

Minnesota Studies in Vocational Rehabilitation:

V. Methodological Problems in Rehabilitation Research

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Methodological Problems in Rehabilitation Research¹

Summary

In preparation for a state-wide survey of the physically handicapped, a series of studies was undertaken to develop the instruments and determine the methods to use in the survey. Two instruments were constructed: an *identification questionnaire*, to identify physically handicapped individuals in the general population; and a *follow-up questionnaire*, to obtain information (such as employment and rehabilitation data) on the handicapped individuals identified. Three survey methods (telephone interview, mail questionnaire, and personal interview) were compared with respect to effectiveness of identifying physically handicapped individuals in the general population and obtaining follow-up information. Questionnaires and methods were tested on groups of individuals known (to the research staff but not to the interviewers) to be physically handicapped.

The following major findings resulted from this series of studies:

1. Wording of the identification questions made a difference in the proportion of handicapped individuals identified.
2. All three methods, telephone interview, mail questionnaire, and personal interview, were about equally effective in identifying handicapped individuals.
3. Only 70% of the handicapped individuals were identified by any of the three methods tried.
4. Individuals with neurological disabilities were most easily identified (90% of them were identified). In contrast, only 33% of the mentally retarded group were identified.
5. No differences were found between identified and not-identified handicapped individuals in age, sex, education, marital status, number of dependents, and occupation.
6. The best method for obtaining follow-up information was by personal interview.

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7. Interview follow-up information was generally found to be valid in terms of agreement with state agency records and information furnished by employers. Information on handicapped individuals' disabilities obtained by interview was valid in terms of comparison with disability information on the same individuals found in state agency records. Occupational information about handicapped individuals obtained by interview was valid in terms of comparison with occupational information on the same individuals furnished by employers.
8. Classifying disability information obtained by interview into 14 general categories was done reliably.
9. Coding job information obtained by interview according to the Dictionary of Occupational Titles (D.O.T.) system was reliable only when the first two code-digits were used. Coding beyond the first two digits was found to be of doubtful reliability for research purposes.

Introduction

The Industrial Relations Center of the University of Minnesota is currently engaged in a program of research in vocational rehabilitation.² Part of this research program is concerned with determining the size and characteristics of the population of physically handicapped persons in the state. This information has been obtained through a state-wide survey.³

Before the survey could be undertaken, studies were made to provide the tools and determine the methods to use in the survey. These studies included:

1. the development of a questionnaire for identifying physically handicapped individuals in the general population;
2. the comparison of methods for identifying the physically handicapped in terms of the proportion of handicapped individuals identified;
3. the development of a "follow-up" questionnaire to obtain information on present employment status, employment history, rehabilitation services received, and other personal history data;
4. the determination of the validity and reliability of the information obtained through use of the "follow-up" questionnaire; and
5. the comparison of methods for obtaining "follow-up" information on the physically handicapped in terms of the proportion of individuals on whom information was obtained, completeness of information, usability of information, and cost of obtaining the information.

The general design of these studies was to test questionnaires and methods on groups of known physically handicapped individuals for whom agency records were available.⁴ This made it possible to determine which questionnaire and which method was most effective in terms of independent criteria.

² See: *Minnesota Studies in Vocational Rehabilitation: I. Research Plan and Bibliography*. IRC Bulletin 21, June 1958.

³ Results of the state-wide survey will be reported in the current series, *Minnesota Studies in Vocational Rehabilitation*.

⁴ Grateful appreciation for their cooperation in this project is extended to the Minnesota State Division of Vocational Rehabilitation and the Minnesota State Employment Service.

Development of the Identification Questionnaire

A. Construction of the questionnaire

In constructing a questionnaire to identify physically handicapped persons in the general population, it was first necessary to define "physical handicap." The problem was to develop a definition of "physical handicap" which was adequate for research purposes and at the same time easy to communicate to persons participating in the survey.

A compilation of definitions used in rehabilitation literature was the basis for the development of four identification questionnaires. Each questionnaire consisted of three sections: an introductory section, the identification section, and a concluding section. The introductory and concluding sections were identical for all four questionnaires.

1. *Introductory section*—After introducing himself, the interviewer very briefly explained the general purpose of the survey and requested the respondent's cooperation, assuring him of the confidential nature of the survey. Then he asked how many persons between 14 and 64 years were in the household. This question was designed to set a "frame of reference" for the identification question(s) which followed.

2. *Identification section*—Four sets of identification questions were used:

Form 1. An *employment-oriented* form in which the interviewee was asked, "Do any of these persons have an illness, physical condition, or emotional problem of any sort which limits the kind of work they can do or the amount of work they can do?"

Form 2. An *origin-of-disability* form consisting of a series of questions, as follows:

- (1) Are any of these persons veterans who were hurt in the service?
- (2) Have any of these persons been injured in accidents in the home, on the farm, in traffic, or elsewhere?
- (3) Have any of these persons been injured at work?
- (4) Have any of these persons been permanently affected by illness?
- (5) Were any of these persons born with physical handicaps?

Form 3. A *disability-list* form, in which the interviewee was asked these questions:

- (1) Do any of these persons have a physical handicap, such as blindness, or loss of hearing, or loss of a leg, foot, arm, hand, fingers, and so on?

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- (2) Did any of these persons have a fairly long illness which has kept them from work or school or other usual activities?
- (3) Do any of these persons have an illness which keeps coming back?
- (4) Do any of these persons have an illness of the kind that one has for a long time even if he can work or go to school or do the things most people do every day?

