Computer-Assisted Consultation: Problem-Identification

David B. Lennox
Western Michigan University

Follow this and additional works at: http://scholarworks.wmich.edu/dissertations

Part of the Experimental Analysis of Behavior Commons

Recommended Citation
http://scholarworks.wmich.edu/dissertations/2312

This Dissertation—Open Access is brought to you for free and open access by the Graduate College at ScholarWorks at WMU. It has been accepted for inclusion in Dissertations by an authorized administrator of ScholarWorks at WMU. For more information, please contact maira.bundza@wmich.edu.
COMPUTER-ASSISTED CONSULTATION: PROBLEM-IDENTIFICATION

by

David B. Lennox

A Dissertation Submitted to the Faculty of The Graduate College in partial fulfillment of the requirements for the Degree of Doctor of Philosophy Department of Psychology

Western Michigan University
Kalamazoo, Michigan
December 1984
Three experiments were conducted to validate the effectiveness of Computer-Assisted Consultation (CAC) - a computer-based problem identification interviewing system for use in conducting school-based behavioral consultation. The specific goals of problem identification are to establish behavioral objectives and initial assessment characteristics. Experiment I functioned as a pilot which: 1) validated the need for problem identification, 2) demonstrated the general utility of CAC, and 3) provide a basis for program improvement. Experiment II provided a more rigorous analysis of CAC by comparing it with an actual problem identification interview. Two groups of three consultees each were exposed to one of two counter-balanced sequences of the following conditions: Baseline, CAC1, CAC2 (abbreviated version), Consultation (interview), and Acquisition Probe. Dependent variables employed were response quality, response errors, development duration, and response remediations. Results indicated comparable performances in both CAC and Consultation conditions. A detailed analysis revealed a more effective teaching
function of CAC than consultation with respect to teaching consultees to conduct problem identification independently. Experiment III demonstrated generality of the findings of Experiments I and II to actual consultation situations, as opposed to contrived consultation situations (i.e., vignettes as employed in Experiments I and II). All three experiments demonstrated that the Computer-Assisted Consultation system was a useful tool in completing the problem identification component of a problem-centered behavioral consultation. Disadvantages of using CAC for problem identification may be the longer durations than those resulting from consultation. Results are also discussed with respect to typical obstacles of conducting problem identification and generality of findings to other situations (populations, problems, and types of consultation services).
INFORMATION TO USERS

This reproduction was made from a copy of a document sent to us for microfilming. While the most advanced technology has been used to photograph and reproduce this document, the quality of the reproduction is heavily dependent upon the quality of the material submitted.

The following explanation of techniques is provided to help clarify markings or notations which may appear on this reproduction.

1. The sign or “target” for pages apparently lacking from the document photographed is “Missing Page(s)” If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting through an image and duplicating adjacent pages to assure complete continuity.

2. When an image on the film is obliterated with a round black mark, it is an indication of either blurred copy because of movement during exposure, duplicate copy, or copyrighted materials that should not have been filmed. For blurred pages, a good image of the page can be found in the adjacent frame. If copyrighted materials were deleted, a target note will appear listing the pages in the adjacent frame.

3. When a map, drawing or chart, etc., is part of the material being photographed, a definite method of “sectioning” the material has been followed. It is customary to begin filming at the upper left hand corner of a large sheet and to continue from left to right in equal sections with small overlaps. If necessary, sectioning is continued again—beginning below the first row and continuing on until complete.

4. For illustrations that cannot be satisfactorily reproduced by xerographic means, photographic prints can be purchased at additional cost and inserted into your xerographic copy. These prints are available upon request from the Dissertations Customer Services Department.

5. Some pages in any document may have indistinct print. In all cases the best available copy has been filmed.
Lennox, David Brian

COMPUTER-ASSISTED CONSULTATION: PROBLEM-IDENTIFICATION

Western Michigan University

University Microfilms
International

Copyright 1985
by
Lennox, David Brian
All Rights Reserved

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Although one will inevitably fail to acknowledge certain persons to which he owes thanks, I will attempt to mention those most instrumental in the completion of this project. First, I would like to thank the sponsors on my doctoral committee - Dr. Galen Alessi, Dr. Bill Armstrong, and Dr. Dale Brethower for their reviews and consideration of proposal, updates, and final manuscript of this project. Similarly, I would like to thank the students of the last three years of Friday Morning Research Seminar for listening patiently and providing suggestions throughout its development. Specifically, I would like to thank Steve Ragotzy and Laurie Thompson-Montgomery for their continuous support as well as participation in the project.

Finally, there are two additional people whom I owe undying thanks for their support and guidance. First, Howard Farris, who provided me with the learning and motivational environments throughout my graduate training critical to this and all past and future contributions to the field. If not for Howard and his persistence, graduate "training" could have easily turned into graduate "career". Lastly, and to whom I would like to
dedicate and devote the remainder of life, my wife Mary Lou. For without the dedication and devotion which she has made, this project and all that it signifies would have been impossible.

David B. Lennox
TABLE OF CONTENTS

ACKNOWLEDGEMENTS ............................................. ii
LIST OF TABLES ................................................ vi
LIST OF FIGURES ................................................. vi

Chapter

I. INTRODUCTION ............................................... 1
   Participants ................................................. 1
   Goals ......................................................... 3
   The Consultation Process ................................. 4
   Problem Identification .................................. 6
   Obstacles to Problem Identification ................. 8

II. COMPUTER-AIDED ASSESSMENT .............................. 15
   Research ..................................................... 15
   General Findings .......................................... 16

III. STATEMENT OF PURPOSE .................................. 19

IV. EXPERIMENT I ................................................. 21
   Introduction ................................................. 21
   Method ....................................................... 22
   Results and Discussion .................................. 26

V. EXPERIMENT II ................................................. 31
   Introduction ................................................. 31
   Method ....................................................... 34
   Results and Discussions ................................. 50
LIST OF TABLES

1. Analysis of errors within scored objectives across all conditions........62
2. Analysis of errors within scored assessment methods across all conditions..........................65
3. Analysis of forced and voluntary remediations within CAC1, CAC2, and Consultation sessions...............69

LIST OF FIGURES

1. Percent of criteria present in ID and CAD objectives for each vignette....28
2. Percent of criteria present in objectives and duration values across all conditions for Group I.......52
3. Percent of criteria present in objectives and duration values across all conditions for Group II.......55
CHAPTER I

INTRODUCTION

Behavioral consultation has become more and more accepted as a way in which to effectively generate desired changes in a given situation (Alessi, 1979; Bergan, 1977; Goodwin, Garvey, & Barclay, 1971). Behavioral consultation as a problem-solving endeavor, has been conducted in schools (Bergan, 1977; see review), mental health environments (Bergan, 1977), and organizational environments (Luthans, 1981). Bergan (1977) has identified two general types of consultation activity. Developmental consultation emphasizes the establishment and achievement of long-range goals. Problem-centered consultation, of which will be the main focus of the following proposal, emphasizes specific immediate short-range goals.

Participants

Generally, consultation involves participation by three individuals - a consultant, a consultee, and a client - each of which possesses certain characteristics and is attributed specific responsibilities. The consultant is an individual solicited because of
his/her expertise in assisting individuals in generating desirable changes in client behavior. This experience may have been acquired in a casual, gradual, trial-and-error fashion or through exposure to a systematic training program (Goodwin, et al., 1971). Depending on the concern, the consultant's responsibilities may vary. However, at minimum, the consultant is expected to
1) coordinate the consultation process and insure the occurrence of all necessary activities (Bergan, 1977),
2) provide relevant information regarding behavioral assessment and analysis of client behavior, possible intervention and evaluation of any such intervention (Bergan, 1977), and 3) provide some form of training to the consultee for future problems (Redmon, Cullari, & Farris, 1979).

The consultee is an individual (often a teacher, parent, or manager) who has expressed a need for assistance in generating desired behavior change(s) of a client (e.g., student, child, or employee). Responsibilities include 1) specification and description of the behavior of concern, 2) decision-making regarding methods proposed by the consultant, and 3) maintaining direct contact with the client and implementing any agreed upon procedure (Bergan, 1977). In this case, the consultee's behavior is targeted for change only because
it will impact the client's behavior in a positive direction.

The client is the participant in a consultation whose behavior is of concern to the consultee and, ultimately, targeted for change. The client may or may not participate in decisions regarding interventions, depending on various client characteristics (Bergan, 1977). The client seldom has any specific responsibilities in a consultation with the exception of expectation of change.

Goals of Consultation

The general goal of behavioral consultation for problem-solving is, in most cases, to ultimately change the behavior of the client in a positive direction (Bergan, 1977; Bergan & Tombari, 1976; Lambert, 1974). This behavior is typically specified clearly and is the goal around which any intervention is based. However, this change is achieved through indirect methods in which the consultant has limited, if any, direct contact with the client. The consultee, instead, becomes the change agent through which the consultant achieves successful behavior change (Bergan, 1977, Keller, 1981). Keller (1981) points out that this "indirectness" is what differentiates behavioral consultation from behavior therapy.
A second goal of consultation is to generate behavior by the consultee which results in improved performance and effectiveness with the client (Bergan, 1977; Goodwin, et al., 1971; Lambert, 1974). This will also potentially improve the consultee's effectiveness with other clients possessing similar behavior deficits or excesses and with other behaviors which are of similar characteristics.

The Consultation Process

The consultation process can follow a variety of formats and consist of several components (see Redmon, et al., 1979, for a comprehensive description of these components). However, once beyond the entry stage (initial contact with the consultee), the process generally follows a fixed sequence of events: 1) Problem Identification, 2) Problem Analysis, 3) Plan Implementation, and 4) Plan Evaluation (Bergan, 1977; Keller, 1981; Redmon, et al., 1979).

The problem identification component typically involves specifying the consultee's concern(s) and prioritizing them. The development of an assessment procedure may also take place in this component (Bergan, 1977). (Note that the development of an assessment procedure is, in some consultation models, considered part of the problem analysis component.) The problem
The analysis component involves identification of the variable(s) controlling behavior and the design of an intervention aimed at generating desired changes in the client's behavior (Bergan, 1977; Keller, 1981). The plan implementation component deals with the implementation of the intervention plan by the consultee. Finally, in the plan evaluation component, the degree to which the intervention plan has effected the desired change in the client's behavior is evaluated.

Although each of these components is essential to the success of the entire consultation process and each requires specific and unique skills (Redmon, et al., 1979), problem identification — identification of objectives and development of an assessment procedure — is emphasized to a much greater extent than the remaining three components. This can be seen by the extreme proliferation of literature dealing specifically with problem identification activities (see Keller, 1981 for a review). In fact, several writings (Bergan, 1977; Bergan & Tombari, 1976; Goodwin, et al., 1971) which purport to focus on the entire consultation process, deal almost exclusively with problem identification. This emphasis can be justified, since a stronger relationship has been suggested between problem identification and successful consultation outcome (Bergan & Tombari, 1976; Keller, 1981) than any other component in a consultation.
Problem Identification

As already stated, the problem identification component typically involves two activities:
Specification of the problem and the development of assessment procedures.

Establishing Objectives

Specification of the problem almost invariably refers to the establishment of one or more behavioral objectives (Bergan, 1977). Behavioral objectives are useful in clarifying the consultee-expected behavior(s) (target behaviors) of the client and, therefore, defining the criteria with which to evaluate the success or failure of the entire consultation process. Behavioral objectives typically consist of a set of specific characteristics: 1) Identification of the client, 2) description of the target behavior in observable and measurable terms, 3) a description of the conditions under which the behavior is expected to occur, 4) criteria for acceptable emission of the behavior, and 5) specification of mastery determination (Bergan, 1977; Mager, 1961; Vargas, 1972).
Assessment Procedures

Assessment procedures developed for use by the consultee via behavioral consultation are characterized by measurement of client behaviors prior to intervention. The purposes of developing an assessment procedure are several. First, assessment validates the consultee's concern about the client's behavior by providing information about the extent of the problem (Keller, 1981). Second, given the functional nature of behavior presumed by the behavioral consultant, assessment may assist in identifying variables which influence the consultee's and/or client's behavior and, therefore, suggest an appropriate intervention (Bergan, 1977; Keller, 1981). Third, assessment provides a description of the state of affairs with which the effects of any intervention plan can be easily compared.

