DOCUMENT RESUME

ED 235 314 CE 037 052

AUTHOR Dodson, Richard; Kogan, Deborah, Ed.
TITLE Statistical Analysis in Evaluation Research: Tools for Investigating Problems in VR Performance.
INSTITUTION Berkeley Planning Associates, Calif.
SPONS AGENCY Rehabilitation Services Administration (ED), Washington, DC.
PUB DATE Apr 83
CONTRACT 300-81-0435; HEW-105-79-4000
NOTE 98p.; This report is a revised version of a chapter included in an original draft of a report entitled "Analytic Paradigm for the Revised Vocational Rehabilitation Program Standards" (July 1981).
PUB TYPE Reports - Research/Technical (143)

EDRS PRICE MF01/PC04 Plus Postage.
DESCRIPTORS Adult Vocational Education; Performance; *Program Evaluation; *Standards; State Agencies; *Statistical Analysis; *Vocational Rehabilitation

ABSTRACT

This report reviews the ways in which statistical analysis can be used as a tool by vocational rehabilitation program managers to investigate the causes of problematic performance and generate strategies for corrective action. Two types of data collection are noted: operational studies and statistical data studies. Descriptions follow of two levels of analysis: client level (micro level) and site or agency level (macro level). Two functions fulfilled by client-level analyses are discussed: (1) checking the validity, reliability, and accuracy of the information used in standards and informational data elements and (2) following up the program managers' investigations and the results of the agency-level analysis to explore the detailed interaction between client characteristics, service interventions, and observed client outcomes. Each description of an approach is followed by a case example. Two questions for evaluative research on the standards that are addressed by agency-level analyses are then considered: (1) how is attainment on the various standards data elements related across the state vocational rehabilitation agencies and (2) what explains the differences among state vocational rehabilitation agencies in attainment on specific standards data elements? A case example follows each description of an approach. (YLB)

STATISTICAL ANALYSIS IN EVALUATION RESEARCH: TOOLS FOR INVESTIGATING PROBLEMS IN VR PERFORMANCE

April 1983

Prepared by:

Berkeley Planning Associates
3200 Adeline Street
Berkeley, California 94703

This report is a revised version of a chapter included in an original draft of a report entitled Analytic Paradigm for the Revised Vocational Rehabilitation Program Standards, completed in July 1981.

This project has been funded, at least in part, with federal funds from the Rehabilitation Services Administration, under Contract Numbers HEW-105-79-4000 and 300-81-0435. The contents of this publication do not necessarily reflect the views or policies of the U.S. Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

ABSTRACT

STATISTICAL ANALYSIS IN EVALUATION RESEARCH: TOOLS FOR INVESTIGATING PROBLEMS IN VR PERFORMANCE, by Richard Dodson, Ph.D., edited by Deborah Kogan, April 1983, 92 pp.

This report reviews the ways in which statistical analysis can be utilized as a tool by VR program managers to investigate the causes of problematic performance and generate strategies for corrective action. Two levels of analysis -- client-level ("micro"-level) analysis and site- or agency-level ("macro"-level) analysis -- are described; several case examples of each type of evaluation research are provided.

TABLE OF CONTENTS

I. INTRODUCTION

THE PROGRAM STANDARDS EVALUATION SYSTEM

The 1973 Rehabilitation Act contained, among its many other provisions, a requirement that evaluation standards be devised and implemented to measure the performance of the VR program in achieving its mandate. Between 1978 and 1982, Berkeley Planning Associates (BPA), under contract to the Rehabilitation Services Administration (RSA), developed an integrated standards evaluation system. The proposed Program Standards Evaluation System evaluates the federal-state VR programs. The proposed program evaluation standards include eight performance standards and associated data elements and five procedural standards and associated data elements. The performance standards pertain to service outcomes (productivity, effectiveness, impact) while the procedural standards pertain to service method and process (e.g., case handling, data quality).

The program standards system is a system for evaluating and managing parts of the VR system. The standards are intended to support state agency decision-making and point to specific actions for program improvement or change.

The purposes of the program standards system are, simply:

- to make available information on the achievement of state VR agencies with respect to VR goals as measured by the standards data elements; and, more importantly,
- to guide the behavior of state VR agencies toward greater achievement on those standards' data elements; as well as
- to identify possible problems and corrective actions, whenever state VR agencies are unable to reach their achievement objectives.

What is new about the revised standards system is that it is oriented to guiding the behavior of the state VR agencies in new directions, not just reporting on past behavior. The revised standards system is prospective, not retrospective, oriented to suggesting directions for future

behavior and not just to reporting on past behavior. By setting objectives for each state VR agency to achieve on each of the standards data elements, the VR system can be guided in the directions that RSA and the states want to go. The overall direction of the VR program thus can be changed, as can the achievement of particular state VR agencies.

The paradigm of the system is concerned with flagging problematic attainment, investigating possible solutions, and identifying corrective actions.

What is also very unique about the revised standards system is that it does not stop when a state VR agency fails to meet its objective on a particular standard data element. Instead, in the revised standards system, the decision support system identifies possible problems and corrective actions. This system is designed to enable program managers to quickly identify whether possible problems can be identified or whether further evaluation is required.

INVESTIGATING PROBLEMATIC ATTAINMENT

According to the analytic paradigm for the program standards system, a state's performance on the data elements should be compared to the performance levels set for that period. Some agencies will not have met some of their objectives set for level of attainment on the standards. The system does not stop with this comparison or grading, but instead moves to investigate the problematic attainment and to identify corrective actions as part of the decision support system. The purpose of the decision support system is to close the gap between reporting on the standards and actions based on the standards. The system should:

- provide an ability to pinpoint causes for problems in attainment;
- identify strategies leading to enhanced attainment; and
- identify appropriate policy recommendations and program actions that can be taken by state agencies, RSA, or Congress, based on the analysis and aimed at improvement in agency attainment.

In order to identify the causes of problematic attainment and develop strategies for corrective action, program managers must be provided with information that is:

- relevant to the issues (ie., problems) under consideration;
- quickly and easily interpretable;
- timely; and
- suggestive either of an immediate policy response to the problem, or of further investigation needed before an appropriate response can be formulated.

Sometimes this information can be developed directly by program staff using data from the standards reporting system, plus agency knowledge of program operations. At other times, the information needed to identify the causes of problems and ways to correct these problems must be developed through a more extensive process of evaluation research, carried out by evaluation staff or by outside consultants, using agency data and other data bases or on-site investigations and case reviews, as needed.

This report is intended to provide state agencies and others with a better understanding of how statistical analysis techniques can be applied in the process of problem identification and corrective action. Data sources for the statistical analysis in such evaluation research will be many and varied. First are those sources resulting from routine reporting within the program. These include:

- the R-300 (or other client record);
- case reviews;
- closure and follow-up surveys;
- the agency-level standard statistical reporting forms;
- caseload statistics;
- summaries of agency organization types, resources, internal procedures, and service provision patterns; and
- the MIS and FMIS.

In addition to routine program reporting, other important data sources include information from other federal agencies and departments, and special studies conducted by RSA or by contract research. For example, the Departments of Labor and Commerce may provide useful information on national economic trends and labor market conditions. Special studies may be conducted for several reasons: to generate new knowledge on variables hypothesized to impact on program success; to further study or validate the relationship between program success and independent factors that

already have been observed to impact on program success; or to update and/or provide information needed to test a "full" causal model of program success (examples here include the needs for data on client motivation and "counselor effort" by client).

For the most part, agency-level evaluation research will rely on already-published data, usually based on the full population of VR clients. Data sources here include the program data book and information on client characteristics and caseload statistics. Aggregate data on performance will be merged with information from other program reports (e.g., on costs, numbers served, services offered, and case reviews) and from data received from non-RSA sources (e.g., on economic and labor market trends). This pool of aggregated data will provide the bulk of information used in the agency-level evaluation research.

Evaluation research may require some analysis that calls for client data that are not regularly collected. If this is the case, such additional data collection should be done on a smaller sample of clients. Part of the data collection for the standards data elements is already based on samples of clients, e.g., the closure survey, the case review. New data collection to support a client-level analysis would be on a one-time-only, as-needed basis and not part of the data collection system.

Evaluation research is intended to supplement the reports of state VR agency attainment on the standards. After such reports have been submitted, they will undergo review by program evaluators and managers who will make preliminary determinations of the necessity for evaluation research.

TYPES AND LEVELS OF ANALYSIS FOR EVALUATION RESEARCH

The most important question for the evaluation research component concerns the types and levels of analysis for the research. First, two types of data collection and of analysis -- operational studies and statistical data studies -- are noted. Then, "micro" and "macro" levels of statistical data analysis are described.

Types of Data Collection and of Analysis: Operational Studies versus Statistical Data Studies

So far, all of the data collection that has been described has been of a "quantitative" nature, which is usually associated with evaluation research. However, there is a whole other style of data collection that is useful in evaluation research that is more qualitiative. No attempt will be made here to specify the myriad types of qualitative data collection -- there is a vast literature on the subject (see e.g., Cook and Reichardt, Bogdan and Taylor, or Douglas). The techniques of participant observation, of unstructured interviewing, or of investigative social research could all be used to identify possible problems and corrective actions. In the VR field, there is already a structure for such data collection around the PARs or SMARs. The point is that in the face of increasing data processing capabilities, the very important role of qualitative information must not be lost.

These operational studies can be used to generate hypotheses to be tested via statistical data analyses, or can be used to understand the findings from the statistical data analyses. Some of the qualitative information collected in the operational studies could be turned into quantitative data, usually at the ordinal or nominal level of measurement.

Levels of Statistical Data Analysis

One of the first choices that must be made in deciding on the kinds of statistical data analysis to do is the choice of a level of analysis. Once the major choice between a "micro" and "macro" level of analysis is made, the analyst chooses the unit of analysis. Below, the difference between these two types of analysis is described. Then, the relative advantages and disadvantages of each level of analysis are presented.

"Micro" and "Macro"

The difference between a micro (client-level) and a macro (service system level) of analysis is primarily a function of the perspective of the analyst. In economics, microanalysis focuses on the individual consumer when applied to an understanding of consumption. Alternatively, a

micro level of analysis for understanding production focuses on the firm, a much larger unit of analysis. While one analyst's micro level of analysis may thus be another analyst's macro level of analysis, a crude but simple across-the-board distinction between the two levels is helpful. Simply, a micro level of analysis is at the level of the smallest possible unit of observation and analysis, while a macro level of analysis is aggregated or combined to form some larger unit of analysis, subsuming many of the micro units of observation.

For social service delivery systems, at the micro level of analysis the unit of observation and analysis is usually the individual client. At the macro level of analysis the unit of analysis could be the counselor, the office, the district or region, or the state VR agency; in each case several micro units of observation, i.e., clients, are combined or subsumed under the macro unit of analysis.

While client-level microanalyses are essential for understanding how individual client outcomes are affected by client characteristics and the particular types of services received, the service system focus of macro-analysis is particularly useful for identifying practices which influence overall program performance. A macro level of analysis offers the following advantages in investigating social service delivery system effectiveness:

1. Certain planning and policy questions frequently asked are macro questions. The attempt to set standards to guide the performance of state VR agencies is a macro concern; the question is not whether individual clients are receiving quality services, etc., but whether the agency as a whole performs well.

2. Given the short length of time clients are in most social service delivery systems, changes in the system over longer periods of time cannot be analyzed using client-level data. Even in a year-to-year analysis, there are still problems in linking pre- and post-data for a given client. With macro level data summarizing overall program performance, time series analysis becomes a possibility.

3. The measurement of a macro -level phenomenon can be fundamentally different from that of a micro level phenomenon. The advantage of a macro analysis is that the contextual effects of a particular program

with specific organizational structure, clients, and services can be assayed. Two clients in different programs may have the same characteristics and receive the same services; however, the organizational structure and the mix of other services and clients might result in a much different impact.

4. Another advantage of a macro -level model is the ability of this level of analysis to examine the effect of environment. A strong emphasis is placed in macroanalysis on the role of environment as a limiting and an additive force. It is very difficult to measure the exact environment at the individual client level. Even if such measurement were possible (e.g., labor market conditions, local political attitudes about the disabled), there would be little variation from client to client, especially for those served by the same office or in the same local area. For example, the unemployment rate is only measurable at a macro level. If assigned to each individual in the area, then no variable would exist; there would be no variation, thereby preventing any analysis of the effect of this factor.

5. In a micro analysis, individual differences and peculiarities come to the fore. In a macro analysis, these effects are wiped out. Neither is necessarily better. Sometimes the emphasis is on larger structural effects, and for this, macro analysis is better.[1]

6. Micro data can always be aggregated, whereas disaggregation of macro data is often difficult and sometimes impossible. For this reason, micro analysis is often preferred to macro analysis. However, in social service delivery systems, a number of variables can be observed only at the macro level (e.g., agency procedures, staffing patterns).

7. Certain concepts for understanding certain behaviors in a social service delivery system are macro concepts. For example, to understand client selection, the concept of population-at-risk is necessary, and this concept is a macro concept.

Both macro and micro analysis are necessary for evaluation research for the data-based decision support system. For VR evaluation, micro analysis refers to client-level analysis, although some macro data could be included in that analysis (e.g., attaching counselor characteristics

---

[1]One circumstance where microanalysis is preferred is in attempts to trace the effect of the particular mix of services on client outcomes. Macro models cannot exhibit a level of detail sufficient to address this issue.

to data on each client served by a particular counselor). Macroanalysis refers to agency-level analysis. The focus of the federal standards system is on state VR agency behavior and, for RSA or national reporting, the macro level may be more useful. On the other hand, microanalysis of subunits within the states and of counselor behavior will be particularly useful to individual state VR agencies.

Decision support is a term that covers the activity of using standards information and other program information to answer questions about the state's attainment in the provision of rehabilitation services. Through the creative use of this approach to employing program information, managers can work in the identification of practices and environmental conditions affecting attainment.

II. CLIENT-LEVEL MICRO ANALYSIS

Client-level analyses can play an important supportive role in the evaluation's research effort to investigate problematic performance. Client-level analyses fulfill two functions:

- checking the accuracy, reliability, and validity of the information used in the standards data elements and in the informational data elements; and
- following up the program managers' investigations and following up the results of the agency-level analysis, in order to explore the detailed interaction between client characteristics, service interventions, and observed client outcomes.

Each of these two functions is discussed further below.

CHECKING VALIDITY, RELIABILITY, AND ACCURACY

Description of Approach

The careful work in developing appropriate standards and data elements will be ineffectual if the data used to report on and analyze attainment on the standards are suspect. To ensure that the data adequately support the desired analyses, we must be concerned with several types of data quality.

A very basic issue is that of validity: do the data measure the concept intended? If, for example, we rely on client reports to counselors of earnings at referral in a data element measuring change in economic independence, do these reports truly reflect the client's pre-VR earnings capability?

Reliability, or the issue of consistency of data under repeated measurements, is a second concern. When looking at the same case file, and asked to determine whether improvement in gainful activity for a non-competitive closure has occurred, would two independent reviewers record the same answer?

Accuracy in recording of data is a final concern. Do checks of the case file, agency vouchers or other independent sources show inaccuracy, perhaps through carelessness, in the recording of data items? Have out-of-range codes been recorded or keypunched?

In the pretest of the standards system in six state VR agencies, several issues of validity, reliability, and accuracy in the use of the new data collection instruments were examined. The results of this analysis are given in the Report on the Pretest of the Revised Vocational Rehabilitation Program Standards, Volume I, November 24, 1980. As the standards system begins to operate, the need for analyzing validity, reliability, or accuracy on any of the data elements may arise.

Addressing each of these data quality issues calls for several different approaches. In terms of validity, the very process of selecting the data elements and data sources for the standards has been carefully designed to guarantee, to the extent possible, the validity of each measure. BPA's recommendations for data elements have been reviewed by RSA and state agency staff to identify data elements based on the best available evidence of their validity. Thus, the development of the standards and data elements has already benefited from existing work identifying validity problems with the measures. Nevertheless, periodic in-depth studies of the validity of key data elements may be required. BPA recommends that validity be re-examined at three to five year intervals. Depending upon the findings on validity problems with a given data element, they should be repeated more or less frequently as appropriate. Data items with no problems would not need to be studied as frequently; those with validity problems would be analyzed more regularly until resolution occurs. We recommend the validity studies be done by RSA, perhaps through contracted studies, using a national sample or samples from selected states.

BPA recommends that procedures for examining reliability also take the form of periodic studies to examine inter-rater reliability on data items requiring reviewer judgment and to analyze consistency in data definitions across states. Where results of these procedures identify reliability problems, they will be converted immediately to revised data elements or instructions for data collection to resolve the reliability problems. These reliability studies should also be done by RSA, using a national or selected state samples, and should examine all items requiring reviewer judgment (such as improvement in gainful activity) and definitional issues (such as competitive versus non-competitive goal).

The recommended procedure for examination of accuracy of data recording is the use of computer and, where appropriate, manual editing checks of recorded data to eliminate and correct out-of-range or "wild" codes, check for missing data, check for inconsistencies across data elements (e.g., a client who is listed as not having a job at closure, but who is listed as having retained a job at follow-up). These computer and manual edits for out-of-range codes, missing data, and consistency of recorded items will be routine procedures occurring annually with each data processing cycle.

Recommended Procedural Standard 9 is directly concerned with R-300 validity and reliability, and somewhat with the validity and reliability of other reporting systems used by RSA. The main procedure to be used to measure performance on this standard is the case review process, using case folder information. Also suggested is occasional outside verification of certain data items by contact with employers, agencies handling public assistance, and so forth.

Case Example: Checking the Accuracy and Validity of Earnings at Referral

In order to illustrate the kinds of data collection and analysis needed to check the validity, reliability, and accuracy of the standards data elements, an example has been drawn from a BPA study for the Assistant Secretary for Planning and Evaluation (ASPE) and the Audit Agency of DHHS (Shea, et al., 1978). The example below concerns checking the earnings at referral data.

To verify the accuracy and validity of the R-300 earnings data in that study, two basic procedures were used. First, in personal interviews clients were asked to report on their earnings and employment situation for the periods in question. In addition to personal interviews, a second verification of validity was done using Social Security Administration Summary of Earnings records. Annual earnings data from the SSA were available for comparison with R-300 reports of earnings. Thus, comparisons among the R-300 data, client interview reports, and Social Security reports formed the basis for verifying the R-300 earnings data.

Table 1 compares the weekly earnings at referral as reported on the R-300 with the weekly earnings reported by the client in the interview. The data show that in 79.6% of the cases, the R-300 figure was the same

as the client's reported figure. Nearly all of these matches were cases in which both data sources reported that the client had no earnings the week prior to referral. Thus, there was a relatively high degree of consistency between the R-300 and the client interview.