Form 4. A direct-approach form: "Are any of these persons physically or emotionally handicapped?"

3. Concluding section—When an interviewee answered affirmatively to any of the identification questions, he was asked, "How would you describe this illness (or injury, physical condition, emotional problem, handicap)?" and "Is this person working?" After obtaining answers to these last two questions, the interview was terminated by thanking the interviewee for his cooperation.

B. Pretest of the identification questionnaires

The names of 350 physically handicapped job applicants were drawn from the files of the Minneapolis local office of the State Employment Service (ES). Names were selected on a stratified random sampling basis, using the major Dictionary of Occupational Titles (D.O.T.) occupational groups as strata. The total number of physically handicapped applicants in each major D.O.T. occupational group was determined from ES records, and a proportionate number of names were selected at random from each group for inclusion in the list. Names without current telephone numbers were eliminated from the list.⁵ Finally, four samples of 20 names each were randomly selected from the remaining names. One form of the identification questionnaire was randomly assigned for use with each of the four samples.

The four samples were compared on age, sex, marital status, education and broad classification of disability. No significant differences among groups were found, using the chi-square test.

The telephone interview method was used exclusively. A female interviewer made all telephone calls. She had no prior knowledge of the persons or households she was contacting. For each individual she was given only a telephone number to call and a questionnaire to be used when the party answered.

⁵ Approximately half of the 350 handicapped job applicants did not have current telephone numbers. However, statistical comparison of those with and those without current telephone numbers showed no significant difference in age, sex, or occupation.

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The interviewer was instructed not to reword any of the questions or to attempt to explain them. If an interviewee hesitated or asked for clarification, the question was repeated in its original form. Verbatim notes were kept of everything the interviewee said or asked.

The 80 telephone numbers and questionnaires, one for each individual in the four samples, were arranged in random sequence. The sequence was strictly followed. When no one answered the telephone or a "busy" signal was obtained, the number was passed over and the next number was called. Calls which were not completed on the first try were made again until successful. These "call-backs" were also made in the original sequence. This sequential arrangement eliminated the necessity of controlling the time of day at which calls were made. Records were kept of the time at which each call was made and each questionnaire completed. The number of calls necessary to contact each interviewee was also recorded.

As a "control," telephone numbers of 13 persons not known to be handicapped were randomly distributed among the 80 telephone numbers of the known handicapped individuals. Seven of these numbers were selected at random from the telephone directory, and six were numbers of persons known to the research staff. The latter numbers were included to enable the staff to check on the interviewer's performance.

Only one of the 93 scheduled calls was not completed. This was a refusal to give information. However, the individual concerned was from the "control" group.

After the calls were completed, "verification-calls" were made on all interviewees in the known handicapped sample who gave negative answers to the identification questions. This was done to determine if the handicapped persons whose names were obtained from ES records were still residing at the contacted households. In each of the samples, two or more of the handicapped persons were no longer living at the contacted address. Table 1 summarizes the results of the telephone calls on the 80 handicapped persons.

Table 1
Comparison of results for four forms of the identification questionnaire

	Identification questionnaire form			
	1	2	3	4
Total number contacted	20	20	20	20
Eliminated from sample*	3	4	2	2
Identified	12	11	8	11
Not identified	5	5	10	7

* Verification showed that these individuals were no longer members of the households contacted.

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The proportion of known physically handicapped individuals identified varied from .44 for Form 3 (the disability-list form) to .71 for Form 1 (the employment-oriented form). The differences among questionnaire forms in the proportion of handicapped individuals identified were not statistically significant (using the chi-square test) due to the size of the samples used.

Information on the handicapped individuals which had been obtained from ES records was analyzed to determine the characteristics which differentiated responses to the identification questions. For this purpose, all identified individuals were grouped, regardless of questionnaire form used, and all individuals not identified were grouped likewise. No statistically significant differences were found on age, sex, education, marital status and employment status. However, the two groups seemed to differ in types of disabilities. Inspection of the data indicated that persons with "visible" disabilities (e.g., amputations, paraplegia) were identified more successfully than persons with "less obvious" or "hidden" disabilities (e.g., psychoneurosis). It was not feasible to apply statistical tests to this apparent difference due to the small number of individuals in each broad classification of disability.

On the basis of the pretest, Form 1 was chosen for use in the state-wide survey. Additional pretest work with the identification questionnaire led to a slight modification of Form 1. The identification question was revised to read: "Have any of these persons (referring to household members between 14 and 64) ever had an illness, physical condition, or emotional problem of any sort which limits the kind of work they can do, or the amount of work they can do?"

A copy of the identification questionnaire developed through the process described above is shown in the Appendix.

Comparison of Methods of Identification

A. The methods

Three methods for identifying physically handicapped individuals in the general population were compared: the telephone interview, mail questionnaire, and personal interview methods. The identification question used was the same for all methods, i.e., "Have any of these persons ever had an illness, physical condition, or emotional problem of any sort which limits the kind of work they can do?" However, slight modifications were made to adapt the total questionnaire (which included introductory and concluding material) to the method.

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1. The telephone interview method

After introducing himself, the interviewer very briefly described the research project and requested answers to a "few questions." He then asked how many persons lived in the household, how many of these were under 14 and over 64 years old, and how many of the 14-to-64 year-old members of the household were employed or looking for work.

Having set his "frame of reference," the interviewer then asked the identification question. If he received an affirmative answer, he asked for a description of the handicapping condition, when the disability was acquired, and if the handicapped person was employed. He also asked if there was any other handicapped person in the household. If a negative answer was given to the identification question, the interview was terminated. Notes were kept of the time and dates of calls, and of the verbatim remarks of the interviewee.

