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Seven Years of Research on Work Adjustment

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Seven Years of Research on Work Adjustment

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Contents

Preface

For the past seven years, the definition, measurement and evaluation of vocational rehabilitation outcomes for the disabled have provided the focal points for a major research program at the Industrial Relations Center of the University of Minnesota. Known as the Work Adjustment Project, this program was preceded by a two year study of placement problems of the disabled. Several research goals were developed from this earlier study which was started in 1957. They eventually led to a research design for the Work Adjustment Project which began in 1959. A theoretical framework emerged from this design and was published, in 1964, as *A Theory of Work Adjustment.*

Now in its seventh year, the Work Adjustment Project is concentrating on continued development and testing of the theory through further refinement of the instruments required to assess the work personality (needs and abilities), satisfaction and satisfactoriness, and tenure outcome variables specified by the theory. At the same time, work is progressing on the development of a psychology of disability and on the accumulation of evidence in general support of the Theory of Work Adjustment. The theory is not regarded as a final statement, but will be modified and revised in the light of new insights gained from research findings.

The present monograph is written as a summary of the past seven years of research on work adjustment. The high point of this summary is the Theory of Work Adjustment. The several studies conducted to date in the Work Adjustment Project serve as the setting and the context for the theory. These studies, however, in their findings and techniques, are useful in their own right and have several implications for vocational rehabilitation practice, some of which are listed in the final chapter.

To complete this account of the past seven years, the monographs of the Minnesota Studies in Vocational Rehabilitation series have been summarized in an appendix to this publication. These summaries also supplement the text for the interested reader.

This monograph, and for that matter, the Work Adjustment Project, would not have been possible without the generous and continuing support of the Vocational Rehabilitation Administration. This monograph serves as a final report to the VRA on Research Project No. 422, but more than that, it serves as grateful acknowledgment of VRA support.

Seven Years of Research on Work Adjustment

Antecedents of the Work Adjustment Project

Two major goals provided the focus for the initial research project in 1957: (1) to determine the extent and magnitude of employment problems of the disabled, and (2) to study the effectiveness of job placement procedures currently used in the various rehabilitation services.[1] A two-year grant was received from the then Office of Vocational Rehabilitation in support of the project.

Research plans called for the use of survey methods in identifying the disabled in the general population and in determining their employment problems. Studies were designed to compare the effectiveness of different survey techniques and instruments in achieving these research objectives.

It was also planned to compare a group of individuals receiving special placement services with a control group receiving the typical rehabilitation assistance. Evaluation was to be based on a comparison of outcomes, measured six months after case closure.

To determine the outcomes appropriate as evaluative criteria, a survey of the rehabilitation literature was undertaken. The results of the survey were dismaying. Wide discrepancies in the definition and use of terms were found. For example, the meaning of the term "employment" varied with regard to the time and method of measurement used. "Employment rates" varied from 5% to 100% for apparently similar groups. "Employment" in some studies referred only to "competitive" jobs. In other studies, a person was counted as "gainfully employed" if he was in remunerative employment, whether or not it was "competitive."

Some studies used case closure, regardless of reason for closure, as the index of "success." Other studies were concerned with the percentage of counselees who were actually placed on a job. The lapse in time between counseling and evaluation varied widely. In some studies evaluation followed immediately after the termination of counseling; in others, evaluation was undertaken as long as ten years after counseling had ended.

[1] *Minnesota studies in vocational rehabilitation*, I (see Appendix A for summary).

Several studies compared the earnings of rehabilitated persons with those of non-disabled persons. Other studies limited their criteria to how much the rehabilitated persons were contributing to society in taxes. "Employer satisfaction" was the criterion in some studies; "job satisfaction" in other studies. Other criteria included productivity, "job adjustment," absenteeism, accident record, tenure, efficiency, and promotion.

The review of the literature clearly indicated that progress in vocational rehabilitation research would be limited, at best, without meaningful and measurable criteria for the evaluation of vocational rehabilitation outcomes. Research in the first two years laid the groundwork for the study of vocational rehabilitation outcomes. Survey studies provided factual data on the characteristics and problems of the disabled.[2] Methodological investigations helped to indicate realistic directions and limits for later research plans.[3] While specific in scope and therefore with only limited implications for vocational rehabilitation practice,[4] these early research efforts contributed to a data pool and to a theoretical point of view that developed as the research progressed.

[2] *Minnesota studies in vocational rehabilitation*, III, IV, VI, VII, VIII.
[3] *Minnesota studies in vocational rehabilitation*, II, V, VI.
[4] *Minnesota studies in vocational rehabilitation*, IX.

The Concept of Work Adjustment

In 1959 the then Office of Vocational Rehabilitation awarded a five-year grant to the investigators in support of research to develop criterion measures for, and a methodology for the evaluation of, vocational rehabilitation outcomes. One of the first projects undertaken was a survey of the pertinent research literature in psychology, sociology, and industrial relations, as well as in rehabilitation.[5]

After thorough review and evaluation of the research literature, the concept of "work adjustment" was developed to designate the general area encompassing evaluative criteria. The appropriateness of the concept of work adjustment to the evaluation of vocational rehabilitation outcomes was strongly suggested by research findings from a variety of sources, such as job satisfaction studies, employee attitude studies, studies of industrial conflict and industrial morale, studies utilizing counseling interviews and exit interviews, studies of productivity and efficiency, job tenure studies, and studies of work history patterns.

The investigators' concept of work adjustment was first formally described in 1960 in the monograph, *A Definition of Work Adjustment.*[6] Following Rodger's suggestion in an early article,[7] the variables of satisfaction and satisfactoriness were selected as the indicators of work adjustment. "Satisfaction" was defined as work adjustment viewed from the vantage point of the individual, while "satisfactoriness" designated work adjustment viewed from the employer's standpoint.

Satisfaction, according to the 1960 monograph, included overall job satisfaction, and satisfaction with various specific aspects of the individual's work environment, such as his supervisor, his coworkers, his working conditions, hours of work, pay, and type of work. It included the satisfaction of his needs and the fulfillment of his aspirations and expectations, and the similarity of his interests to those of successful persons working in his chosen occupation.

Satisfactoriness, as the other index of work adjustment, included such components as the worker's productivity and efficiency, the

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[5] *Minnesota studies in vocational rehabilitation*, X.

[6] Ibid.

[7] The initial source was Heron, A. Satisfaction and satisfactoriness: complementary aspects of occupational adjustment. *Occupational Psychology*, 1954, *28*, 140-153. Professor Alec Rodger, University of London, in a personal communication, May 1965, pointed out that he originated the terms "satisfaction and satisfactoriness" in an early article.

congruence of his abilities with job requirements, his ability to get along with his supervisor and his co-workers, and to follow company policies.

Work adjustment was described as a process that occurred throughout the individual's working years. Cycles of satisfaction and dissatisfaction, and of satisfactoriness and unsatisfactoriness, might occur in the individual's work history. Work adjustment patterns might vary for individuals in different occupations, and were likely to be affected by such factors as age, sex, education, training, disability, and adjustment outside the work setting. The study of the interrelationships among work adjustment variables was essential.

The definition of work adjustment in the 1960 monograph provided a useful framework for the Work Adjustment Project. Studies were carried out to develop measures of the work adjustment variables and to enlarge the understanding of work adjustment, especially as it related to the disabled.[8] Research was undertaken to obtain and validate work histories of employees,[9] to measure attitudes of employers,[10] and to develop criterion measures of satisfaction and satisfactoriness.[11]

Increasingly, the explanation and prediction of work adjustment became the major concern of the project. Although the definition of work adjustment had included some useful principles, a more elaborate and integrated theoretical statement concerning work adjustment was needed. As a result, a theory of work adjustment was published in January, 1964.[12]

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[8] *Minnesota studies in vocational rehabilitation*, XIII, XIV, XVI, XVII.
[9] *Minnesota studies in vocational rehabilitation*, XII.
[10] *Minnesota studies in vocational rehabilitation*, XI.
[11] *Minnesota studies in vocational rehabilitation*, XIII, XIV.
[12] *Minnesota studies in vocational rehabilitation*, XV.

The Theory of Work Adjustment

The Theory of Work Adjustment is based on the premise that the proper subject matter for vocational psychology is the individual as a responding organism. As such, he is assumed to have a set of response potentials, the upper limits of which are presumably determined by heredity. The individual will respond when his response potentials make responding possible, and when the environment permits and/or stimulates responding. As he responds, his responding becomes associated with reinforcers—environmental conditions which maintain responding.

Over a period of time, responses that are utilized most frequently by the individual become identifiable as a primitive set of "abilities." At the same time, the reinforcers in the environment which occur most frequently in the reinforcement of the individual's responding become identified with a primitive set of "needs." Together, these abilities and needs constitute the beginnings of the individual's work personality.

As he grows and develops, the individual's sets of abilities and needs undergo change. Some abilities and needs are strengthened. Others disappear. New abilities and needs are added. The strengths of abilities and needs become more stable as the individual develops an increasingly fixed style of life. Eventually they crystallize, at which point successive measurements of ability and need strength will show no significant change. The individual can then be said to have a stable work personality. The theory of work adjustment is premised on a stable work personality.

Work adjustment is defined as the process by which the individual interacts and comes to terms with his work environment. The outcome of the process is measured by two indicators: satisfactoriness and satisfaction. The significant aspect of the individual in this process is his work personality, that is, his sets of abilities and needs. The significant aspects of the work environment include the abilities required for successful performance of the job and the reinforcers available to the individual. Work adjustment is determined both by the correspondence between abilities and ability requirements, and by the correspondence between reinforcer system and needs.

The theory of work adjustment is stated in the following nine propositions:

Proposition I. An individual's work adjustment at any point in time is defined by his concurrent levels of satisfactoriness and satisfaction.

Proposition II. Satisfactoriness is a function of the correspondence between an individual's set of abilities and the ability requirements of the work environment, provided that the individual's needs correspond with the reinforcer system of the work environment.

Proposition III. Satisfaction is a function of the correspondence between the reinforcer system of the work environment and the individual's set of needs, provided that the individual's abilities correspond with the ability requirements of the work environment.