Although measurement through direct observation is not the sole method of assessment, it is the most widely used procedure (Bergan, 1977). Typically, one of four characteristics of behavior are measured: Frequency, duration, latency, or magnitude. The recording technique employed can be very simple (tally marks on a piece of paper) to a very complex (electronic or computerized) data collection systems.

Establishing behavioral objectives and developing an
assessment procedure are usually achieved by interviewing the consultee. Given the critical goals of the interview, several programs designed to train consultant interviewing skills have recently been investigated. Goodwin, et al. (1971) introduced microconsultation, which trained interview behaviors which were behaviorally defined, easily modeled, and rehearsed on videotape. Moreland, Ivey, and Phillips (1973) evaluated microcounseling as a training technique which is similar to microconsultation. Bergan and Tombari (1976) and Bergan (1977) have suggested a number of critical interviewer skills by conducting systematic research of the verbal responses by the consultant critical to an assessment interview. (For a review of these and additional training programs, see Ford, 1979).

Obstacles to Problem Identification

Although data suggest that a consultant-consultee interview which meets certain specifiable criteria can greatly influence a successful outcome, several obstacles can prevent such interviewing, as well as the entire consultation process from occurring. Although the following discussion is supported by a focus on behavioral consultation in educational settings, it has been noted that the process and factors determining its effectiveness are similar to those in other areas such as
mental health and organizational settings (Bergan, 1977).

**Scarcity of Training Programs**

Although, as noted earlier, several consultant training program components have been identified in the literature, recent surveys (Meyers, 1978; Miles & Hammond, 1979) have indicated a scarcity of such training programs available. Meyers (1978) found that only 44% of 92 counselor education programs had provided consultant training, while Miles and Hammond (1979) found only 38% of surveyed school psychology programs offered such training. These data indicate a severe deficiency in the number of professionals available for consultative services. It has been noted (Hawkins, 1972; Hobbs, 1969) that there are far more persons requiring services than there are helping professionals.

**Consultant Skill Deficits**

Consultant skill deficits may also preclude a successful consultation. Much criticism of professional "training" as a consultant has centered around the fact that it is "unsystematic, involving considerable trial-and-error learning". This criticism is supported by a recent survey (Martin & Meyers, 1980) which indicated that the majority of school psychologists
(57-60%) engaging in consultative activities acquired most of their skill from "on-the-job training" or "life experiences", with very little (12-32%) receiving any systematic of academic training.

Furthermore, even with formal training, the degree to which acquired skills are maintained by the consultant has been questioned (Bergan & Tombari, 1976; Goodwin, et al., 1971). It would be naive to assume that effective consultant skills could be maintained without a systematic program of retraining and/or evaluation, especially given the low frequency with which some consultants actually engage in consultative activities (see Consultant Workload).

Consultant Workload

Another aspect of the consultant-consultee interview, as well as the entire consultation process in general, which may hinder or prevent the occurrence of a successful consultation is the time and response effort required by the consultant. In addition to the limited number of consultants available, those who are trained to provide consultative services may have responsibilities which prevent them from carrying any significant number of consultation cases.

For instance, several investigators (Hughes, 1969;
Lacayo, Sherwood, & Morris, 1981; Martin & Meyer, 1980) attempting to determine the daily activities in which the school psychologist spends time, have surveyed large samples of school psychologists. Respondents indicated that an average of approximately 25% of their time was comprised of consultation activities. Although these data may not be surprising, given the additional responsibilities of the respondents (psychoeducational assessment, staff/case meetings, etc.), it does, again, indicate a paucity of consultative services.

Consultee Workload

Similar to the consultant's plight, the time and response effort required by the consultee may also present certain obstacles to conducting a consultation. Although the consultee may, in fact, initiate the consultation process via a referral or other form of request for services, it must not be overlooked that s/he has ongoing responsibilities which must not be neglected. This condition, necessarily, precludes additional behavior requirements by the consultee, some of which might be those activities prescribed by the consultation. For instance, Abidin (1975) points out that most teachers are provided with little available time, "consequently, devoting any time to interaction with a consultant only increases his work burden ..." (p. 51). Thus, from a
consultee's perspective, regardless of the extent of the client problem, the best consultation is one which requires very little time and effort.

To the consultee's dismay, however, the consultative process prescribed by most models of consultation (Redmon, et al., 1981) necessarily requires extensive consultee input. This participation begins upon the first component of the consultation - the problem identification interview. This fact is especially important given the often presumed critical "first impression" by the consultee of the consultant and the consultative process to the outcome of consultation.

**Intrusive Nature of Consultation**

In addition to the necessary time and effort required by the consultee, several factors which are relevant to the problem identification component have been identified which may contribute to perceived intrusion by the consultant of the consultee's work environment. First, once contact is made with a consultant, the consultee may be perceived, by colleagues, as incompetent and in need of "professional help" in dealing with a client (Pipes, 1981). This, obviously, could result in resistance toward any effective participation on the consultation process. Second, the "inquisition-like" interview conducted by the
consultant in the problem identification interview may be especially threatening to the consultee. A third factor specifically related to behavioral consultation is the emphasis placed on environmental factors responsible for client behavior, of which the consultee is a part. The consultee might otherwise attribute any undesirable behavior by the client to either internal factors such as a "psychoeducational disease" (Piersal & Gutkin, 1983) or other external factors such as the client's home environment or, past teachers, for example (Meyers, 1981). However, regardless of the implicit nature in which the controlling variables are identified, the consultee is often led to believe that s/he has played a significant role in generating or maintaining the client's undesirable behavior (Piersal & Gutkin, 1983).

Secondary Gain

A final factor which may impede the success of a problem identification interview is what has been called "secondary gain". Often the consultee, in describing the client's undesirable behavior, may provide "an emotionally laden account" of the concern (Sandoval, Lambert, Davis, 1977). Furthermore, s/he may actually appear to enjoy discussing the problem, while resisting any action or discussion taken toward solving the problem.
and terminating the consultative process successfully (Piersal & Gutkin, 1983). Piersal and Gutkin (1983) suggest that such discussion and "begin able to 'own' a severe problem" might prove to produce reinforcing consequences (i.e., social consequences from colleagues). Given this context, the problem identification interview, and any subsequent contact will result in nondirective discussion, which the consultee will facilitate.

Thus, it can be seen that there exists several factors which may either prevent or impede a successful consultation, specifically a problem identification interview. Within the literature cited in review of the above factors, several suggestions were proposed for eliminating or reducing the influence of the respective factors. Most often the suggestions centered around additional consultation training, modification in the execution of the consultation, or abandoning the consultation as an unmanageable situation.

One solution which will be discussed and proposed as a possible solution to those problems noted above, is the use of computer technology in the problem identification process. Specifically, it is suggested that the goals of the problem identification interview - establishing objectives and developing an assessment procedure - are uniquely suited for computer application.
CHAPTER II

COMPUTER-AIDED ASSESSMENT

Research

Within the last decade, the benefits resulting from the use of computers in consulting and clinical applications has been realized. Several investigations of the use of computers in conducting diagnostic assessment have been reported. A large portion of the investigations have been conducted by Johnson and his colleagues (Johnson, Giannetti, & Williamson, 1978; Johnson & Williams, 1975; Johnson & Williams, 1979; Klinger, Johnson, & Williams, 1976; Klinger, Miller, Johnson, & Williams, 1977) in conducting and interpreting computer-administered intake assessments of mental health patients. For example, Johnson, Giannetti, and Williams (1975) designed microcomputer software to conduct and interpret scores resulting from an administration of a MMPI. As reported, psychological evaluation data are collected directly from patients via a cathode ray terminal (CRT) which is "on-line" with a larger computer system. Similar research has been reported (Bremser & Davidson, 1978) for conducting general intake information such as historical data.
The use of computer technology in behavioral assessment has also been reported. Angle and his colleagues (Angle, Ellinwood, Hay, Johnsen & Hay, 1977(a); Angle, Hay, Hay, & Ellinwood, 1977(b); Angle, Johnsen, GrebenKemper, & Ellinwood, 1979; Hay, Hay, Angle, & Ellinwood, 1977) have employed a low-cost mini-computer for conducting comprehensive behavioral assessment. The computer-aided assessment interviewing system provides multiple-choice questions to the client via a CRT to which the client responds using a typewriter keyboard. The questions cover a wide range of typical problem areas and, as the program progresses, it branches to more detailed questions depending on the problem area identified by the patient.

General Findings

Most researchers concentrated their findings evaluating computer-aided assessment around three major variables: Efficiency/cost, reliability, and user-preference.

All investigations cited above considered computer-aided assessment far more efficient than the alternative interviewing method (face-to-face human interviewing). Efficiency was evaluated, specifically with regard to the degree to which the would-be
interviewer is freed from the task of interviewing to pursue other responsibilities (Altemose & Williams, 1981; Angle, et al., 1977(a)). However, beyond this obvious advantage, computer-aided assessment has also provided for immediate scoring and interpretation of responses (Skinner & Allen, 1983). Furthermore, although not suggested, convenience to the user, who no longer must synchronize appointments with the human interviewer, is also a clear benefit.

The cost has also been suggested as a clear advantage of computer-aided assessment over traditional interviewing. Although the initial cost may be disturbing, this cost is quickly offset by a substantial reduction in interviewer costs (Johnson & Williams, 1978).

A second, less evident advantage is the potential for improved reliability and consistency in the interviewing task. Human interviewer error has been strongly suspected (Angle, et al., 1977(a)) in affecting the integrity of interview data. It has been proposed that computer-aided assessment eliminates such errors. For instance, once a question is programmed, the information will always be elicited because the interviewer has failed to ask the relevant question (Angle et al., 1977(b)). Furthermore, should it be discovered that a critical assessment characteristic has
been neglected, immediate corrections may be made which will prevent a similar oversight in the future, indefinitely.

Finally, user preference of computer-aided assessment versus the human interviewer has been thoroughly assessed. Except with respect to "friendliness" (Skinner & Allen, 1983), most researchers found computer interviews much more preferred over face-to-face human interviewers (Angle, et al., 1977(a); Angle, et al., 1977(b); Angle et al., 1979; Johnson & Williams, 1978; Skinner & Allen, 1983). Most interviewees, in fact, preferred to be interviewed by the computer a second time (Angle, et al., 1979).

Overall, the findings noted above have supported the use of computers in an assessment interviewing capacity.
CHAPTER III

STATEMENT OF PURPOSE

Given the positive findings with regard to existing research evaluating computer-aided assessment, it would be reasonable to assume that the use of computers in conducting similar components of a consultation—specifically, the problem identification interview—would also be efficacious. First, given the deficient number of available consultants and the potential for skill deficits among some practicing consultants, the "consistency and thoroughness of the computer interview" (Angle, et al., 1979, p. 57) is an obvious advantage. Second, the potential convenience to the consultant and consultee certainly provides further support for computer utilization. Third, it can be argued that the intrusiveness of the consultation process could be substantially reduced, since the consultant would not be as salient in the consultee's environment. It also seems possible, given the indication of a preference for computer (as opposed to human) interviews, that consultees might also possess a similar preference. Finally, given that a computer can only "interact" with the user to the extent that it has been programmed, the
interview would, necessarily, be directive and, therefore, prevent nondirective responses by the consultee.