In terminating the interview, the interviewee was asked how long he had been living at that address. Then the interviewer thanked him for his cooperation.

2. The mail questionnaire method

The identification questionnaire used in this method consisted of four questions: (a) how many persons lived in the household; (b) how many were between 14 and 64 years; (c) how many of these were employed or not employed but looking for work; and (d) the identification question. The questionnaire was mailed out with covering letter and return envelope.

3. The personal interview method

The questionnaire used for the telephone interview method was modified for use in personal interviews. The modification was intended to permit the interviewer to obtain a lengthier *follow-up* interview from the handicapped person or an adult relative of his. (The follow-up interview is described on pages 16-18 of this Bulletin.)

From introduction to identification question proper, the same questions were asked as were asked in the telephone interview. If the interviewee answered affirmatively to the identification question, he was asked what the handicapped person's relationship was to him (except where it was evident that the interviewee himself was the handicapped person). The interviewer then asked to talk to the handicapped person. If the handicapped person was not available, the interviewee was requested to furnish some information about the handicapped person. From this point on, the follow-up interview was conducted.

The personal interview was terminated in the same manner as the telephone interview.

B. The samples

Three samples of 100 names each were drawn randomly from a list of DVR counselees who had been rehabilitated and employed during the years 1953-1957.⁶ This list included only counselees for whom (or for whose parents or guardians) telephone numbers and addresses were available in the current (1958) telephone and city directories. The list was stratified by year of closure (i.e. year when the individual completed rehabilitation, obtained employment, and his case "closed" by DVR.) Each closure year group of names was stratified further by city. Names were drawn randomly in equal proportions from each closure year group and in the proportion of 3 Minneapolis to 2 St. Paul names. Thus, for each sample of 100 names, 20 each were drawn for each closure year from 1953 to 1957. Within each closure year group of 20, 12 were from Minneapolis and 8 from St. Paul, making a total of 60 from Minneapolis and 40 from St. Paul for the sample.

Samples were compared on age, sex, education, marital status, number of dependents, job at closure (in major D.O.T. occupational classification code groups), and broad disability classification. No statistically significant differences were found. The samples were then randomly assigned a method of identification (telephone, mail, or personal interview).

Two samples were also drawn randomly from the list of names of physically handicapped job applicants obtained from ES files.⁷ A sample of 50 names was drawn for the mail questionnaire method and another sample of 100 names was drawn for the personal interview method. No sample was drawn for the telephone interview method since information was available for this method and population (ES handicapped job applicants) from the pretest study described previously.

Stratification by year of last job application and by city was similarly undertaken, using the same proportions as for the DVR samples. No statistically significant differences were found between these two ES samples for age, sex, marital status, education, occupation, and disability.

⁶ See: *Minnesota Studies in Vocational Rehabilitation: IV. A Study of 1,637 DVR Counselees*. IRC Bulletin, 24, November 1958.

⁷ Sample lists drawn randomly from ES files included the names of 607 handicapped job applicants from both Minneapolis and St. Paul in addition to the name list drawn for the pretest study of the identification questionnaire.

C. Administration

Application of the methods in the identification of the physically handicapped was undertaken within the same time period.

1. Administration of the telephone interview method

The procedure followed was similar to that described in the pretest of the identification questionnaires. Only telephone numbers and a questionnaire for each number were given to the interviewer. The same female interviewer who participated in the pretest undertook the telephoning. Calls were completed for 97 telephone numbers. No contact was made on three numbers.

An average of 1.7 calls were made for each telephone number in the sample. Seventeen per cent of the calls were made between 10 and 12 a.m., of which 67% were completed. Fifty-seven per cent of the calls were made between 1 and 3 p.m., of which only 50% were completed. Sixteen per cent of the calls were made between 7 and 9 p.m. and 75% of these were completed. The rest of the calls were made at other times.

2. Administration of the mail questionnaire method

A list was made of names and addresses of the handicapped individuals or their parents or guardians as these names and addresses appeared in the telephone directory. Names and addresses of 50 individuals drawn randomly from the telephone directory were added to the list as a comparison group. The identification questionnaire, with a covering letter and stamped return envelope, was mailed to each individual on the list. Eleven questionnaires were returned undelivered.

One week after the questionnaires were mailed, replies had been received from 38% of the group.⁸ A follow-up letter was sent to those who had not yet replied at this time.⁹ One week later, replies had been received from 64% of the group. A second follow-up letter, together with an identification questionnaire and return envelope, was sent to those who still had not replied. At the end of the third week after initial mailing, replies had been received from 76% of the group. A final follow-up letter was sent to non-respondents. Replies were received from 125 of the 141 in the initial mailing list of handicapped persons and from 36 of the 47 in the comparison group.

⁸ One name was inadvertently omitted from the mailing list of handicapped persons. This, plus the 11 persons not reached by mail, reduced the group to a total of 188, of which 141 were handicapped persons.

⁹ Follow-up letters were sent only to handicapped individuals and not to the comparison group.

3. Administration of the personal interview method

The interviews were conducted by five female professional interviewers under the supervision of a member of the research staff.¹⁰ Interviewers were given two hours of additional training in survey procedures and in use of the survey questionnaires (i.e., identification and follow-up questionnaires.) Each interviewer was assigned 40 specific addresses. Names were not used except in the case of multiple dwelling units. In such cases, names of heads of households were given to designate the specific household assignments.

