
COMMISSIONER

July 9, 1982

Dave Vandergoot, Research Specialist
Human Resources Center
Albertson, Long Island, NY 11507

Dear Dr. Vandergoot:

Thanks very much for your clarification of the research project on work readiness. I am very sorry I have caused some delay and suppose I will now cause an additional delay.

As I interpret your last letter, you will only be adding the states of New York, Connecticut, and Michigan. Our policy states that if four states, or fewer, are involved then the request should go only to the states. I am, therefore, asking that these three states contact you directly as soon as possible to advise you of their participation in your study.

Finally, if you have additional questions, they should be directed to the new chairman of the CSAVR Committee on Research, Mr. Claude A. Myer. Mr. Myer is the Director of the North Carolina Division of Vocational Rehabilitation. His address is 620 North West Street, P. O. Box 26053, Raleigh, NC 27611. His phone number is 919-733-3364.

Very truly yours,

E. Russell Baxter

E. Russell Baxter, Chairman
CSAVR COMMITTEE ON RESEARCH

ERB/gkc

cc: Mr. Joseph H. Owens
Mr. George Engstrom
Mr. Claude A. Myer
Mr. Basil Scott
Mr. Joseph R. Galatti
Mr. Peter P. Griswold



Albertson Long Island, N.Y. 11507 516 747-5400

July 14, 1982

Mr. Peter Griswald
Director
Michigan Rehabilitation Services
Department of Education
Box 30010
Lansing, MI 48909

Dear Pete:

I thought I'd better clarify for you a copy of a letter which you might have received from Russell Baxter, Chairman of the CSAVR Committee on Research. He sent this letter to me regarding approval for our Work Readiness Research, conducted under the auspices of our Placement Research and Training Center. Michigan was included in our request, since a doctoral student of Jim Engelkes' at Michigan State University is attempting to involve Michigan DVR clients in his dissertation research. His proposed research parallels our own research and we hope to include it in our overall sample. We are supporting his research to some extent, basically supplying him with the instruments that he needs. I understand that Bob Struthers has been discussing this possibility with the student, Mr. Madan Kundu. If either you or he would like further clarification from me, please let me know.

I hope things are turning around for you folks in Michigan. I have heard about the horror stories associated with the poor economic condition you have there. I understand the difficulties of undertaking research at a time like this, but I appreciate your willingness to consider it as far as you have.

Sincerely,

Dave Vandergoot
Research Specialist

DV:kp

cc: Madan Kundu ✓



RESEARCH AND TRAINING CENTER

STOUT VOCATIONAL REHABILITATION INSTITUTE, SCHOOL OF EDUCATION
UNIVERSITY OF WISCONSIN-STOUT • MENOMONIE, WISCONSIN 54751

- Research
- Training
- Development
- Demonstration

Daniel C. McAlees, Ph.D.
Center Director
(715) 232-1389

Charles C. Coker, Ph.D.
Research Director
(715) 232-2236

Darrell D. Coffey, Ed.D.
Training Director
(715) 232-1370

July 22, 1982

Olaf Brekke
Wisconsin Division of Voc. Rehabilitation
131 West Wilson Street
P.O. Box 7852, 7th Floor
Madison, WI 53707

Dear Ole,

Attached is a short description of a research project on prediction of rehabilitation success using certain variables.

The tentative research design is being utilized by Madan Kundu who is a doctoral student at Michigan State's University Rehabilitation Education Program. Madan is part of Stout's long-term relationship with MSU in funding doctoral level research, keying on vocational rehabilitation critical issues. This study is also being supported by David Vandergoot at Human Resource Center through their Research and Training Center.

We have attempted to make the design as unobtrusive as possible, but need your advice on the possible problems. Then, we would like to submit it through your formal process for approval.

It is planned that Madan concentrate on the Milwaukee - Racine - Kenosha - Madison - Janesville areas to develop a pool of 150 status 20 clients. It may be necessary to pay the clients a certain amount for incentive purposes and travel costs. Madan may have to make two trips; 1) to set up the research procedures and explain them to those offices involved and 2) to conduct the testing and debriefing until 150 subjects have been tested.

We would appreciate your assistance on the technical problems associated with approval of a research project, your evaluation of the research design and logistical concerns.

Please call me July 26-30 if you can. I hope that the re-organization is going smooth enough for all. Wisconsin seems to be faring better than other states in the region during these trying economic conditions.

Sincerely,

Charles C. Coker, Ph.D.
Director of Research

CCC/ma cc: Madan Kundu David Vandergoot
Encl. Jim Englekes Don Galvin



DAVID C. TREEN
GOVERNOR

State of Louisiana
DEPARTMENT OF HEALTH AND HUMAN RESOURCES
OFFICE OF HUMAN DEVELOPMENT
DIVISION OF VOCATIONAL REHABILITATION
P. O. BOX 44371 1755 FLORIDA BOULEVARD
BATON ROUGE, LOUISIANA 70804
(504) 342-2285

Roger P. Guissinger
SECRETARY

September 22, 1982

Mr. Madan M. Kundu
809 #B Cherry Lane
East Lansing, Michigan

Dear Mr. Kundu:

This is to confirm our earlier conversation regarding your research project entitled "Predicting the Probability of Success of Vocational Rehabilitation Clients Using Demographic, Locus of Control, Work Motivation, and Work History Variables by Cluster Analysis."

As discussed in our conversation, I am approving your request to utilize the Louisiana Vocational Rehabilitation Program to assist in the proposed research project. Our staff has reviewed your project and found that it would be of benefit to us in our program. Mr. Everett Wright, Program Supervisor in Staff Services has volunteered to coordinate the activities of the project.

If I can be of further assistance, please let me know.

Sincerely,

A handwritten signature in dark ink, appearing to read "Lester E. Soileau", with a horizontal line extending to the right.