The purpose of the following study was to determine the extent to which a computer-assisted consultation package, specifically designed to conduct a problem identification interview, could generate responses by the consultee which meet specifiable criteria. Computer-assisted consultation consists of two sequential programs. DEFINE is designed to evoke responses which are appropriate to the behavior specified in the previously constructed behavioral objective. RECORD is designed to evoke responses which are appropriate to the identification of a method of measuring a behavior.
CHAPTER IV

EXPERIMENT I

Introduction

Experiment I of the Computer-Assisted Consultation (CAC) project served as pilot research for investigating the general validity of such a system along two dimensions: A deficit by teaching professionals and, subsequently, assisting in the remediation of these deficits.

The validation of deficits by teaching professionals is of major importance in evaluating the utility of such a program. It is clear that, should teaching professionals possess the skills necessary to achieve the goals of a Problem Identification (PI) interview independently, then neither a PI interview nor a computer-assisted interviewing system would be a useful tool. For these purposes, the CAC system was designed around only those goals consistent with the first half of a problem identification interview—establishing a behavioral objective.

Once deficits are validated, the results from such pilot research will serve two additional purposes. First, it will provide information regarding the utility
Secondly, Experiment I will also serve as a source of feedback essential to the development of instructional programs. By analyzing subject responding, program modifications can be made which will result in improved program efficiency and effectiveness. Modification in the CAC system resulting from Experiment I will be discussed in the introduction to Experiment II.

Method

Subjects and Setting

Two regular- and two special-education teachers (grades 5-8) volunteered to participate in the study without knowledge of the content area of the study. The study was conducted after school days in a classroom equipped with Apple II+ microcomputers, one subject per meeting.

Materials

Vignettes

Four standardized vignettes were composed on which to base the development of the behavioral objective. Each vignette provided the following information: Identification of the target subject, a general problem statement labeling a common classroom behavioral deficit.
or excess, identification of environmental setting and or ongoing activity during which the problem takes place, and a general statement suggesting the need for improvement (samples of vignettes are provided in Appendix A).

Software

A set of five interactive computer programs (the DEFINE system), generated by the author in BASIC computer language, were sequenced in an order consistent with the structured interview proposed by Bergan (1977): Defining the behavior, specifying the conditions, specifying the criteria, specifying mastery, and an alternating summarization program (for voluntary remediations of earlier responses). Each consisted of a series of "frames" providing information, examples, or requiring a subject response. General and subordinate objectives around which programs were constructed are in Appendix B(a), while a flow chart of the subcomponent of the system are in Appendix B(b). (For a more complete description of the DEFINE system, see Lennox, 1984).

In addition, the program for defining the behavior, possessed a data file consisting of unacceptable negative terms, vague terms, and acceptable observable and measurable terms. This permitted screening of subject definitions and rejecting if phrased negatively or
vaguely.

Procedure

Each subject generated two behavioral objectives in each of three sessions in which two conditions were successively presented: Independent Development (ID) and Computer-Assisted Development (CAD).

Independent Development

Each subject was provided with a vignette describing a hypothetical student's behavior excess or deficit. The vignettes were accompanied with instructions to "write a precise behavioral objective (behavior change goal statement) for improving the behavior of [name]." No further instructions were provided. Duration measures of objective construction were also taken.

Computer-Assisted Development

Immediately following the ID condition, subjects were assigned to a computer and provided with the same instructions and vignettes, as well as written instructions for operating the computer (e.g., press return after responses, etc.). Duration measures were again taken by direct observation.
Scoring

All objectives were scored for the occurrence or nonoccurrence of suggested criteria (Mager, 1962; Vargas, 1972; see Appendix C). Initial scoring was conducted by the experimenter and yielded a value indicating the percentage of those criteria that were present in each objective.

Reliability

A school psychologist previously trained in evaluating objectives also scored all objectives using the same criteria. Agreements and disagreements of all scores were assessed for each vignette. Reliability was computed by dividing the number of agreements for each vignette by the number of agreements plus disagreements then multiplied by 100.

Validation of Criteria

In addition to the reliability scorer two additional school psychologists were asked to respond to a questionnaire assessing (Appendix C) the validity of each criterion item by rating each on a scale from "1" (irrelevant) to "5" (essential).
Results and Discussion

Figure 1 shows the percent of criteria present for both ID and CAD objectives for all subjects. The first three sets of bars reflect values for objectives generated for vignettes 1, 2, and 3, while the fourth reflects the mean percent attained for all three objectives for both conditions. Percentage of criteria attained for ID objectives ranged from 19-67% with a mean of 49%, and a range of 42-94% and a mean of 73% for CAD objectives. (Subject 3 was unable to complete vignette 3 for reasons unrelated to the study.)

Duration measures ranged from 3-6 minutes for ID objectives and 9-28 minutes for CAD objectives, with means of 4 and 17, respectively. Reliability measures ranged from 78-87% with an overall reliability of 82%. Mean validation ratings for all criterion items ranged from 3.85-4.35, with an overall mean of 4.18.

As can be seen from ID performance values, deficits existed in the construction of behavioral objectives for these four teaching professionals. No subjects met more than 67% of the criteria for objective construction. These data validate the need for some form of intervention.

The data reported above clearly demonstrate the utility of the computerized problem identification interview. With the exception of subject 3, CAD assisted
all subjects in making significant improvements in behavioral objective construction. Objectives generated via CAD also required an average of 13 minutes longer, which may produce resistance by teacher to utilize CAD. However, it is predicted that after a minimum number of uses, the teacher will become more proficient at using the program.
Figure 1. Percent of criteria present in ID and CAD objective for each vignette.
Figure 1. Percent of criteria present in ID and CAD objectives for each vignette. (continued)
CHAPTER IV

EXPERIMENT II

Introduction

Experiment I served several functions. First, the necessary validation of criteria for the evaluation of a behavioral objective occurred. School psychology professionals possess obvious professional qualifications (Van Houten, 1979) for determining such criteria in school-related problems. Two school psychologists rated the importance of recommended (see Scoring, Experiment I) criteria. Results of these ratings indicated that all criterion items were valid as partial indicators of a functional behavioral objective.

Secondly, Experiment I served to demonstrate that deficits exist with respect to constructing functional objectives by some teachers. All four teachers in Experiment I were experienced (two or more years of full-time teaching) In addition, one of the teachers (#3) reported that she had completed a course in educational psychology/psychology of learning in which similar behavioral objective writing skills were taught.

A third function was to provide data suggesting the utility of CAC as a tool for evoking consultee responses
consistent with the criteria of a functional behavioral objective. The data from Experiment I demonstrate improved performance using CAC from independently developed behavioral objectives. This conclusion suggests that, in the absence of consultant-consultee interaction (a PI interview), CAC is at minimum a useful tool. It does not, however, assess the relative effectiveness of CAC when compared to a consultant-consultee interview during the course of a behavioral consultative process.

A final function of Experiment I was to provide continuous information for improving the CAC program. Through direct observation by the experimenter, several modifications in the CAC program were initiated along a variety of dimensions. The first modification indicated by Experiment I was the necessity of an instructional component which could be accessed (voluntarily or forced) should the consultee repeatedly emit responses considered inappropriate by the CAC program (negative or vague terms, for instance). As the "instructional" frames in CAC rarely required a response (other than a "return"), the rules and information presented in those frames may not have been acquired by the consultee. This was indicated on several occasions in Experiment I in which consultees voluntarily accepted terms identified by CAC.
as potentially vague descriptors of behavior.

A second modification was the addition of a response requirement for "labeling" the behavior of interest before describing the behavior in "observable and measurable terms". Also through observation of consultee-CAC interaction, it became clear that the first descriptive response emitted by the consultees was, in most cases, a vague "label" of behavior (for instance, "on-task", work quietly, etc.). By adding an earlier required behavior-labeling response, it was hypothesized that the consultee would be forced to emit a more detailed response describing the behavior of interest when asked a second time.

Finally, several organizational aspects of the program were altered in order to more clearly present information and prevent program error-producing responses. Examples of these modifications are a reorganization of examples/nonexamples, requests for choosing one of two response presented alternatives ("yes or no"), and the addition of temporal sequencing of information presentation within selected frames.

The major purpose of experiment II was to determine the relative effectiveness of the CAC system as compared to an actual problem-identification interview. Each consultee was exposed to baseline, CAC, and consultation. In addition, since a goal of consultation is behavior
change by the consultee, the acquisition of the verbal repertoire necessary to generate functional objectives by either CAC or consultation (a PI interview) would be relevant. Therefore, such acquisition was assessed following each intervention, prior to the next intervention.

As stated previously, a second element of a PI interview is to determine some method(s) of measuring the behavior specified in the already generated behavioral objective. Thus, an additional system component designed to generate some initial guidelines for baseline data collection was integrated into the CAC system. A secondary function of Experiment II, then, was to provide a pilot investigation of this additional component. This system was simultaneously assessed in a similar manner.

Method

Subjects

Consultees

Six graduate students were recruited from education-related courses. All were enrolled in education-related curricula (Spec. Ed., etc.), who had at least one year of public teaching experience. This population was selected due to the frequency of behavioral consultation received. Additional required
consultee characteristics are as follows:

1) Consultees will be paid volunteers recruited from summer session courses, with no implied or stated consequences administered for performance.

2) Consultees met less than 50% of the criteria for the development of a behavioral objective (see Dependent Variables). This pre-test was administered using the procedure employed in baseline condition (see Procedure). These pre-test data served as the first baseline probe.

Once selected, consultees were randomly assigned to one of two groups, each of which consisted of three consultees. One group (Group I) was exposed to one sequence of experimental conditions (Baseline, Computer-Assisted Consultation 1, Computer-Assisted Consultation 2, Acquisition Probe, Consultation, and Acquisition Probe) while the other (Group II) was exposed to another sequence of the same conditions (Baseline, Consultation, Acquisition Probe, Computer-Assisted Consultation 1, Computer-Assisted Consultation 2, Acquisition Probe). This differential sequencing permitted a counterbalancing of conditions to control for sequencing effects.

Consultant

The experimenter and a recruited psychology graduate
student from a school psychology curriculum served as Consultants. Initially, no specific training of the Consultant occurred, since all responses were programmed via a structured interview script (Appendix E).

The Consultant was given the following instructions in written form:

You will be interviewing a consultee attempting to change the behavior of a hypothetical student. Your task is to do the following:

1) Turn on the tape recorder.

2) Read the instructions to the consultee.

3) Give the consultee the vignette to read.

4) After the consultee has finished reading the vignette, begin asking the series of questions on the interview script, filling the information in brackets as best you can. If necessary (upon a consultee inquiry, for example), you may paraphrase a question, as long as you ask for no more or less information than the original question (with the exception of alternative elicitors, see Consultation).

5) After each question, wait for a complete response by the consultee, then ask the next question.

The consultant was given sufficient time, prior to the interview to become familiar with the script and ask any questions.

**Scorer**

The experimenter will evaluate consultee responses, while a doctoral school psychology student served as a reliability scorer. No previous experience with
construction or evaluation of behavioral objectives was required, as he was trained before any scoring activities (see Training of Scorer).

**Apparatus/Materials**

**Vignettes**

Twenty-four standardized vignettes were composed on which to base the development of two components of a behavioral consultation across several treatment conditions. Each vignette provided the following information: Identification of the target consultee, a general problem statement labeling the behavioral deficit or excess, identification of environmental setting(s) and/or ongoing activity during which the problem takes place, and a general statement suggesting the need for improvement (samples of vignettes are provided in Appendix A). In addition, all vignettes were of the same general length and difficulty level. The vignettes were constructed by the experimenter. To control for inconsistencies across objectives and insure that the information necessary for the development of each component is present, the vignettes were validated using the following procedure. Once composed, the vignettes were rated by two practicing school psychologists on the presence of the following features: 1) inclusion of all necessary information (noted above), 2) significance to
the educational setting, and 3) readability and clearness.

Feature 1 was rated on a "present"/"absent" basis. Features 2) and 3) were rated using a scale ranging from "1" ("significant"/"readable") to "5" ("not significant"/"not readable"). Selection of twelve vignettes were determined primarily by the presence of feature 1) and, secondly, on the combined high score on features 2) and 3).