Most of the cases where the R-300 was not equal to the client interview occurred when one of the sources reported no earnings and the other one did (13.8%), especially when the R-300 reported no earnings, but the client reported some. Thus, earnings the week of referral reported by clients in follow-up interviews indicates more earnings than does the R-300. A client may indeed have difficulty recalling, months later, the precise level of earnings during a particular week if he or she had earnings. However, since most clients are listed by the R-300 as unemployed and thus presumably with zero earnings, this recall error should not be widely prevalent. A client may err in stating the amount of earnings but is less likely to err in stating whether there were any earnings.

Table 1

Weekly Earnings at Referral:
R-300 versus Client Interview
(N=1009, all cases)

Proportion of clients for whom:		
R-300 more than interview:	by 25%[a] or greater	1.4%
	by 10-25%	1.2
	by less than 10%	0.3
	interview reported no earnings	3.7
R-300 equaled interview:	both reported some earnings	0.6
	both reported no earnings	79.0
R-300 less than interview:	by less than 10%	0.6
	by 10-25%	0.7
	by 25% or greater	2.2
	R-300 reported no earnings	10.1
		100.0%

[a]This is calculated as: $\frac{\text{Client Interview Report} - \text{R-300 Report}}{\text{R-300 Report}}$

To check the validity, we compared the R-300 weekly earnings at referral (adjusted to an annual figure) with the annual earnings the year prior to referral reported by the client in the interview, and then with the Social Security Administration earnings data. The same comparisons were done for the client interview reports of weekly earnings at referral to provide additional data on validity.

The client interview question on earnings the year prior to referral recorded these data in 16 ordinal groups from "No earnings," "Less than $2,000," "$2,000 to $2,999," to "$25,000 and over." Table 2 provides a comparison of the extent to which the R-300 weekly earnings figures, extrapolated to annual figures, match the yearly earnings reported by clients in the interview. The table shows that only 44.7% did "match," with 31.7% being cases where the client had no reported earnings. Another 27.4% of the clients had no earnings the week prior to referral according to the R-300, but on the interview reported annual earnings of $1 - 1,999. While the R-300 weekly figure reports that 85.6% of the clients had no earnings the week prior to referral, only 33.1% of the same clients reported no earnings for the year prior to referral in their interviews. Thus, it seems that for a large proportion of the clients, use of annualized weekly earnings at referral reported on the R-300 will not reflect their earnings for the year prior to referral. On the other hand, since 66.1% of clients report earnings of less than $2,000 the year prior, the data are still consistent with the basic conclusion that most clients had minimal earnings expectations before receiving rehabilitation services.

A comparison of the annualized R-300 weekly referral earnings figure with the Social Security Administration (SSA) earnings for the previous year substantiates the above conclusion about validity. Table 3 reveals that in 39.9% of the cases both the SSA and the R-300 reported no earnings, but in 48.5% of the cases the R-300 reported no earnings when the SSA did. This seems to indicate that clients are frequently unemployed the week prior to referral yet have had earnings in the previous year.

Table 2

Weekly Versus Annual Earnings at Referral:
R-300 (Annualized)[a] versus Client Interview
(N=722, all cases)

Proportion of Clients for Whom:		
R-300 more than interview[a]		
R-300 some earnings, interview -- no earnings		1.4%
R-300 and interview both project earnings		
R-300 some earnings, interview $1-1,999		5.6
R-300 some earnings, interview more than $2,000		7.4
Subtotal R-300, some earnings	14.4%	
R-300 and interview both project no earnings		31.7
R-300 less than interview		
R-300 no earnings, interview $1 - 1,999		27.4
R-300 no earnings, interview more than $2,000		26.5
Subtotal interview, some earnings	66.9	
		100.0%

[a]This is calculated as (R300 Report) * (52)

Table 3

Weekly Versus Annual Earnings at Referral:
R-300 (Annualized) versus SSA
(N=922, all cases)

Proportion of Clients for Whom:		
R-300 more than SSA:	by 25%[a] or greater	4.7%
	by 10-25%	0.3
	by less than 10%	1.8
	SSA reported no earnings	2.4
R-300 equaled SSA:	both reported some earnings	0.0
	both reported no earnings	39.9
R-300 less than SSA:	by less than 10%	1.1
	by 10-25%	0.5
	by 25% or greater	0.8
	R-300 reported no earnings	48.5
		100.0%

[a]This is calculated as: $\frac{\text{(R-300 Report)(52)} - \text{SSA Report}}{\text{SSA Report}}$

The validity of using the earnings the week prior to referral as a benchmark for pre-rehabilitation earnings was further checked by evaluating the use of client interview weekly earnings at referral. Perhaps the problem uncovered in validity stems from the inaccuracy of the R-300, rather than from any inherent non-validity of using weekly earnings at referral to estimate client income in the absence of rehabilitation. As Tables 4 and 5 indicate, however, whether R-300 or interview reports of weekly earnings are used, the conclusion of non-validity remains the same.

Table 4, which shows a comparison of annualized client interview weekly earnings at referral with the client interview reported earnings for the 12 months prior to referral, reveals that in only 42.1% of the cases did the two figures match, most of which (34%) were when both figures reported no earnings. Again, a large proportion of clients (43.5%) had reported no earnings the week before referral in their interview, yet reported some earnings in the 12-month period prior to referral.

Table 5 presents a comparison of the annualized client interview weekly earnings at referral with the Social Security Administration annual earnings report. The table shows that all the cases in which the interview figure equaled the SSA figure were cases where both sources reported no earnings (39.2%). In 43.9% of the cases, the client reported no earnings the week prior to referral and the SSA reported some earnings during the year.

The discrepancies between data sources for individual clients revealed by these analyses do not necessarily represent a problem for program management, however, unless individual data are the basis of program decisions. At the program level in the state and federal agencies, individual data are usually aggregated, with monitoring and evaluation primarily making use of mean data, that is, data averaged across all clients. The Program Standards are set in terms of mean client data for earnings, including the cost benefit data elements. Given such uses, individual differences between data sources may prove to cancel out when aggregated. Table 6 presents an analysis of the magnitude of overall discrepancy by comparing

Table 4

Weekly Versus Annual Earnings at Referral:
Client Interview (Annualized) versus Client Interview
(N=799, all cases)

Proportion of Clients for Whom:		
Weekly equaled annual:	both reported some earnings	8.1%
	both reported no earnings	34.0
Weekly reported no earnings, annual reported some		43.5
Weekly reported some earnings, annual reported none		0.0
Weekly and annual both reported some earnings, but unequal		14.4
		100.0%

Table 5

Weekly Versus Annual Earnings at Referral:
Interview (Extrapolated) versus SSA
(N=965, all cases)

Proportion of Clients for Whom:		
Interview less than SSA:	by 25%[a] or greater	1.1%
	by 10-25%	1.5
	by less than 10%	1.9
	interview reported no earnings	43.9
Interview equaled SSA:	both reported some earnings	0.0
	both reported no earnings	39.2
Interview greater than SSA:	by less than 10%	1.4
	by 10-25%	0.4
	by 25% or greater	7.6
	SSA reported no earnings	3.0
		100.0%

[a]This is calculated as: $\frac{\text{(Client Interview Report)(52)} - \text{SSA Report}}{\text{SSA Report}}$

Table 6

Variations in Estimates of
Clients' Earnings Potential Without Services,
Using Aggregated Client Data From Different Data Sources

Data Source	Mean Client Earnings Data			
	All Clients, Closed and Open Cases	All Closed Cases 08, 26, 28, 30	All Closed Cases with Services 26, 28, 30	Successful Closures 26
SSA: Annual Earnings, Year Prior (clients with R-300 data available)	$1561.93 (922)	$1647.80 (379)	$1667.39 (248)	$2073.77 (162)
R-300: Annualized Weekly Earnings at Referral	$ 568.20 (922)	$ 632.38 (379)	$ 630.47 (248)	$ 889.12 (162)
R-300 as Percent of Social Security	36.3% (922)	38.3% (379)	37.8% (248)	42.8% (162)
SSA: Annual Earnings, Year Prior (clients with interview data available)	$1575.83 (965)	$1677.51 (375)	$1777.28 (242)	$2202.18 (160)
Interview: Annualized Weekly Earnings at Referral	$ 813.20 (965)	$1024.05 (375)	$1187.85 (242)	$1465.60 (160)
Interview as Percent of Social Security	51.6% (965)	61.0% (375)	66.8% (242)	66.5% (160)

aggregations of earnings across clients between data sources. The table shows that the inference of earnings without rehabilitation services which would be derived from an annualization of rehabilitants' weekly earnings at referral, as reported on the R-300, consistently is only 36-43% of the inference which would be derived from year-prior Social Security records. If analysts use reports of weekly earnings prior to referral given by clients in interviews, the inference of earnings in the absence of rehabilitation services would be about 60% greater than using the R-300 but would still be only 51-67% of the inference based on Social Security records. While this higher estimate of earnings at referral by clients may simply reflect poor memory, the relatively greater consistency of client reports over Social Security data should provide some confidence in the interview data.

All analyses are thus consistent in their findings. Many clients had no earnings the week prior to referral, yet were employed some time in the previous year. Earnings the week of referral systematically understates the pre-rehabilitation earnings capacity of VR clients. Finally, the magnitude of understatement is not trivial.

EXPLANATORY CLIENT-LEVEL ANALYSES: FOLLOWING UP THE RESULTS OF OTHER ANALYSES

Description of Approach

As was noted in the discussion of investigating problematic attainment in the previous chapter, program managers may come to a point in tracing out possible problems where client-level analyses are required. For example, if the explanation for problematic attainment for cost per 26 closure was that not enough clients were being closed successfully (but enough clients were being closed), an analysis examining what led to the lower success rate would be needed. If other state agencies were having this same problem, then an agency-level analysis would be called for. However, if this agency were the only agency having such a problem, or if the program manager had a specific client-level hypothesis, or if the agency-level analysis suggested a client-level explanation, then a client-level analysis would be required.

The structure of this client-level analysis is very simple. The analysis attempts to explain a dependent variable, such as successful closure, by a set of independent variables. These independent variables should include controlling variables, such as demographics, but they most importantly must include intervention variables, variables that RSA and the state VR agency can manipulate. By including the intervention variables, the explanations gotten from the analysis can easily be turned into corrective actions.

Explanatory client-level analyses have usually taken one of three forms: prediction of outcome, correlates of success, or production function/cost effectiveness analysis. In studies of prediction of outcome, the attempt is to see whether the outcome of the rehabilitation process for an individual client can be predicted at referral or at intake, based on some characteristics of clients (see Worrall for a review of these studies). (Of course, in addition to statistical prediction of outcome there is also clinical prediction, which is also implicit in the determination of eligibility by the counselor.) In studies of correlates of success the attempt is to see what client and other characteristics are associated with success versus non-success, using data collected at any time during the process, including data collected at closure (also see Worrall). The production function/cost effectiveness analysis form is from economics, and has more recently seen use in research on VR (see Dodson, Skaburskis and Collignon for one of the few examples). (A production function is the relationship between quantities of inputs and the maximum amount of output that can be produced.) The first two forms -- prediction of outcome and correlates of success -- have been and are now the predominant ones in the field. However, the production function/cost effectiveness analysis form holds the most promise for use in the supportive evaluation system. In the production function/cost effectiveness analysis form, the actual services received and the dollar amount of services are included in the analysis.

A Proposed Micro Model

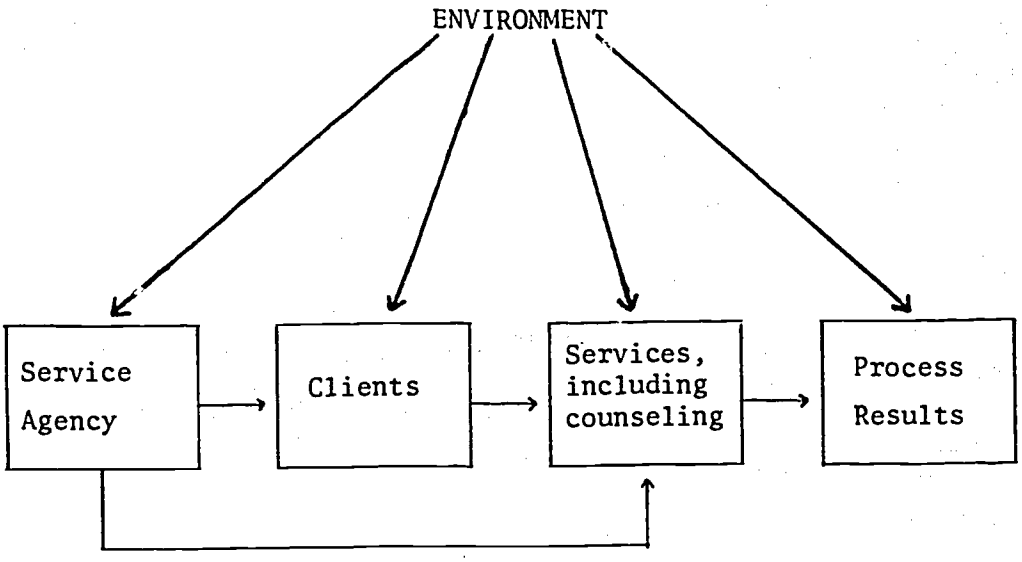
A proper micro model using the statistical approach would specify the aspects of five components of the VR service delivery system: environment, service agency, clients, services, and process results. The model is shown in Figure 1. Below, each of these components is further discussed.

The environment component includes the more general environment, which consists of factors such as region, urbanization, industrialization, and ethnicity and racial composition. A very large number of possible measures of this general environment exists. However, in Dodson (1978) a very large number of measures of the environment were analyzed, and eight measures stood out: South vs. non-South, divorce rate, intra-state migration, unemployment rate, % urban, mortality rate, value added by manufacturing, and number of financial institutions per 100,000 population. In addition to the general environment, there are several other dimensions of the environment that are especially important for the VR service delivery system. One is the job market, the existence of jobs that can be held by the disabled. Another is public and employer attitudes toward the disabled, given the problems of stigma. A third is the medical infrastructure. A fourth is the physical environment, including the existence of cut curbs, ramps, barrier-free buildings, and suitable transportation facilities. A fifth is the availability of other private and public programs. A sixth is the network of referral sources to channel clients to VR. Measures of the specific environment are not readily available, except for referral source for individual clients.

The service agency here includes everything but direct services. Included are the administrative structure, the program structure, method of service delivery, personnel, expenditures, non-direct services, caseload, client selection, program effort, state financial effort, and growth. Non-direct services are those services not given directly to the client, but instead are given in support of direct services. For example, training is a direct service; outreach and job development are non-direct services. Program effort refers to the effort made by the agency to serve those who need services.

Figure 1

Proposed Micro Model



The client component includes: demographic characteristics, nature and extent of problems requiring services, personal characteristics related to problems and services, personal preferences related to problems and services, family situation, economic situation, and overall client difficulty. Demographic characteristics include, among other things, sex, age, race, education, martial status, and location (e.g., rural versus urban, shown to be important for vocational rehabilitation in Goodyear, Bitter, and Micek). Nature and extent of problems requiring services refers to the primary problem of disability. Disability includes type of disability, existence of other secondary disabilities, severity of disability, and functional capability (see Haber for this last concept). Personal characteristics related to problems and services include personal skills (intelligence, aptitudes, training, experience; see Tseng, 1972, for some measures), motivation, flexibility and adaptability, and perception of problems (see Walls and Miller for measurement of perception of disability; see Tseng, 1970, on locus of control, a similar concept). Personal preferences related to problems and services for vocational rehabilitation include preferences for vocation, for location of residence, for desired income versus desired leisure, and for lifestyle. The family situation refers to the support -- emotional, personal, and financial -- provided by the family. The economic situation includes labor force participation, earnings, income, sources of support, number of dependents, and occupation and industry. Client difficulty is the difficulty of successfully serving a client, of attaining a certain process result.

In VR, client difficulty is also called case difficulty. One approach to define difficult clients is to use empirical results from the literatures on prediction of outcome and correlates of success. Worrall surveys 75 such studies and identifies several recurring predictors and correlates of outcome and success: age (younger), race (white), education (higher), and marital status (married). He also notes that these "variables are also significant in studies of labor-force participation; and, since employment is a common measure of rehabilitation program success, we

might expect to find them significant in rehabilitation outcome studies" (p. 110). Although client difficulty may be inferred from other characteristics (or it may not) or may be reflected in the outcome or result of the process (or it may not), client difficulty is not directly measured. The second approach, less used, is to directly measure client difficulty (see Westerheide, Lenhart, and Miller for one suggested measure; see Wright, Reagles, and Thomas for another). However, this approach requires costly interviewing, testing, and observation. A third approach is to define a priori cases that are difficult or easy. This a priori definition could be based on experience and a review of objectives. RSA takes this approach in a memorandum on "Services to Clients with Insubstantial Employment Handicaps: Selected Disabling Conditions of Clients Rehabilitated in Fiscal Year 1973." RSA identifies several disability groups which it believes have "slight or inconsequential disabilities which do not constitute substantial barriers to employment and, thus, are either ineligible for services or do not require VR intervention" (p. 1). These groups include: digestive system conditions (including dental conditions and hernia), hearing impairments other than deafness, other mental illness (character, personality, and behavior disorders other than psychosis, psychoneurosis, drug addiction, and alcoholism), mild mental retardation, and hay fever/asthma. Of the possible client variables, only demographic characteristics, disability (except functional capability), and economic situation are included in the R-300. Personal characteristics related to problems and services, personal preferences, and family situation (except monthly family income at referral) are not included. No direct measure of client difficulty is contained in the R-300, although one could be constructed.

The services component includes the types and amounts of services offered. Moreover, the mix and interactions of services is also important (see Dodson, Skaburskis, and Collignon for one of the few analyses using mix and interactions of services). For example, in VR, training without needed restoration services may not be vocationally fruitful. In addition to quantity of services, the quality of services is of consequence. Whether a technology exists for serving clients is even more important, determining the appropriateness of services. Who provides (pays for) the service

and who produces (delivers) the service are also of significance. Vocational rehabilitation services offered by the agency include the formal purchased services plus the services of the counselor.

Unfortunately, the VR R-300 reporting system includes information only on whether each of the types of formal services are provided, and a few cost categories. The services provided are noted as provided with cost, with no cost, or with partial cost to the agency. Cost categories include total costs, rehabilitation facilities costs, Social Security Trust Funds costs, and extended evaluation costs. That is, no cost by type of service is provided. No costs are recorded for services paid for by sources other than the VR agency. Moreover, services provided by the family are not included, either as delivered or in costs. Participation in certain special federal and state programs is recorded on the R-300, however, thereby allowing a glimpse at some of the other public agencies providing services. However, no information on counselor services is provided. And, of course, no quality measures are available on the R-300. For referral, the reason for nonacceptance and where the client is referred to if not accepted are recorded on the R-300. The appropriateness of services and the implied technology have not received very much discussion in VR. In addition to vocational services, the client may receive other services from public and private agencies. The other services listed on the R-300 include SSDI benefits (status at referral and at closure) and public assistance payments (amount at referral and at closure, amount of time on public assistance at referral, and type of public assistance at referral and at closure) -- both maintenance services.

