The Effects of Feedback, Goals, and Consequences on Response Time for Medical Staff in a Medical-Surgical Hospital Setting

Don K. Nielsen

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THE EFFECTS OF FEEDBACK, GOALS, AND CONSEQUENCES ON RESPONSE TIME FOR MEDICAL STAFF IN A MEDICAL-SURGICAL HOSPITAL SETTING

by

Don K. Nielsen, M.A.

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment of the requirements for the Degree of Master of Arts
Department of Psychology

Western Michigan University
Kalamazoo, Michigan
December 2003
I would first like to thank two people for their guidance throughout this research. Dr. Dale Brethower sparked my interest in Organizational Behavior Management and led me through the development and data collection of this study. Dr. John Austin of Western Michigan University was instrumental in assisting with the completion of the evaluation of the data.

Secondly, I would like to thank Mr. Charles Bianchi, Chief Executive Officer, Ms. Doris Whorley, Director of Nursing, and Mr. Darrell Hoag, all of Hillsdale Community Health Center. Mr. Bianchi and Ms. Whorley made it possible to complete this research in an applied setting. Mr. Hoag guided me in the use of the Composer Communication System and with other technical assistance.

Lastly, I would like to thank my wife, Jo, for having patience and providing the support that assisted me greatly.

Don K. Nielsen
Organizational Behavior Management (OBM) has developed procedures useful in addressing a variety of organizational challenges. Frequently used components of OBM interventions include feedback, goal setting, and consequences. Literature on various combinations of these components is abundant but there are few reports of their use in the hospital setting. Specifically, no published studies were found that focus on response time of answering patient calls. The present study was an attempt to evaluate the effects of feedback, goals, and consequences on the latency of responses to patient calls. A multiple-baseline design across individuals was used in a hospital setting to evaluate the effects of the intervention package. The present study may have demonstrated some limited improvement. Possible behavioral effects are discussed in detail. Future research regarding this topic is recommended to further assess those variables that could result in performance improvement.
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INTRODUCTION

Hospital Settings

Medical-surgical hospitals are health care institutions with an organized medical staff and with inpatient beds available around the clock. Many hospitals provide a broad spectrum of services including emergency care, inpatient acute care for surgical and non-surgical patients, outpatient care, home health care, and education. According to the Joint Commission on Accreditation of Healthcare Organizations an acute care patient is provided with room, board, and continuous general nursing care in an area of the hospital where patients generally stay at least one night. Acuity of each patient is defined by the degree of health treatment, the degree of dependency, or the functional status of the patient (Hanken & Waters, 1994). Annually, over 33 million people are admitted to hospitals as acute care patients. Giving birth is the number one reason for acute care hospital admissions in the United States, followed by circulatory system diseases, respiratory system diseases, and digestive diseases.
General nursing services involve a wide range of activities depending on the specific needs of each patient. In a broad sense, the nursing activities include obtaining the medical history of the patient, providing medications and blood products, monitoring vital signs of the patient and recording them in the patient's medical record, monitoring the general emotional well being of the patient, responding to patient calls for assistance, and providing as much physical comfort to the patient as possible. All of these nursing activities are important to the recovery of the patient. Reducing the time necessary to answer a patient call appears to be an activity that can be improved, thus improving patient care.

Answering a patient call is the latency period from the time a patient places a call until a medical staff person enters the patient's room. However, a review of the literature did not identify any research on this topic. In most hospital settings a patient can seek assistance from the medical staff by activating a call device located on or near his or her bed. The nature of a patient call can range from a request that is not medically related to a critical medical need. Because any given call could be of a critical nature, it is
important that each patient call be answered quickly. In most hospital settings a registered nurse, licensed practical nurse, or a patient care assistant answers patient calls.