Proposition IV. Satisfaction moderates the functional relationship between satisfactoriness and the correspondence of the individual's ability set with the ability requirements of the work environment.

Proposition V. Satisfactoriness moderates the functional relationship between satisfaction and the correspondence of the reinforcer system of the work environment with the individual's set of needs.

Proposition VI. The probability of an individual's being forced out of the work environment is inversely related to his measured satisfactoriness.

Proposition VII. The probability of an individual's voluntarily leaving the work environment is inversely related to his measured satisfaction.

Proposition VIII. Tenure is a function of satisfactoriness and satisfaction.

Proposition IX. The correspondence between the individual (abilities and needs) and the work environment (ability requirements and reinforcer system) increases as a function of tenure.

Instrumentation for the Theory of Work Adjustment

A formal test of the Theory of Work Adjustment requires the translation of its concepts into operational terms. The main concept, "correspondence," requires that both the individual and the environment be described using the same or comparable sets of measurement dimensions. These dimensions, according to the theory, are of two kinds: abilities and needs. The theory also requires the measurement of two intervening variables:[13] satisfactoriness and satisfaction. These variables "intervene" between individual-environment correspondence on the one hand, and tenure outcomes (stay-leave) on the other. Several Work Adjustment Project studies were concerned with the measurement of these variables (abilities, needs, satisfactoriness, and satisfaction). The report on these studies given below follows the historical sequence.

Measurement of Satisfaction

The first work adjustment instrumentation studies were directed toward the development of criterion measures of job satisfaction.[14] The initial study involved Hoppock's Job Satisfaction Blank (a 4-item general satisfaction measure) and the Industrial Relations Center's 54-item Employee Attitude Scale. The latter instrument measured seven aspects of job satisfaction: satisfaction with company, supervision, co-workers, working conditions, hours and pay, type of work and communication. To these two instruments were added 22 experimental job-attitude items, making a total of 80 items for the study.

These instruments were administered to a sample of 638 disabled (physically handicapped) persons and 530 "control" persons (non-handicapped co-workers of the disabled persons). The sample was cross-classified into four occupational groups: nonskilled blue-collar, skilled blue-collar, nonskilled white-collar, and skilled white-collar, making a total of eight groups for the study. Scales were developed to measure different components of satisfaction for each group. These scales were found, for the most part, to be highly reliable and relatively independent of each other.

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[13] In the sense defined by Meehl, P.E., and MacCorquodale, K. On a distinction between hypothetical constructs and intervening variables. *Psychological Review*, 1948, 55, 95-107.

[14] *Minnesota studies in vocational rehabilitation*, XIII.

In general, satisfaction was found to be "organized" in a similar fashion for each of the eight groups. Five components of satisfaction were found in common for all groups: general job satisfaction, satisfaction with working conditions, with supervision, with compensation and with co-workers. In addition, some significant differences in satisfaction components were observed among the groups. For example, a "satisfaction-with-type-of-work" scale appeared only for the disabled, skilled blue-collar group; a "satisfaction-with-company" scale appeared only for skilled blue-collar workers, both disabled and control.

For the most part, differences in scale content were observed more frequently among the occupational groups than between the disabled and the control (non-disabled) groups. However, presence or absence of disability did tend to be more important than occupation in determining the level of satisfaction expressed by workers. *For all components of satisfaction, the level of satisfaction expressed by the disabled groups was invariably lower than that of their control counterparts.*

This study was the basis for the later development of the Minnesota Satisfaction Questionnaire (MSQ), a 100-item, 20-scale instrument to measure satisfaction along the following dimensions: ability utilization, achievement, activity, advancement, authority, company policies and practices, compensation, co-workers, creativity, independence, moral values, recognition, responsibility, security, social service, social status, supervision—human relations, supervision—technical, variety, and working conditions.[15] The MSQ was developed on 1,793 employees in jobs ranging from unskilled blue-collar to managerial. The scales were found to have high reliabilities (median reliability coefficient was .88) and to be relatively independent (median interscale correlation was .45). A factor-analysis of scale intercorrelations resulted in two factors identified as "satisfaction with the 'intrinsic' aspects of reinforcement at work" and a "supervision factor, relating to aspects 'extrinsic' to the work itself."[16] Scale means and scale variabilities indicated adequate discrimination potential for the instrument.

A 20-item short form of the MSQ has also been developed. The short form consists of the one item from each scale which correlated

[15] A copy of the MSQ appears in *Minnesota studies in vocational rehabilitation*, XVIII, pp. 65-71.

[16] Ibid, p. 14.

the highest with the total scale score for the development group (N = 1,793).

Measurement of Satisfactoriness

The development of a satisfactoriness measure was undertaken with a sample of 483 disabled persons and 496 "control" individuals grouped into the same four occupational categories used in the first satisfaction study.[17] Three instruments were used to define employment satisfactoriness: 1) an alternation ranking form on which the supervisor ranked all the persons in the work group on overall job performance; 2) a supervisor evaluation form, consisting of nine questions answered on a 5-point scale with regard to absences, lateness, accident record, need for disciplinary action, general quality of work, promotability, probability of pay raise recommendation, transferability, and a general adjustment item indicating how much of the time the individual was a matter of concern to his supervisor; and 3) a personnel records questionnaire, not used in the final analysis of the data because of insufficient variability in the information which it elicited. There were other serious limitations to the use of this latter form due to the fact that too many companies did not keep the kind and quality of records adequate for the evaluation of work habits, productivity and efficiency variables.

For all groups, two factors appeared to underlie these satisfactoriness measures: a performance factor, which included such considerations as promotability, general adjustment, and quality of work; and a conformance factor, which consisted of such items as absences, lateness, accidents. *On measures of both performance and conformance, the disabled workers were evaluated as equal to the matched "control" workers.*

The relationship between the measures of satisfactoriness and the measures of satisfaction was investigated for each occupational group separately. For all groups in this study, the general finding was that the satisfactoriness and satisfaction components of work adjustment were virtually unrelated. Little statistical relationship was found between how well people did their work and how well they liked their work.[18]

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[17] *Minnesota studies in vocational rehabilitation*, XIV.

[18] Ibid, pp. 31 ff.

Measurement of Needs

The first measure of vocational needs developed in the Work Adjustment Project was the N-Factors Questionnaire (NFQ),[19] an instrument based largely on R. H. Schaffer's work.[20] This instrument consisted of 12 four-item scales measuring the following dimensions: achievement, authority, co-workers, creativity and challenge, dependence, independence, moral values, recognition, security, self-expression, social service, and social status. The questionnaire was developed on 1,014 persons. Analysis of the development data indicated that, while the NFQ scales were relatively independent and had adequate discrimination potential, only five of the twelve scales had acceptable reliabilities.

Based on the NFQ, a second questionnaire was constructed to improve scale reliabilities and the variability of scale scores, and to increase the number of need dimensions measured. This instrument, called the Minnesota Importance Questionnaire (MIQ),[21] consisted of 20 scales, each measured by 5 items. The 20 scales were as follows: (The illustrative item following each scale title is the item which correlated most highly with total scale score in a development sample of 2,308 employed individuals.)

1. *Ability Utilization.* I could do something that makes use of my abilities.
2. *Achievement.* The job could give me a feeling of accomplishment.
3. *Activity.* I could be busy all the time.
4. *Advancement.* The job would provide an opportunity for advancement.
5. *Authority.* I could tell people what to do.
6. *Company Policies and Practices.* The company would administer its policies fairly.
7. *Compensation.* My pay would compare well with that of other workers.

[19] A copy of the NFQ appears in *Minnesota studies in vocational rehabilitation*, XVI, pp. 79-81.

[20] Schaffer, R. H. Job satisfaction as related to need satisfaction in work. *Psychological Monographs*, 1953, No. 364.

[21] A copy of the MIQ appears in *Minnesota studies in vocational rehabilitation*, XVI, pp. 83-89.

8. *Co-workers.* My co-workers would be easy to make friends with.
9. *Creativity.* I could try out some of my own ideas.
10. *Independence.* I could work alone on the job.
11. *Moral Values.* I could do the work without feeling that it is morally wrong.
12. *Recognition.* I could get recognition for the work I do.
13. *Responsibility.* I could make decisions on my own.
14. *Security.* The job would provide for steady employment.
15. *Social Service.* I could do things for other people.
16. *Social Status.* I could be "somebody" in the community.
17. *Supervision—Human Relations.* My boss would back up his men (with top management).
18. *Supervision—Technical.* My boss would train his men well.
19. *Variety.* I could do something different every day.
20. *Working Conditions.* The job would have good working conditions.

Analysis of the development data indicated that most persons responded to many of the items as being "important," or "very important," with few responses of "very unimportant," "not important," or "neither." However, there was enough scale score variation to allow reliable measurement, and most of the scales were relatively independent of the other scales. Subsequent studies showed the MIQ to be capable of discriminating between various groups of individuals, such as disabled vs. non-disabled groups, different occupational groups, and employed vs. pre-employment groups.

In the study of disabled vs. non-disabled groups, analysis of the data showed that *response to the MIQ was apparently related to the presence or absence of disability. Significant differences in response to the MIQ were also observed among four occupational groups.* These differences were consistent with "common-sense" expectations concerning the vocational needs of these occupational groups. Furthermore, *response to the MIQ was found to be affected*

by presence or absence of employment experience, a finding anticipated by the Theory of Work Adjustment. These studies, therefore, provided evidence of construct validity for the MIQ as a measure of vocational needs.

Since both the MIQ and MSQ were similar in format and items, a study was conducted to compare response to the two instruments administered at the same time. Both the MIQ and MSQ were completed at the same time by 1,793 employees. It was found that on 11 scales the MIQ item which correlated most highly with MIQ scale score was the "need" counterpart of the "satisfaction" item which had, in turn, correlated most highly with its MSQ scale score. Further, analysis of the data showed that the scores on the MIQ and the MSQ were relatively independent of each other. Parallel scales (measuring need and satisfaction on the same reinforcement dimension) had a median correlation of .19, while the highest correlation between nonparallel scales was .31. Factor analysis resulted in two "need" factors and two "satisfaction" factors. It was concluded, then, that the two instruments, the MIQ and the MSQ, measure two different sets of variables.[22]

Research is currently being conducted on a paired-comparisons revision of the MIQ. Preliminary analyses suggest that the paired-comparisons format yields better scale score variabilities, better factor structure of scale scores, and better intra-individual variability of scores, than the rating-scale format of the original MIQ. However, the administration time for the revised MIQ is considerably longer, and respondents require more motivation to complete the questionnaire.