**Computer**

An Apple IIc microcomputer was used for presentation of the Computer-Assisted Consultation program (see **Software**).

**Software**

Two Computer-Assisted Consultation components were utilized: DEFINE (a component for generating a behavioral objective), and RECORD (a component for generating a data collection procedure). Each component consisted of a series of "frames" (independent subunits of information displayed in entirety to the user), which provided and requested information necessary to meet the goal of each component. The frames and their presentation followed a model proposed by Evans, Glaser, & Homme (1960) called the RULEG system, in which verbal
material in an instructional program is classified into
either rules (RU's) or examples/nonexamples (EG's). The
RULEG system provides for instructional frames which
contain rules and/or examples which may or may not
require a user response for advancement to the next
frame. (For a complete description of the RULEG system,
see Markle, 1964).

Both Computer-Assisted Consultation components were
designed to evoke responses by the user which met goals
relevant to their respective purposes in a behavioral
consultation. Each component was designed around two
levels of objectives: General program objectives and a
set of subordinate objectives. These objectives are
presented in Appendix B.

Training of Scorer

The Scorer was trained to evaluate those consultee
responses relevant to behavioral objectives. Scoring of
assessment methods was conducted solely by the
experimenter.

The scorer completed a three-component training
sequence before evaluating consultee objectives. The
first component in the sequence required the scorer to
complete a section of the programmed instruction
exercises by Mager (1962) devoted to 1) specification of
the desired terminal behavior, 2) specification of the
conditions under which the desired behavior should occur, and 3) specification of the criterion for evaluation of the desired behavior (pp. 13-53).

In the second component of the training sequence, the scorer was provided with ten nonexamples of written behavioral objectives. Each had an unacceptable component, and was accompanied by a corresponding example in which the error had been corrected. The scorer was required to circle the correct version and score the incorrect version, using the criteria checklist (see D.V. section). The trainer then provided the correct answer. Upon any errors, the experimenter identified and explained the unacceptable component.

In the final component of the training sequence, scorer was given 20 objectives, 10 of which were unacceptable in one of the components. The scorer was requested to, first, state whether the objective was acceptable or unacceptable and, second, if unacceptable, identify the unacceptable component. Criterion for the scorer was 80% accuracy in identifying the acceptable or unacceptable objective and 80% in identifying the unacceptable component of the objective.

**Dependent Variables**

**Response Quality**

As stated earlier, the quality of the behavioral
objective constructed in the problem identification process is essential to the outcome of the consultation.

Each behavioral objective composed by the consultee was independently scored by the experimenter for the presence or absence of the quality characteristics, yielding a percentage of characteristics present in the objective. (See Experiment I for elaboration of the procedure for identification of quality characteristics for behavioral objectives as listed in Appendix C.) Scoring took place after the session but before the subsequent session. The scorer read the vignette and immediately scored the objective. No feedback was provided to the consultee regarding the quality of her objectives.

Quality characteristics for the selection and development of an assessment method (Appendix D) were identified in the same fashion as those for the behavioral objective. The characteristics were determined from a combination of methodology texts and training manuals (Bergan, 1977; Bailey & Bostow, 1979). However, the criteria were reduced to only two items during (Baseline conditions) since it was determined that specification of the items listed in Appendix D were not necessary to yield a valid and reliable method of assessment, after having specified the behavior in the
objective. The scoring was based on (1) the correspondence of the assessment method to the behavior and behavioral dimension identified in the objective, and (2) whether the phenomenon observed (direct observation or a product of the behavior) was a direct measure of the behavior.

Response Remediations

The number of response errors accrued by each consultee during each CAC session was also measured. The first CAC component (DEFINE) contained a built-in counter designed to record the frequency of required and voluntary response remediations accumulated during the construction of each quality characteristic (Response Quality). An error analysis provided further information regarding those criteria with which errors occurred.

A similar measure was collected during each Consultation session via audiotape recordings of consultant and consultee vocal responses. A response error was identified through a request by the consultant for further specification/clarification of the consultee's response in order to meet the relevant criterion or a request by the consultee to remediate a portion or all of the objective.
Development Duration

A duration measure was used to determine the efficiency of each of the conditions employed for the development of the behavioral objective and assessment procedure. The duration was measured each session, each condition by the consultant or experimenter.

Instructions provided by the consultant or experimenter informed the consultee to state when 1) s/he had completed the reading of the vignette, 2) s/he had completed constructing the objective and assessment procedure. These responses marked the beginning and end of the duration measures. Any subsequent reading of the vignette was considered part of the session and included in the duration measure. The data were collected via direct observation or audiotape depending on the condition in effect.

Reliability

In order to determine the accuracy of scorer evaluations, reliability of scores was assessed by tallying agreements and disagreements of all scores for 33% of the behavioral objectives. The objectives on which to compute reliability were selected by randomly identifying one objective per condition (Baseline, CAC1 & CAC2, Acquisition Probes, and Consultation) from each
consultee. Reliability was computed by dividing the number of agreements by the number of agreements plus disagreements and multiplying that value by 100. An agreement was tallied when both scorers agreed on the presence or absence of a particular characteristic. A disagreement was tallied when one scorer marked an occurrence (or nonoccurrence) and the other scorer marked a nonoccurrence (or occurrence). Reliability values ranged from 73% - 100%, with a mean reliability of 67%.

Design

The design was a simple counterbalanced repeated measures design, in which two groups of consultees were exposed to the same conditions, however in two different sequences. This design is a within-subjects design in which the performance of each consultee across all treatment interventions can be assessed. In addition, the repeated-measures design is one in which performance in all conditions (Baseline/Acquisition, Computer-Assisted Consultation, and Consultation) for all consultees (Group I and Group II) can be evaluated, while counterbalancing for sequence effects. See Figure 2 for a graphic layout of the conditions for Group I and Figure 3 for Group II.
**Procedure**

As previously noted, there were five experimental conditions: Baseline, Acquisition Probes, Computer-Assisted Consultation 1, Computer-Assisted Consultation 2, and Consultation. Each condition followed the same format. First, instructions appropriate to the condition were read by the experimenter. Second, each session the consultee was given a new vignette and requested to read it thoroughly. This was followed by the consultant-consultee interactions (except in Baseline/Acquisition Probes) appropriate to the condition in effect for the construction of a behavioral objective. Once the objective had been composed, consultant-consultee interactions appropriate to the condition in effect occurred for the construction of an assessment procedure. The session was terminated following the construction of the assessment procedure.

**Baseline**

A baseline session began with the experimenter reading the following instructions:

*You will be given a general description of a problem behavior exhibited by a hypothetical student. After carefully reading the description, your task is to establish a behavior change goal statement (or behavioral objective) and a method of measuring the behavior. Use as much of the*
information from the description as possible. If the description does not provide information necessary to answer a question, compose an answer which is closely related to the description. You may re-read the description at any time. Now, begin carefully reading the description. Say 'finished' when you have read the entire description."

Upon "finishing" the description, the consultee was immediately instructed to: "Please construct the behavioral objective and assessment procedure now. Say 'finished' when you have completed. Except for the reading of instructions, there were no planned consultant-consultee interaction. Duration measures began upon the consultee responding the first time and ended upon the second response "finished" by the consultee. The responses were required in written form to insure that the consultant was not required to rephrase, summarize, or clarify the consultee's responses, which might have altered the form to be scored.

**Acquisition Probes**

An Acquisition probe, identical to baseline condition was administered after each intervention condition (Consultation, Computer-Assisted Consultation). The purpose of the Acquisition Probe was to assess any improvements in independent performance as a result of a prior condition.
Consultation

Each group of consultees completed three consultation sessions. The sessions followed a standard sequence: instructions, vignette, and interview. The consultant provided each consultee with a vignette and the following set of instructions:

"You will be given a general description of a problem behavior exhibited by a hypothetical student. After carefully reading the description, your task is to establish a behavior change goal (behavioral objective) and assessment procedure by answering a series of prepared questions that I will ask. In some cases, I may rephrase a question in order to help you specify more clearly your answer. Use as much of the information from the description as possible. If the description does not provide information necessary to answer a question, compose an answer which is closely related to the description. You may re-read the description at any time. Now, begin carefully reading the description. Say 'finished' when you have read the entire description."

After reading the above instructions, the consultant handed the vignette to the consultee and remained quiet until the consultee had responded. Upon the consultee response "finished", an audio tape recorder was turned on and the following interview procedure began.

Immediately after the consultee had "finished" reading the vignette, the consultant began soliciting information from the consultee by proceeding through a "problem-identification interview" script (Appendix E) modified from Bergan (1977, pp. 94-97). Bergan's (1977) outline is designed as a general guide for the
establishment of behavioral objectives and assessment procedures in the problem identification component of a behavioral consultation.

The script provided the consultant with general classes of verbal stimuli to emit and, subsequently, evoke responses from the consultee, as well as models of each class. The consultant was required to compose unique stimuli relevant to each class, using the model provided. For instance, for the stimulus class "behavior-setting specification elicitors" (p. 95), a model such as "In what kinds of situations would it be particularly crucial for [the student] to emit [the behavior]" was provided in which stimuli appropriate to the vignettes could be inserted by the consultant. In addition to the "base elicitors", there were two alternative elicitors from which the consultant could select in order to evoke a response more appropriate to the criteria in Appendix C and D.

The responses to be scored were those evoked by "summarization emitters" and "positive-validation elicitors" provided by the consultant (Appendix E). Each interview was audio taped and, subsequently, reviewed by the experimenter to insure that the consultant's responses closely corresponded to the script (Appendix E). All audiotape reviews revealed no major deviations from the script.
All consultees were exposed to three Computer-Assisted Consultation 1 (CAC1) conditions. Each Computer-Assisted Consultation session began with the experimenter reading the following instructions:

"You will given a general description of a problem behavior exhibited by a student. After carefully reading the description, your task is to establish a behavior change goal statement (or behavioral objective) and assessment procedure by providing any information requested by the computer. Use as much of the information from the description as possible. If the description does not provide information necessary to answer a question, compose an answer which is closely related to the description. You may re-read the description at any time. Now, begin carefully reading the the description. Say 'finished' when you have read the entire description."

After reading the above instructions, the experimenter handed the vignette to the consultee and remained quiet until the consultee had responded, at which time the experimenter began duration measures.

Immediately after the consultee had "finished" reading the vignette, s/he was provided with a brief set of instructions for operating the computer and be asked to begin. No other interactions between the experimenter and consultee were required (except basic computer assistance), as the computer program provided all necessary prompts or instructions. A response of "finished" instructed by the computer marked the end and terminated the session.
Computer-Assisted Consultation

All consultees were exposed to one session of CAC2. The purpose of CAC2 was identical to CAC1 except that the instructional frames (examples and nonexamples, rules, etc.) were removed from the presentation. This required consultees only to respond to the requests for information regarding specific objective components and, thus, decrease the time required for completion by the consultee.

Results and Discussion

Response Quality

Figures 2 and 3 show the percentage of criteria attained (open squares) for Groups I and II, respectively. Figure 2 (a-c) provides the percentage of criteria across the following sequence of conditions (for Group I): Baseline, CAC1, CAC2, Acquisition Probe, Consultation, and Acquisition Probe. Figure 3 (a-c) provides similar data for the following sequence (for Group II): Baseline, Consultation, Acquisition Probe, CAC1, CAC2, and Acquisition Probe.

Group I

As shown in Figure 2 (a–c), subjects 1–3 attained
less than or slightly above 50% of the criteria on the first session (pre-test) as required for participation in the study (54%, 45%, and 54%, respectively). The second Baseline measure resulted in decreases in performances for Subjects 1 and 2, and a slight increase for Subject 3. Baseline means for each of subjects 1-3 were 33%, 47%, and 57%, respectively. (As indicated by preliminary scoring [between session], an upward trend existed in baseline performance which resulted in an additional baseline session for this subject only. These data are included in all analyses, but are not represented in Figure 1b since performance in this additional session was comparable to the prior baseline session. A similar phenomenon existed with respect to CAC1 performance by Subject 3 and was analyzed in a similar manner.)