Process results can be measured in many different ways and at many different points in the process. Measures include:

1. acceptance or rejection for services -- eligibility;
2. completion or non-completion of the process;
3. reliability of the plan for services -- whether planned services are delivered at all, and whether in the correct sequence, mix, and amount;
4. return for services;

5. level of outcome;
6. change in level of outcome;
7. quality of outcome;
8. persistence or permanence of outcome -- at follow-up whether retention of benefits;
9. level of public support still required;
10. release from or continuance in an institution;
11. administrative success -- whether considered successful by service deliverer given agency rules and standards;
12. client satisfaction with services;
13. client involvement in planning and in service delivery;
14. time in process;
15. personal development;
16. increased group awareness and group organizing.

The application of these process results measures to the VR system follows. Eligiblity is given by closure status; 08s are ineligible. Completion or non-completion of the process is given by the closure status, although the reason for closure would be more useful (but is not recorded on the final R-300, though on the form). The plan is not recorded on the R-300, and thus the reliability of the plan cannot be gauged. Return for services is recorded for clients before but not after; whether there has been a previous closure within three years, type of closure, and months since previous closure are all recorded. The outcome measurement has several dimensions, corresponding to the objectives of the VR program. Employment is measured by closure status 26 and work status at closure, and weekly earnings at closure. Homemaking is indicated by closure status 26 and work status at closure. No measure of self-care or of independent daily living is available on the R-300 (see Dinnerstein, Lowenthal, and Dexter for one such measure). Reduction in public assistance rolls is indicated by type and amount of public assistance at referral and at closure. Change in level of outcome can be computed using a before and after approach. For example, the change in weekly earnings from referral to closure can be be computed. The question is whether the client gains (see Reagles, Wright, and Bulter for the concept of rehabilitation gain; see

Hawryluk for a criticism) and how much the client gains from the vocational rehabilitation process. Quality of outcome is not measured, along any of the types of outcomes. One type of measure for quality of employment is whether final occupation fits the occupational goal (see Shea, et. al., 1978). Retention of benefits is not available on the R-300, but the follow-up instrument asks this question of a sample of closures. The level of public support still required is given by public assistance, SSDI, and SSI status at closure, and whether public support is needed later is also available from the follow-up survey. The institutional status of clients is not recorded. Administrative success is given by the 26 closure. A client satisfaction measure is available from the closure survey. Client involvement in planning and in service delivery is covered by Procedural Standard 12 on the IWRP. Time in process is given in several categories -- total months, plus months in certain statuses. Nothing about personal development or group awareness or group organizing is recorded on the R-300.

Case Example: Explanation of Client Outcomes

The previous discussion of the proposed micro model has been largely theoretical. But, what will such an analysis look like in the supportive evaluation system? Below is an example of explaining various client outcomes,[1] many of which are incorporated into the standards data elements. This example illustrates the hypotheses examined, the measures used, the analytical and statistical techniques employed, and the types of conclusions that can be drawn from such an analysis.

[1]Also drawn from the Shea, et. al. (1978) study.

In attempting to determine what contributes to successful client outcomes and, thus, what program improvements will enhance VR's effectiveness, we have concentrated on several measures of client success. In addition to the traditional 26 closure measure, we have analyzed the more rigorous employment and economic outcome measures presented earlier: achievement of competitive employment at closure, minimum wages at closure, and retention of wages after closure. The selection of this set of variables permits a comparison between the program definition of success and other more specific outcome measures. We also look at client satisfaction with VR. This is of interest for two reasons. First, it enables us to address recent program (and standards) emphasis on client satisfaction. Second, since our findings suggest satisfaction measures have little relation to program outcomes, it will be instructive to see whether satisfaction is conditioned by factors different from those which condition other program outcomes.

The final list of variables used for analysis thus includes the following:[1]

- The 26-closure: client was closed 26 vs. client was closed 28 or 30.
- Competitive employment: client was closed into competitive employment vs. client was closed into non-competitive employment. The latter group includes those unemployed at closure.
- Achievement of minimum wage: client earned the minimum wage at closure vs. client did not earn minimum wage at closure. The latter group includes those with no earnings at closure.
- Wage retention: a comparison of wages at closure and at follow-up. Clients were considered a "success" if follow-up wages equalled or bettered those at closure. Clients were not considered a "success" if either: (a) follow-up wages were less than closure wages; or (b) the client had zero earnings at closure.
- VR satisfaction: client was either "very satisfied" or "somewhat satisfied" with VR services vs. client was "very dissatisfied,"

[1] Each variable is dichotomous, i.e., is measured in terms of "success" (1) or "failure" (0).

"somewhat dissatisfied," or "neither satisfied nor dissatisfied" with VR services.

In an attempt to explain differences in client outcomes, we looked at a series of variables representing (1) client characterististics, (2) the client's service process experience, and (3) counselor characteristics and agency context.

Client Characteristics. We included such characteristics as age, sex, and race, as well as education and previous work experience, which may be expected to have an observed effect on client outcomes: much previous research has documented that young, white males achieve greater success in the general labor market. Literature specific to VR has also documented age, sex, race, and employment potential characteristics as correlates of success.

A client's specific disability, as well as the severity of the disability, might also show relationships to our dependent variables. It may be that clients with certain disabilities face greater obstacles to employment. Further, severely disabled (SD) clients, or those clients with secondary disabilities, may require greater service investment and represent cases most difficult to rehabilitate. Thus, it is possible that such clients will fare worse than other clients in terms of VR outcomes. In this study, we were particularly interested, given the 1973 provisions for SD priority, to observe outcomes for the severely disabled in relation to those of non-SD clients.

Finally, we included several broad indicators of the client's employment "potential," including the client's level of education and the client's work experience previous to becoming a VR client. In terms of work experience, clients were classified into four groups: those with no work experience; those with work experience, but who worked only before becoming disabled; those who worked after becoming disabled, but who were not working at referral; and those working at referral. Depending on a client's age and/or case severity, lack of any work experience may serve to bias counselors against heavy investment in him or her. And if nothing else, lack of work experience provides some indication of innate employment potential, again depending on age and case severity.

Client welfare status at referral may affect later vocational outcomes, and was also included as a variable in the analyses. Welfare recipients may represent cases more difficult to rehabilitate. In addition, such clients may experience economic disincentives which bias them against successful outcomes.

Service Process Experience. Service process variables selected for inclusion in the analyses included compliance with IWRP requirements, which may facilitate clients' involvement in their own rehabilitation processes. This may, in turn, increase the probability that such clients will "do their share" toward their own rehabilitation and that the agency will carry through its responsibilities more completely, thereby increasing the probability for successful outcomes.

Other process variables potentially important to an analysis of outcomes include various indicators of smooth service flow. For example, reliable delivery of services (i.e., completion of all services planned for the client) might facilitate favorable outcomes, since reliability implies service continuity and follow-through. Other indicators of service flow include elapsed time from referral to acceptance, and from referral to closure. Other things being equal, clients receiving timely service may have greater chances for success, since they have been spared potentially discouraging delays in service provision. On the other hand, clients who have had more than one counselor may suffer from a lack of service continuity and thus may have decreased chances for success. Finally, clients whose cases were reviewed by supervisors may experience outcomes different from those of clients never reviewed by supervisors. Possibly, such clients may benefit from supervisor redirection of their individual rehabilitation program.

Several service-related issues may also be relevant to client outcomes. We looked at whether the number of services planned for a client was associated with probability for success. Larger numbers of services planned may be associated with favorable outcomes, since more services imply heavier VR investment for such clients. Provision of various specific services may increase chances for favorable outcomes. In particular, we wished to know whether provision of employment-oriented services increases chances for success.

Counselor Characteristics and Agency Context. Several factors may affect counselors' abilities to perform their jobs and thereby influence client outcomes. Our analysis included measures of the counselors' education, receipt of in-house training, and experience as a VR counselor. With reference to education, we were interested in determining whether counselors with degrees in rehabilitation achieved greater success. Such a finding might be expected, since these counselors presumably are most knowledgeable in rehab issues and techniques. Provision of in-house training may also facilitate client success; such training may augment counselors' expertise, if it helps counselors keep abreast of current developments aimed at improved performance. Finally, more experienced counselors may have greater familiarity with the subtle nuances of effective counseling; thus, such counselors may be able to deal more effectively with clients of diverse circumstances. A counselor's perception of his or her role in the rehabilitation process might have an impact on client success. For example, counselors who rate vocational counseling as their first priority may achieve greater success with their clients. Alternatively, such counselors may experience varying degrees of success across outcome variables; for example, these counselors may place more clients in employment but fail to help their clients achieve reasonable earnings, if employment is the overriding concern.

Indicators of counselor productivity were also expected to be relevant in an analysis of outcomes. Concern has been expressed that agency pressures for increased performance may hinder client success, if such pressures incline counselors toward hasty planning and quick closure, i.e., a focus on quantity rather than quality. Our analysis included measures of the counselor's number of 26 closures as an indicator of pressure to produce.

Counselor caseload size may also be a variable, representing agency and counselor context, with impact on outcomes. While the obvious hypothesis would be that larger caseloads would hinder success, because the counselors with extremely large caseloads would be overburdened, there have been several studies in VR showing the opposite relationship, suggesting that the more able counselors feel capable of taking on larger responsibility and can serve more cases.

The final counselor characteristic included in our analysis was a measure of counselor autonomy. Counselors were asked how often they checked with their supervisors regarding service decisions. "Autonomous" counselors are those responding that they "didn't usually" or "only occasionally" checked with their supervisors; "non-autonomous" counselors are those responding that they "usually" checked or that they "are required" to check with their supervisors. It may be that autonomous counselors achieve less success if they are freer to "cut corners" in service and closure decisions. Alternatively, autonomous counselors may be those most able to manage their cases without assistance from superiors. If so, autonomous counselors may achieve greater success.

Findings

The first issue addressed in the analysis concerned the relative influence on outcomes of these three general sets of variables -- client characteristics, service process, and counselor characteristics. In this case, we wished to know whether client characteristics, service process experience, and counselor characteristics/agency contexts were relatively equal in their effect on outcome, or whether one set of factors dominated. Determining relative influence allows us to identify general targets at which to aim policies designed to improve VR's performance. For example, a finding that elements of the service process exerted little influence in relation to client characteristics would suggest two conclusions. First, we might conclude that what a client brings to VR in terms of potential and employability most strongly conditions the client's probability for success, and that efforts to change such things as time in process, service reliability, etc., would yield little improvement in outcomes. Second, such a finding might justify a recommendation that VR reassess its service strategies and levels of effort for different client groups to compensate for the inherent disadvantages of some types of clients. Alternatively, such a reassessment might show that certain client groups systematically receive inferior treatment; or, perhaps, it might be found that these groups more appropriately belong in public service programs other than VR.

We assessed relative impact through use of variance partitioning techniques. Our findings show that, in fact, client characteristics tended to be the most potent predictors of overall outcomes (see Table 7). The percentage of variance uniquely explained by client characteristics equalled or exceeded that of the other two blocks for all dependent variables except closure status.

Table 7

Variance Partitioning for Regressions on Outcome of Accepted Clients

Dependent Variable	Explained Variance[a]				
		Unique			
	Total	Client	Process	Counselor	Shared
Closed 26	.62787	.10250	.21884	.05592	.25060
Competitive Employment	.74753	.26324	.19536	.04628	.24265
Minimum Wage	.60525	.28901	.11154	.07979	.12491
Wage Retention	.64329	.24179	.12830	.03676	.23644
VR Satisfaction	.50412	.11486	.09572	.11573	.11781

[a]Unadjusted R^2

Employment and earnings outcomes were particularly influenced by client characteristics, which accounted for one-quarter of the total variance on the competitive employment, minimum wage, and earnings retention variables. Nonetheless, service process variables did exert considerable influence on employment and earnings. Achievement of competitive employment, in particular, appeared to be strongly influenced by service strategy and the individual's experience while a VR client. In contrast, counselor characteristics had little relative impact on employment and earnings: only on the minimum wage variable did counselor characteristics uniquely account for as much as 8% of total variance.

The probability of a "successful" closure was most influenced by service process variables, which uniquely accounted for 22% of total variance. However, the individual client's characteristics did impact somewhat on closure

status. Here again, counselor characteristics exerted little influence. One explanation for the stronger impact of process variables on closure status may be that the 26 closure is "easier" to achieve than are competitive employment and minimum wage earnings. Thus, client characteristics may present less of an obstacle to the 26 closure. Such an explanation is sensible, inasmuch as the 26 closure includes homemakers: a non-working, non-wage-earning group. Put another way, the broadness of the 26 closure permits recognition of the widely varying potentials of clients and that valid rehabilitation, under current regulations and legislation, can mean very different things. Employment outcomes represent a narrower definition of rehabilitation, and we would expect client characteristics associated with labor market receptivity to have greater impact.

Satisfaction with VR showed very different relationships to the independent variable blocks. Each of the blocks uniquely accounted for approximately the same proportion of variance (10%). This is interesting because, first, in this sole case counselor characteristics exhibited an explanatory role equally as powerful as found for client and process variables. This suggests that satisfaction partially reflects the client's feeling toward his or her counselor. Second, process variables have the least impact on satisfaction (albeit by a small margin), justifying the conclusion that satisfaction is not primarily a function of effective planning and/or service provision.

In sum, the above analysis suggests the following general conclusions:

(1) The client's innate potential, both for rehabilitation and employment, most strongly conditioned his or her probability for achieving competitive employment and reasonable wages. This suggests that concerted efforts may be in order on behalf of certain client groups. Such efforts might include rigorous examination of the special problems experienced by these groups, both as clients of VR and as job-seekers.

(2) Nonetheless, process variables did impact on employment and earnings. Thus, we can be reasonably confident of the efficacy of program elements. In the next stage of analysis we will see which program elements bear the strongest relation to outcomes.

(3) As expected, probability of 26 closures and client satisfaction showed somewhat unique relationships to the independent variables. The less rigorous requirements of the 26 closure, in relation to employment and earning criteria, may account for the different patterns observed for closure status. In contrast, client satisfaction is much more influenced by counselor characteristics, while program elements (theoretically the basis for subjective determination of "satisfaction") exert the least influence.

While variance partitioning allows assessment of relative impact of variable blocks, it does not provide information on the effect of each variable; this requires a detailed analysis of coefficients and significance levels. In addition to identifying the most important independent variables, i.e., factors affecting outcome, such an analysis also allows further comparison of the dependent variables or outcome measures themselves. Table 8 presents the analysis of factors affecting client outcome.

Prior to detailed analysis of the regressions, to aid in understanding the explanatory power of our regressions for our outcome measures, classification tables are presented. A predicted value for each case is calculated using the regression coefficients and the values of the independent variables for that case. Then this predicted variable is dichotomized, "no" if the predicted probability is under .5, and "yes" if over .5. Table 9 indicates that our regressions do a fairly good job of prediction: more than 80% of our clients were correctly classified on each dependent variable (that is, are no-no or yes-yes), and in most cases the proportion is closer to 90%. Further, the proportions of prediction errors generally are evenly distributed. For example, 4.5% of our clients were closed 26 when our equation predicted they would be closed 28 or 30; likewise, the regression equation predicted 4.4% would be closed 28 or 30 when in fact these clients were closed 26. Only for the minimum wage and VR satisfaction measures does this pattern not hold. Thus, in general, our model provided accurate predictions of ultimate client outcomes.

As expected, many client characteristics showed strong, consistent relationships to employment and earnings outcomes. This was primarily true

Table 8

Regression for Explanation of Client Outcomes

(Closed Clients, 26, 28, 30)

INDEPENDENT	DEPENDENT				
	Closed 26	Competitively Employed	Earned Minimum Wage or Better	Wage Retention	VR Satisfaction
Client Characteristics					
Age:					
16-24	†-.22 **	-.20 **	-.38 **	-.20 **	-.12
	(.10)	(.08)	(.12)	(.10)	(.11)
25-44[a]	--	--	--	--	--
	--	--	--	--	--
45+	-.01	-.20 **	-.48 **	-.16 +	.10
	(.10)	(.09)	(.13)	(.10)	(.11)
Male	-.03	.11 +	.21 **	.15 *	-.12 +
	(.08)	(.07)	(.10)	(.08)	(.09)
White	.22 **	.20 **	.24 **	.12	.02
	(.09)	(.08)	(.11)	(.09)	(.10)
Education:					
0-8 years	-.15 +	-.32 **	-.04	-.10	.03
	(.10)	(.09)	(.13)	(.10)	(.11)
9-11 years	.09	-.03	.14	-.02	-.03
	(.10)	(.08)	(.12)	(.10)	(.11)
High school[a]	--	--	--	--	--
	--	--	--	--	--
More than high school	.16	.19 +	.05	-.14	.13
	(.14)	(.12)	(.17)	(.14)	(.15)
Severely disabled	-.05	-.09	-.10	-.01	.12 +
	(.08)	(.07)	(.10)	(.08)	(.09)
Has second disability	.08	-.03	.12	-.07	-.14 +
	(.10)	(.08)	(.12)	(.10)	(.11)
Primary Disability:					
Visual	.20	.06	.46 *	-.03	-.06
	(.21)	(.18)	(.26)	(.21)	(.23)
Aural	.07	.01	-.07	-.08	.22
	(.19)	(.16)	(.24)	(.19)	(.21)
Mental illness	-.05	.03	.01	.14	-.09
	(.11)	(.10)	(.14)	(.11)	(.13)
Drug and behavioral	.09	.19 *	-.17	-.00	.05
	(.12)	(.10)	(.15)	(.12)	(.13)
Orthopedic, amputee	--	--	--	--	--
	--	--	--	--	--
Mentally retarded	.19	.10	-.33 +	.27 +	.08
	(.17)	(.14)	(.21)	(.17)	(.19)
Other	.07	.07	-.14	-.13	.20 *
	(.11)	(.09)	(.13)	(.11)	(.12)
Receiving welfare at referral	-.33 **	-.14 +	-.23 *	-.20 **	-.04
	(.10)	(.08)	(.12)	(.10)	(.11)
Work experience pre-VR:					
Never worked	.07	-.26 **	-.39 **	-.48 **	.09
	(.12)	(.10)	(.15)	(.12)	(.13)
Worked, only pre-disability	-.17 +	-.49 **	-.65 **	-.58 **	-.01
	(.12)	(.10)	(.15)	(.12)	(.13)
Worked after disability, but not at referral	-.07	-.18 **	-.40 **	-.30 **	-.10
	(.10)	(.09)	(.13)	(.10)	(.11)
Working at referral[a]	--	--	--	--	--
	--	--	--	--	--

†First number is the unstandardized regression coefficient representing effect of independent on dependent variable. Second number (in parentheses) is the standard error of the coefficient.