Lester E. Soileau
Executive Director

LES:af1

cc: Everett Wright

MICHIGAN STATE UNIVERSITY

UNIVERSITY COMMITTEE ON RESEARCH INVOLVING
HUMAN SUBJECTS (UCRIHS)
238 ADMINISTRATION BUILDING
(517) 355-2186

EAST LANSING • MICHIGAN • 48824

November 2, 1982

Mr. Madan M. Kundu
809 #B Cherry Lane
East Lansing, Michigan 48823

Dear Mr. Kundu:

Subject: Proposal Entitled, "Prediction of Success or Non-Success
of Vocational Rehabilitation Clients Using Demographic,
Locus of Control, Work Motivation & Work History
Variables by Cluster Analysis"

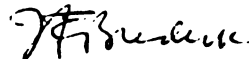
UCRIHS review of the above referenced project has now been completed. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and the Committee, therefore, approved this project at its meeting on November 1, 1982.

You are reminded that UCRIHS approval is valid for one calendar year. If you plan to continue this project beyond one year, please make provisions for obtaining appropriate UCRIHS approval prior to the anniversary date noted above.

Any changes in procedures involving human subjects must be reviewed by the UCRIHS prior to initiation of the change. UCRIHS must also be notified promptly of any problems (unexpected side effects, complaints, etc.) involving human subjects during the course of the work.

Thank you for bringing this project to our attention. If we can be of any future help, please do not hesitate to let us know.

Sincerely,



Henry E. Bredeck
Chairman, UCRIHS

HEB/jms

cc: Dr. Engelkes

APPENDIX B

INTRODUCTION TO THE COUNSELORS AND SUPERVISORS

INTRODUCTION TO THE CLIENTS

INTRODUCTION TO THE COUNSELORS AND SUPERVISORS

Hello, Good Morning/ Good Afternoon.

You heard about me either from Mr. Soileau or from Mr. Wright as I will be conducting a study using your clients. I would like to briefly tell you who am I and what I will be doing with the study. I have been involved with rehabilitation work for the visually handicapped children and adults since my college days in 1963. I was involved in two international rehabilitation research projects with the Social and Rehabilitation Service as Rehabilitation Counselor. I worked with Louisiana State University, Baton Rouge campus to help develop graduate programs in rehabilitation counseling and special education. My wife was a client of the Vocational Rehabilitation Program at Baton Rouge district office. At this point in time, I come from Michigan as a doctoral student at Michigan State University.

The study I am about to conduct with all your help is being sponsored by the Louisiana Vocational Rehabilitation Program. Mr. Soileau and his staff reveiwed the study and felt that it would be of benefit to the Louisiana Vocational Rehabilitation. This study will help me complete my doctoral dissertation requirement at Michigan State University. Also this study is part of a National Study being conducted by the National Institute of Handicapped Research at Human Resources Center, New York.

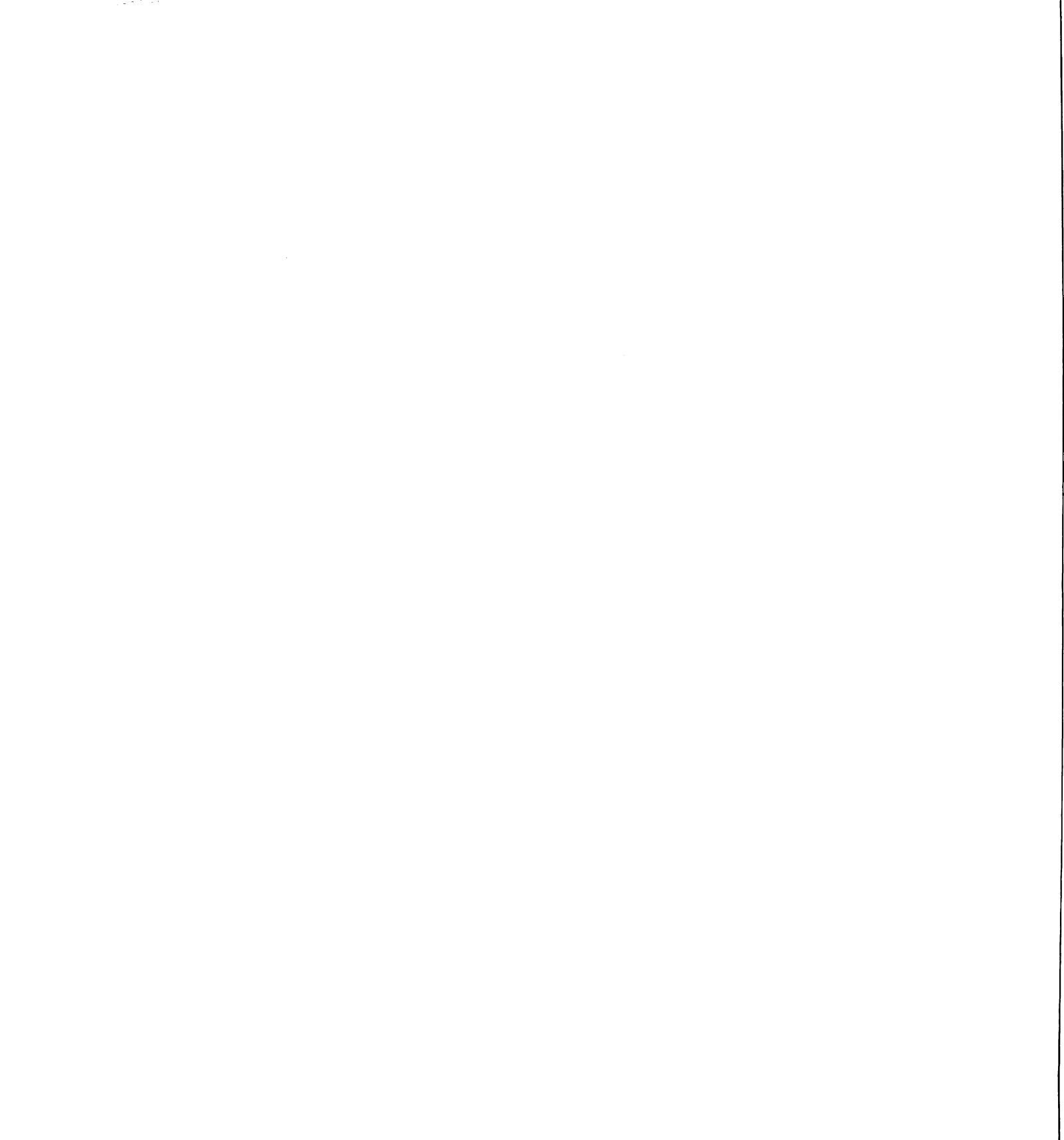
The purpose of the study is to determine those factors and events which contribute to the employment potential of people with disabilities. The National Data from Rehabilitation Services Administration for over a decade indicates that approximately two-third of the clients who have been accepted to receive services are being successfully rehabilitated and the