All Group I Subjects improved performances upon introduction of CAC1 conditions which remained high throughout CAC2. CAC1 means were 100%, 97%, and 98%, respectively. No CAC1 sessions resulted in performance below 91%.

Acquisition Probes following CAC conditions (identical to Baseline sessions) resulted in performance similar to CAC performance. Differences between Baseline means and Acquisition Probe performances were 47%, 55%, and 34%, respectively.
Figure 2. The percentage of criteria met and duration values across all conditions for Group I subjects.
Figure 2. The percentage of criteria met and duration values across all conditions for Group I subjects (continued).
(c) Subject 3

Percentage Criteria Met

BL  CAC1  2  AP  CON  AP

Sessions

Duration

Percentage

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Figure 3. The percentage of criteria met and duration values across all conditions for Group II.
Figure 3. The percentage of criteria met and duration values across all conditions for Group II subjects (continued).
(c) Subject 6

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Following the Acquisition Probe, Subjects 1-3 were exposed to Consultation conditions. As in CAC conditions, performance was high relative to Baseline performance. Consultation means were 97%, 100%, and 100%, respectively. No Consultation conditions resulted in performance below 90%. Acquisition Probes resulted in slightly decreased performances at 70%, 70%, and 90%, respectively.

As Figure 2 reveals, definite deficits existed with regard to the construction of behavioral objectives as evaluated using the present criteria. Baseline performances were relatively low as compared to CAC1, CAC2, and Consultation conditions. Furthermore, both CAC and Consultation conditions resulted in perfect or near perfect performances for all three subjects, with no subject scoring lower than 90%.

Both CAC and Consultation conditions also were followed by near perfect performances resulting from independent development, indicating effective changes in subjects' repertoires. This last point, however, may only be justified with reference to the effects of CAC (and then only CAC2) due to possible "carry-over" effects from CAC conditions to the Acquisition Probe following Consultation conditions.
**Group II**

As shown in Figure 3 (a-c), subjects 4-6 performed very similar to Group I subjects across all conditions. One subject (Subject 5) continued to participate in the study while still attaining performance above 50% (73%) on the pre-test/Baseline session. This was permitted due to subject request and, in addition, it was thought that an analysis of the performance of an initially "high performer" would provide additional information. Subjects 4 and 6 met the pre-test participation criterion of near 50% performance (36% and 50%). Baseline means for Subjects 4-6 were 36%, 42%, and 51%, respectively.

All Group II subjects' performances increased upon introduction of Consultation conditions by 46%, 82%, and 46%, respectively. Performance remained high throughout this condition. However, upon introduction of Acquisition Probe conditions, performance for all subjects decreased to levels lower than any previous Consultation performance level (60%, 54%, and 60%, respectively).

Upon introduction of CAC1 conditions, all subjects returned to performances similar to that of Consultation conditions. Means for CAC1 performances were 91%, 94%, and 94%, respectively. CAC2 performances remained essentially unchanged.

With the exception of Subject 6 (50%; Figure 3c),
Acquisition Probes resulted in maintained high performance with 90% and 100% performances for Subjects 4 and 5, respectively.

As with the data display for Group I, interpretations regarding Group II performances are similar. Baseline performances were relatively low (with the only possible exception being session 1 for Subject 5) as compared to near perfect or perfect performances in CAC and Consultation conditions. In addition, the combined interpretations of Figures 2 and 3 permit comparison of the differential effects of CAC conditions with Consultation conditions, excluding any "carry-over" effects from exposure to earlier conditions.

By observing Acquisition Probe performances following each of these conditions, it is evident that CAC conditions produced a more improved independent development performance than did Consultation conditions. Mean reduction in Acquisition Probe performance following CAC for Group I (CAC1 and CAC2 were combined as first intervention) was 16.3%, while mean reduction following Consultation for Group II was 38%. Analyzed in another way, mean improvement over Baseline independent development of Acquisition Probe (#1) independent development for Group I was 33% and only 15% for Group II. These data seem to indicate that exposure/use of the CAC system results in acquisition by the user of a larger
A proportion of the repertoire necessary for independently constructing behavioral objectives. A similar interpretation of a problem identification interview as employed here would be problematic.

Error Analysis

Objectives

Table 1 presents an analysis of the errors within the scored objectives across all conditions. Along the left column are the criterion items (as presented in Appendix C) for scoring an objective. The experimental conditions are listed at the top of the table. Data from both groups' performances are included. (Note that the sequence of presentation of conditions for Group II is different than that listed.) The first entries under each condition provide the total number of sessions completed under that condition. Next are the total number of errors scored for each item/each condition. Finally, the percentage of objectives possessing the designated error is provided in parentheses.

As can be seen in Table 1, Baseline objectives possessed a high frequency of errors on several criterion items, with no objectives possessing observable target descriptions (#3), mastery criterion values (#8), or designation of successive/consecutive trials for mastery.
Table 1.

Analysis of objective errors by objective component.

<table>
<thead>
<tr>
<th>Objective Error Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Condition</strong></td>
</tr>
<tr>
<td><strong>Criterion</strong></td>
</tr>
<tr>
<td><strong>Item</strong></td>
</tr>
<tr>
<td><strong>BL</strong></td>
</tr>
<tr>
<td><strong>CAC1</strong></td>
</tr>
<tr>
<td><strong>CAC2</strong></td>
</tr>
<tr>
<td><strong>AP</strong></td>
</tr>
<tr>
<td><strong>CON</strong></td>
</tr>
<tr>
<td><strong>AP</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total Sessions</th>
<th>19</th>
<th>19</th>
<th>6</th>
<th>6</th>
<th>18</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Learner</td>
<td>1(5)</td>
<td>-</td>
<td>2(33)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2. Target/Spec.</td>
<td>1(5)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3. Target/Obs.</td>
<td>19(100)</td>
<td>2(10)</td>
<td>-</td>
<td>3(50)</td>
<td>2(11)</td>
<td>3(50)</td>
</tr>
<tr>
<td>4. Target/Pos.</td>
<td>6(32)</td>
<td>1(5)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1(17)</td>
</tr>
<tr>
<td>5. Conditions</td>
<td>8(42)</td>
<td>1(5)</td>
<td>-</td>
<td>1(17)</td>
<td>1(5)</td>
<td>2(33)</td>
</tr>
<tr>
<td>6. Crit./Dim.</td>
<td>16(84)</td>
<td>1(5)</td>
<td>-</td>
<td>1(17)</td>
<td>-</td>
<td>1(17)</td>
</tr>
<tr>
<td>7. Crit./Val.</td>
<td>16(84)</td>
<td>-</td>
<td>-</td>
<td>1(17)</td>
<td>-</td>
<td>2(33)</td>
</tr>
<tr>
<td>8. Mastery/No.</td>
<td>19(100)</td>
<td>-</td>
<td>-</td>
<td>2(33)</td>
<td>-</td>
<td>3(50)</td>
</tr>
<tr>
<td>9. Mastery/Suc.</td>
<td>19(100)</td>
<td>1(5)</td>
<td>-</td>
<td>3(50)</td>
<td>-</td>
<td>3(50)</td>
</tr>
<tr>
<td>10. Acad./Fac.</td>
<td>5(26)</td>
<td>4(21)</td>
<td>2(10)</td>
<td>-</td>
<td>6(33)</td>
<td>1(17)</td>
</tr>
<tr>
<td>11. Acad./Dec.</td>
<td>3(16)</td>
<td>2(10)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>12. Social/Dec.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>13. Social/Fac.</td>
<td>-</td>
<td>2(10)</td>
<td>-</td>
<td>1(17)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Totals</td>
<td>123</td>
<td>15</td>
<td>4</td>
<td>12</td>
<td>9</td>
<td>16</td>
</tr>
<tr>
<td>Errors/Session</td>
<td>6.47</td>
<td>0.79</td>
<td>0.67</td>
<td>2.00</td>
<td>0.50</td>
<td>2.67</td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
The total number of errors for Baseline sessions was 123, with 6.47 errors scored per Baseline session.

CAC1 objectives resulted in a significant decrease in errors scored, with only the item of "Facilitates Academic Behavior" (#10) scoring more than 2 errors. The total number of errors for 19 CAC1 sessions was 15, with .79 errors scored per CAC1 session. CAC2 scored only 4 errors, with .67 errors per CAC2 session.

As with Figures 2 and 3, it can be seen that exposure to CAC1 and CAC2 conditions resulted in a significant decrease in errors in Acquisition Probes scored as compared to Baseline measures, from 6.47 errors per Baseline session to 2.00 errors per Acquisition Probe.

Exposure to Consultation conditions resulted in the lowest frequency of errors with a total of 9 errors scored across 18 session, with .50 errors per Consultation session. However, these data do not indicate a practical improvement in performance over CAC conditions.

The Acquisition Probes following Consultation conditions resulted in performance similar to the Acquisition Probes following CAC conditions. A total of 16 errors across 6 sessions were scored, with 2.67 errors scored per Acquisition Probe session.

Overall, these data indicate considerable reductions
in errors with CAC and Consultation conditions along those criteria which were not attained on independent attempts at constructing behavioral objectives. Most of these reductions occurred with criterion items 2-9. Although other errors were reduced (or in the case of item 13, one additional error was scored), these changes were insignificant given that few errors were even scored in Baseline conditions. Of specific interest, however, is that reductions in errors not only occurred with those criterion items which, it may be argued, only required the consultee to "include" something (and required little more than an example and reminder such as item 9), but also on items which typically require more than a simple instruction (such as item 3).

Assessment Method

Table 2 presents an analysis of the errors within the scored assessment methods across all conditions. Along the left column are the criterion items for scoring an assessment method. The experimental conditions are listed at the top of the table. Data from both groups' performances are included. (As with the Table 1, the sequence of presentation of conditions for Group II is different than that listed.)

As indicated, the number of sessions conducted for each condition for both groups is the first entry.
Table 2

Analysis of assessment errors by assessment component.

**Assessment Error Analysis**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Item</th>
<th>BL</th>
<th>CAC1</th>
<th>CAC2</th>
<th>AP</th>
<th>CON</th>
<th>AP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Sessions</td>
<td>Total Sessions</td>
<td>18</td>
<td>17</td>
<td>6</td>
<td>6</td>
<td>16</td>
<td>6</td>
</tr>
<tr>
<td>1. Corresponds to Behavior &amp; Dimension</td>
<td>4(22)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>3(50)</td>
<td>0(0)</td>
<td>0(0)</td>
<td>0(0)</td>
</tr>
<tr>
<td>2. Direct Measurement</td>
<td>15(83)</td>
<td>3(20)</td>
<td>2(33)</td>
<td>4(67)</td>
<td>2(12)</td>
<td>1(17)</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>19</td>
<td>3</td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Errors/Sessions</td>
<td>1.06</td>
<td>0.18</td>
<td>0.33</td>
<td>1.17</td>
<td>0.12</td>
<td>0.17</td>
<td></td>
</tr>
</tbody>
</table>

Due to software errors, the data for five sessions were lost and were not retrievable. One of these sessions occurred during Baseline (Subject 4), two occurred during CAC1 (Subject 4), and two occurred during Consultation (one with Subject 3 and one with Subject 4).

As with Table 1, the number of errors for each item for each condition is listed with a corresponding percentage of the sessions in which this type of error occurred in the condition (in parentheses). For the first criterion item - "corresponds to the behavior and dimensions specified in objective" - there was a very low
frequency of errors through all conditions (total of 7). Three of these occurred during Baseline and three occurred during the Acquisition Probe sessions following CAC.

For the second criterion item—"direct measurement of behavior"—a total of 27 errors occurred, the majority of which (15) occurred during Baseline conditions. There seemed to be no noticeable difference between the other conditions, except for the lower number of errors in the Acquisition Probe following Consultation conditions (1) relative to that occurring in the Acquisition Probe following CAC conditions (4).

