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COLLABORATIVE RESEARCH: EXPERIENCES OF ALLIED HEALTH PROFESSIONALS

DISSERTATION

Presented in Partial Fulfillment of the Requirements for the Degree Doctor of Philosophy in the Graduate School of The Ohio State University

By

Martha Cardwell Rader, B.S., M.S.

* * * * *

The Ohio State University

1986

Dissertation Committee: Approved By
R. R. Bargar
D. P. Sanders
C. N. Burnett

R. R. Bargar
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College of Education
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To David
Several individuals deserve recognition for their part in this research project. The researchers who were willing to share their insights and experiences with me were invaluable. Dr. Robert R. Bargar, my adviser, and Dr. Donald P. Sanders and Ms. Carolyn N. Burnett, my other committee members, provided expertise and support that allowed me to explore my ideas freely. My co-workers and professional friends put up with my sometimes erratic schedule and encouraged me in my efforts. My parents have maintained their interest in whatever I endeavor. My husband, David, has continued to stretch my limits and help me grow in ways too innumerable to mention. Thank you all so much.
VITA

Martha Cardwell Rader

February 27, 1946 . . . Born - Ironton, Ohio
1968 . . . . . . . . B.S., The Ohio State University
                Columbus, Ohio
1968-1982 . . . . Physical Therapist
            Columbus, Ohio
1982 . . . . . . . . M.S., The Ohio State University
            Columbus, Ohio
1982-84 . . . . . . Physical Therapist
           Columbus, Ohio
1984-85 . . . . . . Graduate Teaching Associate
                The Ohio State University
                Columbus, Ohio
1985-Present . . . . Research Associate
                Florida Institute of Education
                University of North Florida
                Jacksonville, Florida

PUBLICATIONS

Research Reports

The Florida Teacher Scholarship Loan Program: A Case
Study in Recruiting Capable and Promising Students
into Teaching. (1986). Jacksonville, FL: Florida
Institute of Education.

The Status of Multicultural/ Multilingual Education in
Florida: Teacher and Administrator Education.
(1986). Jacksonville, FL: Florida Institute of
Education.
FIELDS OF STUDY