remaining one-third are closed as unsuccessful in status 28 and 30. Furthermore, nationally there is a gradual declining rate of successful rehabilitation, 77.2% in 1970 to 64.5% in 1980. In 1980, the lowest rehabilitation rate by state was for New York 43.7%, followed by New Mexico 48.2% and Michigan 48.4%.

The effectiveness of the counselor, and the agency are always in question in terms of accountability, effective utilization of service, and wasted potential of the client. However, you all are aware of the problem of accountability with the major criterion being the 26 closure. It does not take into account the counselor's effort, time, creativity, genuineness and the rehabilitation gain by the client for those who are closed at 28 and 30. The criteria of accountability is in question too. Research favors to replace the present system with weighted case closure or a point system of rehabilitation gain by the client.

At the present time, the 26 closure remains the major criterion of accountability for the rehabilitation system. This study attempts to develop a model that may be helpful for the counselor and the agency to increase 26 closures.

Using demographic characteristics of client, rehabilitation research predicted the probability of rehabilitation outcome better than chance with average correlation 0.40's. These studies recommended the use of Psychological variables of client behavior, personality stability, and adjustment as independent predictor variables along with demographic variables which may increase the predictive ability to around 0.60's. Most of the research used MMPI, Rorschach, and the Edward Personal Preference Schedule. The use of MMPI or similar personality measures require a highly specialized skill in administration, interpretation and is too costly to be of any practical use for most vocational rehabilitation counselors. Rotter's (1966) Locus of Control Construct will be used to measure psychological variables of the client.



The present study attempts to develop a prediction model utilizing a linear combination of client characteristics of biographic, demographic, locus of control, work motivation, and past work history variables to determine client's probability of rehabilitation. It will be a simple, inexpensive model, easy to administer and interpret by the counselor, to predict the client's probability of rehabilitation success. The model will be able to achieve the following consequential objectives:

a) to diagnose the probable high-risk non-rehabilitants early in the rehabilitation process;

b) to identify clients who may need additional help or may benefit by increased or novel intervention and treatment strategies;

c) to alert the counselor to the idiosyncratic needs, capacities, and interests of these exceptional clients, and facilitate some creative intervention;

d) to enhance the employment potential and reduce the wasted potential of the client;

e) to increase the rehabilitation rate of successful closure in status 26 and decrease the unsuccessful closure in status 28 and 30;

f) to enhance effective utilization of vocational rehabilitation resources and thereby to reduce the cost/benefit ratio; and

g) to meet the legislative mandate of accountability standards for the counselor as well as the agency.

I want to thank each one of you (counselor) as you have spent a considerable amount of your time contacting the client, explaining to them the purpose of the study, and persuading them to participate. Without your effort, there would not be any study. I have to seek your cooperation once again, six months from now, for follow-up on some client characteristics.

All data collected this morning/ afternoon from the clients will be analyzed by cluster analysis to determine what factors or combination of factors can predict the success of rehabilitation. When the study is completed, I will send you a brief summary of the major findings.

I thank you once again for your kindness shown to me already and the privilege of meeting you. I shall be happy to respond to any question you may have.

INTRODUCTION TO THE CLIENTS

Hello, Good Morning/ Good Afternoon.

I am Madan Kundu. I will be collecting some information this morning from you. I want to thank each one of you individually for the trouble you took to come to the district office. I really appreciate your decision to volunteer for the study.

I have been involved with rehabilitation work for the visually handicapped and physically handicapped children and adults since my college days in 1963. I worked at Louisiana State University, Baton Rouge campus to develop a graduate program in rehabilitation counseling and special education. My wife was a client of the Vocational Rehabilitation Program at Baton Rouge district office. At this point in time, I come from Michigan as I am a doctoral student at Michigan State University.