The errors scored per session for each condition are listed at the bottom. These data indicate that, with the exception of Baseline and Acquisition Probe (following CAC), no condition resulted in an error per session rate higher than .33 errors per session (CAC2).

As with Table 1, Table 2 also reveals a reduction in errors with CAC and Consultation conditions over Baseline performances. However, this reduction occurred only on item 2 (direct measurement), due to adequate Baseline performance on item 1 ("corresponds to behavior and dimension").

Development Duration

Figures 2 and 3 also display the duration (solid
circles) of sessions for each condition. As shown, Baseline duration values were all relatively low. For all subjects, the mean duration for Baseline conditions was 5:39 minutes (range 3:06 - 8:26 minutes).

CAC1 sessions required significantly more time, with a session mean of 26:33 minutes (range 13:20 - 57:00). It can be seen in Figures 2 and 3, for each subject (Groups I and II), development duration decreased through the CAC1 condition; in some cases, significantly. For instance, for Subject 2, the first CAC1 session required 57:00 minutes. However, the second CAC1 session required almost half that time (37:00 minutes), and the third session resulted in another significant reduction in time (to approximately 21:00 minutes). Similar trends with all other subjects occurred, although not to the same degree. (It should be noted that Subject 2 was observed on two occasions, sessions 5 and 6, to emit behavior similar to "daydreaming".) CAC2 sessions resulted in a reduction in development duration, however, still longer than Baseline levels with a mean of 15:10 minutes (range 7:44 - 21:40 minutes).

Both Acquisition Probes, as well as Consultation sessions resulted in durations similar to Baseline levels. For the Acquisition Probes following CAC2, the mean duration was 7:51 minutes, and 5:14 for Acquisition Probes following Consultation. The mean development
duration for Consultation sessions was 6:06 (range 3:22 - 8:15 minutes). No consistent trends were found across Consultation sessions.

Overall, the duration measures resulted in similar findings regardless of sequence of presentation. Baseline, Acquisition Probe, and Consultation durations were comparable, with no duration values over 12 minutes. CAC1 durations were higher, with no CAC1 sessions under 12 minutes. However, as stated previously, the duration of CAC1 sessions consistently decreased with repeated exposure, sometimes drastically (as in the case of Subject 2). In addition, CAC2 durations were even lower, with some sessions (Subjects 2 and 6) comparable to duration values resulting from other conditions.

Response Remediations

Response remediations are presented in Table 3 for each subject across each CAC and Consultation condition (since no remediations occurred during Baseline or Acquisition Probe sessions). For each CAC1 and CAC2 session, both forced and voluntary remediations were possible. Forced (F) remediations are those in which the CAC system was programmed to reject a response and required the consultee to generate a more appropriate response. Voluntary (V) remediations are those in which the consultee voluntarily remediated a previously entered
Table 3

(F)orced and (V)oluntary reme diati ons within CAC1, CAC2, and Consultation conditions.

<table>
<thead>
<tr>
<th>Condition/Session</th>
<th>CAC1</th>
<th>CAC2</th>
<th>CONSULTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>4 (0.2)</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TOTALS</td>
<td>8</td>
<td>7</td>
<td>213</td>
</tr>
</tbody>
</table>

PER SESSION REMEDIATIONS

<table>
<thead>
<tr>
<th>TYPE</th>
<th>TOTALS</th>
<th>NA</th>
<th>NA</th>
<th>NA</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAC1</td>
<td>2.26</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>FORCED</td>
<td>0.89/SESSION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAC2</td>
<td>0.83</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>FORCED</td>
<td>0.50/SESSION</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CONSULTATION</td>
<td>2.33 REMEDIATIONS/SESSION</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
response (an option permitted at frequently presented "summary" frames in which all previously constructed objective components were presented). Consultation remediations were all functionally "forced" remediations.

Total forced remediations were 8, 6, and 2 for CAC1 sessions 1, 2, and 3, respectively. Total voluntary remediations were 7, 7, and 13 for the same sessions. Although the remediations per session for the CAC1 sessions was relatively unchanged across CAC1 administrations, these data reveal a decrease of forced (or required) remediations through CAC1 conditions and an increase in voluntary remediations. There were 2.26 remediations per session across all CAC1 sessions.

Consultation conditions resulted in a frequency of remediations similar to that of CAC1 conditions with totals of 19, 12, and 11 across Consultation sessions 1, 2, and 3. This also reveals a decrease in remediations across sessions. There were 2.33 remediations per Consultation session.

Finally, a casual evaluation of all responses which were remediated (recorded by CAC and by audiotape for Consultation) revealed that the majority of remediations resulted in improved responses.

Remediation data reveal several interesting phenomena. Generally, CAC and Consultation conditions required a comparable number of remediations. However, a
closer analysis is required. First, as stated previously, all remediations during Consultation sessions were essentially forced (by the Consultant). Although, the consultee was given the opportunity to "self-remediate" via a summary of the objective and a request for changes, review of the taped interviews revealed none. Given this finding, the total number of remediations or "per session" remediations must be modified. This requires that a direct comparison between CAC and Consultation remediations is only logical after subtracting the voluntary remediations from the CAC remediation totals. After having done this, it is evident that CAC "forced" or required many fewer remediations than did Consultation conditions, with no better results in terms of response quality. Modified response remediations per session for CAC is equal to .89 per session rather than 2.39 per session.

Also as stated previously, there was a transition in the type (forced or voluntary) of remediation occurring through CACI sessions. For subjects 2, 3, and 4, and to lesser extent Subjects 1 and 5, there were fewer forced remediations and more voluntary remediations. It is, at this point, unclear exactly how to interpret such a transition. Such data might suggest that as a result of repeated exposure to the instructional component of CAC, the consultee acquired self-instructional skills in the
form of rules regarding appropriate responses. These data might also suggest that, after repeated correction and feedback through the forced remediation component of CAC, the subject acquired self-evaluation skills in the form of correcting/remediating her own responses. Both interpretations are supported by improved performances in Acquisition Probe conditions following exposure to CAC conditions.
CHAPTER VI

EXPERIMENT III

Introduction

As stated earlier, Experiment I served to demonstrate the general utility of the Computer-Assisted Consultation system. By first validating the existence of deficits in constructing behavioral objectives independently and, subsequently, assisting in the remediation of those deficits, Experiment I provided implications for further investigation. Furthermore, by directly observing the characteristics (response latencies, etc) of consultee-computer interactions and later inspecting responses, modifications which might improve the effectiveness of the DEFINE system were suggested.

Experiment II was designed and implemented to further validate the utility of Computer-Assisted Consultation. Several changes served to provide this measure. First, Experiment II extended the findings of Experiment I by comparing the effectiveness of CAC to a traditional problem identification interview (Bergan, 1977). Since consultation implies that the consultee is to receive some form of assistance, a traditional
interview would provide a more realistic point of comparison than would the Independent Development condition implemented in Experiment I.

Experiment II also provided a more rigorous experimental analysis than that employed in Experiment I. Several aspects of Experiment II contributed to such an analysis. First, the design itself provided repeated measures of each condition without the exposure to other alternating, potentially confounding control and experimental conditions. This permitted a less ambiguous interpretation of results than the design employed in Experiment I. Similarly, the counterbalancing characteristic of Experiment II allowed the minimizing of the contributions made by sequencing effects possible when presenting multiple conditions to subjects. Third, by withdrawing all assistance after each experimental condition (Acquisition Probes), it was possible to assess the differential effects on the subsequent "objective-producing repertoire" of the subject. Finally, Experiment II provided outcome measures on a revised, abbreviated version of Computer-Assisted Consultation (CAC2) after exposure to CAC1. This may eventually prove to be important, given the longer duration measures resulting from the CAC1 system.

Finally, Experiment II provided initial findings
regarding the usefulness of an added component designed to evoke consultee responses necessary for the identification/development of simple assessment of the behavior specified in a previously stated behavioral objective. The utility of such a program component is, at this point, still questionable.

In general, Experiment II provided an extremely useful, essentially "laboratory" investigation of the Computer-Assisted Consultation system for use by a "would-be" consultee. Experimenter written, professionally-validated vignettes were employed as the basis for the consultee "problems". Potentially confounding variables were systematically controlled and repeated measures were collected from which substantiated interpretations were possible. Furthermore, these data were collected in a controlled environment as part of an analogue investigation. It is believed that such investigations are necessary, "...since the contingencies surrounding the conduct of experimentation in field settings discourage serious efforts to identify and pursue fundamental behavioral phenomenon" (Johnston & Pennypacker, 1980, p. 404).

A final step, however, is required to validate the utility of a tool designed for applications in the uncontrolled environment with genuine consultee-identified client behavior problems. Without this final step,
several questions must remain unanswered. Most of these are concerned with the issue of generality (Johnston & Pennypacker, 1980). Would CAC prove useful with a "real" student? With "real" current inappropriate behavior? With a real consultee who is legitimately concerned about the client and future behavior change? In the consultee's and client's working environment? Certainly the conditions under which the desired behavior is to occur might be more complicated than those presented in a vignette. These are all issues which, until addressed in some way, prevent us from making statements regarding the effectiveness of Computer-Assisted Consultation in an environment in which it was designed to be employed.

Therefore, the purpose of Experiment III is to examine the effectiveness of CAC via a "field test". Instead of constructing behavioral objectives based on vignettes, Experiment III will involve use by CAC by self-initiated consultees to construct behavioral objectives based on actual client referrals for problem-centered consultation services.

In addition, the "worthwhileness" of the behavioral objective produced through interaction with CAC, it might be argued, can only be truly evaluated by the actual consumers of the "product". Such an evaluation would provide a more relevant source of social
validation of the CAC system. Thus, the professionals for whom CAC was to provide assistance evaluated (or "scored" as in Experiments I and II) the resulting behavioral objectives. These are the same professionals who are responsible for, and are in immediate and frequent contact with the clients.

Method

Consultees

Consultees were elementary education teachers from a small school district who had previously requested assistance (with a student) by the school psychologist. The school psychologist identified these teachers after having agreed that the Computer-Assisted Consultation system may benefit any future assistance process. The principal of the school then asked the teachers if they would like to participate in a research project to test CAC. No explicit nor implicit consequences for not participating were made.

Software

The CAC system, as described earlier (without RECORD), was employed by each teacher. An Apple IIc (the experimenter's) was provided. However, RECORD (the assessment method component) was removed from the CAC system since the school psychologist who had received the
referral had not indicated future plans for consultee assessment of the referred behaviors.

Procedure

Each Consultee was exposed only to one CACI (see Experiment II) session for the purpose of generating a useful behavioral objective on which to base future consultation activities. Each session was conducted individually and followed the same general format. First, the experimenter provided the Consultee with a general description of the use and purpose of CAC and, subsequently, asked if there were any questions. All questions were answered. In addition, each Consultee was told that the resulting objective would be given to the school psychologist and principal for future discussions regarding the student. The Consultee was then provided with instructions on basic computer use (i.e., identification of the return key, back space, etc.). One Consultee completed CAC immediately after the above instructions, while the other completed it after school. Duration measures were collected by the experimenter via a wristwatch for Consultee 1 and anecdotally from Consultee 2.

Evaluation

Two methods of evaluations were employed. The first
was be identical to the scoring method employed in Experiment II using the criteria listed in Appendix C and Appendix D. Each of the objectives constructed were evaluated.

The second was a social validation measure. Upon all Consultees completing intervention, each was given a simple questionnaire used to evaluate the resulting objective (see Appendix G). The same questionnaire, with each objective was also given to the principal and school psychologist of the school in which the consultees were employed and the clients were a students.