Interviewers submitted daily reports on interviews completed, hours worked, and miles driven. The supervisor periodically reviewed completed interviews with each interviewer. Interviews were completed at 184 of the 200 households assigned; no contact was made at 12 addresses; and 4 households refused to be interviewed.

Interviewing was completed in two weeks. Each interview cost \$1.89 on the average, of which \$1.44 was for interviewer time and \$.45 for travel expenses.

4. Verification of identification information

After completing the administration of each method of identification, responding households were contacted by telephone to determine if the listed handicapped individual (i.e., the individual whose name was on the original sample lists) was still actually a member of the household. The person answering the phone was asked, "Will you please tell me if (name of listed person) still lives at this number?"

This verification process was undertaken to eliminate spurious findings, such as classifying as "identified" some person other than the listed handicapped person, or classifying as "not identified" a listed handicapped individual who was no longer a member of the household. In effect, all handicapped individuals in the original sample lists who were no longer members of the contacted households were eliminated by the verification process from consideration in the analysis of results.

Telephone verification was undertaken for all responding households, with the exception of households responding affirmatively to the personal interview identification questionnaire. For the latter group, verification consisted of comparing information obtained in the follow-up interview with information obtained from agency files. Comparison on two or three items of information such as disability, age and sex, was sufficient in most

¹⁰ For a detailed description of the survey, see: *Minnesota Studies in Vocational Rehabilitation: III. A Follow-up Study of Placement Success*. IRC Bulletin 23, August, 1958.

cases to verify the presence of the listed handicapped person in the household.

D. Results

1. Comparison of methods

Table 2 summarizes the results of the administration of each method. Proportion of households contacted was highest for the telephone interview method and lowest for the mail method. (It should be noted, however, that response to the mail questionnaire was 84%, considerably higher than usual mail survey results.) Refusal rates were higher for the telephone interview method than for the personal interview method.

Roughly one-fourth of each method's total sample was eliminated by the verification process. The samples finally available for the comparison of methods were slightly less than two-thirds of the original samples.

Table 2
Comparison of three methods for identifying the physically handicapped: A. Administration

	Telephone interview			Mail questionnaire			Personal interview			Total		
	DVR N = 100	ES 20	Total 120	DVR 100	ES 49	Total 149	DVR 100	ES 100	Total 200	DVR 300	ES 169	Total 469
	Per cent											
No contact	3	0	2	17	14	16	3	9	6	8	9	8
Refusals	7	0	6	.....	.....	.....	2	2	2	3	1	2
Eliminated from sample ^a	30	15	28	28	8	22	29	20	25	29	16	25
Unclassified ^b ...	3	0	2	2	0	1	0	0	0	1	0	1
Final sample ..	57	85	62	53	78	61	66	69	67	59	74	64

^a No longer members of the households contacted (as determined by verification interview).

^b Status could not be determined by verification interview.

Tables 3, 4, and 5 describe the samples which were finally available for the comparison of methods. No statistically significant differences in age, sex, education, marital status, number of dependents, occupation, and disability were found among the samples.

Comparison of the relative effectiveness of the different methods in the identification of the physically handicapped are presented in Table 6. No statistically significant differences were found among the proportions identified by the different methods. Percentage-wise, the telephone interview method was best with 72% identified. Mail questionnaire and personal

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interview methods were about as effective, with 65% and 66% identified, respectively.

Identification of DVR rehabilitated individuals was consistently better than identification of ES handicapped job applicants. All three methods were about equally effective in identifying former DVR counselees. There were differences among the methods in the proportion of ES job applicants identified, but these differences were not statistically significant.

Table 3

Age, sex, education, marital status and number of dependents
for three identification method samples

Characteristics	Sample		
	Telephone interview N = 74	Mail questionnaire N = 91	Personal interview N = 135
Median age in years	33	35	35
Q*	11.3	10.9	12.8
Per cent: male	70	62	70
female	30	38	30
Median number of years of education completed	11	11	11
Q	1.9	1.7	1.5
Per cent: single	61	48	50
married	37	51	46
other	2	1	4
Per cent: with no dependents	58	56	55
with dependents	42	44	45
Median number of dependents (for individuals with dependents)	2.5	2.6	2.8

* Semi-interquartile range.

Table 4

Occupation of individuals in three identification method samples

Occupation	Sample		
	Telephone interview N = 74	Mail questionnaire N = 91	Personal interview N = 135
	Per cent		
Professional and managerial	16	13	13
Clerical and sales	34	28	30
Service, agricultural and kindred	7	8	13
Skilled	16	13	12
Semiskilled	22	22	22
Unskilled	5	16	10

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For all practical purposes, therefore, there were no differences among the three methods investigated in relative effectiveness of identifying known physically handicapped individuals. It should be noted that even the "best" single method failed to identify about 30% of these individuals

Table 5
Disabilities of individuals in three identification method samples

Disability groups	Telephone interview N = 74	Sample	
		Mail questionnaire N = 91	Personal interview N = 135
		Per cent	
Cardiovascular	4	9	10
Gastro-intestinal	1	4	4
Generalized or systemic	8	5	8
Genito-urinary	0	0	1
Hearing	11	18	10
Mental retardation	6	3	6
Neurological (also epilepsy)	20	6	8
Neuropsychiatric	8	2	5
Orthopedic	24	34	29
Respiratory	14	6	7
Skin and allergy	1	0	4
Speech	0	0	0
Visual	0	2	1
Miscellaneous	3	11	7