Organizational Behavior Management

Although there is little or no research on decreasing call latency in hospitals, there has been a great deal of applied research in organizations. This research, especially in the field of organizational behavior management, has described procedures useful in addressing a wide variety of organizational problems. Many of these techniques appear to be relevant to the issue of call response latency. For example, early studies in organizational behavior management identified that feedback was an effective technique in improving performance (Shook, Johnson, & Uhlman, 1978). Feedback is generally intended to provide information about an individual's performance. Feedback has been defined as statements about past behavior that can guide future behavior (Malott, Whaley, & Malott, 1997). Some writers have argued that feedback tells the performer to change poor performance or to continue producing good performance in the same manner (Rummler & Brache, 1990). In a similar way, feedback about performance may assist
an individual in adjusting or modifying his or her behavior (Daniels, 1994). Researchers have demonstrated that providing feedback for the purpose of increasing task completion does not always work (Houmanfar & Hayes, 1998). In this study the research participants were graduate students and the dependent variable was the timeliness of completion of assigned tasks. The authors reported that private and public feedback had no effect on task completion. A performance feedback literature review by Balcazar, Hopkins, and Suarez (1986) found that feedback does not uniformly improve performance. An updated review of the literature by Alvero, Bucklin, and Austin (2001) supported the previous findings. The 1986 review found feedback and consequences applications consistently the most effective. This review also identified that adding tangible rewards and/or goal setting to graphic display of feedback improved intervention effectiveness. The 2001 review found feedback and antecedents were the most effective applications. The 2001 review also found that feedback was also effective when applications combined feedback with antecedents and behavioral consequences or in applications combining feedback with goal setting and behavioral consequences.
A number of researchers have studied the effects of various combinations of feedback, goals, and consequences on performance. Wilk and Redmon (1990) used feedback and daily-adjusted goal setting to improve the number of tasks completed in a university admissions department. Wilk and Redmon (1998) expanded on this by adding graphic display of performance to the treatment package. Individual performance improvement was greatest when graphic feedback was included with the treatment package.

Researchers have studied the effects of feedback and consequences on staff behavior in various human service settings. Langeland, Johnson, and Mawhinney (1998) used goal setting, verbal feedback, and praise to improve job performance of staff members in a community mental health setting. In a school setting for children with multiple handicaps, a treatment package of instructions, group and individual feedback, and reinforcement was identified as effective in improving performance among staff members of the school (Shook, Johnson, & Uhlman, 1978). In an infant care facility, charting the results of staff performance and the delivery of written feedback from supervisors resulted in a one hundred percent performance improvement on diaper checks and changes (Kunz, Lutzker, Cuvo, Eddleman, Lutzker, Megson, & Gulley, 1982).
Written and oral feedback was an effective intervention for direct care workers in a medical services unit for persons diagnosed with developmental disabilities (Alavosius & Sulzer-Azaroff, 1990). Three staff behaviors under investigation, feeding, positioning, and transferring disabled patients, all quickly improved and were maintained over a period of seven months. In a nursing home setting, supervisors provided verbal and written feedback to nursing assistants (Hawkins, Burgio, Langford, & Engel, 1992). The results were improved performance, however, the investigators identified that the reliability of the results may have been questionable because the experimental data were provided by the nursing assistants themselves. The data were also used by supervisors to evaluate the job performance of the participants, so participants may have had some incentive to inflate self-reports of performance.

Purpose

Despite the reported efficacy of similar treatment packages in similar settings, a literature review conducted for the purpose of this research found no studies of the use of feedback, goals, and consequences
to reduce the response time in a hospital setting. The current study was designed to evaluate the effects of such a treatment package on the latency of responses to patient calls.
METHOD

Participants

The participants for the present study were 2 patient care attendants (PCA) and 2 registered nurses (RN). An announcement for recruitment (see Appendix A) was used, requesting five volunteers. The announcement was posted in the report room where medical staff review each case at the beginning of each shift. A total of 4 volunteers from a pool of 34 possible candidates responded and served as the participants. During the baseline one participant, a PCA, was reassigned and was forced to drop out. All participants were female. Age distribution was typical of PCAs and RNs, ranging in ages from 21 to 40. The length of employment for the participants ranged from 2 years, 2 months, to 7 years, 5 months. All participants had a current PCA certification or RN license, and were employed at the targeted hospital.