Results and Discussion

Response Quality and Duration

Both objectives resulted in response quality scores similar to those of the previous two experiments. The objective constructed by Consultee 1 met 100% of the criteria, while the one constructed by Consultee 2 met 90% of the criteria (not describing the behavior in observable and measurable terms) for a worthwhile objective. These values indicate perfect and near perfect objectives using the present criteria. Consultee 1 reported a duration of approximately 35 minutes, while Consultee 2 reported Approximately 25 minutes using CAC.
Social Evaluation

Four individuals evaluated the worthwhileness of each objective. The two consultees who had constructed one objective each, were asked to evaluate both objectives by answering the questions in Appendix G. Their responses were positive (responses of "yes") for both objectives, with no additional comments emitted.

The school psychologist's evaluation of the two objectives resulted in positive comments. Also, however, a suggestion was made that further definition of what "drill combinations" consisted of might be helpful. An additional comment suggesting that the time with which the goal could be accomplished (item #3; Appendix G) would depend on baseline rates at this time.

The principal responded positively with respect to the first two questions, while suggesting (similarly to the school psychologist) that more data regarding baseline performance levels was needed to estimate the time to achieve the goal.

Consultee Opinion

In addition to the above data, consultee's were asked their opinion of Computer-Assisted Consultation. Both provided positive comments regarding its usefulness in problem-identification. Consultee 2, however, also
commented negatively on the specificity of the responses for describing behavior required by CAC. As indicated by an analysis of this consultee's remediations, an early description had been attempted ("learn math combinations") which CAC had rejected.
CHAPTER VII

GENERAL DISCUSSION

Review

The previous three experiments served to provide a systematic series of investigations into the development and utility of Computer-Assisted Consultation. Generally, Experiment I served several functions as a pilot investigation. First, it provided important validation data regarding the existence of deficits by four public school teachers in individually constructing behavioral objectives for problem-centered consultation. Without such a validation, the development and utility of a system like CAC would be unimportant.

A second function, and general purpose of Experiment I, was to demonstrate the general utility of CAC in improving behavioral objective construction over independent development. Each consultee constructed three behavioral objectives independently (ID) and three using CAC. These objectives were scored using professionally-validated criteria for "worthwhile" behavioral objectives, and compared through a simple repeated-applications design (ID, CAC, ID, CAC, ID, CAC). CAC improved all consultees' performances over ID.
performance, while taking somewhat longer to construct.

A final function of Experiment I was to identify program characteristic which may be inadequate in terms of evoking the appropriate consultee responses in an efficient and unambiguous manner. Several modifications were made possible through direct observation of consultee-CAC interactions, as noted in Experiment II.

Experiment II provided a much more rigorous examination of the utility of CAC. First, CAC was compared to a traditional behavioral consultation problem-identification interview (in addition to Baseline/Independent Development conditions). This provided a much more valid comparison than that conducted in Experiment I. Secondly, a more stringent design was employed which provided several controls for confounding variables by counter-balancing for sequence effects, obtaining repeated-measures of each condition before exposure to another condition, and assessing acquisition of new repertoire elements as a result of exposure to each condition.

Experiment II also permitted analysis of two additional elements of a larger CAC system. A revised, shorter version of the original version of CAC (CAC1) was developed (CAC2) for more efficient use. This proved to be a valuable addition, although only assessed following
use of the original version. Also, an assessment component was "piloted" (RECORD) which was designed to assist the consultee in identifying the essential information to begin data collection regarding the previously defined behavior.

A third characteristic of Experiment II was an essentially "molecular" analysis of responding across all conditions (Baseline, CAC1, CAC2, Consultation, and Acquisition Probes). In addition to simply determining and comparing the overall quality of behavioral objectives and assessment methods across conditions, several other analyses were conducted. A detailed analysis of error patterns was completed in which improvements on specific criterion items could be identified. These data allowed a more precise validation of the valuable components of CAC and Consultation conditions in terms of improving Baseline performance.

A similar analysis was completed of remediations within each CAC and Consultation session. From CAC administrations, information regarding the frequency of forced and voluntary remediations was obtained. From Consultation sessions, voluntary remediations were determined. Both of these sources of information permit more valid interpretations of the utility of the respective conditions.

Finally, as in Experiment 1, durations measures were
collected for each session. And, due to the improved experimental design, analysis of trends in duration measures was possible.

Experiment III addressed a significantly different issue than that addressed by Experiments I and II. After controlled evaluation of CAC, it was suggested that demonstration of generality of results is of major importance in evaluating any "applied" technology. Therefore, Experiment III assessed the utility of CAC in conditions under which it will ultimately be employed.

General Discussion

Overall, Computer-Assisted Consultation can be evaluated as an extremely useful tool for use by consultees in developing behavioral objectives designed for problem-centered consultative services. Response quality measures indicate significant improvements and perfect or near perfect performances when employing CAC (CAC1 and CAC2) for the construction of behavioral objectives based on a wide variety of client inappropriate behaviors and behavioral excesses. These interpretations are similar to those of Consultation condition performances.

Quality measures revealed similar performances in Acquisition Probes following CAC conditions, indicating at least short-term maintenance of a newly acquired
repertoire. This suggests that CAC not only improves immediate performance as originally intended, but also possesses some instructional characteristics. When comparing CAC to Consultation conditions in this regard, similar effects were not as evident. In fact, the most methodologically accurate comparison (Acquisition Probes following the first Condition for each group) suggests that Consultation conditions only slightly improved performance over Baseline performances.

A detailed analysis of changes in error patterns further support these positive interpretations of CAC. As indicated in Experiment II (Results and Discussion), a significant reduction of errors occurred along those criteria which were not attained by any subjects in Baseline conditions. Errors were reduced for those items which would be expected to require little more than a prompt, as well as those response components which are somewhat more complex (e.g., defining behavior in observable and measurable terms).

With respect to the construction of an assessment method, similar improvements were noted with significant reductions in errors during both CAC and Consultation conditions. This analysis provides initial data regarding the potential effectiveness of the RECORD element of the larger CAC system. This finding, although preliminary in nature, is somewhat surprising, given that
the development of assessment procedures is more consultant directive/determined than the behavioral objective (Bergan, 1977).

In addition to supporting improvements in response quality, an analysis of response remediations during CAC and Consultation conditions provide further interesting information. Also as noted in Experiment II (Results and Discussion), there was a significant reduction in forced remediations through the three CAC sessions for several subjects, while voluntary remediation (although unnecessary by the criteria programmed in CAC) decreased. Although speculative in nature, one might suggest that this transition reveals still additional benefits to CAC exposure in terms of the acquisition of self-instructional and/or self-evaluation skills by the subject. Of course, such interpretations must be made cautiously, as only indirect evidence is available.

Finally, duration measures (across all three experiments) indicate that a CAC1 session required significantly more time to complete than did Consultation or Baseline/Acquisition Probe sessions. However, as noted earlier, by the third CAC1 session duration measures had been minimized. The original long durations may be a reflection of unfamiliarity with computers in general since only one subject (Subject 6) reported (when all were asked) having received some experience with
computer usage in the past. The reductions may also be taken to support this notion.

CAC2 resulted in much more comparable duration values to those of Baseline/Acquisition Probe and Consultation conditions, while still maintaining quality performance. This reduction is assumed to have occurred due to the revised, "shorter" version of CAC1. However, they may also have been a simple continuation of the trends noted earlier in CAC1. This distinction cannot be determined at this time.

Obstacles to Problem Identification

In addition to achieving the formal goals of the problem-identification component of the behavioral consultation process, it is also suggested that the Computer-Assisted Consultation system assists in the elimination of the obstacles noted earlier (see Introduction). CAC has obvious utility in addressing the issue of scarcity of direct or formal training of consultation skills. Although, several researchers have proposed specific training guidelines for training problem-identification interviewing skills (Bergan, 1977; Bergan & Tombari, 1976; Goodwin, et. al., 1971), other available data (Meyers, 1978; Miles & Hammond, 1979) suggest that enough individuals are not receiving this training. Computer-Assisted Consultation, in essence,
makes such training unnecessary, at least where the problem-identification interview is concerned.

A similar argument can be made for the obstacles that consultant skill deficits present. Given the availability of a system such as CAC, deficits in the interviewing repertoire of a consultant generate less concern, as does the maintenance of appropriate skills. This does not suggest, however, that other necessary skills (for instance, behavior analytic skills) may be neglected from consideration.

The documented workload of consultees (Abidin, 1975), as well as would-be consultants (Hughes, 1969; Lacayo, Sherwood, & Morris, 1981; Martin & Meyer, 1980) was another noted obstacle to a successful problem-identification interview. Although the use of CAC would not reduce the current output requirement of either party, its availability would certainly reduce the response effort and time required to engage in the consultation process.

Experiment III illustrated just this advantage. Both subjects in Experiment III were public school teachers who were currently responsible for elementary level classrooms continuously throughout the day. Little time was available for meeting with the school psychologist. What time availability that existed, in addition, required the availability of the school
psychologist. Such "synchronization" of activities can lead to delays of up to several weeks or months in the completion of the problem-identification component of behavioral consultation. However, the convenience of CAC permitted almost immediate problem-identification, in the absence of synchronization.

Both subjects were provided with a diskette containing the CAC system. Subject 1 chose to complete problem identification during a lunch hour, using the authors computer (although computer availability was not a problem). Subject 2 chose to complete problem identification after school using one of the schools several compatible computers. Both diskettes (with recorded responses) were retrieved by the experimenter at later, more convenient times.

The "intrusiveness" of problem identification can also be addressed. While contact with the consultant is still required (although later in the consultative process), the "inquisition-like" nature of the problem-identification interview is minimized.

Finally, the issue of secondary gain which potentially leads to nondirective consultee discussion is, necessarily eliminated. Although CAC can be considered what has come to be known as "user-friendly", it is very unlikely that the reinforcing events that strengthen this type of discussion are provided by
interaction with the CAC system. Computer-Assisted Consultation provides to the consultant directive, unambiguous verbal stimuli which, as demonstrated, are extremely unlikely to evoke responses other than those appropriate to problem-identification.

Generality of Findings

The issue of generality of results is of extreme concern in the evaluation of Computer-Assisted Consultation, as noted in Experiment II (Introduction). Johnston & Pennypacker (1980) suggest several dimensions across which generality of results can be evaluated. Some of these are applicable to the present analysis. Several others are also applicable. They are generality across: Consultees, clients, problems, environments, and populations.

Generality across consultees and clients has been demonstrated in and through all three investigations provided here. A total of 12 subjects were exposed to CAC. All applications yielded the same positive interpretation of the effectiveness of CAC in problem identification. In addition, a variety of "clients" were employed. Although most were hypothetical (vignettes), the "live" client is never presumed to interact with CAC - only the consultee who possesses client information similar to that provided by the vignettes.
Generality across problems requires clarification. Two interpretations of this "generality" are possible. First, generality across types of problems has, it is suggested, been demonstrated. Overall, 14 different types of academic and nonacademic client "problems" have been represented, either via vignettes or real client (as in Experiment III).

A second type of generality across problems is not as easily evaluated. Bergan (1977) has proposed two common types of consultative services: Problem-centered and developmental consultations. Problem-centered consultation has been illustrated through this investigation in which one particular inappropriate behavior, behavioral excess, or behavioral deficit is of concern to the consultee. It is this "problem" around which consultation is initiated. Developmental consultation, however, is based on changes in more than one behavior, and generally requires a long period of time to attain. For instance, a consultee may be concerned with a larger area such as "emotional development" of the client. In this case, several behavioral objectives are likely to be required. The adequacy of CAC for this type of consultation - developmental consultation - is, at this time, unknown. It would certainly seem feasible to utilize CAC for the construction of objectives and assessment methods for
each of the relevant behaviors under the larger response class of appropriate "emotional behaviors".

Generality of CAC across environments was addressed in a limited manner. Experiments I and II evaluated its adequacy in a "laboratory" environment while Experiment III permitted its evaluation in a more relevant environment to the consultation process. This is extremely important since the "natural" environment is potentially much more complicated and distracting than the controlled laboratory.