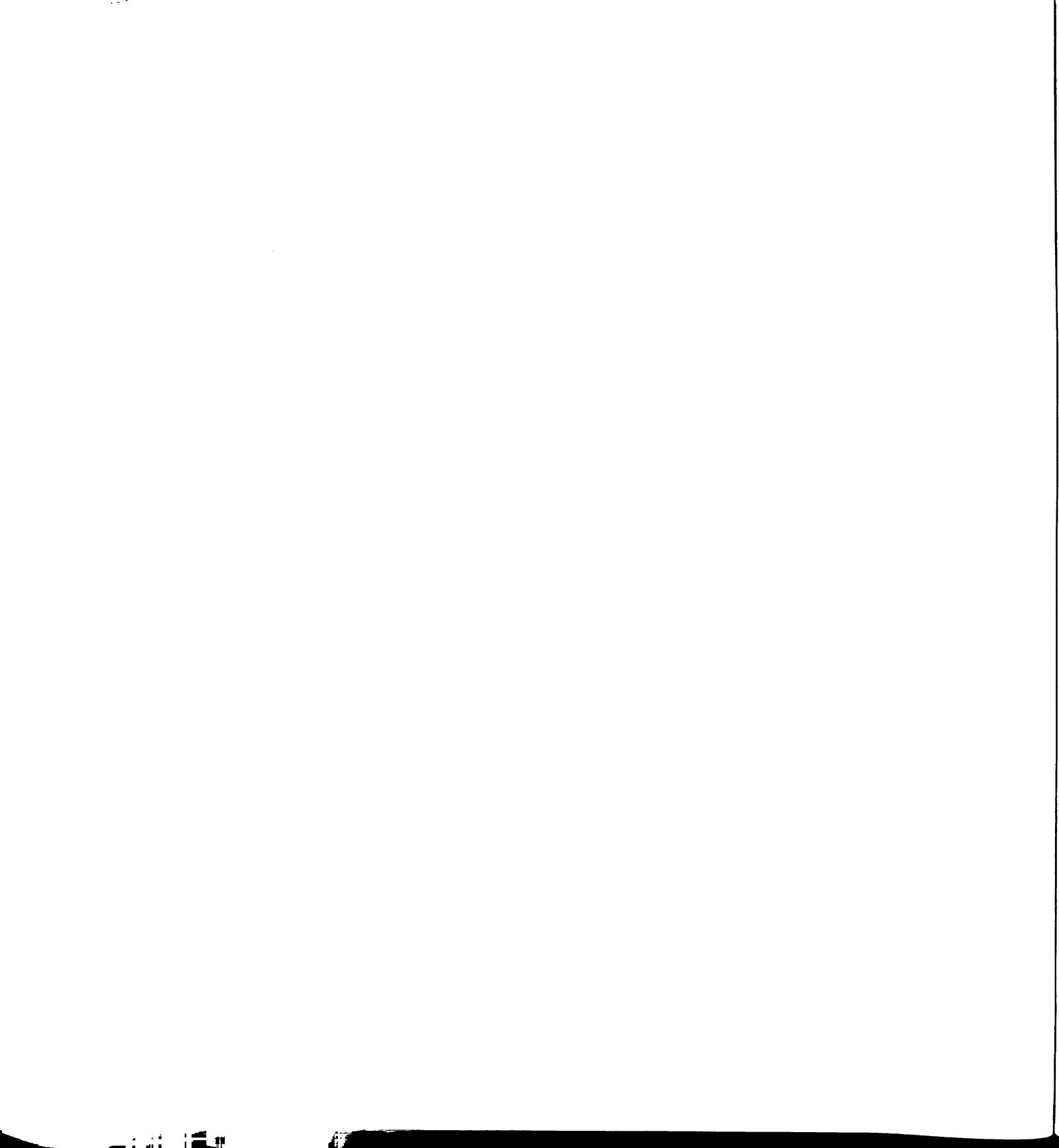
This study is being sponsored by Louisiana Vocational Rehabilitation Program as they see it would benefit the program here. Also this study is part of a National Study being conducted by the National Institute of Handicapped Research at Human Resources Center, New York.

The purpose of the study is to determine those factors and events which contribute to the employment

potential of people with disabilities. I will collect some information from you this morning/afternoon on some biographic and demographic characteristics, such as, your age, education, training, number of dependents you have, where you live, then on some psychological aspects as to how you perceive or believe yourself, and the society at large; your opinion about work and the world of work; and what kind of job you have done in the past. There is no right or wrong answer to these questions. It is just a matter of opinion. So, please feel free to respond as you really feel or believe, no matter what others might think or believe. Whatever your responses may be, they all are confidential. Nobody sees it. All information will be coded, analyzed and interpreted by a computer. You can rest assured that no one will know about your responses, not even your counselors.

One of the important aspects to remember is to please respond to each question. If you find it difficult to understand the question, please feel free to get my attention. If you do not answer or forget to answer one question in a questionnaire, it will be no use for the study. I will check your responses to make sure everything is done the way it should be. This may take somewhere between one to one and a half hours to complete.

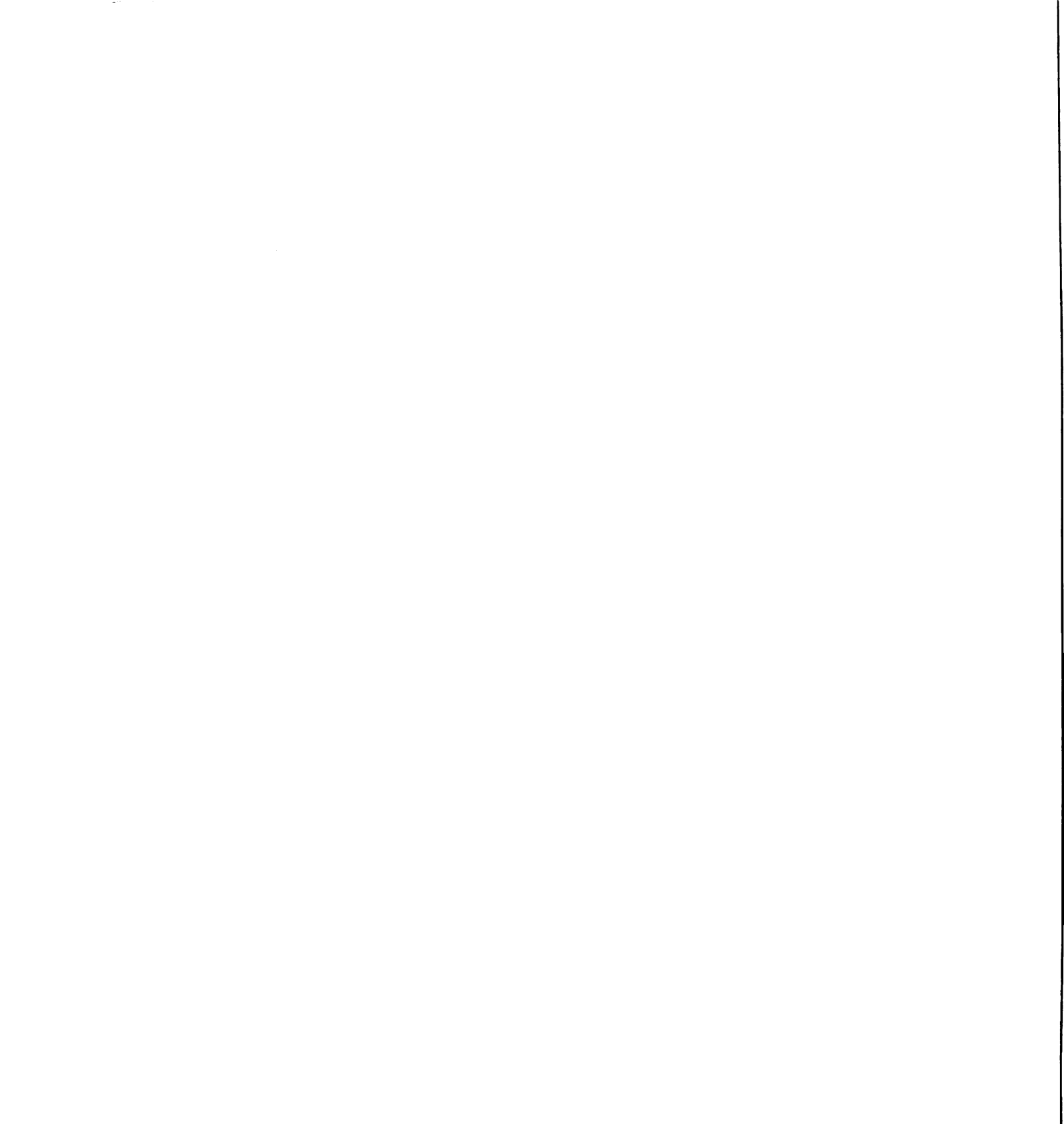
How does this study affect you and what are your benefits? There are no immediate benefits to anyone. However, your participation will be of help for the Louisiana Vocational Rehabilitation Program to improve