[a]Categories for which no dummy variable was created ("left out" category).

[b]Continuous variables; coefficients give range of effect.

Significance levels for coefficients noted as follows: **=.000 to .050; *=.051 to .100; +=.101 to .200.

Table 8 (continued)

INDEPENDENT	DEPENDENT				
	Closed 26	Competitively Employed	Earned Minimum Wage or Better	Wage Retention	VR Satisfaction
Process Variables					
Has IWRP	[†].26 ** (.09)	.30 ** (.07)	.08 (.11)	.12 + (.09)	.15 + (.09)
Plan reliability	.19 * (.10)	-.11 + (.09)	.07 (.12)	-.16 + (.10)	.16 + (.11)
Time from referral to acceptance[b]	-.00,-.46 (.0004)	.00,.52 (.0003)	.00,.22 (.0005)	.00,.24 (.0004)	-.00,-.54 (.0004)
Time from referral to closure[b]	.00,.25 (.0001)	.00,.07 (.0001)	-.00,-.57 (.0001)	-.00,-.43 (.0001)	.00,.01 (.0001)
Had more than one counselor	.10 (.09)	.04 (.07)	.14 + (.11)	-.01 (.09)	-.01 (.09)
Supervisor reviewed case	-.01 (.08)	-.06 (.07)	-.36 ** (.10)	-.16 * (.08)	-.17 * (.09)
Number of services planned[b]	.03,.27 (.03)	-.07,-.58** (.02)	.03,.23 (.03)	-.02,-.21 (.03)	.03,.23 (.03)
Services delivered:					
Prosthetics	.27 ** (.11)	.44 ** (.09)	.12 (.14)	.24 ** (.11)	.04 (.12)
Diagnostics and evaluation	.03 (.08)	.15 ** (.07)	.10 (.10)	.10 (.08)	.03 (.09)
Education	.21 (.20)	.26 + (.17)	.59 ** (.25)	.46 ** (.20)	.11 (.22)
Vocational training	.21 * (.12)	.45 ** (.10)	.18 (.15)	.25 ** (.12)	-.05 (.13)
On-the-job training	.19 (.19)	-.03 (.17)	.03 (.24)	.27 + (.20)	-.33 + (.21)
Tools	-.09 (.13)	.20 * (.11)	-.16 (.16)	-.19 + (.13)	.10 (.14)
Job placement	.23 * (.12)	.27 ** (.11)	.13 (.15)	.29 ** (.12)	-.18 + (.14)
Transportation	.09 (.14)	-.03 (.12)	-.03 (.17)	.05 (.14)	.19 (.15)
Maintenance	-.15 (.14)	-.02 (.12)	-.11 (.17)	.09 (.14)	.00 (.15)
Family services	-.50 ** (.25)	-.09 (.21)	-.10 (.31)	.24 (.25)	-.20 (.27)
Follow-up services	.13 (.16)	.04 (.13)	.12 (.20)	-.01 (.16)	.07 (.17)
Other	.06 (.10)	.05 (.08)	-.07 (.12)	.13 + (.10)	.01 (.11)

[†]First number is the unstandardized regression coefficient representing effect of independent on dependent variable. Second number (in parentheses) is the standard error of the coefficient.

[a]Categories for which no dummy variable was created ("left out" category).

[b]Continous variables; coefficients give range of effect.

Significance levels for coefficients noted as follows: **=.000 to .050; *=.051 to .100; +=.101 to .200.

Table 8 (continued)

INDEPENDENT	DEPENDENT				
	Closed 26	Competitively Employed	Earned Minimum Wage or Better	Wage Retention	VR Satisfaction
Counselor Characteristics					
Education:					
Less than BA	[†].09	-.12	-.31 +	-.16	-.02
	(.19)	(.16)	(.23)	(.19)	(.21)
BA	.06	-.11	-.27 +	-.05	.22 +
	(.13)	(.11)	(.17)	(.13)	(.15)
Some graduate	.06	-.01	-.15	-.08	.09
	(.13)	(.11)	(.16)	(.13)	(.15)
Graduate: rehabilitation counseling[a]	--	--	--	--	--
	--	--	--	--	--
Graduate: psychology, sociology, special education	.17	-.22 +	-.33 +	-.19	-.12
	(.19)	(.16)	(.23)	(.19)	(.20)
Graduate: counseling and guidance	.05	-.12	-.17	-.00	-.11
	(.15)	(.11)	(.17)	(.13)	(.15)
Graduate: other	.04	.13	-.34 *	.06	.18
	(.16)	(.14)	(.20)	(.16)	(.18)
Received training in:					
Needs of severely disabled	.10	-.01	.06	.09	.15 +
	(.08)	(.07)	(.10)	(.08)	(.09)
Job market requirements	.01	.02	-.03	-.14 *	-.01
	(.08)	(.07)	(.10)	(.08)	(.09)
Caseload management	-.09	-.07	-.06	-.06	-.10
	(.10)	(.08)	(.12)	(.10)	(.11)
Counselor experience:					
Less than 2 years	.10	.19 **	.19 +	-.04	.17 +
	(.11)	(.10)	(.14)	(.11)	(.12)
2-5 years	-.14 +	-.07	.17 +	-.01	-.02
	(.09)	(.08)	(.11)	(.09)	(.10)
Over 5 years[a]	--	--	--	--	--
	--	--	--	--	--
Perception of role:					
Diagnostics: testing and evaluation	.02	.04	.17 +	.04	-.03
	(.10)	(.09)	(.12)	(.10)	(.11)
Vocational counseling[a]	--	--	--	--	--
	--	--	--	--	--
General counseling	-.01	.07	-.03	-.04	-.10
	(.09)	(.08)	(.11)	(.09)	(.10)
Referral	-.29	.08	-.34	-.11	-.12
	(.23)	(.20)	(.28)	(.23)	(.25)
Job placement	.14	.08	.33 *	.02	-.09
	(.15)	(.12)	(.18)	(.15)	(.16)
Number of 26s[b]	.00,.21	-.00,-.17	.00,.23	-.00,-.17	-.00,-.11
	(.002)	(.001)	(.002)	(.002)	(.002)
Caseload size[b]	-.00,-.07	.00,.32+	.00,.41	.00,.29	.00,.56*
	(.001)	(.001)	(.001)	(.001)	(.001)
Autonomy: does not usually, or only occasionally checks with supervisor	.14	-.10	-.20 +	-.07	.15
	(.12)	(.10)	(.15)	(.12)	(.13)
Constant	-.14	.41	.87	-.15	.21
Significance (F)	.000	.000	.000	.000	.001
% correctly classified	91.1	90.7	83.1	86.4	89.7
R^2	.63	.75	.61	.64	.50
Adjusted R^2	.44	.62	.41	.47	.26
N	170	170	170	170	170

[†]First number is the unstandardized regression coefficient representing effect of independent on dependent variable. Second number (in parentheses) is the standard error of the coefficient.

[a]Categories for which no dummy variable was created ("left out" category).

[b]Continous variables; coefficients give range of effect.

Significance levels for coefficients noted as follows: **=.000 to .050; *.051 to .100; +=.101 to .200.

Table 9

Classification Tables for Outcomes Measures: Statuses 26, 28 and 30

Prediction: 26 Closure	Client Closed 26?		Total
	No	Yes	
No	34[a] (27.9%)[b]	5 (4.5%)	40 (32.4%)
Yes	5 (4.4%)	77 (63.2%)	83 (67.6%)
Total	40[c] (32.3%)	83 (67.7%)	122
Prediction: Competitive Employment	**Client Competitively Employed?**		**Total**
	No	Yes	
No	41 (38.0%)	5 (5.0%)	46 (43.1%)
Yes	5 (4.3%)	57 (52.7%)	61 (56.9%)
Total	46 (42.3%)	62 (57.7%)	108
Prediction: Earned Minimum Wage	**Client Earned Minimum Wage?**		**Total**
	No	Yes	
No	51 (47.5%)	7 (6.1%)	59 (54.3%)
Yes	9 (10.1%)	38 (35.6%)	49 (45.7%)
Total	61 (57.5%)	46 (42.5%)	108

[a] frequency

[b] total percentage

[c] due to weighting, sum of numbers may not equal row/column total.

(Continued)

Table 9 (continued)

Prediction: Retention of Wages	Client Retained Wages?		Total
	No	Yes	
No	45 (43.0%)	8 (7.1%)	53 (50.1%)
Yes	7 (6.5%)	46 (43.4%)	53 (49.9%)
Total	52 (49.5%)	53 (50.5%)	106
Prediction: VR Satisfaction	**Client Satisfied with VR?**		**Total**
	No	Yes	
No	28 (23.1%)	3 (2.7%)	31 (25.8%)
Yes	9 (7.6%)	81 (66.6%)	90 (74.2%)
Total	37 (30.7%)	84 (69.3%)	121

for basic demographics (age, sex, race) and the client's employment and welfare status at referral. Our findings confirm that younger (16-24) and older (45+) clients face greater obstacles to employment. These two groups were 20% less likely to achieve competitive employment and to retain earnings compared to those 25 to 44 years old. Their chances for achieving the minimum wage were even poorer, being at least 40% lower than for clients 25 to 44 years of age. Interestingly, only younger clients showed decreased probability for a "successful" closure.

Females and non-whites also experienced lower chances for favorable employment and earnings outcomes in relation to their respective counterparts. In addition, whites were 22% more likely to be closed 26. The 26 homemaker closure may account for the fact that sex bore no relation to closure as "successful." Interestingly, males were less likely to be satisfied with VR, even though they had greater chances for favorable outcomes. This suggests that satisfaction may be influenced by one's expectations the degree to which they are met or unmet. If males expect more than females, then the chances for unmet expectations are thereby raised. It is interesting, however, that whites did not also express less satisfaction, as would be expected by our hypothesis.

The above findings support the notion that younger and older people, females, and non-whites are harder to place in employment. Further, these people are more likely to lose employment over time (the last hired, first fired). This is indicative of current labor market conditions, which are largely exogenous variables over which VR has little control. However, the findings might justify a recommendation that VR increase efforts on behalf of these clients, in order that they may compete successfully in the job market. Still, any such decision must take into consideration the relationship which higher costs incurred through greater efforts may have on long-term cost-effectiveness.

Two other groups consistently faring better on our employment and earnings variables were clients who were working at referral and clients not receiving welfare at referral. Those working at referral were anywhere from 18% to 65% more likely to achieve "success" on our measures than were clients not working at referral. Interestingly, clients who had worked, but only before becoming disabled, were least likely to achieve success. It

may be that the majority of these clients only recently became disabled; if so, they may prove more difficult to rehabilitate if they are still adjusting to their disabled condition. Corollary to this, such clients may have high expectations, based on what they could do before becoming disabled. Perhaps these clients are more prone to give up before the rehabilitation process can be completed.

Clients receiving welfare at referral also were much less likely to achieve success in terms of employment and earnings. There are two possible (and not necessarily mutually exclusive) explanations for these findings. On the one hand, welfare recipients may have intrinsically lower employment potential and may represent more difficult cases. On the other hand, clients receiving welfare may have an economic disincentive to achieve success: these clients may seek to preserve income and especially health care and attendant benefits already enjoyed via public assistance, which would be difficult to equal given the low wage prospects often associated with competitive employment rehabilitation.

The findings regarding clients receiving welfare and/or not working at referral suggest several recommendations. First, VR should perhaps expend greater energy on clients not working at referral. These clients probably need more extensive services, especially those services aimed at employment, such as education, vocational training, and job placement. In addition, diagnosis and evaluation should aid in effective goal identification and service planning. Finally, VR should identify those clients experiencing difficulty in adjusting to their disabled condition. Such clients may need assistance in recognizing their limitations, but, especially, VR should help the client become cognizant of his or her as yet untapped potential. In terms of clients receiving public assistance, the first need is to determine the extent to which economic disincentives are responsible for these clients' poorer outcomes. If disincentives do explain the findings, then perhaps a more graduated reduction in welfare payments and health care subsidies as earnings increase might induce more favorable outcomes for these clients.

Contrary to expectation, neither client education, specific disability, nor severity of disability showed consistent relationships to outcomes. For

example, we might have expected success to be linearly related to education, since education is generally thought to increase employability. However, education was significant only in terms of achieving competitive employment, although the relationship is consistent with theory: in relation to high school graduates, clients with no more than elementary school education were 32% less likely to achieve competitive employment, while those with at least some college were 19% more likely to be competitively employed. Also, clients with an elementary education were less likely to be closed 26.

A client's specific disability showed only sporadic relation to outcomes. Interestingly, clients with visual disabilities were almost twice as likely as other clients to earn the minimum wage. This may be because these clients are relatively easy to rehabilitate, particularly if they only require, for example, a pair of glasses to be "rehabilitated." Likewise, clients with drug and behavior related disabilities, who were more likely to achieve competitive employment, may require minimal effort to achieve success. The main conclusion, however, is that the specific disability of a client is not an important determining factor in vocational outcome.

Finally, measures of case severity had no value as predictors of employment and earnings outcomes. This finding is of particular importance in relation to the legislative mandate for priority service to severely disabled clients. Although no formal definition of "priority" yet exists, we can be confident that the severely disabled fared no worse than non-severe clients, all other things being equal, in terms of one conceivable measure for priority (i.e., outcomes). Interestingly, both severity and secondary disability were related to satisfaction, although in an inconsistent manner. The fact that severely disabled were more likely to express satisfaction points again to our "expectations" hypothesis, that, perhaps, they do not expect too much. However, the hypothesis is not supported by the responses of those with a second disability. The explanation for the differences in satisfaction may well be in the priority mandate for the severely disabled: to the extent that these clients were receiving greater attention and better services, they were more satisfied. Clients with secondary disabilities were not a particular priority group, and it may even be that counselors, by focusing on the primary obstacle to employment, failed to meet expectations of these clients with respect to other needs.

The findings on education suggest that VR should form a strategy for dealing with poorly educated clients. One obvious suggestion might be that VR provide more educational services to these clients. Such a policy, again, must be considered in light of potential consequences for case service cost and length of time in service in relation to potential benefits gained.

In comparison to client characteristics, service process variables showed less consistent relations to outcomes. The particular program elements most strongly related to outcomes included: compliance with the 1973 legislative mandate for Individual Written Rehabilitation Programs; service plan reliability; supervisory review of case; and certain services delivered to the client. Among the dependent variables, competitive employment and wage retention were associated with the greatest number of process variables. This bears out the variance partitioning findings which showed process uniquely accounting for a considerable amount of variance on these two outcome measures. However, we might have expected similar results for the 26 closure, for which process accounted for the greatest amount of variance, and achievement of the minimum wage, as well. As we will see, only certain key process variables were related to the 26 closure and minimum wage outcomes, once client characteristics were controlled.

Possession of an IWRP impacted positively on various client outcomes. Clients with IWRPs were 30% more likely to be closed into competitive employment and had 12% greater chances of retaining wages. Provision of IWRPs also increased, by 26%, the probability of being closed 26. Finally, clients with IWRPs were 15% more likely to express satisfaction with VR. Thus, it appears that the IWRP process (assumedly entailing client-counselor cooperation in service planning) has the theorized effect on client satisfaction. It is important to note that possession of an IWRP will soon be the case for all clients, assuming satisfactory agency compliance with laws and regulations, and thus will no longer be a discriminating variable among clients. However, the finding of the positive effect of the IWRP is still very important now, in its relatively early stages of implementation, because of its confirmation that the new legislative requirement is sound and positive in its impact.

Service plan reliability showed quite varying results: although reliability increased the chances for 26 closure and satisfaction with VR,

it was associated with lesser chances for achieving competitive employment and retaining wages. It seems reasonable that reliable service delivery should increase client satisfaction. Yet it is somewhat surprising to find reliability impacting one way (positively) on probability of 26 closure while impacting negatively on achievement of competitive employment and retention of wages. However, the explanation may well lie in the homemaker closure. Bivariate analysis indicates lower reliability for homemaker and other non-competitive closures. Apparently, these clients do not as reliably get their planned services, and this may be the reason for closure in work statuses inferior to competitive employment.

Supervisory review of a client's case might normally be expected to increase chances for favorable outcomes; such review might serve to redirect rehabilitation strategy to more appropriately satisfy the client's rehabilitation needs. However, in our sample, clients whose cases had been reviewed were much less likely than those never reviewed to achieve the minimum wage (36%) and to retain earnings (16%). In addition, the former group expressed less satisfaction than the latter group. Apparently, supervisory case review does not necessarily imply supervisor intervention for more effective service provision. Instead, perhaps supervisors review cases of those clients who are "troublesome" to their counselor: clients with unrealistic expectations, or who are uncooperative, or who represent particularly difficult cases. In fact, counselors themselves may initiate the bulk of requests for such reviews.

Provision of certain VR services seems to facilitate favorable employment and economic outcomes. In most cases, observed effects are consistent with intuitive notions of service impact. Education services showed the greatest association with employment and earnings. In particular, education seemed to greatly enhance a client's wage-earning power and ability to compete successfully over time in the job market, regardless of the client's personal characteristics. That is, we might well expect "the best and brightest clients" to fare well with education; we would not thereby infer that all clients should get more educational services since not all clients might have the aptitude to benefit from education. Since we have controlled for other client characteristics likely to affect general aptitude, the positive findings for educational services

do indeed indicate that most clients benefit from educational services when provided. It is interesting to note, also, that provision of educational services exerted the strongest positive effect on minimum wage and wage retention; further, the magnitude of the two coefficients was very high, emphasizing the considerable effect of educational services. This is sensible, of course, since education augments a client's personal resources, thus providing greater opportunities.

Other substantial services tended to impact on a client's short- and long-term ability to achieve and maintain employment. For example, provision of vocational training and job placement services increases chances for employment and retention. Both of these services are aimed at placing clients in stable employment. In addition, these two services increase chances for a "successful" closure. Clients who received on-the-job training (OJT) or "other" service were more likely to retain wage. OJT may allow clients to gain greater familiarity with the demands of their occupations, while operating in a somewhat relaxed atmosphere. Those clients receiving "other" services may receive auxilliary services with particular relevance to their occupational goals. In the case of both variables, retention should be enhanced. Finally, clients receiving diagnosis and evaluation, and clients receiving tools, have greater probabilities of achieving competitive employment. This is sensible, inasmuch as diagnosis is aimed at identifying a vocational goal suited to the client's needs, and tools are provided with specific jobs in mind.