Lifespan Development/Creativity
   Dr. Robert R. Bargar

Higher Education/Curriculum and Instruction
   Dr. Elsie J. Alberty

Research Methods
   Dr. J. David McCracken
   Dr. Donald P. Sanders

Health Behavior/Patient Education
   Dr. David S. Stein
<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEDICATION ............................................. ii</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS .......................................... iii</td>
</tr>
<tr>
<td>VITA ..................................................... iv</td>
</tr>
<tr>
<td>LIST OF TABLES ........................................... ix</td>
</tr>
<tr>
<td>LIST OF FIGURES ........................................... x</td>
</tr>
<tr>
<td>CHAPTER</td>
</tr>
<tr>
<td>I. Introduction ............. 1</td>
</tr>
<tr>
<td>Purpose of the Study .......... 3</td>
</tr>
<tr>
<td>Toward a Definition .......... 4</td>
</tr>
<tr>
<td>The Research Question .......... 9</td>
</tr>
<tr>
<td>Scope of the Study .......... 9</td>
</tr>
<tr>
<td>Importance of the Problem .......... 11</td>
</tr>
<tr>
<td>II. A Review of the Literature ......... 13</td>
</tr>
<tr>
<td>The Tradition of Science ....... 14</td>
</tr>
<tr>
<td>Depth and Breadth of Science ....... 14</td>
</tr>
<tr>
<td>History of Science ....... 17</td>
</tr>
<tr>
<td>Pure versus Applied Science ....... 19</td>
</tr>
<tr>
<td>What Makes a Scientist? ....... 22</td>
</tr>
<tr>
<td>Personal Attributes ....... 23</td>
</tr>
<tr>
<td>Typologies of Scientists ....... 25</td>
</tr>
<tr>
<td>Importance of Diversity ....... 29</td>
</tr>
<tr>
<td>Developmental Issues ....... 30</td>
</tr>
<tr>
<td>An Acknowledgement without Apology ....... 32</td>
</tr>
<tr>
<td>Training Researchers ....... 33</td>
</tr>
<tr>
<td>Structured Experiences ....... 34</td>
</tr>
<tr>
<td>Modeling ....... 35</td>
</tr>
<tr>
<td>Determinants of Research Participation ....... 38</td>
</tr>
<tr>
<td>Inhibitors ....... 39</td>
</tr>
<tr>
<td>Facilitators ....... 41</td>
</tr>
<tr>
<td>Section</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Professionalization of the Health Care Fields</td>
</tr>
<tr>
<td>Professions Defined</td>
</tr>
<tr>
<td>Identity Crisis</td>
</tr>
<tr>
<td>Role of Research in Professional Identity</td>
</tr>
<tr>
<td>Up the Totem Pole</td>
</tr>
<tr>
<td>Collaboration versus Competition</td>
</tr>
<tr>
<td>Collaboration as a Research Alternative</td>
</tr>
<tr>
<td>Coming of Age</td>
</tr>
<tr>
<td>Principles of Collaboration</td>
</tr>
<tr>
<td>All for One and One for All?</td>
</tr>
<tr>
<td>Advantages</td>
</tr>
<tr>
<td>Disadvantages</td>
</tr>
<tr>
<td>Forms of Collaboration</td>
</tr>
<tr>
<td>Joining Diverse Sectors</td>
</tr>
<tr>
<td>The Theory/Practice Connection</td>
</tr>
<tr>
<td>Direction for the Research</td>
</tr>
<tr>
<td>III. Methodology</td>
</tr>
<tr>
<td>Data Collection</td>
</tr>
<tr>
<td>The Plan</td>
</tr>
<tr>
<td>The Reality</td>
</tr>
<tr>
<td>Respondent Selection</td>
</tr>
<tr>
<td>The Plan</td>
</tr>
<tr>
<td>The Reality</td>
</tr>
<tr>
<td>Instrument Development</td>
</tr>
<tr>
<td>The Plan</td>
</tr>
<tr>
<td>The Reality</td>
</tr>
<tr>
<td>Interview Implementation</td>
</tr>
<tr>
<td>The Plan</td>
</tr>
<tr>
<td>The Reality</td>
</tr>
<tr>
<td>Information Analysis</td>
</tr>
<tr>
<td>The Plan</td>
</tr>
<tr>
<td>The Reality</td>
</tr>
<tr>
<td>IV. Findings of the Study</td>
</tr>
<tr>
<td>Description of the Groups</td>
</tr>
<tr>
<td>Emerging Themes</td>
</tr>
<tr>
<td>Group Formation</td>
</tr>
<tr>
<td>Group Structure</td>
</tr>
<tr>
<td>Group Process</td>
</tr>
<tr>
<td>Impact of the Collaborative Process</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>TABLE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Characteristics of Researchers Whose Research Projects Were Studied</td>
<td>81</td>
</tr>
<tr>
<td>2. Group Formation</td>
<td>108</td>
</tr>
<tr>
<td>3. Group Structure</td>
<td>114</td>
</tr>
<tr>
<td>4. Group Process</td>
<td>122</td>
</tr>
<tr>
<td>5. Impact of the Collaborative Process</td>
<td>129</td>
</tr>
<tr>
<td>6. Pros and Cons of Collaborative Research</td>
<td>135</td>
</tr>
<tr>
<td>7. Advice from the Experts</td>
<td>141</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>FIGURE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Possible Relationship Between Type of Communication and Successful Collaboration</td>
<td>156</td>
</tr>
<tr>
<td>2. Possible Relationship Between Type of Communication and Successful Collaboration</td>
<td>156</td>
</tr>
<tr>
<td>3. Suggested Interaction Between Type of Communication, Group Size, and Successful Collaboration</td>
<td>158</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

The call for more research in all health-care related fields is persistent. Roncari, Salter, Till, and Lowy (1984) termed biomedical research the "lifeline of medicine." In the field of nursing, "nurses are acutely aware of the need for nursing research to improve nursing practice and strengthen nursing's research base" (Iwasiw & Olson, 1984, p. 39).

The bylaws of the American Physical Therapy Association (1984) state that one of the eight functions of the Association shall be to "encourage research, promote the development of new knowledge, and foster contributions to professional literature" (p. 1632). Research competencies for clinicians and educators have been established by the American Occupational Therapy Foundation ("Research Competencies," 1983). In discussing the importance of the relationships between the "questions raised by illness to the answers lying in research," Frederickson (1981) noted that "the health sciences have led the healing arts out of dark empiricism, and there must be no retreat" (p. 517).
Conducting research has traditionally been a personal endeavor. An individual sets out to investigate a unique problem or portion thereof in an independent and autonomous manner. Most training in research rewards, even requires, independence in the research process.