service delivery and future clients will benefit. At National level, National Institute of Handicapped Research may help change some policies or legislation that may have some effect on all the clients.

Six months from now, I will contact you again to find out how you are doing with respect to a job. This will be done by one of the following ways: either by a one-page mail questionnaire or by a 10 minute telephone interview.

Once again I thank you personally, each one of you, for your participation to a good cause.



APPENDIX C

CONSENT AND RELEASE OF INFORMATION FORM

DIVISION OF VOCATIONAL REHABILITATION

STATE OF LOUISIANA

CONSENT AND RELEASE OF INFORMATION FORM

I, _____, give my consent to participate voluntarily in the research study of predicting the probability of success of vocational rehabilitation clients sponsored by Louisiana Vocational Rehabilitation Program and to be conducted by Mr. Madan M. Kundu, M.A., C.R.C. The purpose of the study is to determine those factors and events which contribute to the employment potential of people with disabilities. The data gathered will be utilized in Mr. Kundu's doctoral dissertation at Michigan State University and in a National Study being conducted by the Institute of Handicapped Research at Human Resources Center, Long Island, New York.

I give permission to Louisiana Vocational Rehabilitation Program to allow the researcher to obtain information from my case file. I also consent to be recontacted for the purpose of follow-up on my progress in employment either by letter or by telephone interview which may last approximately 10 to 15 minutes. I give this consent with the understanding that my name or other identifying information or relevant data will not be revealed by the researcher.

I understand that I may withdraw anytime from the study without penalty, and that I may receive a report of the findings upon request.

This consent is valid through December, 1983.

Signature of the client
or his/her legal representative _____

Date _____

APPENDIX D

DEMOGRAPHIC QUESTIONNAIRE

DEMOGRAPHIC QUESTIONNAIRE

Name _____ Date of Birth _____
 Address _____ Age _____
 _____ Zip _____ Sex: _____ Male _____ Female
 Phone _____ Race: _____ Black
 _____ White
 _____ Native Indian
 _____ Hispanic
 _____ Puerto Rican
 _____ Asian American
 _____ Other
 Marital Status: _____ Married
 _____ Separated
 _____ Divorced
 _____ Widowed
 _____ Never Married
 Number of Dependents (including self) _____

Education: _____ 1 to 8th Grade completed
 _____ 9 to 12th Grade completed or
 _____ equivalent to High School
 _____ 1 to 2 years of College
 _____ 3 to 4 years of College
 _____ Graduate study
 Have you attended any Vocational Technical or trade school?
 _____ yes _____ no
 If yes, name of the trade you learned

Have you worked before ? _____ yes _____ no

Disability : Primary _____ Secondary _____
 At birth _____ Acquired _____ At what age _____

Living conditions: _____ Own home _____ Rural
 _____ Rented _____ Semi-Urban
 _____ Hospital _____ Urban

PLEASE DO NOT WRITE BELOW THIS LINE

Source of referral _____ Age at referral _____
 Date of acceptance _____
 Employment at acceptance _____ Earnings _____
 Source of support: at referral _____ now _____
 Public Assistance: received before _____ now receiving _____

APPENDIX E

LOCUS OF CONTROL SCALE

LOCUS OF CONTROL SCALE

This is a questionnaire to find out the way in which certain important events in our society affect different people. Each item consists of a pair of alternatives letter a or b. Please select the one statement of each pair (and only one) which you more strongly BELIEVE to be the case as far as you're concerned. Be sure to select the one you actually believe to be more true rather than one you think you should choose or the one you would like to be true. This is a measure of personal belief; obviously, there are no right or wrong answers.

Please answer these items carefully but do not spend too much time on any one item. Be sure to find an answer for every choice. For each numbered question make an X on the line beside either the a or b, whichever you choose as the statement most true.

In some instances, you may discover that you believe both statements or neither one. In such cases, be sure to select the one you more strongly believe to be the case as far as you're concerned. Also, try to respond to each item independently when making your choice; do not be influenced by your previous choices.

Items begin on the next page. Remember, select an alternative you PERSONALLY BELIEVE TO BE MORE TRUE.