Measurement of Abilities

With the availability of several carefully constructed measures of abilities, one of these was selected for use in the research program. The United States Employment Service's General Aptitude Test Battery (GATB)[23] was an obvious choice, primarily because of the psychometric qualities of the battery and the wealth of data available concerning the GATB, and also because of the vocational rehabilitation orientation of the research program. It was felt that, of all available multifactor ability tests, the GATB was the most

[22] *Minnesota studies in vocational rehabilitation,* XVIII, pp. 16-21.
[23] United States Department of Labor, Bureau of Employment Security.

frequently used in public rehabilitation agencies, and probably in private agencies as well.

Recently, work aimed at supplementing the GATB was started in two directions. First, measures of ability dimensions not covered by the GATB are being studied. Data on several of these are now being collected. Second, development work is proceeding on an experimental type of aptitude test which makes use of a gain score (from pre-test to post-test) resulting from the interposition of a standard practice sequence between pre- and post-tests.[24]

Summary

With the preceding developments, the Work Adjustment Project is "tooled up" for a first major test of some of the propositions of the Theory of Work Adjustment. Initially, the test requires the administration of GATB, MIQ and MSQ to large occupational samples, and the collection of satisfactoriness data on these individuals. Each occupational sample must be large enough to permit division into a "development" group, to be used in determining ability requirements and reinforcers for the occupation, and a "validation" group on which to test the theory. Such a study is currently being carried out.

In addition, findings from several studies conducted during the past two years support the validity and utility of the Theory of Work Adjustment. The most important of these studies are discussed in the next chapter.

[24] This sub-project is supported, in part, by research funds from the Graduate School of the University of Minnesota.

Studies Supporting the Theory of Work Adjustment

Support for the Theory of Work Adjustment has been found in the construct validation studies of the Minnesota Importance Questionnaire.[25] These studies were based on Proposition III of the Theory, which states, "Satisfaction is a function of the correspondence between the reinforcer system of the work environment and the individual's set of needs, provided that the individual's abilities correspond with the ability requirements of the work environment." Two assumptions were made for these studies: that the abilities of *employed* persons corresponded with ability requirements of the job, and that dissatisfaction (or a lowering of satisfaction scores) occurred only when need level exceeded reinforcement level, but not where the reverse was true.

The following research hypotheses, derived from Proposition III and the two additional assumptions, were used to test the construct validity of the MIQ as a measure of needs:

1) The variability of satisfaction scores for a group of "high need" individuals should be greater than the variability of satisfaction scores for a group of "low need" individuals, when both groups include individuals exposed to high, and individuals exposed to low, levels of reinforcement;

2) The "high-need-high-reinforcement" group should have the highest average satisfaction score, and the "high-need-low-reinforcement" group should have the lowest average satisfaction score. The difference between these average scores should be greater than the corresponding difference between the "low-need-high-reinforcement" and "low-need-low-reinforcement" groups. Also, the difference in average satisfaction scores between the "high-need-high-reinforcement" group and the "high-need-low-reinforcement" group should be greater than the corresponding difference between the total "high-reinforcement" group and the total "low-reinforcement" group.

3) If reinforcement level is held constant, variation in need level should be related to variation in satisfaction level.

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[25] *Minnesota studies in vocational rehabilitation, XVIII.*

The MSQ was used as the measure of satisfaction. To determine reinforcement level for these studies, five judges rated 19 job groups in terms of the relative level of reinforcement which each job environment provided. This procedure was followed for 16 of the 20 reinforcement dimensions represented in the MIQ, omitting four dimensions where reinforcement level was considered to be unique to the company: company policies and practices, co-workers, supervision—human relations, and supervision—technical.

The four "need-reinforcement" groups were drawn from a group of 1,417 individuals whose jobs had been ranked for reinforcement level. The "high-need" group consisted of those individuals scoring above the third quartile on the MIQ while the "low-need" group included those scoring below the first quartile. Those scoring in-between quartiles were not used in the study. The "high-reinforcement" group included job groups receiving a median rank of 1 through 5, while the "low-reinforcement" group included job groups receiving median ranks of 15 through 19. Job groups ranking below 5 and above 15 were not used in the study. "Need-reinforcement" groups were selected separately for each of the 16 reinforcement dimensions.

For these construct validation studies, need was treated as the independent variable, satisfaction as the dependent variable, and reinforcement as the moderating variable. One analysis involved testing the significance of the differences in mean and variability of satisfaction scores for groups cross-classified by need and reinforcement levels. This analysis yielded evidence of construct validity for seven of the sixteen MIQ scales: Ability Utilization, Achievement, Advancement, Authority, Creativity, Responsibility and Variety.

A frequency distribution analysis using only need and reinforcement as variables was also carried out. It was assumed, for this analysis, that workers who remain in their jobs should be at least minimally satisfied, and therefore, proportionately more "high-need" individuals than "low-need" individuals should be found in "high-reinforcement" jobs, while proportionately more "low-need" individuals than "high-need" individuals should be found in "low-reinforcement" jobs. This analysis showed evidence of construct validity for ten scales, including the seven mentioned above (for which such evidence had been previously obtained) and three other scales: Compensation, Independence, and Social Service.

In summary, *individuals with "high" needs in "high-reinforcement" jobs tended to express higher satisfaction than "high-need" individuals in "low-reinforcement" jobs or "low-need" individuals in any kind of job.* Furthermore, *more "high-need" than "low-need" individuals were found in "high-reinforcement" jobs, while the reverse was true for "low-reinforcement" jobs.*

The results, therefore, support Proposition III of the Theory of Work Adjustment, in that satisfaction on several dimensions was shown to be a function of correspondence between need and reinforcement.

Further support for the Theory of Work Adjustment was reported in a Ph.D. dissertation by Robert E. Carlson, formerly a member of the Work Adjustment Project staff.[26] This study concerned satisfactoriness as a function of ability-requirement correspondence (Proposition II of the Theory), and job satisfaction as moderating the relationship between satisfactoriness and the ability-requirement correspondence (Proposition IV of the Theory). The GATB was used to measure ability, while ability requirements were determined from USES's Worker Trait Requirements (WTR).[27] The Hoppock Job Satisfaction Blank was used as the measure of satisfaction. The data were obtained on blue-collar and white-collar workers.

GATB scores were converted to the same scale as the WTR, and difference scores (GATB minus WTR) were derived. These difference scores (a total of nine, one for each GATB-WTR ability dimension) indicated the degree of individual-environment correspondence on each ability-requirement dimension and constituted the measure of ability-requirement correspondence used in the study.

Multiple correlations between ability-requirement difference scores and satisfactoriness were found to be low, indicating very little, if any, relationship. When job satisfaction was used as a moderator variable, however, multiple correlations of .56 and .53 were found for the blue-collar and white-collar "high-job-satisfaction" groups, while correlations for the corresponding "low-job-satisfaction" groups were .37 and .23 respectively. These results were

[26] Carlson, R. E. An empirical evaluation of selected hypotheses from a Theory of Work Adjustment. Unpublished doctoral dissertation, University of Minnesota 1965.

[27] U. S. Department of Labor. Estimates of worker trait requirements for 4,000 jobs as defined in the Dictionary of Occupational Titles. Washington: Government Printing Office, 1956.

in line with predictions from Proposition II and Proposition IV of the Theory of Work Adjustment.

Also studied in Carlson's dissertation were the relationships between satisfaction, satisfactoriness and tenure outcomes. The Theory of Work Adjustment states that "Tenure is a function of satisfactoriness and satisfaction" (Proposition VIII). Therefore, one would expect that individuals with high satisfactoriness and satisfaction would have longer tenure on the average than those whose satisfactoriness and satisfaction was low. The analysis showed that *for the white-collar group tenure was related to satisfactoriness but not to satisfaction.* There were no significant findings for the blue-collar group. These essentially negative findings may reflect the "rigidities" of the labor market, that is, that many dissatisfied people are really not "free" to leave jobs nor are many employers "free" to "fire" unsatisfactory or marginally satisfactory employees.

On the whole, however, Carlson's findings lend additional support to the validity of the Theory of Work Adjustment.

Most recently, support for the Theory of Work Adjustment has been found in a series of studies concerning the use of an inferential approach to the measurement of occupational reinforcement.[28] These studies were conducted to explore the feasibility of describing the work environment in terms of the reinforcers available for the satisfaction of various needs, as required by the Theory. One approach to the identification of these reinforcers is suggested by Proposition II of the Theory, which states that satisfaction is a function of the correspondence between the reinforcer system of the work environment and the individual's set of needs. This proposition implies that, if reinforcement were held constant (i.e., if only one work environment were being studied), satisfaction would become a function of need. The nature of this relationship would depend on the level of reinforcement. A positive correlation between need and satisfaction would indicate a higher level of reinforcement, while a negative correlation would indicate a lower level of reinforcement.

The design of the studies required the correlation of scores on the 20 MIQ scales with general job satisfaction scores. The criterion, general job satisfaction, was developed from the Minnesota Satisfaction Questionnaire (MSQ). Two multivariate correlational techniques, linear multiple regression, and reciprocal averages predic-

[28] *Minnesota studies in vocational rehabilitation*, XIX.

tion,[29] were used, the latter being a method which takes account of nonlinear relationships between predictors and the criterion. Significant occupational reinforcers were indicated by significant partial regression coefficients in the linear multiple regression method, and by significant eta coefficients in the reciprocal averages method.