Two other services -- prosthetics and family services -- showed strong relations to some dependent variables. However, the nature of the relationships is unclear. For example, clients receiving prosthetics experienced far greater chances for "successful" closure, competitive employment, and wage retention. There is no intuitive reason why prosthetics should exert such an impact on outcomes, although in some cases receipt of prosthetics may really indicate an easy case, one requiring little effort to "rehabilitate," and simple provision of glasses or hearing aid equipment. Alternatively, there may be cases where prosthetics represent a very sophisticated and needed service, one which is a VR specialty and, when provided, greatly increases employability. At this time no explanation can be given for the observed negative relation between family services and the 26 closure.

Services, in general, are very important factors contributing to employment outcome. Most had coefficients of very high magnitude relative to any of the other individual variables considered, including client characteristics. The more "substantial" services, of education, vocational training, and job placement, showed up consistently in terms of quality closure and retention of benefits, although only education showed a strong relation to achieving minimum wages. Interestingly, the provision of specific services appears to have nothing to do with client satisfaction, except in the cases of on-the-job training and job placement services which showed negative relationships for which we can posit no explanation. Finally, it is interesting to note two things. First, provision of follow-up services, though infrequent, did not seem to increase the chances for wage retention when provided. Second, clients with many services planned were less likely than other clients to achieve competitive employment. Conceivably, those clients requiring many services are also the clients facing the greatest obstacles to employment. Alternatively, since bivariate analysis showed homemakers and other unpaid work statuses to have the greatest number of services planned, it may be that plans are changed and new services added when it becomes clear that the original services will not yield competitive outcomes.

The remaining elements of the service process considered, time in process and turnover of counselors assigned to a client, showed no consistent relationships with client outcome.

Some possible recommendations, on the basis of the above findings on the role of service process, include:

(1) Agencies should emphasize completion of the IWRP process for each client. Although client awareness and client participation do not significantly affect earnings outcomes, they do facilitate entrance into the competitive labor market and retention of wages and employment and seem to engender client satisfaction.

(2) Agencies may want to increase provision of certain services, especially those services needed for effective planning (i.e., diagnosis) and adjustment and entrance to the labor

market (such as vocational training and job placement). In addition, education increases chances for success on many measures.

(3) Further investigation is warranted to determine:

-- the reasons why clients receiving prosthetics are so advanced in terms of outcomes. It may be that these clients have minimal need for VR services.

-- why clients' cases are reviewed by supervisors. This question is mostly of academic interest. However, it may be instructive to see more clearly whether this review procedure can be used by agencies to improve the outcomes of these apparently problematic cases.

The last block of independent variables investigated, counselor characteristics, showed the least consistent relation to our dependent variables, as was earlier suggested by variance partitioning. Counselor education showed only sporadic association to outcomes. However, clients of two groups of counselors -- those with no more than a college degree, and those with graduate degrees in psychology, sociology, and special education -- fared worse in terms of competitive employment and earnings. In general, with regard to the question of how counselors with degrees in rehabilitation fare in comparison to others, we find that for most of our measures there was no significant difference. They did not appear to perform better on the traditional measure of 26 closure or on competitive employment or satisfaction. However, they did fare better than other counselors with regard to achievement of minimum wages for clients.

Training in rehab-related issues had varying impacts on outcomes. Apparently, training in caseload management bears no relation to outcomes. This is somewhat surprising, since one might expect such training to facilitate smooth service delivery and counselor-client communication. It may be that the quality or content of the training available is limited. Surprisingly, training in the needs of the job market was negatively associated with earnings outcomes. Again, it could be that the training on this topic is out of date. Finally, training in the needs of the severely disabled was associated with greater VR satisfaction.

Contrary to expectations, the most experienced counselors registered the least success on employment and earnings measures. This may be due to greater enthusiasm of newer counselors -- a hypothesis supported somewhat by the increased probability for satisfaction with VR exhibited by clients of the newest counselors. If this is true, then VR may face problems with counselor burn-out, in which case VR is well advised to address the issue for the benefit of all concerned.

Counselor productivity (number of 26s) did not affect client outcomes. This finding should dispel, somewhat, the fears of those concerned with the adverse impact of pressures for high productivity, since it supports the contention that high productivity counselors do not necessarily produce poorer quality outcomes.

In conjunction with the above finding, it is interesting to see the apparent positive effects of larger caseloads. It is unlikely that large caseloads, in and of themselves, are responsible for positive outcomes. Possibly, caseload size is a proxy measure for counselor skill: better counselors can handle more clients. Likewise, better counselors have greater success.

Finally, clients of relatively autonomous counselors (i.e., those experiencing less direct supervision) were 20% less likely to earn the minimum wage. Autonomy did not, however, have a significant relation to other outcomes, including probability of 26 closure. Thus, while clients of such counselors are equally likely to find and retain employment, their counselors may be freer to close them into less well-paying jobs. To the extent that this is a concern, agencies may want to employ more supervision of counselors.

To summarize, certain conclusions and recommendations are suggested by the analysis of counselor characteristics. First, VR need not be too concerned with a counselor's specific education. Second, more detailed analysis of the nature and extent of in-house training is required. Current training programs, with the exception of training about the severely disabled, do not appear to be particularly fruitful, but it remains possible that improved curricula could change this situation. Third, VR may face the problem of counselor burn-out, a problem with serious consequences for program performance. Fourth, high productivity does not seem to be incompatible with

"quality" rehabilitation. Finally, agencies may wish to provide greater counselor supervision in order to facilitate achievement of employment and earnings "suitable to the clients' capabilities."

III. SITE- OR AGENCY-LEVEL MACRO ANALYSIS

Agency-level analyses are at the front line of evaluation research for data-based decision support. Agency-level analyses address the two most important questions for evaluation research on the standards:

- how is attainment on the various standards data elements related across the state VR agencies? and
- what explains differences among state VR agencies in attainment on specific standards data elements?

Both of these questions are discussed further below.

RELATIONS AMONG THE STANDARDS DATA ELEMENTS

Description of Approach

The relations among the program standards are a major concern for the standards system. The statistical methodology for this type of analysis is most appropriately that of correlation and factor analysis. First, the analysis of the data elements is done standard by standard. For this analysis, correlations are sufficient. Then, factor analysis is used to explore the dimensionality of all the data elements of all the standards at once (although a separate analysis might be appropriate for the Performance Standards and for the Procedural Standards).

The factor analysis technique BPA recommends to explore the dimensionality of the measures is principal factoring with iteration for improving the estimates of the communalities. The choice of the number of factors to retain is to be made using Guttman's strongest lower bond. Using this criterion, the initial number of factors is chosen based on the number of components with eigenvalues greater than or equal to in a principal components analysis. Then, an initial principal factoring with iteration of this initial number of factors gives the final number of factors, those with eigenvalues greater than or equal to one. A second principal factoring with iteration gives the initial factor matrix of loadings. To aid the

interpretation of these factor loadings, an orthogonal -- rather than oblique -- rotation, varimax rotation with Kaiser normalization, is performed. Oblique rotation is not used because of the difficulty of choosing the degree of correlation allowable between the factors and thus the question of whether highly correlated factors are really separate factors at all. The missing data technique proposed is pairwise deletion. (See Harman for an elaboration of the factor analysis technique and of the methodological decisions made.)

Case Example: Relations Among the Program Standards

The number of performance standards data elements (21) creates certain problems in designing and implementing the standards system. The problems revolve around which standards and elements to emphasize, realizing that some choice will have to made between improving on one standard over another, or improving a little on each. The problem is exacerbated when improvement on one standard may be at the expense of another standard, i.e., with decline on another standard.

The various data elements represent diverse goals, some in conflict. With a single objective function (single goal), VR may be expected to maximize on the measure (e.g., close as many clients as "26s" as possible). But with multiple objectives, as represented by the standards and data elements, conflicting in many subtle and not-so-subtle ways, a system of attainment levels can only indicate desired achievement on all elements. Among elements are trade-offs, however. For example, an agency might maximize its benefit-cost ratio by reducing its coverage rate and by creaming. As a result, success in achieving one program goal could be counterproductive to success on other goals.

The reason this problem arises, of course, is because the basic VR program has several conflicting, although legitimate, performance and service objectives. (To paraphrase one regional official visited during our study, VR is really many programs, each with distinct goals.)

The discussion below presents some empirical findings on the relations among measures of performance to underline the difficulties that multiple measures cause. Then, two approaches to the problems of multiple measures are presented with their shortcomings noted. Last, the implications of continuing with multiple measures for the standards system are laid out.

A data base of all the standards data elements is not available for all agencies (since several new data collection instruments are involved and since the standards' pretest was carried out in only six state VR agencies). However, the data are available for some of the data elements, allowing analysis of some of the relationships among VR performance measures.

In Knuce, Miller, and Cope, relationships among several measures of inputs, process, and outputs were investigated for the 54 states and U.S. territories. Several of the measures used are found in the standards data elements, and others are very similar. The bivariate correlations among some of these measures for 1968 and 1969 are shown in Table 9. The authors state:

> Both the high levels of rehabilitation rate and rehabilitant's salary are desirable program outcomes. Yet, the results suggest that these outcomes may be incompatible with each other. Such an incompatibility is highlighted by the opposite relationship that the two output variables (the rehabilitation rate and rehabilitant's salary) have to the number of cases served. Where more clients are served, the rehabilitation rate is higher but rehabilitant's salary is lower. Conversely, when fewer clients are served a higher placement level (rehabilitant's salary) is achieved. Parenthetically, it is noted that volume, as measured by number of cases per 100,000, is associated with lower rehabilitation cost.
>
> The inverse relationship between rehabilitation rate and rehabilitant's salary has special implications for program evaluation. Many programs that look good on one of these outcome variables will look bad on the other one. This finding does not necessarily imply that programs high or low on either of these variables are good or bad. However, the results do strongly support a position that the two kinds of programs have different resources and strategies. Those agencies with high rates tend to have more financial resources, work with more clients, rely more on workshops, and keep clients in the caseload for a shorter period of time. Those with lower rates tend to deal with fewer clients, be more selective in accepting clients, keep them in the program for a longer period of time, and provide them more training. Therefore, examination and evaluation of a program on the basis of only one criterion could lead to erroneous conclusions about program effectiveness. [page 137]

In Dodson (1978), factor analysis was used to investigate the relationships among measures of outputs, and among measures of performance for the

Table 9

Correlation Among Measures -- Knuce, Miller, and Cope

Measure	1	2	3	4
1. Clients served per 100,000 population		-.38/-.43[a]	.89/.92	-.34/-.29
2. Expenditure per 26 closure			-.39/-.56	.06/.30
3. Rehabilitation rate per 100,000 population				-.39/-.39
4. Average earnings at closure for 26				

[a]1968/1969

states for 1970. The results of the factor analysis for the performance measures are shown in Table 10.

A factor analysis of all eight performance measures yields three factors. The first has high loadings on percent with earnings at closure (.93), competitive employment (.86), and homemaking (-.93). The second factor has high loadings on earnings at closure (.93) and on increase in earnings (.81), reflecting the high correlation (.92) between these two measures. The third has a high loading on benefit cost ratio (.89). These factors account for the following percentages of the shared variation: 50.6%, 31.1%, and 18.3%, respectively. Overall, these three factors account for 71.1% of the total variation. Of the individual measures, only reduction in public assistance (4.5%) and percent with public assistance at closure (23.1%) have less than 50% of their variation explained by these three factors.

Thus, the percentage of earnings or competitive employment (as in data element 4i or 5i) comprises a very different dimension than the absolute level of earnings (as in data element 4ii). The cost benefit ratio presents again another dimension.[1]

The main conclusions to be drawn from these analyses are:

- some of the standards data elements are positively related, so that an agency doing well in one data element will likely be doing well on other data elements;
- some of the standards data elements are unrelated, even within the same standard, so that an agency doing well on one data element will not be related to its doing well on other data elements;
- some of the standards data elements are negatively related, so that an agency doing well on one data element will likely do less well on another data element; and
- the attainment of VR agencies with regard to the Performance and Procedural Program Standards is clearly multidimensional.

---

[1] These dimensions have a correlation of zero, since orthogonal rotation has been performed; when oblique rotation was tried, the correlations between dimensions stayed near zero.

Table 10

Factor Analysis of Output Measures -- Dodson (1978)

Measure	Factor 1	Factor 2	Factor 3
1. Percent 26 with earnings at closure	.93		
2. Average earnings at closure		.93	
3. Percent 26 with competitive employment	.86		
4. Percent homemaking	-.93		
5. Increase in earnings from referral to closure		.81	
6. Reduction in public assistance			
7. Percent with public assistance at closure			
8. Benefit cost ratio (crude)			.89

Some possible approaches to the problems of the relations among program goals are described in Berkeley Planning Associates, Vocational Rehabilitation Program Standards Evaluation System: Final Report, Volume II: Using the System: An Analytic Paradigm for Management, pp. 54-60.

EXPLAINING DIFFERENCES IN ATTAINMENT AMONG AGENCIES

Description of Approach

Evaluation research may be needed to explain differences in attainment among the state VR agencies in any of the following scenarios in the operation of the data-based decision support system:

- federal (or state) program managers, in investigating problematic attainment for a particular agency (or unit), are unable to uncover a set of possible problems;
- program managers can identify alternative problems, but they are unable to choose between them;
- program managers can identify possible problems, but have difficulty suggesting corrective actions; or
- program managers notice some patterns or trends over time in problematic attainment across state VR agencies (or across sub-state units).

For example, if the explanation for problematic attainment for cost per 26 closure for a particular agency (or sub-state unit) was that not enough clients were being closed successfully (but enough clients were being closed), an analysis examining what led to the lower success rate would be needed. A first step would be an agency analysis, conducted for the eighty-odd agencies (or some subset such as blind agencies).

The structure of this agency-level or site-level analysis is also very simple, like the client-level analysis. The analysis attempts to explain a dependent variable, such as percent of clients closed successfully, by a set of independent variables. These independent variables should include controlling variables, such as environmental conditions, but the independent variables most importantly must also include intervention variables, variables that RSA and the state VR agency can manipulate. By including the intervention variables, the explanations suggested by the analysis can easily be turned into corrective actions.

Existing Agency-Level Analyses

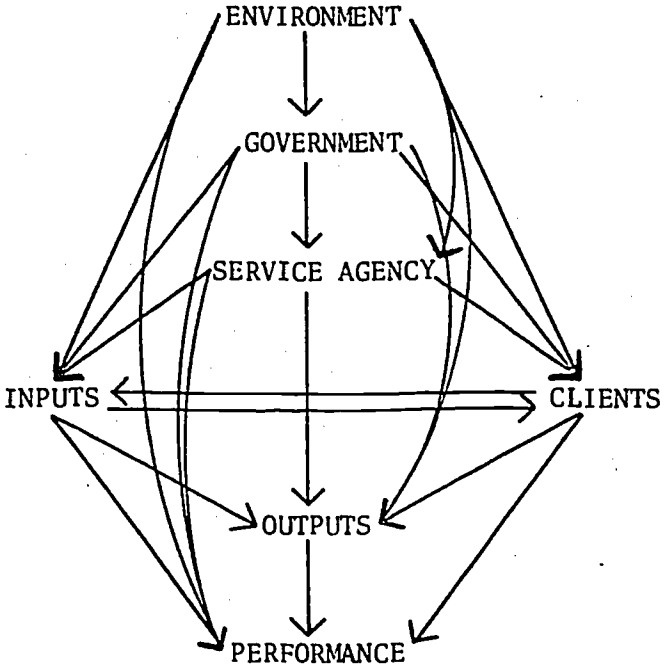
There have been several agency-level analyses conducted on the VR system. However, most of them have been concerned with very specific questions (e.g., Collignon and Serot attempted to answer the single question of whether the organizational structure of the state VR agency has any impact on performance), have used only a few measures of the VR system (e.g., Flynn uses only six measures), or have used primitive statistical methodology (e.g., Knuce, Miller, and Cope use bivariate correlations only). However, there have been some more rigorous efforts undertaken (e.g., Rubin). The BPA approach to doing agency-level analysis is based on a series of research pieces by Dodson. In Dodson (1973), the modeling approach and statistical methodology are fully developed, and the application of the model and of the statistical methodology are applied to a limited (in the measurement sense) example. In Dodson (1978), the measurement of the VR system and the theoretical underpinnings are more fully worked out. In Dodson (1979), the methodology is applied to the operations of the SSDI/SSI-VR Special Program.

A Proposed Macro Model

The proposed "macro" model for conducting agency-level analyses to explain differences in attainment across state VR agencies is given in Figure 2. Note that the macro model builds on the micro model. The model components are shown to be: environment, government, service agency, clients, inputs, outputs, and performance. A short definition of each model component follows. The environment is the economic, social, and physical environment. The government is the political system, with its structure, process, and expenditures and policies. The service agency is the set of characteristics of administrative structure, program structure, method of service delivery, personnel and expenditures, non-direct services, client selection, effort, and growth. The clients component includes demographic and economic characteristics of the clients, as well as the characteristics of their problems requiring services. The inputs component includes the amounts, types, mix, and interactions of direct services, as well as the quality and appropriateness of serivces. The outputs component includes throughput, processing efficiency, output production, and administrative

Figure 2

Proposed Macro Model



success. The performance component refers to program goal achievement. Both the outputs component and the performance component refer to the success of the service agency, but success along different dimensions.

The causal hierarchy (what causes what) is as is seen in the model: environment, government, service agency, clients and inputs, outputs, and performance. The environment affects all parts of the system. Different types of governments and service agencies occur in different environments, partly in response to these environments. Different clients come from different environments and the types and amounts of inputs are constrained by the environment. And the success of the system -- its output and performance -- is affected by the environment. In turn, the type of government affects the structure of the service agency, the types of clients served, and the kinds of inputs that are provided, as well as the success of the system -- its output and performance. The kinds of clients served are influenced by the structure of the service agency and by the types and amounts of inputs offered, as well as by the environment and government, as noted before. In addition, the inputs are determined by the kinds of clients to be helped and the service agency, as well as by the environment and government, as noted before. The outputs are determined by the types of clients served, the inputs, and the service agency, along with the environment and government, as noted before. The performance of the system is affected by this same set of factors, with the addition of outputs. Each of the components is discussed further below.

To the environment component in the micro model is added the concept of population-at-risk. Population-at-risk here refers to those who could benefit from the services of interest. Similar concepts are need, latent demand, and problem incidence and prevalence (a more suitable concept than incidence in a cross-section analysis). Not only does the population-at-risk concept suggest the dimensions of the possible service population, but also illuminates a very important part of agency and counselor behavior -- client selection. Clients may be selected on the basis of available resources, of first-come/first-served, of balanced caseload, of greatest need for services, of least cost, of fastest throughput, or of most likely to benefit from vocational reahbilitation. Creaming refers to the skimming of easier cases (least cost, fastest throughput, most likely to succeed

administratively). Note that the concept of effective demand is not implied here, since these services are not paid for. Also, the concept of demand itself is not implied here, since a measure of demand for services is rarely available. Usually, needs assessment or prevalence estimation is based on demographic projections and is used to identify the number of people who could benefit from the social service delivery system or who have the problems of interest.