Finally, generality across populations was not directly addressed in the present series of investigations. The utility of CAC in assisting other populations of consultees (for instance, parents, institutional staff, staff managers, business personnel, etc.) has yet to be seen, since public school teachers were the only consultee population employed. It is likely that the adequacy of CAC for these uses would depend on the similarity of client, client problems, and type of consultation desired.

Limitations and Advantages

In addition, to those generality issues just addressed, there are at least two additional disadvantages to the Computer-Assisted Consultation which could prevent its use. First, as already noted, the
initial time requirements of CAC employment were significantly longer than those for Consultation. Although, these were significantly reduced on repeated exposure to CAC, the initial time requirements may produce resistance.

Also, although not a problem in the current investigations, computer availability could very likely prevent the possibility of CAC employment. Many potential consultees may not have access (immediate or otherwise) to the computer hardware necessary for CAC. Upon this is added the possibility of computer availability, but software incompatibility. CAC was written for use on Apple manufactured hardware which might not be available to the consultee. This problem could be eliminated by producing several versions of CAC for use by other computer hardware, but is not presently available.

Future Research

The current results strongly suggest the adequacy of Computer-Assisted Consultation in problem identification within a problem-centered consultation framework. However, future research is needed to strengthen the validity statements regarding CAC. Although presumed effective, CAC has yet to be investigated within the context of the larger behavioral consultative process.
It seems feasible that once the goals of problem identification have been attained, the remaining tasks of the consultative process will follow. However, such a statement is speculative in nature and warrants further validation.

Bergan & Tombari (1976) have provided a research framework on which such a validation could be based. In their investigation, they assessed the extent to which adequate problem identification predicted successful problem resolution. By assessing the skill with which problem identification was completed (among other measures) across 11 consultants, and subsequently evaluating outcome of the entire consultation process which followed, Bergan & Tombari (1976) were able to determine that problem solution was directly related to successful problem identification.

An additional line of research which would illuminate additional benefits of CAC to the consultee and future consultation activity would be to assess the extent to which CAC generates a self-instructional and/or self-evaluative repertoire with respect to objective construction. As discussed earlier, the analysis of forced versus voluntary remediations through repeated exposures to CAC seems to suggest such a process. Should this be the case, it is conceivable that the problem-identification component of behavioral
consultation could become a less effortful and
time-consuming task than is typically the case.

In conclusion, it appears that Computer-Assisted
Consultation is an extremely useful tool in completing
the problem-identification component of a
problem-centered behavioral consultation. In the present
investigations, it was employed by public school teachers
for a variety of client inappropriate behavior,
behavioral excesses, and behavioral deficits, but seems
feasible for application by other professionals depending
on the nature of consultation goals. It also appears
that CAC may be useful in achieving not only the goals of
problem resolution regarding the client behavior, but
also altering the repertoire of the consultee in terms of
acquisition of self-instructional and self-evaluation
skills.
APPENDIX A

Sample Vignettes

STUDENT #1

John is one of the brightest students in your class. However, you have seen John exhibit several episodes of aggressive behavior toward other students on several occasions. You have noticed that this behavior consistently occurs during assigned seatwork, while John should be on-task.

Write a behavioral objective/goal statement for changing John's behavior.

STUDENT #2

Bill, a student with above-average intelligence, is plodding in his classes, maintaining grades just high enough to remain in school. You think one of his problems could be his lack of studying, both at home and in school (i.e., study hall). Bill also spend a great deal of time watching television and reading comic books.

Write a behavioral objective/goal statement for changing Bill's behavior.
APPENDIX B(a)

Program Objectives

DEFINE

General Objectives

1. Given a vignette and DEFINE, the consultee will write a behavioral objective which includes:
   a) a statement of the learner,
   b) a statement describing relevant conditions,
   c) a statement describing student behavior,
   d) a statement specifying criteria,
   e) a statement specifying mastery.

2. Given a vignette and DEFINE, the consultee will be able to write a behavioral objective including all the identified components in a minimal amount of time.

Subordinate Objectives

1. Given a vignette and DEFINE, the consultee will be able to specify the student's name in the statement, "[student's name] will".

2. Given a vignette and DEFINE, the consultee will be able to specify the conditions under which the behavior should occur in observable terms.

3. Given a vignette and DEFINE, the consultee will be able to specify the desired student behavior in positive, observable, and measurable terms.

98

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
4. Given a vignette and DEFINE, the consultee will be able to specify the criterion including the dimensions with which the behavior should be emitted.

5. Given a vignette and DEFINE, the consultee will be able to specify when the student has mastered the behavior previously specified.

6. Given a vignette and DEFINE, the consultee will be able to specify each component in a minimal amount of time from instruction.

**RECORD**

**General Objectives**

1. Given a vignette and RECORD, the consultee will specify a procedure for assessing a client behavior which includes:
   
   a) a statement of the general goal/dimension,
   b) response dimension,
   c) relevant conditions/response events.

2. Given a vignette and RECORD, the consultee will specify a procedure for assessing a client behavior.
APPENDIX B(b)

Computer-Assisted Consultation Program Components

- DEFINE (Defining Behavior)
  - CONDITIONS (Specifying Conditions)
    - CRITERIA (Specifying Response Criteria)
      - MASTER (Specifying Mastery Criteria)
        - RECORD (Specifying Assessment Characteristics)
          - SUMMARIZATION
APPENDIX C

Objective scoring criteria

Subject_________________________ Session_____

Vignette_____

1. Statement of Learner (Name/Initials) _______

2. Description of Target Behavior
   - Specific - manageable behavioral unit _______
   - Observable and Measurable _______
   - Stated positively/to increase _______

3. Statement of Conditions
   Desirable time to occur,
   Instructions to learner, or
   Necessary materials specified. _______

4. Criteria for acceptable performance
   Behavioral Dimensions _______
   Dimension Value _______

5. Mastery criteria specified
   Number of sessions specified _______
   Successive sessions required _______

6. Worth of Objective
   If academic situation
   - behavior compatible with education _______
   - behavior likely to decrease inappropriate behavior - _______

   If nonacademic situation
   - behavior likely to decrease inappropriate behavior - _______
   - incompatible _______

101
APPENDIX D

Assessment method scoring criteria

Subject ___________________________  Session___

Vignette______

DIMENSION CORRESPONDS TO THAT IN OBJECTIVE _____

IF THE DIMENSION IS: THEN SPECIFY:

- Latency
  - Recording Period _____
  - Antecedent Event _____
  - Response Onset _____
  - "Time" Specification _____

- Duration
  - Recording Period _____
  - Response Onset _____
  - Response Offset _____
  - "Time" Specification _____

- Frequency (for Direct Observation)
  - Recording Period _____
  - "Number" Spec. _____

(for Permanent Product)
  - Permanent Product _____

- Accuracy (for Direct Observation)
  - Recording Period _____
  - Response Onset _____
  - Response Offset _____
  - "Number" Spec. _____

(for Permanent Product)
  - Permanent Product _____

- Unspecified Method of Assessment
  or

Difficult to determine dimensions

Comments:
APPENDIX E

Problem-Identification Interview

Establishing Objectives

I. General Goal Statement

WHAT ARE YOUR GENERAL CONCERNS ABOUT [NAME]?

[*IF TWO CONCERNS] WHICH WOULD YOU LIKE TO
CONCENTRATE ON FIRST?

II. Behavior Specification Statements

[*IF NEGATIVE] WHAT WOULD YOU LIKE TO OCCUR INSTEAD?

HOW WOULD YOU DEFINE THE BEHAVIOR OF [BEHAVIOR
LABEL]?

COULD YOU BE MORE SPECIFIC ABOUT WHAT YOU MEAN
BY [BEHAVIOR LABEL]?

>>WHAT WOULD I SEE OR HEAR IF I WAS ATTENDING TO
[BEHAVIOR LABEL]?

III. Behavior Setting Statements

IN WHAT KINDS OF SITUATIONS WOULD IT BE IMPORTANT
FOR [NAME] TO [BEHAVIOR LABEL]?

[*IF TWO SETTINGS] IN WHICH ONE WOULD YOU MOST
LIKE IT TO OCCUR?

IS THERE A SPECIFIC TIME/INSTRUCTIONS TO [NAME]
OR MATERIALS THAT SHOULD BE PRESENT FOR [NAME]
TO ENGAGE IN [BEHAVIOR LABEL]?
IV. Behavior Criterion Statements

WHICH OF THE FOLLOWING CHARACTERISTICS IS MOST IMPORTANT WHEN ENGAGING IN [BEHAVIOR LABEL]?
- MORE IMPORTANT TO DO IT MORE FREQUENTLY
- MORE IMPORTANT TO DO IT MORE ACCURATELY
- MORE IMPORTANT TO DO IT LONGER (IN MINUTES)
- MORE IMPORTANT TO BEGIN IT MORE QUICKLY

[* IF 2 DIMENSIONS] WHICH IS MORE IMPORTANT TO MARY!

HOW FREQUENT/LONG/QUICK/ACCURATE SHOULD [BEHAVIOR LABEL] BE IN ORDER TO BE ACCEPTABLE?

V. Mastery Criterion

HOW MANY CONSECUTIVE TIMES MEETING THE CRITERIA OF [??????] WOULD CONVINCE YOU THAT [NAME] HAS ACQUIRED [BEHAVIOR LABEL]?

VI. Summarization Statement

SO FAR WE'VE SAID THAT [UNDER THESE CONDITIONS], [NAME] SHOULD ENGAGE IN [BEHAVIOR LABEL] WITH/AT [X DIMENSION] FOR [X CONSECUTIVE TIME PERIODS]. IS THIS CORRECT?

Establishing assessment procedures

VII. Observation Statements

WE NEED TO RECORD . . .

WHY DON'T YOU OBSERVE AND RECORD [HOW MANY TIMES/LONG/QUICK/ACCURATE] [NAME] ENGAGES IN [BEHAVIOR LABEL]?

***IF ACCURACY
IS THERE SOME WAY TO RECORD HOW ACCURATE
WITHOUT DIRECTLY OBSERVING? - PERMANENT PRODUCT
**III. IF LATENCY** — SPECIFY ANTECEDENT EVENT AND ONSET

WHEN EXACTLY DO YOU WANT [NAME] TO BEGIN?

WHEN WOULD YOU KNOW THAT [NAME] HAS STARTED?

**III. IF FREQUENCY OR DURATION** — SPECIFY ONSET AND OFFSET

WHEN WOULD YOU SAY THAT [NAME] HAS STARTED...?

WHEN WOULD YOU SAY THAT [NAME] HAS STOPPED...?

VIII. Summarization Statements

WE AGREED TO OBSERVE AND RECORD [HOW LONG/FREQUENT/QUICK/ACCURATE] [NAME] ENGAGES IN [BEHAVIOR LABEL]. IS THIS CORRECT?
APPENDIX F

Representative Response Samples

Low-Scoring Samples

Behavioral Objective

"Improve Bill's use of study hall."

Assessment Method

"See if John can stay in own "new area" and complete "new" assignment.

"Monitor Bill's progress over a period of weeks, and if Bill's grades go up during this time, the objective has been met."

High-Scoring Samples

Behavioral Objective

"Given a worksheet, Mary will answer all questions on the worksheet with 95% accuracy over 5 consecutive days."

Assessment Method

"Each recording of the latency of the behavior will begin when Frank is given verbal instructions to 'clean-up' and end when Frank puts supplies in desk."
APPENDIX G

Social Validation

Please evaluate each behavioral objective by answering the following questions. Also, feel free to include any comments you may have regarding each question (i.e., clarification, qualifiers) or the objective in general.

1. Does this behavioral objective describe behavior and characteristics which are consistent with the educational goals of the student?

2. Does this behavioral objective describe behavior that is important for the student to exhibit?

2. Does this behavioral objective describe a goal that could be accomplished in a reasonable amount of time?
BIBLIOGRAPHY


Hawkins, R. D. (1972). "It's time we taught the young how to be good parents (and don't we wish we'd started a long time ago). *Psychology Today*, p. 28.


Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.