Various groups of workers were studied to determine and compare inferred occupational reinforcement patterns in terms of differences among occupational groups, differences between male and female workers, differences between long-tenure and short-tenure employees, and differences between full-time and part-time employees. The findings showed that *significant and unique occupational reinforcement patterns could be determined by the inferential approach.* Occupational reinforcement patterns were reliably inferred for managers and supervisor nurses, but not for truck drivers or secretaries. Differences in inferred occupational reinforcer patterns were observed between full-time and part-time nurses. Different patterns of reinforcers were found for male workers as compared with female workers in the same occupation, and for long-tenure as compared with short-tenure employees in the same job. These results lend support to Proposition II of the Theory of Work Adjustment.

Some support for Proposition IX of the Theory was also found in these studies of occupational reinforcement. This proposition states that the correspondence between the individual (abilities and needs) and the environment (ability requirements and reinforcer system) increases as a function of tenure. In comparing the occupational reinforcement patterns for long-tenure and short-tenure groups of laborers, a large difference was found in the number of significant reinforcers. Fifteen reinforcers were identified for the long-tenure group and only four for the short-tenure group, with all but one of the four short-tenure group reinforcers being significant also for the long-tenure group. Similar findings, but to a much lesser degree, were observed for long- and short-tenure groups of toy assemblers. These results indicate that tenure has some effect on occupational reinforcer patterns, as predicted from Proposition IX of the Theory of Work Adjustment.

[29] Weiss, D. J. A technique for curvilinear multivariate prediction. Unpublished doctoral dissertation, University of Minnesota 1963.

Implications for a Psychology of Disability

Work is proceeding on the development of a psychology of disability based on the Theory of Work Adjustment.[30] In this context, disability is defined in terms of its effects on work adjustment, rather than in terms of medical diagnostic categories. This kind of definition emphasizes the extent to which the individual's work potential is affected by his particular disability, and recognizes that disabling conditions do not necessarily have a significant effect on the individual's work adjustment. The effect of the disabling condition on the individual's work adjustment will depend not only on the disabling condition itself, but on such factors as the ability requirements of the individual's pre-trauma occupation. Disability defined in the context of the Theory of Work Adjustment permits consideration of both the variability of disabling conditions within a disability classification, and of individual differences in the impact of a particular disabling condition on the work adjustment of the individual.

Severity of disability is described in terms of such measures as amount of ability loss from the original pattern of ability strengths, amount of decrease in satisfactoriness in the pre-trauma job, reduction in the number of job requirement patterns potentially available to the individual, and ease or difficulty in achieving stability of the work personality.

A psychology of disability based on the Theory of Work Adjustment requires extensive research on such basic problems as the following:

1. The estimation of an individual's pre-trauma work personality from examination of job-analysis data for specific jobs in his work history (especially those in which he had substantial tenure), and from the cumulative record of his educational history;

2. The identification of characteristic need patterns for disability subgroups, when these subgroups are defined psychometrically instead of medically;

[30] *Minnesota studies in vocational rehabilitation*, XVII.

3. The identification of characteristic need patterns for subgroups of the psychiatrically disabled with common ability losses, regardless of specific psychiatric diagnosis;
4. The investigation of demographic characteristics, such as age and occupational level prior to trauma, as factors affecting the severity of disability;
5. The relationship between severity of disability and post-trauma stability of job satisfaction and work history;
6. The impact of sensory disability on the number of occupational possibilities;
7. The effect of individualizing the reinforcer system on the job to meet the needs of the disabled;
8. The effect of the manipulation of reinforcement during rehabilitation on the re-stabilization of the work personality;
9. The development of work personalities of congenitally disabled individuals;
10. The relationship between congenital disability and job satisfaction;
11. The relationship between job satisfaction and "outward visibility" and "social acceptability" of disabling conditions;
12. The measurement of the work personalities of mentally retarded individuals;
13. The relationship between stability of the work personality and "acceptance of loss";
14. The relationship of counselee's description of his work personality and vocational rehabilitation counseling process criteria; and,
15. The influence of disability information expressed in work adjustment terms on employer attitudes.

Implications for Vocational Rehabilitation Counseling

Because of its relevance to the stated goals of vocational rehabilitation, the Theory of Work Adjustment provides the vocational

rehabilitation counselor with a useful systematic framework within which to conceptualize counseling practice. The theory indicates the major variables for the counselor to examine, and the implications of relationships among these variables for his understanding of the counselee. A further advantage of the theory for the practicing counselor is the degree to which it has been operationalized (i.e., the practicability of measuring the relevant variables or otherwise obtaining data on them).

If the theory is adopted as the counselor's systematic frame of reference, several implications for practice are apparent:

1. The theory specifies the criteria which are relevant to vocational rehabilitation, namely: satisfaction, satisfactoriness and tenure outcomes. These criteria are defined in terms which are meaningful to counselor and counselee alike. In addition, these criteria are measurable. Measured criteria provide the counselor with bench marks by which the quality of counseling may be assessed and the effectiveness of different counseling techniques evaluated. The use of such criteria is a significant advance over reliance on gross quantitative indices of counseling effectiveness such as number of closures or number of job placements.

2. The theory also emphasizes the importance of considering the satisfaction and satisfactoriness outcomes jointly when counseling toward work adjustment. One criterion should not be maximized to the exclusion of the other. In other words, success on one criterion cannot compensate for failure on the other. The vocational rehabilitation counselor, working in the context of the theory, seeks to *optimize* satisfaction and satisfactoriness.

3. The theory stresses the importance, for counselors, of ascertaining not only the abilities of the counselee but his needs as well. "Needs," according to the theory, refers to the reinforcement properties associated by the individual with classes of stimulus conditions. Counseling the disabled toward work adjustment must be based on the individual's work-relevant abilities *and* needs, not merely on his disabling condition and the limitations connected with his disability.

4. The knowledge of counselee needs (that is, what is reinforcing to a counselee) can be useful to the counselor in his application of counseling techniques which utilize counselee reinforcement. Counseling, then, proceeds on an individualized basis.

5. If the counselor operates within this theory, he must obtain data on the available reinforcers in jobs, in addition to the occupational information related to skill and ability requirements of jobs.

6. Use of the theory facilitates organization of the counselor's information-gathering activities. The theory delineates the kinds of information that are most useful in predicting work adjustment, and the adequacy of the data collected is defined by its usefulness for prediction, rather than by its volume.

7. The Theory of Work Adjustment indicates several uses for work history information. For example, work history information may be used to confirm psychometric measurements of abilities and needs. It may be used to reconstruct the individual's pre-trauma levels of abilities and needs. It is helpful in understanding or explaining counseling outcomes which do not follow predictions from the theory. Work Adjustment Project research has also underscored the necessity of verifying work history information if it is to be used for any purpose.[31]

8. The counselor who operates within the Theory of Work Adjustment framework is required to assess the counselee's work-relevant sets of abilities and needs. It follows, therefore, that such a counselor must be conversant with appropriate ability- and need-measuring instruments and be expert in the use of these. In addition, such a counselor must be proficient in the technique of making predictions concerning work adjustment, based on the information provided by these instruments.

9. The counselor operating within the framework of the theory would de-emphasize attempts to bring about direct change in the individual's work personality, that is, in the individual's sets of abilities and needs. He would instead emphasize the careful assessment of the individual's abilities and needs and the identification of work environments appropriate for the utilization of such abilities and the satisfaction of such needs. He would focus on making the individual aware of his work personality (that is, his abilities and needs) and of the work environments appropriate for him.

10. The preceding statements have corresponding implications for the educational preparation of vocational rehabilitation coun-

[31] *Minnesota studies in vocational rehabilitation.* XII

selors, since they specify the knowledge and skills necessary to the application of the Theory of Work Adjustment in vocational rehabilitation counseling.

Implications for Administrators in Vocational Rehabilitation

When a vocational rehabilitation agency administrator adopts "work adjustment" as the focus of agency activity, the following implications of the Theory of Work Adjustment and Work Adjustment Project research are relevant:

1. Agency goals (insofar as these pertain to the provision of services to individuals) are defined in precise, measurable terms. Such definition enables agency personnel to work toward concrete, specifiable goals and to have clear standards by which their activity is assessed.

2. A "quality" dimension for the assessment of agency "production" is added to the criterion of number of closures. Assessment of satisfaction, satisfactoriness and tenure provides a more goal-relevant measure of agency effectiveness than is reflected in a simple count of cases closed. In addition, it shifts concern from a superficial criterion (closure count) to the more profound objectives of vocational rehabilitation as stated in public policy.

3. It can be seen from the preceding section (Implications for Vocational Rehabilitation Counseling) that the adoption of the Theory of Work Adjustment as the counselor's frame of reference should result in more efficient use of counselor time. For example, the theory indicates shifting the emphasis from "changing" the counselee to "matching" him with appropriate work environments. It points to counseling tools (such as ability- and need-measuring instruments) as important aids in counselee assessment, the proper use of which would enable the counselor to spend more time with more counselees. It specifies the kinds of information that should be collected for a counselee, thereby eliminating much information-gathering activity of dubious value.

4. Furthermore, the theory provides a framework for the evaluation on an agency-wide basis of different counseling techniques and other vocational rehabilitation procedures. For example, the effectiveness of individual versus group methods of counseling can be compared, using work adjustment measures as the criteria.

5. The theory should also be useful in indicating the appropriate focus for in-service training by defining the objectives and content of in-service training programs.

6. The adoption of a "work adjustment" focus by community rehabilitation agencies should contribute to the establishment of a more uniform basis for interagency communication, especially in relation to psychometric and personal history information.

7. The "work adjustment" approach places the emphasis, in the efforts to "employ the handicapped," on such realistic considerations (to both employer and disabled individual) as the probability of success on a given job or the number of jobs for which the probability of success is high.

8. When disability is viewed in the context of the Theory of Work Adjustment, the administrator should be able to specify more clearly the training and retraining facilities his rehabilitant population requires.

Implications for Vocational Rehabilitation Research

Monograph I of the Minnesota Studies in Vocational Rehabilitation (MSVR) noted that the research need of highest priority in vocational rehabilitation was the follow-up study.[32] Despite the accumulation of various kinds of statistical information on different rehabilitant groups, vocational rehabilitation workers have felt the need to evaluate, in more precise terms, the contribution of their programs to the vocational rehabilitation of the disabled. It is to this problem, and to the agency research personnel who are most immediately concerned with this problem, that this section is addressed.