1. ____ a. Children get into trouble because their parents punish them too much.
____ b. The trouble with most children nowadays is that their parents are too easy with them.
2. ____ a. Many of the unhappy things in people's lives are partly due to bad luck.
____ b. People's misfortunes result from the mistakes they make.
3. ____ a. One of the major reasons why we have wars is because people don't take enough interest in politics.
____ b. There will always be wars, no matter how hard people try to prevent them.
4. ____ a. In the long run people get the respect they deserve in this world.
____ b. Unfortunately, an individual's worth often passes unrecognized no matter how hard he tries.
5. ____ a. The idea that teachers are unfair to students is nonsense.
____ b. Most students don't realize the extent to which their grades are influenced by accidental happenings.
6. ____ a. Without the right breaks one cannot be an effective leader.
____ b. Capable people who fail to become leaders have not taken advantage of their opportunities.
7. ____ a. No matter how hard you try some people just don't like you.
____ b. People who can't get others to like them don't understand how to get along with others.
8. ____ a. Heredity plays the major role in determining one's personality.
____ b. It is one's experiences in life which determine what they're like.
9. ____ a. I have often found that what is going to happen will happen.
____ b. Trusting to fate have never turned out as well for me as making a decision to take a definite course of action.
10. ____ a. In the case of the well prepared student there is rarely if ever such a thing as an unfair test.
____ b. Many times exam questions tend to be so unrelated to course work that studying is really useless.

11. ____ a. Becoming a success is a matter of hard work, luck has little or nothing to do with it.
- ____ b. Getting a good job depends mainly on being in the right place at the right time.
12. ____ a. The average citizen can have an influence in government decisions.
- ____ b. This world is run by the few people in power, and there is not much the little guy can do about it.
13. ____ a. When I make plans, I am almost certain that I can make them work.
- ____ b. It is not always wise to plan too far ahead because many things turn out to be a matter of good or bad fortune anyhow.
14. ____ a. There are certain people who are just no good.
- ____ b. There is some good in everybody.
15. ____ a. In my case getting what I want has little or nothing to do with luck.
- ____ b. Many times we might just as well decide what to do by flipping a coin.
16. ____ a. Who gets to be the boss often depends on who was lucky enough to be in the right place first.
- ____ b. Getting people to do the right thing depends upon ability; luck has little or nothing to do with it.
17. ____ a. As far as world affairs are concerned, most of us are the victims of forces we can neither understand, nor control.
- ____ b. By taking an active part in political and social affairs the people can control world events.
18. ____ a. Most people can't realize the extent to which their lives are controlled by accidental happenings.
- ____ b. There is really no such thing as "luck."
19. ____ a. One should always be willing to admit his mistakes.
- ____ b. It is usually best to cover up one's mistakes.
20. ____ a. It is hard to know whether or not a person really likes you.
- ____ b. How many friends you have depends upon how nice a person you are.

21. ____ a. In the long run the bad things that happen to us are balanced by the good ones.
____ b. Most misfortunes are the result of lack of ability, ignorance, laziness, or all three.
22. ____ a. With enough effort we can wipe out political corruption.
____ b. It is difficult for people to have much control over the things politicians do in office.
23. ____ a. Sometimes I can't understand how teachers arrive at the grades they give.
____ b. There was a direct connection between how hard I studied and the grades I got.
24. ____ a. A good leader expects people to decide for themselves what they should do.
____ b. A good leader makes it clear to everybody what their jobs are.
25. ____ a. Many times I feel that I have little influence over the things that happen to me.
____ b. It is impossible for me to believe that chance or luck plays an important role in my life.
26. ____ a. People are lonely because they don't try to be friendly.
____ b. There's not much use in trying too hard to please people, if they like you, they like you.
27. ____ a. There is too much emphasis on athletics in high school.
____ b. Team sports are an excellent way to build character.
28. ____ a. What happens to me is my own doing.
____ b. Sometimes I feel that I don't have enough control over the direction my life is taking.
29. ____ a. Most of the time I can't understand why politicians behave the way they do.
____ b. In the long run the people are responsible for bad government on a national as well as on a local level.

APPENDIX F

MODIFIED LOCUS OF CONTROL SCALE

MODIFIED LOCUS OF CONTROL SCALE

Name _____

Directions

There are four items on this page. Each item has a pair of statements, A and B. Circle one statement that you believe most. Then check with an X if the statement is much closer or slightly closer to your point of view.

1. A. What happens to me is my own doing.
 B. Sometimes I feel that I don't have enough control over the direction my life is taking.
 _____ much closer _____ slightly closer
2. A. When I make plans, I am almost certain I can make them work.
 B. It is not always wise to plan too far ahead, because many things turn out to be a matter of good or bad fortune anyhow.
 _____ much closer _____ slightly closer
3. A. In my case, getting what I want has little or nothing to do with luck.
 B. Many times we might just as well decide what to do by flipping a coin.
 _____ much closer _____ slightly closer
4. A. Many times I feel that I have little influence over the things that happen to me.
 B. It is impossible for me to believe that chance or luck plays an important role in my life.
 _____ much closer _____ slightly closer

APPENDIX G

VOCATIONAL OPINION INDEX

FORM A

ASSOCIATES

VOCATIONAL OPINION INDEX

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THE SCIENCE CENTER
34TH AND MARKET STREETS
PHILADELPHIA, PENNSYLVANIA 19104**

Identification No. _____

Name: _____

Apartment No. _____

Street No. _____

City

State

Zip

Program: _____

1. Sex: 1 () Male 2 () Female

2. Age: _____

3. Race or Culture:

1 () Black

2 () White

3 () American Indian

4 () Mexican-American

5 () Puerto Rican

6 () Other: _____

SPECIFY

4. Highest Grade Completed:

1 () Less than 8

2 () 8-11

3 () 12 or more (include high school equivalency)

5. Are you currently participating in a training program?

1 () Yes 2 () No (SKIP TO Q. 8)

6. How do you get to the training center? (check all that apply)

1 () My own car

2 () Friend's car

3 () Public transportation

4 () Walk

5 () Other: _____

SPECIFY

7. Which of the following problems is most likely to cause you to be late or absent from the training program?

(check all that apply)

1 () Child care problems

2 () Transportation problems

3 () Medical problems

4 () Family problems

5 () Money problems

6 () Other: _____

SPECIFY

8. How many children do you have who are:

(1) Under 6 years of age? _____

(2) 6-12 years? _____

(3) Over 12 years? _____

9. Why did you leave your last job?

1 () Never worked

2 () Laid off

3 () Lack of skill

4 () Child care/family problems

5 () Transportation problems

6 () Medical problems

7 () For a better job

8 () Did not like the work

9 () Did not like the people at work

10 () Other: _____

SPECIFY

10. Do you have any older sisters or brothers?

1 () Yes

2 () No

Answer the following questions only if you have children under 12 years of age.