To the micro model components must be added the macro model component of government, both general and specific government. In a macro model not only must the services given to individual clients be understood, but also the resources given to the service agency must be understood. Moreover, the service agency itself, and the inputs, the clients, the outputs, and the performance are all affected by government. A very large number of possible measures of this general concept of government exist. However, in Dodson (1978) this very large number of measures of the government were analyzed, and the following six measures stood out as influencing performance: number of legislative bills, electoral structure, expenditures per capita, bureaucratic merit, percent state revenue from the federal government, and the congruence of state policies with public opinion in the state.

The service agency component is the same as for the micro model. However, the emphasis in a macro model is on the behaviors of service agencies, vis-a-vis client selection, choice of services, and the emphasis on output versus performance.

One part of the clients component of the micro model, case difficulty, requires an aggregated procedure for the macro model, if a single index is desired. Weighted case closure is a method that attempts to take into account client difficulty when comparing output or performance measures (see Conley, 1973; Sermon), although the method is somewhat more oriented to the level of individual counselor performance than to agency-level performance.

In the macro model, a more general component of inputs is used, rather than services, since the actual services are very difficult to measure in VR. In addition to the other aspects of inputs, productivity of inputs is important in a resource allocation-oriented macro model. Unfortunately, little is known about the productivity of inputs, except

in the crude terms of resulting processing efficiency. Also, when discussing macro modeling, the reliability of services is important, although conceptually reliability is included as part of outputs in the macro model. Reliability asks whether the services outlined in the plan are actually given, and given in the correct sequence, mix, and amount. Although reliability may be defined for the individual client, at the micro level the measurement is either yes or no; only for the macro level can reliability be used in the probability sense. Unfortunately, information about the plan realization is not available on the R-300. Another important dimension of macro inputs is the integration of services; however, no information is available on the R-300 for this dimension either.

The process results component of the micro model is broken into two parts for the macro model, outputs and performance, to distinguish processing efficiency from goal achievement. Outputs, or processing efficiency, includes from the micro process results: acceptance or rejection for services, completion or non-completion of process, reliability of the plan for services, administrative success, client involvement in planning and in service delivery, and time in process. In addition, the concept of output production is used to capture the amount of output per unit of input, input defined in terms of counselors or dollars.

Performance, or goal achievement, includes from the micro process results: return for services, level of outcome, change in level of outcome, quality of outcome, persistence or permanence of outcome, level of public support still required, release from or continuance in an institution, client satisfaction with services, personal development, and increase in group awareness and group organizing. In addition, the concept of cost effectiveness is used to capture the goal achievement, in terms of change in earnings, per unit of input, in terms of cost. The meaning of performance here is rather different (see Bennett and Weisinger, pp. 61-88; Harris; Walls and Tseng for other measures of performance in VR) and should be kept in mind. Also, the meaning of performance here is not the same as in Performance Standards.

Case Example: An Explanation of Differences in Attainment in the SSDI/SSI-VR Special Program

The previous discussion of the proposed macro model has been largely theoretical. But, once again, what will such an analysis look like in the data-based decision support system? Below is an example of explaining differences in attainment among state VR agencies in their operation of the SSDI/SSI-VR Special Program.[1] Several of the measures used are either incorporated into the standards data elements, or similar to some of the standards data elements. This example illustrates the hypotheses examined, the measures used, the analytical and statistical tehcniques employed, and the types of conclusions that can be drawn from such an analysis. First, a set of conceptual factors affecting performance, along with measures for each of these factors, are discussed. Then, empirical relations between these factors and four types of performance are examined.

Measures of Performance

The four performance measures selected for analysis reflect an interest in cost-benefit performance as well as administrative performance. The four measures include:

- Coverage, or the percentage of SSDI and SSI recipients (the population-at-risk) served;
- Rehabilitation rate, or the percentage of all closures who are closed in status 26;
- Percent SGA, or the percentage of 26 closures with weekly earnings at or above the substantial gainful activity (SGA) level; and
- Cost per SGA, or the total program expenditures divided by the number of SGA closures.

Factors Affecting Performance

Economic Environment. The economic environment within the state must surely determine how easy it is for the individual client to find

[1] Drawn from Dodson, 1979.

employment. In this analysis, measures of unemployment and of wages are used to capture the economic environment. State agencies facing an economic environment of high unemployment and/or low wages are expected to perform less well on the measures of economic performance, such as percent with earnings at substantial gainful activity level (SGA).

However, there are three problems with these two measures of the economic environment. First, these measures are for the entire state, not for the local labor market. The economic environment does vary quite a bit within states, and measures of unemployment and weekly wages are not available for local labor markets, only for certain cities. Moreover, matching clients with specific labor markets is very difficult.

The second problem is that these two measures are for the general population. The job market for the disabled may be similar to the job market for the nondisabled, but probably is not. The job market for the disabled may include underemployment, secondary labor markets, sheltered employment, low wages, concentration in specific sectors and industries, and discrimination. Measures of the job market faced by the disabled are not available and, thus, the measures of economic environment may not represent the economic environment of the VR agency.

Third, the only available weekly wages data are for manufacturing industries. Several have criticized the use of such in examining VR agencies, both because the service sector is not represented and because there are certain states where manufacturing is such a small part of the industrial mix.

Benefit Levels. States vary widely in the average monthly benefits that they provide, both due to differing beneficiary populations and due to differences in state supplementation (for SSI beneficiaries). The higher the benefit level, relative to wages and cost of living, the more likely clients will choose continued beneficiary status over employment. Average benefit levels can function, then, as a crude measure of disincentives.

VR Agency. The characteristics of the VR agency delivering services should affect the performance of these agencies. The characteristics

considered here are the organizational overstructure of the VR agency, whether the agency is a blind or general agency, and whether the agency is large or small.

The definitions of the alternative organizational overstructures are derived from the definitions used by RSA. There are three basic forms of organizational overstructure for the agency administering rehabilitation programs. These are:

(1) independent agency reporting directly to Governor or Legislature;

(2) bureau within a broader functional agency. In rehabilitation, when bureaus are the organizational unit responsible for administering programs, the bureaus -- due to the historical origin of the program -- have traditionally been lodged under a State Education or Vocational Education Agency or Department;

(3) agency under a multifunctional "umbrella" state agency, which can include welfare, labor, social service, and/or health functions.

Three basic conceptual arguments have been raised in favor of including rehabilitation agencies under umbrella agencies in recent years. First, proponents of umbrella agencies argue that this form of overstructure produces greater coordination of related services (such as vocational rehabilitation, education, welfare, medical services, and employment services) and thus increases the effectiveness of functional service programs in achieving their objectives. If each service is provided by a separate agency, there exists the potential problem of fragmentation of services, duplication of services, and ineffectiveness as clients can get lost in trying to find the appropriate services in a confusing array of agencies. Merging agencies under a single structure presumably ensures improved coordination of services such that clients and their families receive the full mix of services necessary to achieve society's objectives, and thus the effectiveness of each particular service is increased. Second, proponents of umbrella agencies maintain that this form of overstructure can increase the efficiency of service delivery by permitting a significant saving of overhead expenditures, especially administrative expenditures.

Third, proponents argue that inclusion of all social service or manpower programs under umbrella agencies facilitates efficient resource allocation across programs, quite apart from better management and resource allocation within programs. Thus, the overall funding level of rehabilitation programs as compared to other programs might change, depending on the relative performance of rehabilitation and other programs in achieving goals desired by the state.

On the other hand, supporters of other forms of organizational over-structure have maintained that an umbrella agency could become too large and unwieldy to properly provide services to a client. The individual client may become lost in a large mass of clients having diverse problems and service needs. Increased red tape resulting from efforts to coordinate services may impede flexibility and delay services, encumber professionals in paper work rather than service delivery, and reduce the effectiveness and efficiency of service delivery. Moreover, some argue that the creation of umbrella agencies adds unnecessary layers of bureaucracy which increase rather than reduce administrative costs and which disrupt without compensating benefits the management of the specialized systems which have gradually evolved over many years to respond to the particular needs of client subpopulations. Moreover, VR agencies lodged under an umbrella agency may lose sight of the traditional goals and focuses of the VR agency, especially with respect to restorative services and vocational goals.

Blind agencies and general agencies (including combined agencies) are quite different. The blind agency serves only one type of client and is very specialized. These agencies are usually very small and the service milieu is more intensive. Moreover, blind clients are very different from other types of clients, in basic characteristics as well as in employment goals.

Large versus small agencies is a question of both the quality of service as well as of economies of scale. Many would argue that the small agencies are able to offer more personal and more intensive service delivery. On the other hand, many argue that the larger agencies are able to offer economies of scale.

Expenditures. The way VR agencies choose to spend their special program funds also will affect how well they will perform.

The first decision made, either explicitly or not, is whether to spend the allocation on many clients or on a few clients. An easy way to measure the way this decision has gone is to look at the total expenditures divided by the number of clients served, to get an average expenditure per client served.

The second decision made, either explicitly or not, is how to divide the monies among the major expenditure categories: administration, counseling and placement, and services to individuals. Because the percentages of these categories must add to 100% for any particular agency, one of the categories must be left out of the analysis, as is services to individuals for this analysis.

Staffing. A major area of concern in the special program is the use of specialists, including supervisors and especially counselors. Arguments on both sides abound, and VR agencies change from specialist to non-specialist and back again over time.

No survey of state agencies in this area was available, so a proxy is used -- whether or not any staff was paid for out of special program funds.

Referral. A particular complaint of VR agencies has been the paperwork required for the processing of the large number of referrals from the State Disability Determination Unit and the Social Security District Offices (SSDOs). An equally important question, however, is whether these referrals lead to successful closures (see, for example, Mueller and Patrick). For this reason, the percent of referrals from DDS or SSDOs has been included as a factor affecting performance.

Use of the Special Program. Both SSDI and SSI beneficiaries can be served either in the special program or in the general 110 program. Agencies may elect to cream the best beneficiaries for the special program, i.e., to choose the clients most likely to achieve SGA closure or termination. Other agencies may elect to serve more beneficiaries in the special

program, thereby getting additional monies. The percent beneficiaries served in the special program is thus included to reflect this choice by a VR agency.

Demographic Characteristics of Clients. In all analyses of the performance of agencies delivering services, the characteristics of clients must be controlled for, so that differences in performance will not be attributed to services, for example, when the differences are really due to the type of clients served. The basic categories of age, education, sex, and race are included here. Age and education have been combined into one variable because of the correlation between the two. The categories, between 25 and 44 years old and with 12 or more years of education, are drawn from the Rutgers analysis (Berkowitz, et al.), of which clients are most likely to terminate.

Economic Situation of Clients. For the economic situation of clients, the percent with dependents, the percent with earnings at referral, and the percent with public assistance at referral have been chosen to represent the various factors affecting employment.

Disabilities of Clients. A disability by disability analysis would require a micro analysis, because of the many different disability groups. Here, an RSA measure of insubstantial handicaps to employment is used (RSA, 1975). The attempt is to get a measure of client difficulty, using disability codes. Thus, the percent with insubstantial employment handicaps reflects the percent of less difficult clients, since few are in the specified disability codes. These codes are the absolute easiest cases, and do not allow differentiation among the moderately difficult and very difficult clients in the special program. Moreover, the R-300 severely disabled category is of no help here, since SSDI and SSI clients are by definition severely disabled under the R-300 classification. Also, because the blind codes are not included in this definition, blind agencies have zero percent with insubstantial employment handicaps. Thus, this measure and the blind agency measure are necessarily colinear.

Services. A service by service analysis would also require a micro analysis, because of the many different services and different service combinations. Here the major service categories of diagnosis and evaluation, restoration, and training are used. The categories omitted are maintenance, services to family members, other services, and post-employment services.

Time in Process. Very few process measures are available from the existing data sources. For example, IWRP, counselor contact, reliability of service delivery are not available. The only readily available process measure is time in process. Here, two measures are used, months in referral and months from referral to closure. Arguments for the efficacy of both faster through-put and more lengthy service delivery exist.

Findings

The measures of the factors affecting performance are here used to examine the empirical relations between these factors and the four measures of performance. A summary of the measures of the factors affecting performance is given in Table 11, along with definitions of the measures.

The statistical methodology used to examine the empirical relations is that of OLSQ regression.

For each of the four measures of performance, regressions were run for FY 75 and for FY 76, separately for SSDI and for SSI clients. In addition, regressions were run for general agencies and for all agencies. No regressions could be run for blind agencies alone, since there were too few blind agencies (given the number of independent variables).

The results from these regressions are given in Tables 12 through 19.

Table 11

Definition of Measures of Factors Affecting Performance

Measure	Definition	Source
Economic Environment		
(1) unemployment rate	% unemployed of total work force in state	Statistical Abstract
(2) average wages	average weekly earnings of production workers in manufacturing industries in state	Statistical Abstract
Benefit Levels		
(3) average benefit	average benefits for state; for SSI, federal plus state supplementation; for blind agencies, blind SSI; for general agencies, disabled SSI; for combined agencies, average of blind and disabled SSI (weighted by number of beneficiaries)	Statistical Supplement
VR Agency		
(4) education agency, umbrella agency, independent agency	administrative location and overstructure of VR agency	IM-72-60
(5) blind agency, general agency	whether blind or general agency	Program Data
(6) large agency, small agency	based on number of clients served in 110 program; large general or combined if 25,000 or more; small blind if 1,000 or more; based on distribution of agency sizes to give .5,.5 distribution	Program Data
Expenditures		
(7) expenditure per client served	total expenditures by state VR agency from DI Trust Fund and from General Treasury under SSI special program ÷ number clients served (i.e., clients in active statuses 10-24 and clients closed)	Program Data
(8) % expenditures on administration	% expenditures in (7) spent on administration	Program Data
(9) % expenditures on counseling and placement	% expenditures in (7) spent on counseling and placement	Program Data
Staffing		
(10) specialist staff, no specialist staff	whether any special program monies expended on staff	Program Data
Referral		
(11) % DDS-SSDO referrals	% 26 closures with referral at any time from DDS or SSDO	R-300 tapes
Use of Special Program		
(12) % beneficiaries served in special program	% SSDI or SSI beneficiaries served under special program of all SSDI or SSI beneficiaries	IM-76-32

Table 11 (cont.)

Measure	Definition	Source
Clients -- Demographics		
(13) % between 25 and 44 years old and with 12 or more years of education	% closures between 25 and 44 years old and with 12 or more years of education	R-300 tapes
(14) % male	% 26 closures male	R-300 tapes
(15) % white	% 26 closures white	R-300 tapes
Clients -- Economic Situation		
(16) % with dependents	% 26 closures with one or more dependents	R-300 tapes
(17) % with earnings at referral	% 26 closures with average weekly earnings at referral greater than 0	R-300 tapes
(18) % with public assistance at referral	% 26 closures public assistance recipients at referral	R-300 tapes
Clients -- Disability		
(19) % with insubstantial handicaps	% 26 closures with insubstantial employment handicaps, defined as % 26 closures with disability codes of digestive system disorders, hearing other than deafness, character, personality, and behavior disorders, mild mental retardation, and hay fever/asthma	R-300 tapes
Services		
(20) % services spent on diagnosis and evaluation	% special program expenditures for services to individuals spent on diagnosis and evaluation	Program Data
(21) % services spent on restoration	% special program expenditures for services to individuals spent on physical and mental restoration	Program Data
(22) % services spent on training	% special program expenditures for services to individuals spent on training	Program Data
Time in Process		
(23) months in referral	average months in referred statuses (00,02) for 26 closures	R-300 tapes
(24) months from referral to closure	average months from referral to closure for 26 closures	R-300 tapes

Sources:

1. IM-72-60 -- RSA. "State Agencies Responsible for Administering Vocational Rehabilitation Programs." Information Memorandum RSA-IM-72-60, March 10, 1972.
2. IM-76-32 -- RSA. "Quarterly Status Report: Disability Insurance Program (SSDI) and Supplemental Security Income Program (SSI), Fiscal Year 1975." Information Memorandum RSA-IM-76-32, October 30, 1975. Also for FY 76, RSA-IM-77-6, October 29, 1976.
3. Program Data -- RSA. "State Vocational Rehabilitation Agency: Program Data Fiscal Year 1975." Also, Fiscal Year 1976.
4. R-300 tapes -- computer tapes of all closures during FY 1975 and of all closures during FY 1976 with Federal Special Program Identification R-300 codes of SSDI or SSI special program, computer tapes provided by RSA.
5. Statistical Abstract -- Bureau of the Census. Statistical Abstract of the United States. For 1976 and 1977.
6. Statistical Supplement -- SSA. "Annual Statistical Supplement" to the Social Security Bulletin. For 1974 and 1975.

Table 12

Regressions; SSDI Clients; Dependent Variable: Coverage

Independent Variable	General Agencies		All Agencies	
	coefficient	t-value	coefficient	t-value
	FY75/FY76	FY75/FY76	FY75/FY76	FY75/FY76
Economic Environment				
unemployment rate	.04/.29	.16/.83	[Coverage for SSDI clients is not defined for blind agencies and thus no regression on all agencies is possible.]	
average wages	.004/.005	.21/.24		
Benefit Levels				
average benefit	-.009/-.030	-.18/-.44		
VR Agency				
education agency	.04/-1.63*	.04/-1.32		
umbrella agency	-1.27/-1.46	-1.18/-1.18		
independent agency†	---	---		
blind agency	X	X		
general agency†	---	---		
large agency	-1.06/-1.41*	-1.15/-1.35		
small agency†	---	---		
Expenditures				
expenditure per client served	X	X		
% expenditures on administration	*.16/-.10	1.52/-.80		
% expenditures on counseling and placement	-.02/-.06*	-.47/-1.37		
Staffing				
specialist staff	-.34/-.25	-.30/-.22		
no specialist staff†	---	---		
Referral				
% DDS or SSDO referrals	.02/.01	1.02/.29		
Use of Special Program				
% [illegible] Served in special program	*.07/.04	2.15/.95		
intercept	-.57/9.32			
R^2	.195/.196			
$\bar{R}^2$	-.032/-.036			
F	.86/.84			
significance of F	.584/.599			
n	51/50			
min n	51/50			

Note:

* significant at .20 level or less -- two tailed test of significance for null hypothesis that coefficient is zero

† base category for a dummy variable -- category to which coefficients are compared

X variable excluded from the regression: blind agency is excluded when only general agencies are being analyzed; % with insubstantial handicaps is excluded when all agencies are being analyzed because of collinearity with blind agency -- see text; expenditure per client served is excluded from coverage and cost per SGA dependent variable regressions because of shared terms in the definitions -- see text.