1. The Theory of Work Adjustment defines evaluative criteria that are both meaningful in a follow-up study and relevant to the objectives of vocational rehabilitation. These criteria are the satisfaction, satisfactoriness, and tenure history of the rehabilitant. The theory provides a systematic framework within which to view these criteria. In addition, Work Adjustment Project research has provided criterion measures which meet rigorous psychometric standards. Work Adjustment Project research has also explored the inter-

[32] *Minnesota studies in vocational rehabilitation, I.*

relationships among these criterion measures (one of the specific research needs noted in MSVR Monograph I).[33]

2. The Theory of Work Adjustment has also indicated the predictors of these criteria. These predictors are the set of abilities and the set of needs of the rehabilitant, taken in relation to the ability requirements and the reinforcer system of the work environment in which the rehabilitant has been "placed."[34] While it is true that these predictors are chosen on theoretical grounds, research evidence is accumulating in support of the theory. Work Adjustment Project research has contributed toward the measurement of these predictors, principally toward the measurement of needs.[35] In addition, the Work Adjustment Project staff has explicated a definition of disability in vocationally relevant terms (a perennial vocational rehabilitation research problem).[36]

3. Work Adjustment Project research has several applications to the design of follow-up studies:

(a) As noted in MSVR Monograph I, the failure to provide "controls" was a major weakness of follow-up studies reported in the literature at that time.[37] Work Adjustment Project research developed a "co-worker control" method which not only meets the technical requirements of research design but also has been shown in practice to be extremely feasible. The method is described in detail in MSVR Monograph XIII.[38] The co-worker control group becomes the reference group against which the success of the vocationally rehabilitated group is evaluated;

(b) Work Adjustment Project research also demonstrates the importance of taking different work environments into consideration. Work Adjustment Project research has shown that differing research results are obtained for different groups stratified by work environment.[39] As a minimum, stratification by blue-collar vs. white-collar vs. managerial-professional work en-

[33] *Minnesota studies in vocational rehabilitation*, XIV.
[34] *Minnesota studies in vocational rehabilitation*, XV.
[35] *Minnesota studies in vocational rehabilitation*, XVI, XVIII.
[36] *Minnesota studies in vocational rehabilitation*, XVII.
[37] *Minnesota studies in vocational rehabilitation*, I.
[38] *Minnesota studies in vocational rehabilitation*, XIII, pp. 10-12.
[39] *Minnesota studies in vocational rehabilitation*, XIII, XIV, XVI.

vironments should be undertaken. As an ideal, stratification by job should be the goal.

Other applications of Work Adjustment Project research to the design of follow-up studies include: (a) control of the time variable in data collection; (b) procedures to insure objectivity (control of bias) and completeness (thoroughness) in data collection; (c) solutions to mechanical problems in a longitudinal design; and (d) sampling and data collection procedures to enable the use of the powerful tools of statistical analysis, such as analysis of variance.[40]

4. Several examples of methodology employed in the development of instruments are available in the MSVR series. These include the construction of attitude scales (e.g., needs, satisfaction) and questionnaire or interview schedules. [41] Procedures for development of such instruments have been fully described in the monograph series. In addition, normative data on items and scales are available (e.g., frequency of response for alternative choices and various populations, scale score distributions for various populations).[42]

5. The importance of verifying work history information has been discussed elsewhere in this monograph.[43] As a requirement of sound methodology, some kinds of "factual information," obtained by either interview or questionnaire, should be verified as a matter of course.

6. As pointed out in MSVR Monograph XII, the fact that employer response to questionnaires exceeded 90% should encourage the routine verification of work history information.[44] This fact, and the invariably high rate of returns achieved in Work Adjustment Project studies involving questionnaires, should encourage the use of questionnaires in follow-up studies. This high rate of return was due in large measure to the questionnaire follow-up procedures

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[40] e.g., *Minnesota studies in vocational rehabilitation*, XIII, XIV.

[41] Copies of needs questionnaires may be found in *Minnesota studies in vocational rehabilitation*, XVI, pp. 79-92; satisfaction questionnaires in *Minnesota studies in vocational rehabilitation*, XIII, pp. 80-85 and XVIII, pp. 65-71; and interview schedules in *Minnesota studies in vocational rehabilitation*, XII, pp. 28-36.

[42] Item and scale norms for satisfaction measures are in *Minnesota studies in vocational rehabilitation*, XIII, pp. 86-125 and pp. 178-181; norms for the MIQ are in *Minnesota studies in vocational rehabilitation*, XVI, pp. 69-75.

[43] See p. 22.

[44] *Minnesota studies in vocational rehabilitation*, XII, p. 9.

used in these studies. These procedures are discussed in several MSVR monographs.[45]

7. Another methodological application of Work Adjustment Project research worth mentioning is the set of procedures developed to insure the confidentiality of research participants. These procedures involve a "double-file" system which makes it extremely difficult to collate research data with names of persons. These procedures are described in the MSVR series.[46] The system has built and kept the continuing confidence of several thousand research participants in the Work Adjustment Project.

8. In addition to the system of insuring confidentiality of participants, interest of the participants in the Work Adjustment Project has been maintained through a set of "feedback" procedures. As a part of the Work Adjustment Project methodology, letters of appreciation are written to all participants, those who take psychological tests are sent reports on the results, and participating employers are sent summary reports of research findings.

The preceding discussion is presented to indicate that it is feasible for vocational rehabilitation research workers to undertake more intensive, and extensive, follow-up studies of rehabilitants within the framework of the Theory of Work Adjustment and with the supporting technology of the Work Adjustment Project.

[45] *Minnesota studies in vocational rehabilitation*, V, p. 10; XI, p. 7; XII, p. 8; XVI, pp. 21-22.

[46] *Minnesota studies in vocational rehabilitation*, XIII, pp. 10-12.

Appendix A

Summaries of the Monographs in the Minnesota Studies in Vocational Rehabilitation Series

I. Research Plan and Bibliography

Purpose—Although gross data are available on the employment or non-employment of the disabled population in the United States, these figures do not touch on the more important issues of suitability of employment, employment stability, job adjustment and job satisfaction. This monograph presents a research plan for the study of a selected, limited aspect of these relatively unexplored issues, to serve as the starting point for a program of research on the employment problems of disabled persons. The monograph also includes an annotated review of the pertinent literature.

Research Plan—Two major projects are outlined: (a) a community survey, to identify a sample of the disabled in the community, and to serve as the basis for an intensive study of the characteristics and employment problems of disabled persons, with methodological sub-studies to determine the effectiveness of different survey methods of locating, identifying, and "following-up" the disabled persons; and (b) an experimental study, to be conducted in cooperation with the State Division of Vocational Rehabilitation and the State Employment Service, to study the effectiveness of job placement procedures.

Review of the Literature—A review of the research literature on the employment of the disabled is presented in this monograph as a background for the research plan. Annotations from 61 articles are included in the bibliography. This bibliography is the result of a search of the literature for the years 1931 to 1958. Evaluation of the studies is limited by such difficulties as inadequate description of sample characteristics, inconsistency in the choice of variables, and lack of comparability in the operational definition of variables. Most of the studies are evaluations of total rehabilitation programs or of rehabilitation procedures and techniques. Many studies illustrate the problems involved in the choice of evaluative criteria and in not providing for a control group.

II. A Study of Referral Information

Purpose—Preparing for the experimental study of job placement procedures, this study was undertaken to investigate the preferences of counselors and placement specialists for the types of information to be included in inter-agency placement referrals, and the form in which this information should be transmitted.

Method—A questionnaire was constructed to obtain preferences concerning (a) the kinds of information felt to be most useful in the placement of disabled persons; and (b) the form in which referral information should be expressed. After pre-testing, the questionnaire was mailed to groups of vocational rehabilitation counselors and Employment Service placement personnel who were involved in providing job placement services for the disabled.

Results—1. Counselors and placement specialists generally agreed that the following information was important in referrals: vocational plan, disability, education, work experience, and test results. Social history was believed to be less important.

2. The items listed as being most important for referral were: physical capacities, working conditions to be avoided, work history for the past 5 years, kind of educational specialization, total number of years of education, vocational plan, aptitude test results, experience with tools and equipment, degrees or certificates earned, expected medical outcome.

3. Both counselors and placement interviewers preferred to receive referral information in terms of interpreted statements, rather than general or technical statements.

4. The study suggested that many referral problems result from the failure to communicate the information which both groups consider important in job placement of the disabled. The use of a standardized referral form and the training of workers in referral procedures would improve the referral process.

III. A Follow-up Study of Placement Success

Purpose—This study was undertaken to examine the vocational adjustment of a sample of disabled persons who had received services from the Division of Vocational Rehabilitation (DVR) and the Employment Service (ES).

Method—A two-part interview was used: the first part was designed to determine if any member of a household was disabled; the second part, to be used when a disabled person was identified, consisted of questions about the disabled person's characteristics, employment, and employment problems.

Results—Of the 91 disabled individuals identified, 60 were employed full-time, 7 were employed part-time, 19 were unemployed and 5 were no longer in the labor force. The unemployment rate was found to be 22%, considerably higher than the 8.9% rate for the state's labor force at that time.

Full-time workers among the disabled worked an average of 42.4 hours per week and earned an average of $75.00 per week, as compared with an average work week of 38.9 hours and weekly pay of $81.17 for non-disabled workers during a comparable period. More than two-thirds of the disabled persons held jobs which were at the same or higher levels than the jobs held before they were disabled.

About one-fifth of the disabled persons did not like their jobs. This compared with a median of 13% reported in studies of job satisfaction. The most frequently mentioned reason for either liking or disliking the job was the type of work involved.

According to the interviewees, employer resistance was the major difficulty they faced in finding and holding jobs, followed by the physical limitations of their disability. Many suggestions were offered toward the improvement of placement services for the disabled.

IV. A Study of 1,637 DVR Counselees

Purpose—Statistical information regarding the characteristics, rehabilitation status and job placement of the Minnesota DVR rehabilitant population was analyzed to provide the research staff with needed background knowledge about vocationally handicapped disabled persons.