Before this study, the participants typically had not been exposed to an intervention of feedback, goals, and consequences during their medical careers. PCAs and RNs in the medical-surgical setting typically receive annual performance appraisals which tend to be subjective in nature. Objective information included in these
annual appraisals is presented long after the performance has occurred.

Setting

This study was conducted on a 25-bed floor of a rural private hospital serving acute care needs of patients. The floor was comprised of patient rooms on each side of a long hallway. The nurse’s station was located in the center of the hallway. An automated patient call system was used throughout the duration of the study to track the time required to respond to patient calls. The participants of this study worked only on the acute care floor. The number of shifts that were worked each week was based on the patient census of the floor. The rooms had either one or two patients per room during the study. The nursing supervisor assigned the number of patients for each participant based on the anticipated needs of each patient. The number of patients assigned to each participant per shift ranged from 2 to 14.

Dependent Variable

The dependent variable under investigation was staff latency for answering patient calls, defined as the time calls were placed by the patient until calls were
answered by the PCA or RN assigned to that specific room. A call was considered "answered" when medical staff actually entered the room. Response times were recorded in minutes and seconds by the Composer Communication System. The system automatically recorded the response from the instant the call was made until a staff person, wearing the locator badge, entered the room. The system was also used to identify the number of patients that were assigned to each participant and the number of calls answered during each shift. Information about the dependent variable was collected for each participant during the course of each shift and was reported in number of minutes and seconds needed to respond to the call, for each participant, for each shift.

Data from the automated system (see Appendix B) were transferred to a response call form (see Appendix C). The investigator trained the nursing supervisor to transfer the data from the automated system report to the response call form. To train the nursing supervisor, the investigator transferred the data to the form for the first five sessions while the supervisor observed. Then the supervisor transferred the data for the next five sessions while the investigator observed. For the remainder of the sessions, the investigator checked the transfer of data from the automated data sheets to the
response call forms once per week for one shift for each participant, approximately 20% of the response call forms. No errors were discovered. Because an automated system was used, it was not deemed necessary to provide any other type of observer training or interobserver reliability estimates. Human observers were involved in assessment only to the extent that the data were summarized and converted into mean times on the response call forms.

Independent Variable

The independent variable (IV) for this study was an intervention consisting of a combination of feedback, goals, and consequences. During the intervention, each of the three components was in effect simultaneously. The feedback component consisted of a visual display of performance from the previous shift for each participant and verbal comments from the nursing supervisor. Verbal comments included simple statements such as "Good job," or "Nice work." Participants were only allowed to view the summary forms showing their own performance. A response time goal was established by each participant in individualized goal setting sessions at the end of the baseline period. Each goal setting session was arranged and conducted by the investigator and nursing supervisor.
Each participant appeared to be interested in setting a personal goal because a quick response to a patient call was recognized as an important dimension of the patient’s treatment and the patient’s overall satisfaction with treatment. There was no advantage in having each participant set her own goal because all baselines were at similar levels. However, Fellner and Sulzer-Azaroff (1985) reported that employees prefer to participate in setting goals. Because there were no industry standards for an acceptable amount of time to respond to a patient call, the opinions of nursing supervisors, the director of nursing, and the hospital administrator were collected. In their collective opinion, a response time of five minutes or less was identified as an appropriate response time. Each participant’s response time goals were less than five minutes.

Once each participant set her own response time goal, the nursing supervisor was instructed to meet briefly with each participant at the beginning of each shift to present feedback. During this feedback meeting, each participant viewed her mean response time from the previous shift recorded on the response call form. The investigator observed the first three feedback meetings for each participant once the intervention was implemented. The consequence component consisted of
verbal comments from the nursing supervisor and the opportunity for a free lunch. More specifically, when a participant met or exceeded the established goal, the nursing supervisor provided verbal praise and a coupon, which allowed the participant to receive a free lunch (value range from $2 to $5) at the hospital cafeteria. When a goal was not met in the previous shift, the nursing supervisor encouraged each participant to attempt to reach the goal during the next shift. The response goals for each participant were not changed during the intervention phases.