Table 13

Regressions; SSI Clients; Dependent Variable: Coverage

Independent Variable	General Agencies		All Agencies	
	coefficient	t-value	coefficient	t-value
	FY75/FY76	FY75 '76	FY75/FY76	FY75/FY76
Economic Environment				
unemployment rate	.17/.42*	.86/1.41	-.30/.38	-.60/.64
average wages	.003/.006	.28/.46	.042/.041*	1.29/1.59
Benefit Levels				
average benefit	-.018/-.051*	-.96/-1.92	.034/-.050	.68/-1.04
VR Agency				
education agency	-.54/-1.89*	-.58/-1.72	1.59/.44	.61/.18
umbrella agency	*-1.34/-1.47*	-1.49/-1.32	2.02/2.25	.92/1.08
independent agency†	---	---	---	---
blind agency	X	X	*13.71/10.52*	4.83/4.05
general agency†	---	---	---	---
large agency	*-1.29/-1.10	-1.64/-1.19	-.76/.83	-.39/.46
small agency†	---	---	---	---
Expenditures				
expenditures per client served	X	X	X	X
% expenditures on administration	*.14/.09	1.51/.80	*-.30/-.02	-1.95/-.11
% expenditures on counseling and placement	.02/-.02	.72/-.67	.08/-.02	1.15/-.31
Staffing				
specialist staff	-.83/-.13	-.89/-.12	1.86/1.85	.86/.92
no specialist staff†	---	---	---	---
Referral				
% DDS or SSDO referrals	.01/-.01	.72/-.62	-.01/.02	-.18/.58
Use of Special Program				
% beneficiaries served in special program	*.05/.05*	2.39/1.54	*.16/.07	2.81/1.16
intercept	-.10/5.27		-18.42/-8.86	
R^2	.307/.235		.460/.361	
$\bar{R}^2$	.101/.014		.348/.228	
F	1.49/1.06		4.11/2.73	
significance of F	.176/.415		.000/.005	
n	49/50		71/71	
min n	49/50		71/71	

Notes:

* significant at .20 level or less -- two tailed test of significance for null hypothesis that coefficient is zero

† base category for a dummy variable -- category to which coefficients are compared

X variable excluded from the regression: blind agency is excluded when only general agencies are being analyzed; % with insubstantial handicaps is excluded when all agencies are being analyzed because of collinearity with blind agency -- see text; expenditure per client served is excluded from coverage and cost per SGA dependent variable regressions because of shared terms in the definitions -- see text.

Table 14

Regressions; SSDI Clients;

Dependent Variable: Rehabilitation Rate

Independent Variable	General Agencies		All Agencies	
	coefficient	t-value	coefficient	t-value
	FY75/FY76	FY75/FY76	FY75/FY76	FY75/FY76
Economic Environment				
unemployment rate	-.70/-.09	-.63/-.05	-.04/.[illegible]	-.45/.51
average wages	.058/.180*	.60/1.86	.016/.088	.[illegible]/1.27
average benefit	[illegible]/-.405	-.72/-1.01	-.061/-.158	-.26/-.65
VR Agency				
education agency	-2.72/-2.34	-.47/-.38	1.23/.58	.26/.13
umbrella agency*	-7.84/-1.47	-1.37/-.29	-2.18/.06	-.53/.02
independent agency†	---	---	---	---
blind agency	X	X	*24.33/21.64*	3.76/3.18
general agency†	---	---	---	---
large agency	-4.59/-9.25*	-.96/-2.01	*-5.03/-6.12*	-1.43/-1.90
small agency†	---	---	---	---
Expenditures				
expenditures per client served	-.0032/-.0048	-.62/-1.17	-.0015/-.0005	-1.00/-.25
% expenditures on administration	.12/-.66	.19/-1.15	.09/-.42*	.31/-1.32
% expenditures on counseling and placement	.02/-.07	.08/-.35	-.02/-.12	-.16/-.90
Staffing				
specialist staff	-5.48/-5.69	-.90/-1.03	*-6.02/-3.15	-1.57/-.97
no specialist staff†	---	---	---	---
Referral				
% DDS or SSDO referrals	.04/-.03	.34/-.23	.05/.07	.60/.85
Use of Special Program				
% beneficiaries served in special program	-.06/-.11	-.42/-.65	*-.21/-.20*	-1.68/-1.00
Clients - Demographics				
% between 25 and 44 years old and with 12 or more years of education	-.36/.01	-1.30/.03	*-.28/.02	-1.70/.15
% male	-.06/-.37	-.20/-1.07	-.10/-.29*	-.50/-2.18
% white	.04/.04	.37/.33	.01/-.03	.09/-.36
Clients - Economic Situation				
% with dependents	-.08/-.22	-.35/-.75	-.03/-.14*	-.25/-1.74
% with earnings at referral	-.27/-.20	-.64/-.37	*-.47/-.00	-2.11/-.01
% with public assistance at referral	-.03/.06	-.21/.49	-.09/.06	-.97/.57
Clients - Disability				
% with insubstantial handicaps	.03/-.07	.08/-.19	X	X
Services				
% services spent on diagnosis and evaluation	-.19/-.36	-.46/-.86	-.11/-.42*	-.37/-1.61
% services spent on restoration	.07/.15	.24/.64	.08/.18	.52/1.24
% services spent on training	.08/-.05	.24/-.18	.09/.01	.74/.04

(continued)

Table 14 (cont.)

Independent Variable	General Agencies		All Agencies	
	coefficient	t-value	coefficient	t-value
	FY75/FY76	FY75/FY76	FY75/FY76	FY75/FY76
Time in Process				
months in referral	-.62/-1.02	-.49/-.81	-.63/1.17*	-.89/-1.54
months from referral to closure	.22/-.13	.45/-.30	-.14/-.15	-.60/-.61
intercept	127.80/183.54		113.40/126.99	
R^2	.456/.532		.643/.702	
$\bar{R}^2$	-.045/.064		.468/.546	
F	.90/1.14		3.68/4.51	
significance of F	.591/.378		.000/.000	
n	51/50		74/73	
min n	51/49		74/71	

Notes:

* significant at .20 level or less -- two tailed test of significance for null hypothesis that coefficient is zero

† base category for a dummy variable -- category to which coefficients are compared

X variable excluded from the regression: blind agency is excluded when only general agencies are being analyzed; % with insubstantial handicaps is excluded when all agencies are being analyzed because of collinearity with blind agency -- see text; expenditure per client served is excluded from coverage and cost per SGA dependent variable regressions because of shared terms in the definitions -- see text.

Table 15

Regressions; SSI Clients;

Dependent Variable: Rehabilitation Rate

Independent Variable	General Agencies		All Agencies	
	coefficient	t-value	coefficient	t-value
	FY75/FY76	FY75/FY76	FY75/FY76	FY75/FY76
Economic Environment				
unemployment rate	*-2.95/-2.75*	-2.18/-1.56	*-2.22/-1.71*	-2.09/-1.31
average wages	*-.129/.098	-1.62/1.30	-.046/.027	-.69/.48
Benefit Levels				
average benefit	.018/.046	.15/.30	-.019/.106	-.19/.97
VR Agency				
education agency	*10.74/-2.82	1.70/-.51	*7.02/3.37	1.36/.67
umbrella agency	1.13/2.20	.19/.37	2.52/6.86*	.61/1.66
independent agency †	---	---	---	---
blind agency	X	X	*13.90/27.41*	2.04/3.78
general agency †	---	---	---	---
large agency	*-9.09/-10.12*	-1.91/-2.07	*-6.34/-2.40	-1.57/-.61
small agency †	---	---	---	---
Expenditures				
expenditures per client served	-.0001/.0011	-.01/.27	-.0024/.0012	-1.00/.71
% expenditures on administration	.25/-.21	.41/-.30	.06/-.94*	.18/-2.44
% expenditures on counseling and placement	*.43/-.08	1.63/-.55	*.29/-.10	1.90/-.79
Staffing				
specialist staff	*-13.60/-1.03	-2.23/-.17	-3.11/-6.96*	-.74/-1.58
no specialist staff †	---	---	---	---
Referral				
% DDS or SSDO referrals	.09/.08	.82/.88	-.09/.14*	-1.09/1.56
Use of Special Program				
% beneficiaries served in special program	.01/-.07	.08/-.47	*-.22/-.09	-1.86/-.68
Clients - Demographic				
% between 25 and 44 years old and with 12 or more years of education	-.04/-.09	-.20/-.33	-.01/.22*	-.11/1.54
% male	-.06/-.26	-.28/-.92	.04/-.43*	.31/-2.91
% white	-.09/-.06	-.68/-.58	.01/-.03	.10/-.32
Clients - Economic Situation				
% with dependents	-.11/.08	-.40/.32	*.29/-.07	1.65/-.44
% with earnings at referral	.48/-.33	.90/-.85	.02/.23	.11/1.05
% with public assistance at referral	-.12/-.02	-.93/-.12	-.03/.06	-.37/.69
Clients - Disability				
% with insubstantial handicaps	-.11/-.19	-.42/-.67	X	X
Services				
% services spent on diagnosis and evaluation	.26/.04	.67/.11	-.05/-.18	-.19/-.77
% services spent on restoration	.12/.26	.33/.85	-.27/.36*	-1.22/1.59
% services spent on training	.39/.20	1.08/.76	.00/.10	.03/.59

(continued)

Table 15 (cont.)

Independent Variable	General Agencies		All Agencies	
	coefficient	t-value	coefficient	t-value
	FY75/FY76	FY75/FY76	FY75/FY76	FY75/FY76
Time in Process				
months in referral	-.23/.48	-.22/.42	.63/1.18*	.77/1.50
months from referral to closure	-.32/-.30	-.73/-.79	.01/-.30	.03/-1.03
intercept	103.07/72.99		98.98/64.78	
R^2	.625/.490		.645/.645	
$\bar{R}^2$	.233/-.019		.455/.452	
F	1.59/.96		3.40/3.33	
significance of F	.134/.537		.000/.000	
n	49/50		71/71	
min n	48/49		70/69	

Notes:

* significant at .20 level or less -- two tailed test of significance for null hypothesis that coefficient is zero

† base category for a dummy variable -- category to which coefficients are compared

X variable excluded from the regression: blind agency is excluded when only general agencies are being analyzed; % with insubstantial handicaps is excluded when all agencies are being analyzed because of collinearity with blind agency -- see text; expenditure per client served is excluded from coverage and cost per SGA dependent variable regressions because of shared terms in the definitions -- see text.

Table 16

Regressions; SSDI Clients;

Dependent Variable: Cost Per SGA

Independent Variable	General Agencies		All Agencies	
	coefficient	t-value	coefficient	t-value
	FY75/FY76	FY75/FY76	FY75/FY76	FY75/FY76
Economic Environment				
unemployment rate	*1131/1295	1.93/.45	439/-742	.66/-.43
average wages	*-71/-73	-1.48/-.56	-8/-67	-.13/-.71
Benefit Levels				
average benefit	73/-449	.52/-.79	12/7	.07/.02
VR Agency				
education agency	1701/7680	.59/.83	*-4850/5329	-1.38/.87
umbrella agency	-2674/-5154	-.94/-.69	-2414/749	-.77/.16
independent agency†	---	---	---	---
blind agency	X	X	3.796/9789	.74/1.04
general agency†	---	---	---	---
large agency	1157/5825	.47/.85	*-3686/3445	-1.35/.77
small agency†	---	---	---	---
Expenditures				
expenditures per client served	X	X	X	X
% expenditures on administration	*642/1283*	2.02/1.49	*441/546	2.07/1.23
% expenditures on counseling and placement	*-198/89	-1.55/.28	*220/102	2.19/.53
Staffing				
specialist staff	-1438/6444	-.46/.82	3607/4264	1.19/.94
no specialist staff†	---	---	---	---
Referral				
% DDS or SSDO referrals	59/52	1.05/.31	-48/8	-.78/.07
Use of Special Program				
% beneficiaries served in special program	-31/-17	-.40/-.07	-79/151	-.83/.87
Clients - Demographic				
% between 25 and 44 years old and with 12 or more years of education	*324/522	2.58/1.10	-9/1	-.07/.00
% male	-131/-288	-.89/-.56	-157/82	-1.02/.45
% white	-39/115	-.83/.77	43/61	.69/.54
Clients - Economic Situation				
% with dependents	39/-154	.31/-.36	*152/96	1.61/.62
% with earnings at referral	*539/2144*	2.56/2.67	245/356	.01/1.28
% with public assistance at referral	-38/449*	-.60/2.28	*128/364*	1.73/2.67
Clients - Disability				
% with insubstantial handicaps	213/-137	1.02/-.25	X	X

(continued)

Table 16 (cont.)

Independent Variable	General Agencies		All Agencies	
	coefficient	t-value	coefficient	t-value
	FY75/FY76	FY75/FY76	FY75/FY76	FY75/FY76
Services				
% services spent on diagnosis and evaluation	-49/-305	-.23/-.51	68/-232	.30/-.63
% services spent on restoration	-98/391	-.66/1.09	-53/-38	-.42/-.19
% services spent on training	*-360/146	-2.28/.40	-52/-12	-.54/-.07
Time in Process				
months in referral	170/-3394*	.26/-1.80	*1418/-1200	2.60/-1.15
months from referral to closure	-125/-173	-.50/-.28	78/-196	.43/-.57
intercept	13743/81927		-1515/-3761	
R^2	.644/.481		.531/.340	
$\bar{R}^2$	.341/.003		.316/.017	
F	2.12/1.01		2.46/1.05	
significance of F	.031/.491		.004/.426	
n	51/50		74/73	
min n	51/49		74/71	

Notes:

* significant at .20 level or less -- two tailed test of significance for null hypothesis that coefficient is zero

† base category for a dummy variable -- category to which coefficients are compared

X variable excluded from the regression: blind agency is excluded when only general agencies are being analyzed; % with insubstantial handicaps is excluded when all agencies are being analyzed because of collinearity with blind agency -- see text; expenditure per client served is excluded from coverage and cost per SGA dependent variable regressions because of shared terms in the definitions -- see text.

Table 17

Regressions; SSI Clients;

Dependent Variable: Cost Per SGA

Independent Variable	General Agencies		All Agencies	
	coefficient	t-value	coefficient	t-value
	FY75/FY76	FY75/FY76	FY76/FY76	FY75/FY76
Economic Environment				
unemployment rate	-3841/-3163	-.40/-.47	-2693/-374	-.42/-.19
average wages	353/-8	.63/-.06	*625/-34	1.57/-.40
Benefit Levels				
average benefit	-414/247	-.50/.90	241/-22	.39/-.14
VR Agency				
education agency	-38490/10566	-.86/.99	*-58445/8405	-1.91/1.11
umbrella agency	*-59486/1144	-1.52/.10	-31244/-4904	-1.26/-.79
independent agency †	---	---	---	---
blind agency	X	X	-12138/2118	-.30/.20
general agency †	---	---	---	---
large agency	-16106/-1862	-.49/-.20	5140/-472	.21/-.08
small agency †	---	---	---	---
Expenditures				
expenditure per client served	X	X	X	X
% expenditures on administration	*6713/-.764	1.60/-.55	1800/461	.96/.79
% expenditures on counseling and placement	-264/-107	-.16/-.37	-937/-46	-1.01/-.24
Staffing				
specialist staff	*58727/3019	1.52/.27	30037/2838	1.20/.42
no specialist staff †	---	---	---	---
Referral				
% ODS or SSDO referrals	225/160	.29/.89	-268/169	-.55/1.28
Use of Special Program				
% beneficiaries served in special program	-261/92	-.23/.30	-655/-65	-.91/-.32
Clients - Demographics				
% between 25 and 44 years old and with 12 or more years of education	815/-153	.57/-.33	-738/-125	-1.08/-.57
% male	*-3055/-403	-1.88/-.74	-957/89	-1.17/.40
% white	-86/204	-.09/1.08	306/196*	.51/1.54
Clients - Economic Situation				
% with dependents	*-2685/-459	-1.44/-.96	*-1373/-237	-1.31/-1.05
% with earnings at referral	*5211/523	1.45/.71	846/506*	.67/1.49
% with public assistance at referral	29/5	.03/.02	*738/-82	1.38/-.58
Clients - Disability				
% with insubstantial handicaps	-716/544	-.39/1.00	X	X

(continued)

Table 17 (cont.)

Independent Variable	General Agencies		All Agencies	
	coefficient	t-value	coefficient	t-value
	FY75/FY76	FY75/FY76	FY75/FY76	FY75/FY76
Services				
% services spent on diagnosis and evaluation	*-6169/-547	-2.42/-.88	-1769/-188	-1.28/-.54
% services spent on restoration	-2196/372	-.37/.65	1348/307	1.02/.94
% services spent on training	*-4783/-190	-2.16/-.38	-915/-25	-1.00/-.10
Time in Process				
months in referral	*-16963/3213*	-2.27/1.50	-4784/1315	-.97/1.10
months from referral to intake	-1463/-796	-.48/-1.10	809/-85	.57/-.19
intercept	648498/25217		48921/9931	
R^2	.545/.389		.325/.289	
$\bar{R}^2$	.110/-.173		-.013/-.074	
F	1.25/.69		.96/.80	
significance of F	.294/.810		.526/.718	
n	49/50		71/71	
min n	48/49		70/69	

Notes:

* significant at .20 level or less -- two tailed test of significance for null hypothesis that coefficient is zero

† base category for a dummy variable -- category to which coefficients are compared

X variable excluded from the regression: blind agency is excluded when only general agencies are being analyzed; % with insubstantial handicaps is excluded when all agencies are being analyzed because of collinearity with blind agency -- see text; expenditure per client served is excluded from coverage and cost per SGA dependent variable regressions because of shared terms in the definitions -- see text.