Method—This study concerned persons counseled during the years 1953-1957 at the Minneapolis and St. Paul offices of Minnesota DVR. Data were transcribed from the closed case reports on file at the DVR offices and submitted to statistical analysis.

Results—Major findings of the analysis were:

1. Median age at acceptance was 21 years. Only one-fourth of all persons in the sample had had substantial work experience prior to rehabilitation;

2. The largest disability groups were: orthopedic (27%), mental retardation (12%), tuberculosis (12%), deaf and hard-of-hearing (10%). More than half were disabled before age 14;

3. One-third of the total sample attended business college, college or university; one-fifth were trained in public, vocational or private trade schools; more than one-third did not receive any training;

4. Half of the counselees obtained jobs in the professional-managerial or clerical-sales fields. Median weekly wage of the total group was $51. Half of the counselees did not receive agency help in finding their jobs;

5. Only 60% of the university-trained counselees obtained jobs in professional fields. Fewer than half of those trained in vocational schools obtained skilled and semi-skilled jobs;

6. Minneapolis counselees differed from those of St. Paul in age, sex, marital status, number of dependents, education, disability, and job at closure, suggesting a need for caution in generalizing from one urban area to another;

7. Age, education and employment history at acceptance were important factors in determining the type of training program received by the counselees;

8. Economic responsibility, as reflected by the number of dependents, was more important than age at acceptance or type of training in determining the length of the rehabilitation period, the period of rehabilitation being shorter for those with more dependents;

9. Counselees with congenital disabilities spent the most time and those with lower extremity amputations the least time in rehabilitation;

10. Nature of disability was related to job at closure, weekly earnings, and method of obtaining jobs.

V. Methodological Problems in Rehabilitation Research

Purpose—This series of studies was undertaken to develop instruments and procedures for use in a household survey to identify the disabled and obtain vocationally relevant data on them.

Method—The following studies were carried out:

1. The development of a questionnaire for use in identifying disabled persons in the general population;

2. The comparison of three identification methods (telephone, mail and personal interview) in terms of the proportion of disabled persons identified by each method;

3. The development of a follow-up questionnaire to obtain information on present employment status, employment history, rehabilitation services received, and other personal data;

4. The determination of the validity and reliability of the follow-up information;

5. The comparison of methods for obtaining follow-up information in terms of proportion of persons reached, completeness and usability of information, and cost of obtaining the information.

The instruments and methods developed in the project were pretested on randomly selected groups of disabled DVR counselees and disabled ES job applicants.

Results—The following major findings resulted from these studies:

1. Wording of identification questions made a difference in the proportion of disabled persons identified;

2. The three methods of identifying disabled persons (telephone interview, mail questionnaire, and personal interview) were equally effective in terms of the proportion of persons identified;

3. Only 70% of the disabled were identified by any one of the three methods;

4. Individuals with neurological disabilities were most easily identified, with 90% identification;

5. No differences were found between the identified and the non-identified persons in age, sex, education, marital status, number of dependents, or occupation;

6. The personal interview was found to be the best method for obtaining follow-up information. Generally, this information was found to be valid in terms of agreement with agency records and employer information; and

7. Coding the job information according to the Dictionary of Occupational Titles was reliable only for the first two code-digits.

VI. A Survey of the Physically Handicapped in Minnesota

Purpose—The research described in this monograph was carried out at the request of the Minnesota State Legislature's Interim Commission on the Employment of the Handicapped and was supported largely by this Commission. Its purpose was to provide basic facts needed for an analysis of the employment problems of the disabled.

Method—The study consisted of two parts:

1. A survey of a random sample of Minnesota households for the purpose of estimating the size of the non-institutionalized population of disabled persons by type of disability and age; and

2. A survey of every hospital, institution, nursing home and boarding care home in Minnesota.

The household survey used, with slight modifications, a questionnaire developed in previous methodological studies (Monograph V of this series). Professional interviewers surveyed a total of 2,440 households throughout the state. These households were chosen to reflect population density and geographic location.

The institutional survey used a questionnaire developed in consultation with directors and medical personnel of hospitals and institutions in Minneapolis. The questionnaire was then mailed to each of the 641 institutions on the survey list. Usable, completed questionnaires were received from 82% of the institutions, a group which represented 91% of the available beds.

Results—Based on the sample data, the following estimates were made:

1. There are approximately 323,000 disabled persons in Minnesota. Of these, approximately 288,000 are non-institutionalized and 35,000 are in institutions;

2. The three largest disability groups, constituting about half of all disabled persons in the state are: orthopedic (89,000), cardiovascular (59,000), and generalized-systemic (32,000);

3. Approximately 40,000 disabled persons are under 14 years of age; 200,000 are in the labor force age range of 14-64 years; 77,000 are 65 years and older;

4. Disabilities among the non-institutionalized are caused by illness in 60% of the cases, by employment accidents in 9%, and by war injuries and one or more illnesses in 4% of the cases;

5. More than half (56%) of the non-institutionalized disabled in the labor force age range are currently not working. Of these, approximately 21% are actively looking for work. Approximately 33% of the group have worked since their injury or illness;

6. Approximately 41% of the non-institutionalized disabled persons live in rural areas, suggesting a need to increase services in the rural areas; and

7. Only 30% of the disabled are less than 30 years old, while 60% of those rehabilitated are below age 30, indicating a need for more services to persons in the higher age levels.

VII. Factors Related to Employment Success

Purpose—This study was conducted to investigate the employment status and related characteristics of the disabled persons identified in the statewide survey (Monograph VI).

Method—Interview data on a sample of 255 disabled persons of labor force age (14-64 years) were analyzed with particular reference to employment problems. Students and housewives were omitted from this sample.

Results—Personal characteristics of the sample included: median age was 44 years; three-fourths of the disabled males, but only one-fourth of the disabled females, were married; average school grade completed was 10th grade; there was an average of 3.5 dependents in each household.

In terms of employment status:

1. 59% of the group were employed. Of those actively looking for work, 18% had never worked at a full-time job;

2. Median wage for employed disabled persons was $65 per week, compared with $77 for the average non-disabled worker;

3. The disabled employee worked an average of 40 hours per week, compared with 39 for the average non-disabled worker;

4. The disabled worker had been employed on his present job for an average of more than four years;

5. More than 90% of persons with orthopedic or respiratory disabilities who had worked before disablement were able to return to work. In contrast, less than 60% of those with cardiovascular and neuropsychiatric disabilities were able to return to work;

6. Of those who had worked before disablement and who were able to return to work, 80% maintained their occupational level, and more than half maintained or increased their earning power;

7. Two-thirds of the men, but only one-third of the women, were employed;

8. Age was not related to employment status, but age at disablement was. Being disabled before age 30 was least handicapping,

and being disabled after age 45 was most handicapping, in terms of maintaining employment status;

9. Nature of disability was related to employment status, but origin of disability and occupation were not;

10. Employment rates increased with education, except for persons over 45. For these persons, education did not seem to help in maintaining employment status; and

11. Only half of those persons with one or two dependents were employed, compared with 80% of those with three or four dependents.

VIII. A Study of ES Applicants

Purpose—This monograph reports the second of two studies of disabled populations undertaken to provide the research staff with background knowledge about vocationally handicapped disabled persons. The first study of DVR counselees was reported in Monograph IV of this series.

Method—This study concerned disabled job applicants at the Minneapolis and St. Paul local offices of the State Employment Service (ES). Data were transcribed from application cards on file at those offices, and submitted to statistical analysis.

Results—Major findings of the analysis were:

1. Handicapped ES applicants differed from DVR counselees in age, occupation and kind of disability. The population served by the Employment Service was older, predominantly blue-collar, and was less severely disabled than the DVR population;

2. Disabled ES applicants in Minneapolis differed from those in St. Paul in age, marital status, and number of dependents;

3. Persons with neuropsychiatric and neurological disabilities received more counseling service than any other disability group;

4. Referrals were made to employers for 34% of the disabled applicants in the sample. Of those referred, 46% were hired. Relatively more referrals were made for females and for applicants with more than a high school education;

5. Among applicants referred to employers, the proportion hired was higher for those referred for service and unskilled jobs, for the less severely disabled, and for persons widowed, divorced, or separated. No relationship was found between hiring rate and sex, age, education, number of dependents, kind of disability, length of time on last job, or wage on last job;

6. Counseled and non-counseled groups, matched for sex, age, education and occupation, showed no differences in length of time on past job, pay on last job, or type of disability, but the counseled group was more severely disabled;

7. Counseled and non-counseled groups did not differ in frequency of referral or hires. Since employers tended to hire the less

severely disabled, this might be regarded as a favorable outcome of counseling;

8. A comparison of disabled and non-disabled applicants in selected occupational groups showed there were no differences between the two groups in the proportion of each sex, in amount of education, in marital status and number of dependents, in length of time or pay on last job (except for disabled applicants on semiskilled jobs who had been paid more than the non-disabled on their last jobs), in the frequency of referral to employers, in the frequency of being hired, and rates of pay (with the exception of disabled applicants for professional-managerial jobs, who were hired at higher rates of pay).

The disabled were older than the non-disabled persons in the same occupational categories. The non-disabled group refused referrals, refused employment, or failed to report to employers more often than did the disabled. There were differences between the two groups in pay rates for semiskilled, clerical and sales jobs to which applicants were referred, the rate being lower for referrals of the disabled group.

IX. The Application of Research Results

Purpose—This monograph was written to summarize the first eight monographs of the MSVR series and to indicate implications of the studies for vocational rehabilitation practitioners—administrators, counselors and placement workers. In addition, technical considerations of interest to research workers in the field were summarized.

Implications—1. For Administrators: The studies point up the magnitude of the rehabilitation problem and the need to review present criteria for accepting applicants for rehabilitation services. The data show more services being provided for younger persons than for older persons, and fewer services for the rural disabled, the blue-collar disabled, and persons with cardiovascular or systemic disabilities. The findings also indicate counselor training needs in specific areas, and the need for careful consideration of the criteria by which a counselor's work is evaluated. Furthermore, the studies underscore the importance of evaluating rehabilitation programs through research utilizing a broad range of criteria (such as work adjustment criteria), rather than in terms of numbers of closures alone.