Procedure

Volunteers each read and signed a consent form (see Appendix D). During the baseline conditions, the participants were instructed to carry out their regular duties, which included responding to patient calls. The Hill-Rom Composer Communication System, product number P2500, was used to automatically record response times for patient calls. Each PCA or RN on the floor wore a locator badge and was trained prior to baseline to use this communication system. Each patient bed was equipped with a Hill-Rom Bed Interface Unit, connected to the master station. Patient room toilet and showers were also equipped with a call interface unit. A patient
could place a call to the nurse’s station using any of the interface units. The master unit at the nurse’s station identified the specific patient who placed the call. A PCA or RN at the nurse’s station answered the call and then verbally communicated with the patient, making an inquiry of the nature of the patient’s needs. On a daily basis, data were transferred from the Hill-Rom system to the summary form. As previously described, the experimenter trained the supervisor and demonstrated how to record the data. Data were not shared with the participants during the baseline period.

At the start of the intervention phase the supervisor and the experimenter presented the response call summary forms from the baseline phase to each participant. Each participant reviewed her own response times and established a response time goal. The goal identified the desired maximum time in which responses to patient calls should be made and was used throughout the intervention phase. The goal was recorded on the reponse call form for each participant. The supervisor recorded response times on the response call form, updating the average response time for the shift, for each participant. The nursing supervisor presented the updated summary form to each participant at the beginning of each new shift. In addition to the written
information, the supervisor provided verbal comments and a lunch coupon when goals were met or exceeded. The experimenter met with the nursing supervisor each day to review the delivery of the feedback and consequences that were provided to each participant. The purpose of this meeting was to ensure that the independent variable was being administered consistently for each participant, for each shift.

Experimental Design

A multiple-baseline design across individuals was used to evaluate the effects of the treatment package on response times. According to Kazdin (1982), this design is appropriate for studies in which the behavior in need of change is consistent among different participants. The multiple-baseline design was appropriate in the hospital setting because a planned reversal of improved performance would have been undesirable and perhaps unethical.

The study began with a baseline phase for all participants. Then the intervention consisting of feedback and consequences was applied to each participant until all participants were exposed to the intervention. Three baseline sessions were completed for the first participant before the intervention was implemented.
Subsequent interventions were not implemented until the performance of each participant appeared to be stable. During the baseline and intervention phases, existing contingencies were in effect.
RESULTS

Figure 1 displays the mean response times of all participants for all sessions.

Figure 1. Mean Response Times to Patient Calls for All Participants During Baseline and Intervention Sessions.
Participant 1

During baseline the mean response time for participant 1 was 2.18 minutes (SD: 0.1; range: 2.18 to 2.26 minutes). Mean time was based on an average of 20.3 calls (SD: 2.08; range: 18 to 22) and an average of 6 patients (SD: 0.0; 6 patients each session) per session. At the completion of baseline, participant 1 established a response time goal of 2 minutes. Mean response times decreased to 1.62 minutes (SD: 1.19; range: 0.18 to 6.12 minutes) during the intervention phase. Mean time was based on an average of 10.84 calls (SD: 6.82; range: 2 to 34) and an average number of 7.11 patients (SD: 3.07; range: 2 to 14) per session during the intervention phase.

Participant 2

During baseline the mean response time for participant 2 was 1.71 minutes (SD: 1.48; range: 0.29 to 5.59 minutes). Mean time was based on an average of 7.82 calls (SD: 4.85; range: 1 to 19) and an average of 6.0 patients (SD: 3.22; range: 2 to 14) per session. At the completion of baseline, participant 2 established a response time goal of 1.5 minutes. Mean time increased
to 2.01 minutes (SD: 2.34; range: 0.08 to 11.5 minutes) during the intervention phase. Mean time was based on an average of 11.32 calls (SD: 7.70; range: 1 to 33) and an average number of 7.55 patients (SD: 3.46; range: 2 to 14) per session during the intervention phase.