Table 6
Comparison of three methods for identifying
the physically handicapped: B. Results

Method	N	Per cent of final sample	
		Identified	Not identified
Telephone interview: DVR	57	72	28
ES	17	71	29
Total	74	72	28
Mail questionnaire: DVR	53	72	28
ES	38	55	45
Total	91	65	35
Personal interview: DVR	66	70	30
ES	69	62	38
Total	135	66	34
Total: DVR	176	71	29
ES	124	61	39
Total	300	67	33

2. Comparison of identified and not-identified handicapped individuals

Characteristics of handicapped individuals identified by the various methods were compared with characteristics of those who were not identified. For this analysis, data were pooled and analyzed regardless of method of identification used. No statistically significant differences were found between the two groups (identified versus not-identified) in age, sex, education, marital status, number of dependents, and occupation. The two groups differed, however, in the distribution of individuals by broad classification of disability. The chi square statistic obtained in a test of the difference in disability distribution between identified and not-identified groups was significant at the .001 level. Nature of the disability definitely was one factor which influenced the proportion of handicapped individuals identified. Table 7 shows this finding.

Table 7 shows that, regardless of method used, individuals with neurological disabilities were easiest to identify (90% identified). Next in order were individuals with respiratory diseases (79%), orthopedic disabilities (76%), and gastro-intestinal diseases (73%). The group most difficult to identify was the mental retard group (only 33% identified). Differences in the proportions of each disability group identified by different methods are also shown in Table 7.

Table 7
Percentage in each disability groups identified by three methods

Disability groups	Telephone		Mail		Interview		Total	
	N	% of N identified	N	% of N identified	N	% of N identified	N	% of N identified
Cardiovascular	3	33	8	38	13	38	24	38
Gastro-intestinal	1	100	4	75	6	67	11	73
Generalized or systemic	6	67	5	40	11	73	22	64
Genito-urinary	0	.....	0	.....	1	0	1	0
Hearing	8	88	16	69	13	54	37	68
Mental retardation	4	25	3	67	8	25	15	33
Neurological (also epilepsy)	15	87	5	100	11	91	31	90
Neuropsychiatric	6	50	2	50	7	57	15	53
Orthopedic	18	83	31	61	39	85	88	76
Respiratory	10	70	5	100	9	78	24	79
Skin and allergy	1	0	0	.....	5	40	6	33
Speech	0	.....	0	.....	0	.....	0	.....
Visual	0	.....	2	50	2	50	4	50
Miscellaneous	2	50	10	70	10	50	22	59

Development of the Follow-Up Questionnaire

The follow-up questionnaire was designed to obtain data on:

- a. criteria of placement success—information on the employment of physically handicapped individuals, such as present employment status and employment history, which were considered indicative of the success with which these individuals had been placed; and
- b. predictors of placement success—information on characteristics of the handicapped individual (such as age, sex, education and disability) and about his rehabilitation history (such as rehabilitation services received) which were considered to be related to placement success.

A list of items pertaining to these two kinds of information was compiled from the literature on vocational rehabilitation. The list was expanded through staff discussion and later revised to include only those items which, in the staff's opinion, were relevant to the project, obtainable through survey methods and obtainable in a form appropriate for analysis.

Questions on each item on the list were written in several forms. Survey literature¹¹ and questionnaire forms from various counseling agencies were utilized in developing the questions. An initial draft of the follow-up questionnaire was prepared from the pool of questions. This draft was revised, mainly in terms of question sequence.

The revised, 6-page form was pretested on the 43 individuals "identified" as physically handicapped in the identification questionnaire pretest (see pp. 5-7). Follow-up questionnaires, with covering letter and stamped, return envelope, were mailed to these individuals. Returns were received from 17 (40% of the total), of which only 11 (26% of the total) were in usable form.

A trial analysis of the 11 usable pretest returns was made to determine if further revision of the questionnaire was necessary. There were indications that the questionnaire was too long and too complicated. Some questions were left unanswered. Other questions elicited responses which could not be used in the analysis or which required clarification before they could be used. It was found that several questions could have been combined without loss of information.

The 37-question, 6-page questionnaire was revised to 20 questions and pages. The new form was pretested on a sample of 23 known physically

¹¹ The major source book was *Public Opinion 1935-46*, Princeton University Press, 1951.

handicapped individuals drawn randomly from available lists. The personal interview method was used in this pretest. Five staff members conducted the interviews.

(This pretest was part of a combined pretest of the personal interview method, the revised identification questionnaire, and the follow-up questionnaire.)

Handicapped individuals were identified at 8 and not identified at 6 of the 23 households contacted. No contact was made at 8 addresses, and one household refused to be interviewed. Follow-up interviews were obtained on the 8 handicapped individuals identified.

Inspection of the 8 completed interviews showed that, with very little modification, the follow-up questionnaire was ready for extensive use. A copy of the follow-up questionnaire developed through the process described above is shown in the Appendix.

Comparison of Methods of Follow-up

A. Methods and administration

Originally, two methods of obtaining follow-up data were considered for comparison: the mail questionnaire method and the personal interview method. (The telephone interview method was not included in the study because the length of the interview would have made it extremely difficult to secure the desired information.) However, the small proportion of usable returns in the initial mail pretest of the follow-up questionnaire raised serious doubts about the effectiveness of the mail method. Accordingly, the comparative study of follow-up methods was revised, as follows:

1. The mail questionnaire method

Follow-up questionnaires with covering letter and stamped return envelope were sent to all households in which physically handicapped individuals had been identified by telephone interview in the comparative study of identification methods. Two weeks after initial mailing, a follow-up letter was sent to individuals failing to reply. Another copy of the questionnaire and return envelope were sent with the letter.