2. For Counselors: The major implications of the studies have to do with the problem of evaluating the methods and results of counseling. For example, relationships observed between counselee characteristics at acceptance and measures of progress and outcomes suggest that the agency's acceptance criteria must be examined, that stereotyping can occur in the counseling or rehabilitation process, and that case records can be used to evaluate counseling techniques and outcomes. In addition, the study of referral methods suggests ways of improving communications among the various rehabilitation specialists.

3. For Placement Workers: The studies of employment and unemployment among the disabled have such implications for placement workers as the need to extend placement services, the usefulness of personal data and work history information in achieving effective placement, the need for attention to the fact that the disabled are frequently overqualified for the jobs in which they are placed. The dissatisfaction with placement services which was ex-

pressed by disabled persons should spur efforts to evaluate these services through follow-up studies.

4. For Research Workers: The Minnesota studies reveal the paucity of evaluation in vocational rehabilitation, and the need for carefully designed and controlled studies. Research needs in many areas are suggested, such as the determination of criteria for evaluating counseling and rehabilitation-program outcomes, and the development of a methodology for follow-up studies. Implications for research methodology are indicated (e.g., the use of survey methods in identifying the disabled in the general population, the validation of interview data, and the design of work history schedules).

X. A Definition of Work Adjustment

Purpose—Based on previous findings in the Minnesota Studies in Vocational Rehabilitation, the concept of "work adjustment"—the adjustment of the individual to the world of work—is advanced as encompassing the criteria appropriate for the evaluation of vocational rehabilitation outcomes. This monograph reviews the research literature relevant to the concept of work adjustment: studies on job satisfaction, morale and employee attitudes, worker motivation, behavioral criteria and vocational fitness.

Review of Literature—Job satisfaction is one of the primary indicators of work adjustment. This includes both overall satisfaction and satisfaction with specific aspects of the work environment. Job satisfaction has several correlates which also indicate work adjustment. Among these are wage progression, progression within the company, steadiness of employment, turnover, worker popularity, and utilization of one's abilities. Several factors apparently affect job satisfaction. These include age, sex, education, vocational training, occupation, personality, general adjustment and general satisfaction.

Studies on morale and employee attitudes reinforce the conclusions drawn from job satisfaction studies. Certain major attitudinal (i.e., satisfaction) dimensions have appeared consistently in the studies, such as satisfaction with supervision, wages, working conditions, co-workers, the company, advancement, communication, management and type of work. Similarly, certain variables which relate to work adjustment have been mentioned consistently, such as tenure, wage progression, evaluations by superiors and co-workers, productivity, efficiency and turnover.

The literature on worker motivation underscores the desirability of including motivational concepts in the definition of work adjustment. Satisfaction, for example, is conceptually related to needs, but the available literature has not clearly defined this relationship. Other relevant concepts in motivation include the level of aspiration, expectation, and vocational interest.

Satisfactoriness, another primary indicator of work adjustment, is measured in terms of such behavioral criteria as productivity, efficiency, turnover, tenure, absenteeism and disciplinary problems. The complex interrelationships among these criteria, and methodological problems in the use of multiple criteria complicate the task

of defining satisfactoriness. The tendency of measurements for these criteria to fluctuate over time complicates an already difficult problem.

Labor mobility studies show that work history patterns also provide indications of work adjustment. However, serious problems concerning the validity and reliability of work history data as currently collected have been indicated by the literature. Finally, indicators of vocational fitness help to predict work adjustment. When used in conjunction with other work adjustment indicators, the determination of vocational fitness enlarges the definition of work adjustment.

Conclusions—The following conclusions, derived from the survey of the literature, apply to the study of work adjustment:

1. The individual should be the basic unit in the study of work adjustment;

2. Work adjustment may be inferred from two primary indicators, "satisfaction" and "satisfactoriness";

3. Work adjustment occurs throughout the individual's working years. There may be cycles of satisfaction and dissatisfaction, satisfactoriness and unsatisfactoriness;

4. Work adjustment patterns may differ from occupation to occupation;

5. The study of inter-relationships among work adjustment criteria is a much-needed research priority;

6. Demographic factors, such as sex, age, and educational level, may affect considerably the satisfaction and satisfactoriness outcomes;

7. The following psychological instruments seem desirable in studying work adjustment: a satisfaction measure (including both overall and specific satisfactions); a measure of needs and aspirations; an aptitude test battery; a vocational interest test; measures of productivity and/or efficiency; measures of absenteeism, accidents, turnover, disciplinary problems and grievances; a work history questionnaire and follow-up schedule;

8. In addition, the study of work adjustment of the disabled requires as a minimum a detailed description and history of the individual's disability and rehabilitation experiences.

XI. Attitudinal Barriers to Employment

Purpose—An important correlate of work adjustment for the disabled is the attitude of management toward hiring the disabled worker. This study was conducted to determine what these management attitudes were, and what managers believed were the factors underlying the high rate of unemployment among the disabled.

Method—Eight hundred personnel managers and five hundred first-line supervisors were surveyed by means of a mail questionnaire to determine their attitudes toward workers in general as well as toward disabled workers. The questionnaire included both factual and opinion questions, items concerning company selection and placement procedures, and items reflecting reasons for not hiring the disabled.

Results—In general, those responding to the questionnaire had favorable attitudes concerning the hiring of the disabled. The disabled were *not* seen as having higher accident, turnover, and absenteeism rates, or lower production rates, than the non-disabled. Most items pertaining to personal characteristics of the disabled also elicited favorable responses. The cost of hiring the disabled was not advanced as being of major importance, most personnel managers being sufficiently familiar with workmen's compensation laws to know that hiring disabled persons did not automatically raise compensation rates.

However, responses to certain other items indicated that employment and advancement opportunities were limited for the disabled. Respondents stressed the importance of such factors as health, appearance and the potential for flexible placement within the company. There was a strong rejection of differential standards for employees, suggesting that the disabled were expected to compete on equal terms with the non-disabled.

Many of the personnel managers and supervisors seemed unaware of the training aspect of vocational rehabilitation, and felt that it was hard to find jobs that disabled persons were trained to do. Also, many were uninformed on the second injury fund aspect of workmen's compensation. Many felt that union contracts and seniority clauses made it difficult to transfer workers to less demanding jobs when they became unable to perform their usual tasks. Half of the personnel managers and one-fourth of the supervisors agreed

that a company should not hire anyone who could not pass a physical examination.

One of the major findings of the survey was that the attitudes of the supervisors and personnel managers were generally very similar.

The problem of unemployment among the disabled was recognized by the respondents but there was lack of agreement as to possible solutions. Any form of governmental intervention was strongly rejected. There were indications that attitudes and practices with regard to hiring the disabled vary so widely that each company and each personnel manager must be evaluated separately.

Furthermore, it appears that the effort to "educate" industry-at-large about the employment problems of the disabled has served its purpose, but a new focus is needed. This might well require exploring with each individual company the potential barriers to the employment of the disabled and making arrangements to minimize such barriers.

XII. Validity of Work Histories Obtained by Interview

Purpose—This study was conducted to determine the validity of work history data obtained in interviews, when these data are compared with information furnished by employers.

Method—Work histories were obtained from 325 individuals by means of structured interviews. The data, covering a five-year period and at least 3 jobs, included such items as job title and duties, starting and ending dates, hours, starting pay and ending pay, kind of job training, promotions and reason for separation. To serve as the criterion of validity, data on these same items were obtained from employers through mailed questionnaires.

Results—The study revealed that validity of work history information obtained by interview was generally not very high. On only three of the eleven items studied did the proportion of valid information exceed 70%. On four items, 40% or more of the information was invalid.

Validity varied from item to item. The most valid information was that reported for separation and hours; the least valid, for pay. Information on job title and duties, and length of job, was valid in only about two-thirds of the cases studied. For most items, validity decreased as time increased between job termination and interview. However, information for the present job was no more valid than for past jobs.

Invalidity by means of "upgrading" occurred more frequently than by "downgrading." The ratio of "upgrading" to "downgrading" instances varied from item to item, ranging from 5:1 for job title and duties to 1:1 for ending date and pay increase. Time, age, disability, education, occupation and sex had minor and item-specific effects on the occurrence of invalidity.

The following implications are suggested by the study:

1. The use of interview-obtained work history information without further verification is unwarranted. The fact that more than 90% of employers responded to the validation questionnaire should encourage the routine verification of interview-obtained work history data.

2. The validity of the work history information is so variable that the specific item(s) involved must be indicated when speaking of validity.

3. The influence of time on validity of data suggests that memory is an important factor in producing invalidity of information. However, it appears that memory distortion is not random, but, rather, tends in the more socially desirable direction.

4. There is no evidence from this study that characteristics of the interviewee such as disability, age, occupation, or sex, have any marked influence on the validity of the information or the frequency of different types of invalidity.

XIII. The Measurement of Employment Satisfaction

Purpose—This study was carried out to develop criterion measures of satisfaction, and to learn more about the job satisfaction of disabled persons.

Method—The instruments used were the Industrial Relations Center's Employee Attitude Scale, the Hoppock Job Satisfaction Blank, and 22 experimental job satisfaction items. The sample consisted of 638 disabled and 530 non-disabled persons, further subdivided into four occupational groups: nonskilled blue-collar, skilled blue-collar, nonskilled white-collar, and skilled white-collar. Analysis of the data focused on differences among groups and on the development of multidimensional scales measuring satisfaction in each group.

Results—In general, the study showed that satisfaction was organized in a similar fashion for each of the eight groups. Five components were found for all groups: general job satisfaction, satisfaction with working conditions, with supervision, with compensation, and with co-workers. Other components found for specific groups included: sensitivity, satisfaction with company and with type of work. Scales were developed for each group to measure different components of satisfaction. These scales, for the most part, were found to be highly reliable and independent.

The following differences were observed among the groups:

1. A "sensitivity" component appeared for all but the skilled white-collar groups (disabled and control). This component represented the worker's sensitivity about his position in the social structure of the world of work. It appeared to constitute a more prominent component for blue-collar workers than for white-collar workers.