11. Who takes care of your children who are not old enough to go to school when you are at the training program?

1 () No children under school age

2 () Relative/friend

3 () Babysitter

4 () Nursery/day care center

5 () Other: _____

SPECIFY

12. Who takes care of your school age children when you are at the training center?

1 () No children over 6

2 () Old enough to care for themselves

3 () Relative/friend

4 () Babysitter

5 () School or public program

6 () Other: _____

SPECIFY

13. How did you find day care?

(check all that apply)

1 () I don't need day care

2 () Found it myself

3 () Training Center helped

4 () Training Center provides

5 () Other: _____

SPECIFY

Instructions:

All of the following statements are about working, or about things that can or might happen when people work. Some of them you may agree with and some you may disagree with.

For each statement, decide how much you agree or disagree with it. If you agree very strongly with it and think it is definitely true about working, put a check mark beside "strongly agree". If you agree somewhat and think that it's probably true, put a check mark beside "somewhat agree". If you neither agree nor disagree or really don't know whether it's true or not, put a check mark beside "neither agree nor disagree". If you somewhat disagree with the statement, and think it's probably not true, put a check mark beside "somewhat disagree". If you disagree strongly and are quite sure the statement is not true, put a check mark beside "strongly disagree".

The scale looks like this:

- ☐ strongly agree
- ☐ somewhat agree
- ☐ neither agree nor disagree
- ☐ somewhat disagree
- ☐ strongly disagree

Example:

People who go to work become much more beautiful.

- ☐ strongly agree
- ☐ somewhat agree
- ☐ neither agree nor disagree
- ☒ somewhat disagree
- ☐ strongly disagree

If you disagree somewhat with this statement and think it is probably not true, you would put a check mark as shown.

Read over each statement and mark how much you agree or disagree with it.

1. There is more choice about how to spend money earned from working than welfare money.

- ☐ strongly agree
- ☐ somewhat agree
- ☐ neither agree nor disagree
- ☐ somewhat disagree
- ☐ strongly disagree

3. People who work are usually able to live better than people on welfare.

- ☐ strongly agree
- ☐ somewhat agree
- ☐ neither agree nor disagree
- ☐ somewhat disagree
- ☐ strongly disagree

2. People who work are usually treated better than people on welfare.

- ☐ strongly agree
- ☐ somewhat agree
- ☐ neither agree nor disagree
- ☐ somewhat disagree
- ☐ strongly disagree

4. Working gives people more freedom.

- ☐ strongly agree
- ☐ somewhat agree
- ☐ neither agree nor disagree
- ☐ somewhat disagree
- ☐ strongly disagree

5. The family will have more money if the mother is working.
- ☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree
6. People who work are more independent.
- ☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree
7. Working gives people more dignity.
- ☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree
8. People who work usually feel better about themselves.
- ☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree
9. Children are more likely to finish school and get good jobs if their parents work.
- ☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree
10. People who work are bothered less by their problems, partly because they have less time to worry about them.
- ☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree
11. Working usually makes people better parents and helps them do more for their children.
- ☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree
12. Working lets people raise their standard of living.
- ☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree
13. People who work often seem more attractive or interesting.
- ☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree
14. Working helps keep people from becoming depressed or unhappy.
- ☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree
15. Working means losing a lot of your freedom.
- ☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree

16. People who work have less free time to take care of personal needs.

☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree

17. Most jobs require too much time and money traveling back and forth between home and work.

☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree

18. Working leaves less time to take care of family problems.

☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree

19. Mothers who work often cannot find time to take good care of their families.

☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree

20. Parents spend less time with their children when they work.

☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree

21. Working gives people less freedom.

☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree

22. Working leaves people less time for a social life.

☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree

23. Working prevents people from raising their children as well as they might if they were not working.

☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree

24. There are not enough jobs around.

☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree

25. There are certain types of people for whom there isn't much chance to get a job.

☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree

26. For some people no matter how hard they try they can't find a job.

☐ strongly agree
☐ somewhat agree
☐ neither agree nor disagree
☐ somewhat disagree
☐ strongly disagree

27. Most jobs don't pay enough to make working worthwhile.

- ☐ strongly agree
- ☐ somewhat agree
- ☐ neither agree nor disagree
- ☐ somewhat disagree
- ☐ strongly disagree

28. Most people really have less money to spend from working than they do on welfare.

- ☐ strongly agree
- ☐ somewhat agree
- ☐ neither agree nor disagree
- ☐ somewhat disagree
- ☐ strongly disagree

Instructions:

On the following pages are statements about problems that might make it difficult for some people to get a job or to keep a job. Some of them are very difficult problems and some are not.

Put a check mark on the scale under each statement to show how difficult you think the problem would be if you had it.

The scale looks like this:

- ☐ extremely
- ☐ very
- ☐ somewhat
- ☐ a little
- ☐ not at all

Example:

Having to find something to do with one's paycheck.

- ☐ extremely
- ☐ very
- ☐ somewhat
- ☐ a little
- ☒ not at all

You might check "not at all" because this is not a major problem. It can be solved very easily and is not likely to cause any difficulty at all.