Table 18

Regressions; SSDI Clients;

Dependent Variable: % SGA

Independent Variable	General Agencies		All Agencies	
	coefficient	t-value	coefficient	t-value
	FY75/FY76	FY75/FY76	FY75/FY76	FY75/FY76
Economic Environment				
unemployment rate	-.37/-.65	-.29/-.22	-.80/1.35	-.83/.73
average wages	*.239/-.030	2.14/-.20	.090/.046	1.00/.45
Benefit Levels				
average benefit	-.361/.408	-1.02/.67	-.015/-.166	-.58/-.46
VR Agency				
education agency	3.99/3.66	-.60/.39	2.50/1.53	.46/.23
umbrella agency	-4.40/5.06	-.66/.64	-1.78/1.58	-.38/.29
independent agency †	---	---	---	---
blind agency	X	X	*-10.28/-9.78	-1.40/-.97
general agency †	---	---	---	---
large agency	4.38/-3.85	.79/-.55	1.33/-2.58	.33/-.54
small agency †	---	---	---	---
Expenditures				
expenditures per client served	*-.0094/.0044	-1.56/.70	-.0010/.0030	-.55/1.11
% expenditures on administration	-.01/-.00	-.02/-.69	.08/-.62	.27/-1.29
% expenditures on counseling and placement	-.03/.16	-.12/.48	-.01/.01	-.09/.06
Staffing				
specialist staff	-3.34/-.99	-.47/-.12	-4.92/-3.71	-1.13/-.77
no specialist staff †	---	---	---	---
Referral				
% DDS or SSDO referrals	*-.20/-.06	-1.58/-.37	-.11/-.08	-1.17/-.63
Use of Special Program				
% beneficiaries served in special program	-.12/.16	-.68/.60	-.09/.05	-.66/.26
Clients - Demographics				
% between 25 and 44 years old and with 12 or more years of education	*.73/.09	2.30/.17	*.58/.26	3.11/1.20
% male	*.76/.48	2.32/.91	*.45/.19	2.03/.96
% white	*.29/-.22	2.43/-1.26	*.14/-.03	1.50/-.26
Clients - Economic Situation				
% with dependents	.19/.53	.70/1.15	.11/-.10	.81/-.59
% with earnings at referral	-.17/-.89	-.33/-1.09	.18/-.02	.71/-.05
% with public assistance at referral	.08/-.32*	.59/-1.61	.03/-.17	.31/-1.18
Clients - Disability				
% with insubstantial handicap	-.00/.59	-.01/1.07	X	X

(continued)

Table 18 (cont.)

Independent Variable	General Agencies coefficient FY75/FY76	General Agencies t-value FY75/FY76	All Agencies coefficient FY75/FY76	All Agencies t-value FY75/FY76
Services				
% services spent on diagnosis and evaluation	.19/.25	.38/.39	-.18/.20	-.57/.52
% services spent on restoration	-.18/-.66*	-.54/-1.80	-.11/-.26	-.58/-1.20
% services spent on training	-.24/-.25	-.64/-.62	-.11/-.07	-.82/-.38
Time in Process				
months in referral	1.64/4.48*	1.12/2.34	*1.29/1.57*	1.61/1.40
months from referral to closure	*.93/.27	1.66/.41	*.38/.54*	1.37/1.46
intercept	-8.12/-77.32		-10.46/54.80	
R^2	.630/.439		.591/.336	
$\bar{R}^2$	.289/-.123		.391/-.011	
F	1.85/.78		2.95/.97	
significance of F	.064/.725		.001/.520	
η	51/50		74/73	
min η	51/49		74/71	

Notes:

* significant at .20 level or less -- two tailed test of significance for null hypothesis that coefficient is zero

† base category for a dummy variable -- category to which coefficients are compared

X variable excluded from the regression: blind agency is excluded when only general agencies are being analyzed; % with insubstantial handicaps is excluded when all agencies are being analyzed because of collinearity with blind agency -- see text; expenditure per client served is excluded from coverage and cost per SGA dependent variable regressions because of shared terms in the definitions -- see text.

Table 19

Regressions; SSI Clients;

Dependent Variable: % SGA

Independent Variable	General Agencies		All Agencies	
	coefficient	t-value	coefficient	t-value
	FY75/FY76	FY75/FY76	FY75/FY76	FY75/FY76
Economic Environment				
unemployment rate	2.09/2.30*	1.23/1.59	.36/1.23	.27/.88
average wages	.048/.038	.48/.43	.025/.033	.29/.54
Benefit Levels				
average benefit	-.047/-.030	-.32/-.16	-.074/.067	-.56/.57
VR Agency				
education agency	-2.35/-1.45	-.30/-.23	2.10/-1.41	.32/-.26
umbrella agency	-4.25/3.18	-.55/.45	3.66/4.98	.69/1.12
independent agency†	---	---	---	---
blind agency	X	X	-4.59/4.23	-.53/.54
general agency†	---	---	---	---
large agency	-6.18/-2.75	-1.04/-.48	-1.94/-3.76	-.37/-.89
small agency†	---	---	---	---
Expenditures				
expenditure per client served	.0059/.0042	.69/.88	-.0020/-.0015	-.65/-.81
% expenditures on administration	-.00/-.24	-.00/-.28	-.15/-.09	-.38/-.21
% expenditures on counseling and placement	-.24/.232*	-.72/1.33	-.15/.32*	-.76/2.31
Staffing				
specialist staff	*-11.97/3.39	-1.56/.49	-5.43/-4.20	-1.01/-.89
no specialist staff†	---	---	---	---
Referral				
% DDS or SSDO referrals	.05/.00	.38/.03	.02/.04	.20/.43
Use of Special Program				
% beneficiaries served in special program	-.11/.01	-.49/.05	-.06/.02	-.36/.13
Clients - Demographics				
% between 25 and 44 years old and with 12 or more years of education	.33/.24	1.25/.77	*.27/.15	1.86/.98
% male	*.48/.59*	1.67/1.78	$.68/.75*	3.94/4.73
% white	-.18/-.31*	-1.08/-2.49	*-.33/-.22*	-2.58/-2.44
Clients - Economic Situation				
% with dependents	.06/.04	.16/.15	-.15/.18	-.66/1.11
% with earnings at referral	-.53/-.17	-.79/-.38	.33/-.27	1.22/-1.13
% with public assistance at referral	-.02/.17	-.15/1.05	-.12/.11	-1.06/1.14
Clients - Disability				
% with insubstantial handicaps	.10/.09	.32/.27	X	X

(continued)

Table 19 (cont.)

Independent Variable	General Agencies		All Agencies	
	coefficient	t-value	coefficient	t-value
	FY75/FY76	FY75/FY76	FY75/FY76	FY75/FY76
Services				
% services spent on diagnosis and evaluation	.62/.02	1.27/.06	.36/.12	1.18/.45
% services spent on restoration	.03/.06	.06/.16	-.26/.01	-.92/.05
% services spent on training	.16/.20	.35/.65	-.01/.07	-.05/.37
Time in Process				
months in referral	.95/-.09	.72/-.07	-.03/-.22	-.02/-.03
months from referral to closure	*.98/1.46*	1.77/3.29	*.88/1.06*	2.92/3.39
intercept	-15.69/-66.80		34.97/-50.67	
R^2	.553/.671		.560/.720	
$\overline{R}^2$	.089/.341		.326/.567	
F	1.19/2.04		2.39/4.71	
significance of F	.343/.044		.006/.000	
n	49/50		71/71	
min n	48/49		70/69	

Notes:

* significant at .20 level or less -- two tailed test of significance for null hypothesis that coefficient is zero

† base category for a dummy variable -- category to which coefficients are compared

X variable excluded from the regression: blind agency is excluded when only general agencies are being analyzed; % with insubstantial handicaps is excluded when all agencies are being analyzed because of collinearity with blind agency -- see text; expenditure per client served is excluded from coverage and cost per SGA dependent variable regressions because of shared terms in the definitions -- see text.

For the regressions using coverage as the dependent variable, none of the factors occurring after referral (such as the demographics of 26 closures) are used, because such factors are temporally and thus causally after the decision to serve. Expenditure per client served is excluded from the coverage and cost-per-SGA regressions because of shared terms in the definitions, number of clients served for coverage, and total expenditures for cost per SGA. Such shared terms lead to artificial coorelations. The percent with insubstantial employment handicaps measure is excluded from the regressions for all agencies, because of colinearity with the blind agency (0,1) variable.

The regressions are disappointing in several respects. First, the explanatory power of several of the regressions is poor (e.g., coverage for SSDI clients). Second, the results vary widely from year to year, from general agency to all agencies, and from client type to client type (from SSDI to SSI). Sometimes these results conflict. For few of the regressions do many statistically significant factors emerge, and, very few patterns emerge.

Rather than discuss each regression separately and rather than speculate on the disappointing results, the few patterns that do emerge are discussed.

For rehabilitation rate, the factors explaining performance all fall into the category of characteristics of the agency and of the selection of clients. Blind agencies have higher rehabilitation rates, as do smaller agencies. Agencies spending money on specialist staff have lower rehabilitation rates. And agencies taking a larger proportion of beneficiaries into the special program have lower rehabilitation rates. None of these relations has implications for policy, since rehabilitation rate itself is not related to the primary goal of the special program, i.e., termination or reduction in benefits.

The more interesting patterns exist for the regressions using as the dependent variable % SGA. Clearly, the demographic characteristics of clients are related to performance in this measure. The traditional variables of age, education, sex, and race are all related to performance in the ways usually found in labor participation and income studies (except for the negative effect of percent white for SSI clients). These findings also agree with the micro results in Berkowitz, et al.

Based on such a finding, a policy of creaming is usually suggested. There are, of course, several problems with suggesting such a policy. First is the problem of discrimination, given that sex, age, and race are involved. Second is the question of whether there is any more room for creaming. That is, creaming may be so pervasive now that there is no more slack for further expansion of creaming. To empirically examine the slack for creaming, demographics for all the eligible beneficiaries in the state who could meet the SSC would be needed. However, these data are not available. Second best, data on 26 closures could be used. A look at Tables 20 and 21 indicate that there is more room for creaming. For example, 25-30% of the 26 closures are in the prime age/education group; it is unlikely that this is all of the possible clients in this demographic group.

A third question is more telling, however. Is creaming really in the interests of the special program? Creaming will certainly lead to a higher cost-benefit ratio (B ÷ C). However, the more important criterion for the special program is discounted net present value (B - C), since this criterion addresses the net outflow of monies from the Trust Fund.

Given the above, the following strategy is suggested. Clients in the above demographic groups, more likely to succeed, would still be served, but with less attention, since they will likely succeed anyway. Clients in the demographic groups less likely to succeed would be given special attention, to try to bring them to employment and thus a reduction in benefits or termination. Such a strategy might lead to a smaller % SGA and CB ratio, but also to a larger savings to the Trust Fund.

Another finding from the % SGA regressions is that time in process is positively related to % SGA. While there may be differing interpretations of this finding, it seems that the intensity and duration of the service process is being measured. That is, controls for other possible explanations are included in the analysis, e.g., for expenditures, services, and demographics.

Table 20

Demographic Characteristics of SSDI Clients

	% 25-44 years old with 12+ education	% male	% white
	FY75/FY76	FY75/FY76	FY75/FY76
minimum	14.9/0	44.9/0	1.1/0
maximum	66.7/100.0	100.0/100.0	100.0/100.0
mean	38.5/25/8	73.9/54.1	84.4/75/9
median	37.6/25.0	73.1/52.9	90.8/83.7
number of agencies	74/70	74/71	74/71

Table 21

Demographic Characteristics of SSI Clients

	% 25-44 years old with 12+ education	% male	% white
	FY75/FY76	FY75/FY76	FY75/FY76
minimum	0/0	0/0	0/0
maximum	100.0/100.0	76.2/100.0	100.0/100.0
mean	28.0/25.8	49.4/54.1	76.8/75.9
median	26.2/25.0	51.9/52.9	83.3/83.7
number of agencies	71/70	71/71	71/71

Cross-Sectional and Time Series Analyses

The example presented is a cross-sectional analysis, done for two different time periods (1975 and 1976). As the standards system operates over time, a time series of data will also be available for each state VR agency. As such, analysis of agency-level data will move from cross-sectional analysis to time series analysis for a particular agency and for the nation as a whole, and to combined time-series cross-sectional analysis. While the statistical methodology for these analyses is more involved[1], the basic analytical approach used in the example will still apply.

[1]See Balestra and Nerlove, Box and Jenkins, and Glass, Willson, and Gottman for examples of the types of time-series analyses and of time-series -- cross-sectional analyses involved.

REFERENCES

Balestra, P. and Marc Nerlove. "Probing Cross-Section and Time Series Data in the Estimation of a Dynamic Model. The Demand for Natural Gas," Econometrics (July, 1966), pp. 585-612.

Bennett, Eleanor Carol, and Marvin Weisinger. "Program Evaluation: A Resource Handbook for Vocational Rehabilitation." New York: ICD Rehabilitation and Research Center, 1974.

Berkowitz, Monroe, et al. "Rehabilitating Social Security Disability Insurance Beneficiaries: The Promise and the Performance," Bureau of Economic Research, Rutgers University, January 1978.

Bogdan, Robert, and Steven J. Taylor. Introduction to Qualitative Research Methods: A Phenomenological Approach to the Social Sciences. New York: Wiley, 1975.

Box, George E.P., and Gwilynn M. Jenkins. Time Series Analysis: Forecasting and Control. Revised edition. San Francisco: Holden-Day, 1976.

Collignon, Frederick C., and David E. Serot. "An Investigation of the Impact of Organizational Overstructure upon the Performance of State Vocational Rehabilitation Programs." Submitted to the Vocational Rehabilitation Services Division, Department of Social and Health Services, State of Washington. Berkeley, California: Berkeley Planning Associates, December, 1972.

Conley, Ronald W. "Weighted Case Closures," Rehabilitation Record, XIV (September-October, 1973), pp. 29-33.

Cook, Thomas D., and Charles J. Reichardt, editors. Qualitative and Quantitative Methods in Evaluation Research. Beverly Hills: Sage, 1979.

Dinnerstein, Albert J., M. Lowenthal, and M. Dexter. "Evaluation of a Rating Scale of Ability in Activities of Daily Living," Archives of Physical Medicine and Rehabilitation, XXVI (August, 1965).

Dodson, Richard. "A Macro Model for Understanding Social Service Delivery Systems: The Case of Vocational Rehabilitation in the United States," unpublished doctoral dissertation, Department of City and Regional Planning, University of California, Berkeley, 1978.

_____. "A Methodological Approach to Macro Modeling Social Service Delivery Systems," unpublished paper, Institute of Urban and Regional Development, University of California, Berkeley, 1973.

_____. "Analysis of Systematic Differences Among States in Achieving Employment and Termination of DI/SSI Clients," Berkeley Planning Associates, October, 1978.

_____, Andrejs Skaburskis, and Frederick C. Collignon. "An Evaluation of the Costs and Effectiveness of Vocational Rehabilitation Service Strategies for Individuals Most Severely Handicapped (IMSH)." Submitted to Urban Institute. Berkeley, California: Berkeley Planning Associates, May, 1975.

Douglas, Jack D. Investigative Social Research: Individual and Team Field Research. Beverly Hills: Sage, 1976.

Flynn, Robert J. "Determinants of Rehabilitation Rate: A Causal Analysis," Rehabilitation Counseling Bulletin, XVIII (March, 1975), pp. 181-91.

Glass, Gene V., Victor L. Willson, and John M. Gottman. Design and Analysis of Time-Series Experiments. Boulder: Colorado Associated University Press, 1975.

Goodyear, Don L., James A. Bitter, and Leo A. Micek. "Rehabilitation Service for Rural, Rural-Urban, and Urban Clients," Rehabilitation Counseling Bulletin, XVII (December, 1973), pp. 92-99.

Haber, Lawrence D. "Disabling Effects of Chronic Disease and Impairment: II. Functional Capacity Limitations," Journal of Chronic Diseases, XXVI (1973), pp. 127-51.

Hannan, Michael T. Aggregation and Disaggregation in Sociology. Lexington, Massachusetts: Lexington, 1971.

Harman, Harry H. Modern Factor Analysis. Third Edition. Chicago: University of Chicago Press, 1976.

Harris, Jeff. "The Uses of Performance Measures in Rehabilitation Programs." Working Paper No. 215. Berkeley: Institute of Urban and Regional Development, University of California, August, 1973.

Hawryluk, Alex. "Rehabilitation Gain: A New Criterion for an Old Concept," Rehabilitation Literature, XXXV (November, 1974), pp. 322-28, 341.

Kunce, Joseph T., Douglas E. Miller, and Corrine S. Cope. "Macro Data Analysis and Rehabilitation Program Evaluation," Rehabilitation Counseling Bulletin, XVII (March, 1974), pp. 132-40.

Mueller, Paul F.C., and Ginger Parrick, "What Happens with the Disability Determination Office Referrals to Vocational Rehabilitation Agencies? -- Nothing Much." Sacramento: State of California, Department of Rehabilitation, April 13, 1979.

Reagles, Kenneth W., George N. Wright, and Alfred J. Butler. "Rehabilitation Gain: Relationship with Client Characteristics and Counselor Intervention," Journal of Counseling Psychology, XVIII (September, 1971), pp. 490-95.

Rehabilitation Services Administration. "Services to Clients with Insubstantial Employment Handicaps: Selected Disabling Conditions of Clients Rehabilitated in Fiscal Year 1973." Memorandum to Directors, Office of Rehabilitation Services, Regions I-X, November 7, 1975.

Robinson, William S. "Ecological Correlations and the Behavior of Individuals," American Sociological Review, XV (June, 1950), pp. 351-57.

Rubin, Jeff. "Variations in DI and SSI Rehabilitation Performance Across States: Some Preliminary Results," Bureau of Economic Research, Rutgers University, 1978.

Shea, Susan, et al. "Implementing the Rehabilitation Act of 1973: The VR Program Response." Submitted to Office of the Assistant Secretary for Planning and Evaluation, United States Department of Health, Education and Welfare. Berkeley, California: Berkeley Planning Associates, February, 1978.

Sermon, Duane T. "The Difficulty Index -- An Expanded Measure of Counselor Performance." Research Monograph No. 1. St. Paul, Minnesota; Division of Vocational Rehabilitation, State of Minnesota, March, 1972.

Thomas, Edwin N., and David L. Anderson. "Additional Comments on Weighting Values in Correlation Analysis of Areal Data," Annals of the Association of American Geographers, LV (September, 1965), pp. 492-505.

Tseng, M.S. "Predicting Vocational Rehabilitation Dropouts from Psychometric Attributes and Work Behaviors," Rehabilitation Counseling Bulletin, XV (March, 1972), pp. 154-59.

Tukey, John W. Exploratory Data Analysis. Reading, Massachusetts: Addison-Wesley, 1977.

Walls, Richard T., and John J. Miller. "Perception of Disability by Welfare and Rehabilitation Clients," Perceptual and Motor Skills, XXXI (1970), pp. 793-94.

Walls, Richard T., and M.S. Tseng. "Measurement of Client Outcomes in Rehabilitation," in Handbook of Measurement and Evaluation in Rehabilitation, Brian Bolton, editor. Baltimore: University Park Press, 1976, pp. 207-25.

Westerheide, William J., Lowell Lenhart, and M. Clinton Miller, III. "Field Test of a Services Outcome Measurement Form: Case Difficulty." Monograph no. II. Oklahoma City, Oklahoma: Department of Institutions, Social and Rehabilitation Services, State of Oklahoma, 1974.

Worrall, John D. "Correlates of Success and Prediction of Outcomes," in An Evaluation of Policy Related Rehabilitation Research, Monroe Berkowitz, et. al., editors. New York: Praeger, 1975, pp. 108-28.

Wright, George N., Kenneth W. Reagles, and Kenneth R. Thomas. "Who Are the Tough Rehabilitation Cases?", American Archives of Rehabilitation Therapy, XXI (March, 1973), pp. 2-5.