2. A "satisfaction with company" component appeared only for skilled blue-collar workers, both disabled and control. Apparently, for these workers, satisfaction with company was distinct from general job satisfaction.

3. A "satisfaction with type of work" component appeared for the disabled, skilled blue-collar group only. This scale appeared to pertain to occupational rather than job satisfaction.

4. Differences in scale content were observed more frequently among the occupational groups than between disabled and control groups.

5. Differences in the organization of satisfaction tended to be associated mainly with occupational differences rather than with the presence or absence of disability. However, presence or absence of disability tended to be the more important factor in determining level of satisfaction, with the disabled being consistently lower on all components of satisfaction.

6. For most groups, satisfaction with co-workers was highest, followed in order by satisfaction with supervision, with working conditions, general job satisfaction and compensation.

XIV. The Measurement of Employment Satisfactoriness

Purpose—This study was undertaken to develop criterion measures of employment satisfactoriness, to examine satisfactoriness among disabled workers as compared with the non-disabled, and to determine the relationship between satisfactoriness and satisfaction.

Method—The instruments used were an Alternation Ranking Form, a Supervisor Evaluation Form, and a Personnel Records Questionnaire. The sample consisted of 483 disabled persons and 496 non-disabled co-workers of the disabled workers, each group subdivided into four occupational groups: nonskilled blue-collar, skilled blue-collar, nonskilled white-collar, and skilled white-collar. Differences among the groups were analyzed. Scales measuring components of satisfactoriness were developed. Finally, the relationship between measured satisfaction and measured satisfactoriness was determined for each group.

Results—The study showed that the disabled workers compared favorably with the "control" workers on all but two items: overall ranking and quality of work performed. On these two items they ranked lower.

The skilled workers were rated higher than the nonskilled on job suitability, but were rated lower on absences and lateness. The white-collar workers were rated higher than the blue-collar workers on disciplinary actions, quality of work, promotability, and recommendation for pay raise. On all other items, the contrasted groups obtained comparable ratings.

Satisfactoriness was organized in a similar fashion for all eight groups, and consisted of two components: performance and conformance. Reliable and relatively independent scales were developed to measure these components.

Analysis showed that the disabled were rated as favorably as their non-disabled counterparts on both performance and conformance; skilled workers were rated higher than the nonskilled on both scales; and white-collar workers were rated higher than blue-collar workers on performance only. Analysis also showed that the satisfactoriness scales measured dimensions which were different from those measured by the satisfaction scales.

XV. A Theory of Work Adjustment

Purpose—This monograph proposes a theory of work adjustment as a systematic contribution to the science of vocational psychology and as a theoretical base for research in vocational rehabilitation and vocational behavior.

The Theory—The theory builds on such basic psychological concepts as stimulus, response, and reinforcement. It views the individual as a responding organism, with abilities based on those responses utilized most frequently, and needs related to those environmental stimuli (reinforcers) which most frequently reinforce the individual's responses. The individual's work-relevant abilities and needs constitute his work personality. On a given job, the abilities required set the standard for work satisfactoriness, and the reinforcers provided by the work environment establish the potential for need satisfaction. Correspondence between the individual's abilities and the job's ability requirements results in satisfactoriness, while correspondence between the job's reinforcers and the individual's needs results in satisfaction. The individual's work adjustment at any point in time is defined by the concurrent levels of his satisfactoriness and satisfaction.

Implications—Research hypotheses derived from the theory are proposed by the authors. The literature on work adjustment and related topics is interpreted in relation to the theory. The social utility of the theory is pointed out in terms of its relevance to vocational counseling, education, and special problem areas such as disability, automation, unemployment and retirement.

XVI. The Measurement of Vocational Needs

Purpose—The Theory of Work Adjustment requires the assessment of needs in the work personality. The purpose of this study was to develop a measure of vocational needs.

Method—Standard procedures for the construction of summated rating scales were used in developing two need-measuring instruments. The N-Factors Questionnaire (NFQ), consisting of two-response-choice, 4-item scales measuring 12 hypothesized dimensions (based on Schaffer's work), was administered to more than 1,000 persons. The Minnesota Importance Questionnaire (MIQ) was based on the NFQ and consisted of 20 five-response-choice, 5-item scales. It was administered to more than 2,300 persons.

Results—The NFQ measured 12 dimensions as intended, but only five of the scales had adequate reliabilities. The MIQ scales, on the other hand, had very adequate reliabilities but were less unique (independent of each other) than the NFQ scales. However, the MIQ scales had enough specific variance to be considered relatively independent.

Group differences in MIQ scores showed some evidence of validity for the MIQ. Differences among occupational groups and between employed and pre-employment groups were in accord with expectations based on the Theory. In addition, differences were observed between disabled and nondisabled groups. Furthermore, the MIQ was found to have sufficient test-retest reliability to warrant its further use as a research instrument.

XVII. Disability and Work

Purpose—In this monograph, disability is viewed in the context of the Theory of Work Adjustment. Disability is defined in terms of its effects on work adjustment, rather than in medical terms, to focus attention on the potential of the disabled person for work adjustment. The monograph is written to delineate a psychology of disability as derived from the Theory of Work Adjustment.

A Psychology of Disability—Work adjustment, according to the theory, is the interaction between an individual and his work environment, the outcome of this interaction being reflected in measures of satisfaction, satisfactoriness and tenure. The theory states that work adjustment can be predicted from knowledge of the correspondence between an individual's abilities and the job ability requirements on the one hand, and between the individual's needs and the job reinforcer system on the other. For vocational rehabilitation counseling, this would imply a concern for the effect of trauma on the individual's job-relevant abilities, and on his vocational needs as well, when changes in needs accompany changes in job-relevant abilities.

Disability is defined literally as ability loss. A significant loss is a change from the pre-trauma correspondence between abilities and job requirements which is reflected in a change in satisfactoriness or in the number of job-requirement patterns for which the individual would be satisfactory. Other terms of importance in defining disability are also reexamined within the context of the theory. A number of research problems leading to a psychology of disability and work are listed.

A discussion of procedures for rehabilitation counseling based on the Theory of Work Adjustment is presented, with emphasis on such steps as: securing detailed background information; constructing a model of the pre-trauma personality; measuring abilities and needs and comparing their pre- and post-trauma levels; and determining which jobs match the individual's ability and need patterns. Criteria against which to measure counseling effectiveness are also indicated.

XVIII. Construct Validation Studies of the Minnesota Importance Questionnaire

Purpose—This monograph reports studies on the construct validity of the Minnesota Importance Questionnaire. The design of these studies is based on Proposition III of the Theory of Work Adjustment which relates the need variables to the variables of reinforcement level and of satisfaction.

Method—The Minnesota Satisfaction Questionnaire (MSQ) was developed as a measure of satisfaction on 20 dimensions paralleling those used in the MIQ. Administered to 1,793 employed individuals, it was found to have lower means, higher variabilities, higher reliabilities, and more specific variance than the corresponding MIQ scales. Factor analysis yielded two factors interpretable as satisfaction with the job ("intrinsic" satisfaction) and with the work environment, principally supervision ("extrinsic" satisfaction). The MIQ and MSQ were shown, by various analyses, to be measuring different sets of variables.

A judging procedure was used to measure reinforcement level. Nineteen jobs were ranked in terms of comparative reinforcement levels accorded workers in these jobs. Ranking was done separately for each reinforcement dimension. (Need and satisfaction data had been previously obtained for employees in these 19 jobs.) The data were analyzed in two ways: (1) a study of satisfaction scores for groups cross-classified by need and reinforcement level, and (2) a comparison of need-level frequency distributions for high and low reinforcement groups.

Results—Findings from the two analyses supported the construct validity of 10 of the 16 MIQ scales studied. Four dimensions were not included in the study because in these cases reinforcement level was unique to the particular work situation. These four dimensions were: company policies and practices, co-workers, supervision-human relations, and supervision-technical. The ten scales validated by the study were: ability utilization, achievement, advancement, authority, compensation, creativity, independence, responsibility, social service and variety.

These studies also supported Proposition III of the Theory of Work Adjustment in that satisfaction on several dimensions was shown to be a function of the correspondence between need and reinforcement.

XIX. An Inferential Approach to Occupational Reinforcement

Purpose—This monograph reports an approach to the identification of the effective reinforcers in the work environment. The method, inferring reinforcers from data on need and satisfaction, provides a means of describing the work environment in terms of effective reinforcers, as required by the Theory of Work Adjustment.

Method—Linear multiple regression and reciprocal averages prediction were used in the multivariate prediction of satisfaction from needs. General job satisfaction, measured by the MSQ, was the criterion, and the 20 MIQ scales were the predictors. Prediction equations were derived on development samples and tested on cross-validation samples when the latter were available. Significant regression coefficients (in the linear multiple regression method) and significant eta coefficients (in the reciprocal averages method) indicated the effective reinforcers.

Results—Major findings of the study were:

1. Reliable (i.e., cross-validated) occupational reinforcer patterns were inferred for managers and supervisor-nurses, but not for truck drivers or secretaries.

2. Inferred reinforcer patterns differed for groups of males as compared with groups of females in the same occupations, and for workers with tenure of more than two years as compared with those having tenure of less than two years, also in the same occupation. Longer tenure was associated with a larger number of reinforcers. These findings, however, were not cross-validated.

3. Differences were observed in the reinforcer patterns inferred for full-time and part-time nurses. More reinforcers were included in the set for full-time nurses. Cross-validation confirmed the inferred reinforcer patterns, but some lack of reliability in the inferential method was indicated by differences in patterns obtained for different samples.

4. The two multivariate techniques functioned differently to some degree in these determinations, indicating the differential significance of predictor-variable interaction and the presence of nonlinear predictor-criterion relationships.

Appendix B

Publications of the Work Adjustment Project

Publications of the Work Adjustment Project

Dawis, R. V., England, G. W., Lofquist, L. H., Hakes, D. T. Research plan and bibliography. *Minnesota Studies in Vocational Rehabilitation*, I, June 1958.

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