2. The personal interview method

The personal interview method of obtaining follow-up data was used in conjunction with the identification of handicapped individuals by the

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same method.¹² Upon identifying a physically handicapped individual at a household, the interviewer attempted to obtain a follow-up interview with the handicapped person or an adult relative (if the handicapped person could not be interviewed.) The follow-up questionnaire was used as the interview schedule in these interviews. A questionnaire was filled out for each physically handicapped individual identified.

B. Results

Questionnaires were mailed to 41 households in which physically handicapped individuals had been identified by telephone interview. Twenty-six (or 63%) of these individuals returned the questionnaire. Only 18 of the 26 questionnaires were usable. These results confirmed earlier doubts about the use of mail questionnaires in obtaining follow-up data.

In contrast to the mail questionnaire results, follow-up interviews were completed for all 91 individuals identified as physically handicapped in the personal interview identification survey. It is clear from these results that follow-up data should be obtained by the personal interview method.

Validity of Follow-up Data Obtained by Personal Interview

A. Comparison with data from agency records

Data from agency records were available on each of the 91 physically handicapped individuals on whom follow-up interviews were obtained. It was therefore possible to compare the information obtained by personal interview with information from agency records. Table 8 shows the differences found between the two sets of data. Table 8 also compares results on DVR counselees with those on ES job applicants, and results when the information was provided by the handicapped persons themselves with results when the information was obtained from adult relatives of the handicapped persons.

The greatest difference between interview-obtained information and agency records was found on the question of having received assistance from the agencies. Fifty of the 91 interviewees (20 of these being the handicapped persons themselves) answered "No" to this question. A larger proportion of former ES job applicants than DVR counselees said they had not received any assistance from the agencies.

The next item of greatest disagreement between the two sets of data was on the age at which the handicapped person became disabled. More

¹² See: *Minnesota Studies in Vocational Rehabilitation: III. A Follow-up Study of Placement Success*. IRC Bulletin 23, August, 1958.

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Table 8
Percentage of handicapped individuals
with interview data different from agency records

Item	DVR counselees		ES job applicants	
	Handicapped Persons ^a (N = 17)	Adult Relatives ^b (N = 31)	Handicapped Persons ^a (N = 22)	Adult Relatives ^b (N = 21)
Per cent				
Age				
difference of 1 year	12	26	32	38
difference of more than 1 year ...	12	3	18	10
Sex	0	0	0	0
Marital status	24	32	0	0
Education				
difference of 1 year	35	32	27	19
difference of more than 1 year ...	12	42	8	10
Veteran status	6	6	5	0
Disability	0	9	0	19
Age at disability ^c				
difference of 1 year	29	19	.....	.....
difference of more than 1 year ...	53	23	.....	.....
Having received assistance from the agency	29	55	68	62

^a Information provided by the physically handicapped persons themselves.

^b Information provided by an adult relative of the handicapped person.

^c No agency information on this item for former ES job applicants.

disagreement was found where the handicapped persons themselves furnished the interview information than where adult relatives did (which was not what one would expect).

Differences were also found in the data on age and education. Most of these differences were discrepancies of only one year, however. Differences in marital status information were found only in the DVR counselee data. Most of these differences were changes of status from single to married. Differences in disability data occurred only when the informant was not the handicapped person.

B. Comparison with information provided by employers

The names of employers were obtained for 52 of the 60 physically handicapped individuals who were employed at the time of the personal interview survey. These employers were sent questionnaires requesting them to provide employment information (such as job title, job description, wages, and hours) on the handicapped individuals. All 52 employers responded to the questionnaire.

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Forty-eight employers verified the employment of the handicapped persons in their firms. Two employers said that the two handicapped individuals concerned were former employees. In only two cases did the employers report having no personnel records on the handicapped individuals who were supposed to be in their employ.

Three research staff members¹⁸ independently determined whether the two sets of data (interview-obtained information versus information furnished by employers) were in agreement. For each handicapped employee, each judge compared data on five different items: job title, job duties, hours, pay and length of employment. Each judge made 240 judgments. (Only one set of data was available on 10 items.) Agreement among the judges (i.e., number of identical judgments) was 71%.

Table 9 compares employment information obtained by the personal interview method with employment information on the same individuals as provided by their employers. Agreement between any two of the three judges was used as the basis for the data in Table 9.

Table 9

Comparison of employment information obtained by personal interview with employer records for 50 physically handicapped individuals

Item	Same information		Different information		Comparison not possible ^a	
	N	%	N	%	N	%
Job title	37	74	12	24	1	2
Job duties	44	88	5	10	1	2
Hours	40	80	8	16	2	4
Pay	36	72	10	20	4	8
Length of employment	34	68	14	28	2	4

^a Date not furnished by employers or not obtained in interviews.

The highest amount of agreement between interview-obtained information and information furnished by the employer was on the description of job duties. There was agreement on the job duties of 44 of the 50 handicapped employees. Next, in order of agreement between the two sets of data, came hours, job title, and pay. The lowest amount of agreement was on the length of time the individual had been an employee of the firm.

Tables 8 and 9 show that information obtained by personal interview does not always agree with information from other sources, such as agency

¹⁸ Graduate students in industrial and applied psychology.

and employer records. In general, however, the kinds of follow-up information obtained in the personal interview survey reported in the preceding pages have sufficient validity (in terms of comparison with data from independent and presumably more reliable sources) to permit their use in research.