Participant 3

During baseline the mean response time for participant 3 was 1.62 minutes (SD: 0.85; range: 0.5 to 4.03 minutes). Mean time was based on an average of 14.65 calls (SD: 9.27; range: 1 to 45) and an average of 9.4 patients (SD: 2.44; range: 4 to 14) per session. At the completion of baseline, participant 3 established a response time goals of 1.5 minutes. Mean time decreased to 1.05 minutes (SD: 0.51; range: 0.3 to 1.68 minutes) during the intervention phase. Mean time was based on an average of 12.22 calls (SD: 7.14; range: 4 to 25) and an average number of 8.0 patients (SD: 3.61; range: 2 to 12) per session during the intervention phase.
DISCUSSION

The intervention delivered in the present study may have had some control over the responses of the participants but overall, results demonstrated limited performance improvement. At best, there were marginal improvements for two of the three participants and the third participant’s average behavior slightly worsened.

Response times marginally improved for two of the participants during the intervention phase. Of these two participants, the number of assigned patients during the intervention phase increased for participant 1 and decreased for participant 3. The number of patient calls decreased for participants 1 and 3 during the intervention phase, which may have accounted for the response time improvements. Response times for participant 2 increased during the intervention phase, perhaps because of an increase in both the number of patients and patient calls. Where possible, future research might incorporate the same number of patients for all participants during baseline and intervention phases, keeping this dependent variable constant across all phases. It was not possible to do this in the present study because nursing staff at the hospital where this study was conducted were not assigned to a specific number of patients. Assigning nursing staff to a
specific number of patients may be unrealistic in similar settings, so future researchers might not be able to control this variable.

This study incorporated an indirect-acting contingency. In all cases, the feedback that each participant received for each session was too delayed to reinforce or punish the response in a technical sense. Feedback and consequences may have served as an analog to avoidance. That is, when a participant met or exceeded her goal, she would avoid the loss of positive feedback and the meal coupon.

Two types of potential reinforcers were presented during this study. The meal coupons were potential tangible reinforcers and verbal praise from the supervisor was intended to serve as a social reinforcer. Future research may establish the effectiveness of other stimuli as reinforcers under similar conditions. At the conclusion of this intervention, changes in participant responding were maintained by the nursing supervisor who provided ongoing weekly feedback to the participants. Future research may establish maintenance of the performance by providing feedback on an intermittent basis, such as providing feedback after every third or fourth shift.
Strengths and Weaknesses

A primary strength of this investigation was the use of an automatic data collection system. This eliminated potential human error, making interobserver agreement unnecessary. A second strength was the cost effectiveness of the investigation. It required no additional equipment and very little of the participants’ time. The value of the meal coupons generally ranged from two to three dollars. The hospital dietary department donated all meal coupons resulting in no additional cost. Interventions that are cost and time effective may be more likely to be utilized and maintained. A third strength was the use of a multiple baseline across subjects design in a setting where using a reversal design would have been unethical. A final strength of this investigation was the novelty of feedback and reinforcement for the participants. Prior to this investigation these strategies had not been utilized in this particular setting, but the strategies were well received by the three participants. Anecdotally, they liked the intervention and each of them made many positive comments about the introduction of consistent feedback. The participants were consistently interested in knowing their response rates. This
suggests goals were important and relevant to them.

A possible weakness of this intervention was a small reduction in the times necessary to respond to patient calls by two of the participants. The size of the effects for the two participants was roughly 30 seconds each. This improvement may have not been of enormous importance, though any improvement in response times was probably better for patients, on the whole. It is possible that the response times were already good in this setting, with little or no room for improvement. During their goal setting meetings each of the participants believed that answering a patient call within five minutes was appropriate. A second weakness of this investigation was the amount of time necessary to prepare the display of the results of each participant for each shift. The automated system made the collection of the data easy but it was necessary to transfer the data to the response call forms for each participant following each shift, which required approximately 30 minutes each day. A completely automated system in which individual participant results are immediately displayed would eliminate this weakness. A third weakness was allowing the healthcare workers to volunteer to be participants. This may have resulted in self-selection of only the best performers. Future studies may randomly select participants. Another approach would be to select
low, medium, and high performers, with at least two participants in each group. A fourth weakness was the short duration of the study which may have limited the results of the intervention. Future studies should conduct the intervention over longer periods of time. A final weakness was the limited number of participants. A larger group of participants may have provided a better opportunity to demonstrate effectiveness of the intervention.
Appendix A

Announcement for Recruitment of Participants
Study: The effects of feedback, goals, and consequences on reducing response times for nursing staff.