1. Having a high school diploma or being able to pass the high school equivalency test (GED).

- ☐ extremely
- ☐ very
- ☐ somewhat
- ☐ a little
- ☐ not at all

3. Not having time to take care of the house.

- ☐ extremely
- ☐ very
- ☐ somewhat
- ☐ a little
- ☐ not at all

2. Being afraid a job won't last.

- ☐ extremely
- ☐ very
- ☐ somewhat
- ☐ a little
- ☐ not at all

4. Finding it too hard to be organized the way you have to be at work.

- ☐ extremely
- ☐ very
- ☐ somewhat
- ☐ a little
- ☐ not at all

5. Having child care problems.

☐ extremely
☐ very
☐ somewhat
☐ a little
☐ not at all

6. Having to take care of parents or relatives.

☐ extremely
☐ very
☐ somewhat
☐ a little
☐ not at all

7. Having too many family and personal problems to take care of.

☐ extremely
☐ very
☐ somewhat
☐ a little
☐ not at all

8. Being too ill most of the time to hold a regular job.

☐ extremely
☐ very
☐ somewhat
☐ a little
☐ not at all

9. Not being able to find someone to take care of children who will be there and ready on time every day.

☐ extremely
☐ very
☐ somewhat
☐ a little
☐ not at all

10. Not being able to find someone who will take care of children for a reasonable amount of money.

☐ extremely
☐ very
☐ somewhat
☐ a little
☐ not at all

11. Having trouble getting along with all the different kinds of people at work.

☐ extremely
☐ very
☐ somewhat
☐ a little
☐ not at all

12. Having trouble getting along with people who have more experience and may look down on new people.

☐ extremely
☐ very
☐ somewhat
☐ a little
☐ not at all

13. Having to be nice to people you may not like on a job.

☐ extremely
☐ very
☐ somewhat
☐ a little
☐ not at all

14. Not being able to raise children right because you have to be away at work.

☐ extremely
☐ very
☐ somewhat
☐ a little
☐ not at all

APPENDIX H

WORK HISTORY QUESTIONNAIRE

WORK HISTORY QUESTIONNAIRE

NAME/CODE NO.: _____
 AGE: _____
 DISABILITY: _____
 Type(s) _____
 At Birth _____
 Acquired _____ At what age _____

INSTRUCTIONS:

1. List all jobs in order, begin with the first job.
2. Write the number(s) next to the activities performed related to a job.

JOBS HELD	JOB TITLES	DATES From _____ To _____ Month/ Year Month/ Year	DO NOT RECALL WRITE TOTAL PERIOD WORKED Year/ Month/ Year	TRAINING REQUIRED 4-more than 6 months 3-Less than 6 months 2-Less than 1 month 1-Less than 1 day	CERTIFICATE/ LICENSE REQUIRED 1-yes 2-no	HOURLY WAGES RECEIVED	REASON FOR LEAVING	JOB SATISFACTION 5-Liked a great deal 4-Liked much 3-Liked little 2-Liked little 1-Could not like
Before Disability								
After Disability								

What job(s) are you interested in or looking for now: _____

How successful do you think you will be (circle one for each job)

Very Successful Successful Not sure Unsuccessful

1. _____
2. _____
3. _____

APPENDIX I

FOLLOW-UP QUESTIONNAIRE - COUNSELOR

FOLLOW-UP QUESTIONNAIRE - CLIENT

FOLLOW-UP QUESTIONNAIRE - CLIENT

Client _____ Counselor _____ D.O. _____
 Phone _____ Phone _____

1. Are you presently employed? Yes=1 No=2

2. Were you employed for any time in last six months? Yes=1 No=2

JOB TITLE	NATURE OF INDUSTRY	HOW LONG	2=FULL TIME 1=PART TIME	TRAINING REQUIRED 4=MORE THAN 6 MONTHS 3=LESS THAN 6 MONTHS 2=LESS THAN 1 MONTH 1=NO	CERTIFICATE OR LICENSE REQUIRED 2=NO 1=YES	HOURLY WAGE	JOB SATISFACTION 5=LIKED A GREAT DEAL 4=LIKED MUCH 3=LIKED SOME 2=LIKED LITTLE 1=DID NOT LIKE	REASON FOR LEAVING

3. If unemployed, are you presently seeking employment? Yes=1 No=2

4. What are the reasons, you are not getting a job?

- 1=There are no jobs
 2=No job interviews
 3=Many job interviews
 4=Lack of skill
 5=Transportation problem
 6=Medical problem
 7=Family problem
 8=Other specify

5. Are you in touch with your counselor?

Yes=1 No=2

6. What are your future plans?

- 1=Get more training/schooling
 2=Change career
 3=Continue looking for a job
 4=Given up
 5=Other specify

7. Your present sources of support:

- 1=Family & Friends
 2=Current Income
 3=Social Security
 4=Public Assistance
 5=Other specify

APPENDIX J

FOLLOW-UP LETTERS

MICHIGAN STATE UNIVERSITY

COLLEGE OF EDUCATION · DEPARTMENT OF COUNSELING,
EDUCATIONAL PSYCHOLOGY AND SPECIAL EDUCATION

EAST LANSING · MICHIGAN · 48824-1034

Dear

Last December, while you attended Job Club, you participated in a research study conducted by me to determine the factors and events that contribute to successful employment. A copy of your signed Consent and Release of Information Form is enclosed for your information.

A part of the study is to collect follow-up data on your progress in obtaining employment. I have been unable to reach you by telephone. Enclosed please find the FOLLOW-UP QUESTIONNAIRE-CLIENT. It will take only a few minutes to respond. If you are employed now or have been employed for some time since December, 1982 please give details of the job and other information. If you are currently employed, omit #4 and #6. Your responses to this questionnaire and earlier ones are totally confidential. All information provided now and earlier will be analyzed only on a group basis.

Please return the completed questionnaire in the enclosed self-addressed stamped envelope. It is very important that you kindly take a few minutes to respond to the questionnaire and return it immediately. Without this information data cannot be analyzed and your earlier participation becomes meaningless. If you have any question please feel free to contact me at (517) 355-8137.

Thank you for your cooperation.

Sincerely,

Madan M. Kundu, M.A., C.R.C.
Doctoral Candidate

MMK/sq

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BIBLIOGRAPHY

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