Coding Reliability of Disability and Occupational Information

One important problem in processing interview-obtained information for analysis is the reliability of classifying procedures used with non-quantitative data such as disability and occupational information. The problem simply stated is this: Given a statement describing an individual's disability (or job), how well would different individuals agree in classifying the disability (or job) under one of several general categories? Data obtained in the personal interview survey were used to investigate this problem.

A. Coding reliability of disability information

Two research staff members¹⁴ were given copies of verbatim responses of 89 interviewees to the question: "How would you describe this injury or illness that limits the kind of work you can do or the amount of work you can do?" Working independently, they classified each disability description into one of 14 general categories: cardiovascular, gastro-intestinal, generalized or systemic, genito-urinary, hearing, mental retardation, neurological (including epilepsy), neuropsychiatric, orthopedic, respiratory, skin and allergy, speech, visual, and miscellaneous. Comparison of results showed that the two classifications were identical in 83% of the cases.

Since the 89 physically handicapped individuals concerned had received services from DVR and/or ES and therefore agency records were available, it was also possible to compare each staff member's classification of the disability data with the agency's classification.

DVR and ES use different systems in classifying disabilities, differing somewhat in the major disability categories used. It was necessary to develop a "conversion table" which assigned specific DVR and ES disability code numbers to one of the 14 general categories used by the staff members. This conversion table is shown in the Appendix.

Using the conversion table, the general category of each handicapped individual's disability was determined from DVR and ES records. This listing was compared with each staff member's listing. The classifications

¹⁴ Graduate students in applied and experimental psychology.

agreed in 78% of the cases for one staff member and 76% of the cases for the other. These results indicate that classification of interview-obtained disability data into general categories is not only sufficiently reliable but sufficiently valid as well for research purposes.

B. Coding reliability of occupational information

Three staff members¹⁵ were given identical copies of occupational information obtained in the interviews. The information included job titles, job duties, hours and pay for 50 jobs. Using the Dictionary of Occupational Titles, each staff member independently assigned a three-digit D.O.T. occupational classification code number to each job. The following results were obtained:

- a. Agreement on the first digit was 78% for all three coders, 86% between Coder A and Coder B, 84% between Coder A and Coder C, and 88% between Coder B and Coder C;
- b. Agreement on the first two digits was 66% for all three coders, 72% between Coder A and Coder B, 82% between Coder A and Coder C, and 76% between Coder B and Coder C.
- c. Agreement on three-digit code numbers was 54% for all three coders, 60% between Coder A and Coder B, 74% between Coder A and Coder C, and 70% between Coder B and Coder C.

It must be concluded from these results that assigning D.O.T. code numbers to interview-obtained job information is sufficiently reliable for research purposes only when the first D.O.T. digit or at the most the first two D.O.T. digits are used. Results are of doubtful reliability when three-digit D.O.T. code numbers are used.

¹⁵ Graduate students in psychology who had had courses in vocational and occupational psychology, and occupational information. The course work included training in the use of the D.O.T.

Appendix

1. Identification Questionnaire

IRC OVR Project

Confidential

No. _____	Phone: _____	Calls: _____	Dates _____	Time _____
Id: P: t f N: t f Sex: M F _____				

I'm (name) and I'm calling for the University of Minnesota.

We're doing a study on employment problems caused by sickness or injury. I'd like your answers to a few questions.

* We need your answers to help us understand these problems. Your answers will be kept strictly confidential and will be used for research purposes only.

How many persons live in this household? _____

Be sure to include every one who rooms in your home or is living temporarily with you. And be sure to count yourself too.

How many of these persons are under 14? _____

How many are over 64? _____

How many are employed or looking for work? _____

Have any of these persons ever had an illness, physical condition, or emotional problem of any sort which limits the kind of work they can do, or the amount of work they can do?

Yes _____ No _____

Yes How would you describe this condition?

How old was he when he got sick (injured)?

Is he working now? Yes _____ No _____

Is there anyone else in this household who has ever had an injury, illness, or emotional problem that limits the amount or the kind of work they can do? Yes _____ No _____

One last question. How long have you been living at this address? _____

Thank you very much for your cooperation.

2. Follow-up Questionnaire

University of Minnesota
Industrial Relations Center
OVR Project

Confidential

1. How would you describe this injury or illness that limits the kind of work you can do or the amount of work you can do?

2. How old were you when this happened? _____ years.

3. Which of the following helped you get ready for a job after you became sick or injured? What kind of assistance did you receive?

Agency	Kind of assistance * *					
	1.	2.	3.	4.	5.	6.
a. State Vocational Rehabilitation (DVR)	___	___	___	___	___	___
b. State Employment Service	___	___	___	___	___	___
c. Veterans Hospital	___	___	___	___	___	___
d. Veterans Administration (other than hospital)	___	___	___	___	___	___
e. Other public or private agencies	___	___	___	___	___	___

Specify: _____

**1. Medical, surgical, and other hospital services

2. Counseling and guidance

3. Training for a job

4. Assistance in finding a job

5. Other (such as providing artificial limbs, tools, licenses)

Specify: _____

6. No assistance from this agency.

4. Have you done any job planning with a counselor? ____ Yes ____ No

5. Were you employed at the time you were injured/became sick? ____ Yes ____ No
Yes:

a. Name of job held before injury/illness _____

b. How long did you hold this job? _____ (____ mos.)

c. How long was it before you returned to work? _____ (____ mos.)

d. Name of first job held after injury/illness _____

e. How did you get this job?