Principle Investigator: Dale Brethower
Student Investigator: Don Nielsen
Western Michigan University
Department of Psychology

Five volunteers, from HCHC's Registered Nurses and or Patient Care Assistants are needed to participate in a study for the purpose of determining the effects of feedback, goals, and consequences in reducing response times to answer patient calls. The first five respondents will serve as the subjects. This project is part of Don Nielsen's master thesis project. All volunteers will be asked to meet briefly with a nursing supervisor during each shift throughout this study to review specific aspects of performance.

Improved job performance is the expected benefit of this research. This project will be approximately eight weeks in duration. Participants can discontinue participation in the research at any time without prejudice, penalty, or risk or any loss of service that they would otherwise have. Data from this project will not become part of the participant's permanent record.

To volunteer for this research project, or if you have any questions, please contact Don Nielsen at 849-7111.
Appendix B

Automated Data System Printout
### Detailed COMposer Call Report

**by Location**

from 2/28/2001 07:00 to 2/28/2001 15:00

Units: MED

**Call_type: ALL**

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**Total Number of 101 Calls: 3**

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**Total Number of 104 Calls: 7**

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Appendix C

Response Call Form
# Summary of Daily Performance

## Patient Call Response, Goals, and Outcomes

Participant: _____________________

Call light response goal (minutes): _________________

Mean response times per shift:

<table>
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Appendix D

Consent Form
Western Michigan University, Department of Psychology

Study: The effects of feedback, goals, and consequences on reducing response times for nursing staff in a medical-surgical hospital setting.

Principal Investigator: Dale Brethower  
Student Investigator: Don Nielsen

You have been invited to participate in this study for the purposes of determining the effects of feedback, goals, and consequences in reducing times to answer patient calls. The duration of this study will be approximately eight weeks. This project is Don Nielsen's master's thesis project. You will be asked to meet briefly with the nurse supervisor during each shift throughout this study to review a specific aspect of your performance. As in all research, there may be unforeseen risks to the participant. A potential risk may be that your performance does not improve. However, your supervisor will be available to identify methods which will help you improve performance. A second potential risk involves time. Reviewing performance from each shift will involve only a small amount of time. If accidental injury occurs, appropriate emergency measures will be taken; however, no compensation or additional treatment will be made available to you except as otherwise stated in this permission form. You will have the opportunity to meet with your supervisor to identify action steps designed to establish appropriate performance. Improved job performance is the expected benefit of this research. Data concerning response times will be measured and will be made available to you and will be shared only with your supervisor, the researcher, the Hospital President, and the Director of Nursing. Data from this project will not become part of your permanent record.

As a participant, you can withdraw your consent to research or discontinue participation in the research at any time without prejudice, penalty, or risk of any loss of service that you would otherwise have.

I will be able to contact the researcher or the researcher's faculty advisor at the following numbers if I have any questions or if any problems arise during the course of the study:

Don Nielsen: 517/849-7111 (office) or 517/629-2835 (home)
Dale Brethower, Ph.D., advisor: 616/387-8312 (office) or 616/676-3485 (home)

I may also contact the Chair, Human Subjects Institutional Review Board (616/387-8293) or the Vice President for Research (616/387-8298) if questions or problems arise during the course of the study.

Subject  
Student Investigator

Date  
Date

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right hand corner. Subjects should not sign this document if the corner does not have a stamp indicating approval for one year.
Appendix E

Protocol Clearance from the Human Subjects
Institutional Review Board
Date: 18 September 2000

To: Dale Brethower, Principal Investigator  
Don Nielsen, Student Investigator for thesis

From: Sylvia Culp, Chair

Re: HSIRB Project Number: 00-06-10

This letter will serve as confirmation that your research project entitled “The Effects of Feedback, Goals, and Consequences of Reducing Response Times” has been approved under the full category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: 18 September 2001
BIBLIOGRAPHY