____ (1) through the State Vocational Rehabilitation (DVR)

____ (2) through the State Employment Service

____ (3) through a vocational counselor

____ (4) through friends or relatives

____ (5) I got the job myself

____ (6) I am self-employed

____ (7) Some other way (Specify: _____)

6. Do you have a job now? ____ Yes ____ No

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7. What do you do on your present job? (Or on last job, if unemployed now.)

Name of job: _____

Describe duties: _____

Name of employer: _____ Hours worked per week _____

Date job started: _____ Date job ended: _____

Do you like your present job (or last job, if now unemployed)? ____ Yes ____ No

Why? _____

Money earned a week on this job?

- | | | |
|------------------------|------------------------|------------------------|
| ____ a. Less than \$20 | ____ f. \$60 to \$69 | ____ k. \$110 to \$119 |
| ____ b. \$20 to \$29 | ____ g. \$70 to \$79 | ____ l. \$120 to \$129 |
| ____ c. \$30 to \$39 | ____ h. \$80 to \$89 | ____ m. \$130 to \$139 |
| ____ d. \$40 to \$49 | ____ i. \$90 to \$99 | ____ n. \$140 to \$149 |
| ____ e. \$50 to \$59 | ____ j. \$100 to \$109 | ____ o. \$150 or more |

8. Not counting your present job, on the average, what was the most you ever earned per week on a full-time job?

- | | | |
|------------------------|------------------------|------------------------|
| ____ a. Less than \$20 | ____ f. \$60 to \$69 | ____ k. \$110 to \$119 |
| ____ b. \$20 to \$29 | ____ g. \$70 to \$79 | ____ l. \$120 to \$129 |
| ____ c. \$30 to \$39 | ____ h. \$80 to \$89 | ____ m. \$130 to \$139 |
| ____ d. \$40 to \$49 | ____ i. \$90 to \$99 | ____ n. \$140 to \$149 |
| ____ e. \$50 to \$59 | ____ j. \$100 to \$109 | ____ o. \$150 or more |

Name of employer: _____

Date job started: _____ Date job ended: _____

9. During the past 12 months, how many months have you been employed full time? _____ months; part time? _____ months; unemployed? _____ months

10. What is your usual line of work? _____

How long did you work at this? _____

11. Circle the highest grade in school that you have finished:

1 2 3 4 5 6 7 8	9 10 11 12	13 14 15 16	17 18 19 20
Grade School	High School	College	Graduate

12. Age on your last birthday? _____ years

13. Sex: ____ Male ____ Female

14. Military service: ____ Veteran ____ Non-veteran ____ Date of Service

15. Marital status: ____ Single ____ Married ____ Other

16. If you are married, is your wife (or husband) employed now? ____ Yes ____ No

17. How many persons do you support other than yourself? _____
(Count your wife or husband if you support her/him.)

18. What are your present sources of income or support? Check as many as apply to you.

- ____ a. Wage earnings
- ____ b. Family
- ____ c. Veterans pension
- ____ d. Unemployment compensation
- ____ e. Workmen's compensation

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- _____f. Private insurance or pension
- _____g. Public agency assistance
- _____h. Private agency assistance
- _____i. Other (specify below)

What is your total yearly income from all sources?_____

19. What do you think makes it difficult for physically handicapped persons to find and hold jobs?
20. From your experience, what would you suggest so that public agencies (such as the State Employment Service, State Vocational Rehabilitation) can be of more help to physically handicapped persons in finding jobs for them?

Closing Interview*

- ★ Is there anyone else in this household who has ever had an injury, illness, or emotional problem that limits the amount or the kind of work they can do? (If Yes, fill out another interview schedule, pages 2, 3, and 4 for this person.)
- ★ One last question. How long have you been living at this address?
- ★ Thank you very much for your cooperation.

3. Conversion Table for Disability Codes

General	ES Code	DVR Code
01 Orthopedic	001, 020, 042,	01, 11, 31, 41, 51, 61
	002, 021, 043,	02, 12, 34, 42, 52,
	003, 022, 044,	03, 13, 35, 43,
	004, 023, 046,	04, 14, 36, 44,
	005, 024, 047	05, 15, 37, 45,
	006,	06, 18, 38, 46,
02 Visual		07, 21, 47,
		08, 23, 48, (except
		hemiplegia which is
		neurological)
	060	70
	061	71
03 Hearing	062	72
	063	73
		75
	076	82
	077	83
	078	84
04 Speech	079	
05 Cardiovascular	090	86
	091	
	092	

* This section was omitted in the mail questionnaire.

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06 Respiratory	045 (when thoracoplasty)	89
	110, 172	
	111	
	112	
	113	
07 Neurological	130, 152	49
(also epilepsy)	131	62
	132	92
	133	96
08 Neuropsychiatric	150	93
	151	94
	153	95
	154 (unless injury results in paralysis; if so, neurological)	97
09 Skin and Allergy	170	66
	171	
	173	
10 Generalized or Systemic	190, 195	68
	191, 196	85
	192, 197	87
	193, 198	90
	194*	
11 Gastro-Intestinal	210	
	211	
	212	
12 Genito-Urinary	220	
	221	
	222	
13 Mental Retardation		98
14 Miscellaneous	040	39
	041	63
	045 (other than thoracoplasty)	64 (except brain damage and mental retard)
	300 (except for mental retard)	74
		78
		80
		88
		99

* Possibly will find enough cancer to warrant a separate category.

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