The products of research have, therefore, frequently represented isolated bits of information of interest primarily to the researcher himself. The researcher tends to interact primarily with his own research rather than with others. By limiting his interaction with other individuals, the researcher also limits the relationship of his research findings to the larger body of knowledge. Krebs (1967) questioned the generation of more and more facts, advocating instead the need for facts of strategic value such that "an observation or an experiment should lead to the clarification of a problem or deeper insight into a phenomenon or to the linking of previously unrelated facts and ideas" (p. 1443).

Three factors seem to be important in explaining to some extent the increased interest in collaborative research. A first factor has, in part, been an outgrowth of this tradition of individual research with its tendency toward reductionism. Collaborative research is more in tune with the holistic philosophy prevalent among many of today's health care practitioners. A second
factor that has encouraged collaborative efforts has been the need to maximize available funding resources as they have become more limited. The need for increased accountability of these scarce resources has made shared activities more acceptable. Third, the increasing complexity of the scientific world has made apprehension and manipulation by any one individual an awesome task. The pooling of expertise is frequently necessary for major projects.

The field of education has led the way in providing a body of literature about the collaborative research process. Some other disciplines, such as nursing, also furnish isolated articles that deal with collaboration between researchers. The allied health professions, while supplying numerous reports of collaborative research, have shared little about the collaborative process itself.

**Purpose of the Study**

Although collaborative research is becoming an accepted process for investigation in the allied health fields, relatively few individuals have actually been involved in the process. Little is known of the motivations, the perils, the guidelines, or the
strategies that lead to successful outcome of the process.

The purpose of this study has been to capture some sense of how the collaborative research process works in the allied health field. Interpersonal factors as well as external facilitators and inhibitors were examined. These external factors encompassed, but were not be limited to, institutional considerations, administrative arrangements, and financial and moral support mechanisms.

A description of various aspects of collaboration has been provided based on information shared by experienced collaborators. The conclusions should help provide a framework for allied health professionals interested in collaborative research.

**Toward a Definition**

In a broad sense of the term, collaborative research is any investigative activity in which two or more individuals work together. Yet, several authors have gone to some length to give more depth and breadth to this definition.

Hord (1986) distinguished between cooperation and collaboration in an effort to define what "counts" as collaborative research. Cooperation implies mutual agreement on goals but separate, autonomous programs.
Collaboration, on the other hand, requires a continuing relationship of planning, implementing, and evaluating activities with shared responsibilities as well as mutual rewards. All parties contribute time, energy, and expertise in a collaborative project.

Ownership of the project is shared among the parties in a collaborative effort and each has a stake in successful completion of the research. Based on their experience in collaborative nursing research, Iwasiw and Olson (1984) concluded:

Collaboration includes giving, asking for, and receiving information; discussing; sharing problem-solving; negotiating; and perhaps sharing work on particular tasks. Effective communication is the key. Successful collaboration depends on being receptive to the influence of other members of the collaborative team while, at the same time, being assertive, knowledgeable and skillful enough to influence them. (p. 39)

Collaborative research can be used to describe activities between individuals with similar training and positions - people who work together as relative equals. The term is more frequently used, however, when the research process bridges differences or dissimilarities. These differences can take a variety of forms.

The most common type of collaborative research from the field of education is activity that brings together the theory-laden universities and the practice-centered schools. Descriptions of such activities are no longer
uncommon in the literature (Duckett, 1984; Kearney & Tashlik, 1985; O'Brien & Pulliam, 1984; Trubowitz, 1986).

The medical community is also engaging in research that tries to make meaningful connections between the laboratory and the clinic, although apparently with mixed success. Ferris (1984) described the "present drift toward dividing into two faculties, one engaged in research and the other in the clinical care of patients" (p. 28). Edwards (1983) was more colorful in defining the issue:

Indeed, the sooner we stop making the distinctions between basic and clinical (or pure and applied) research, the better. It has been jokingly said that rather than dividing scientists into those who are 'pure' and those who are 'applied,' they should be divided into 'splitters' (analysts) and 'lumpers' (who try to integrate) in their research. (p. 280)

Some nursing programs have initiated activities specifically designed to facilitate the merging of more basic research with clinical concerns (Batra, 1983; Loomis, 1982). A program to link rehabilitation practitioners and researchers through dialogue has been successful in increasing the likelihood that research information will be used to improve clinical practice (Casey, 1983).

A second kind of collaborative research involves the sharing unique to a student and his mentor. The mentor is frequently an advisor or professor who helps guide the
student through a shared research process (Randall, 1982). In examining his own research career that culminated in a Nobel prize, Krebs (1967) stressed the importance of the "genealogy" of earlier teachers and pupils. The mentor need not be an academician but may rather be a more experienced researcher who is able to guide the fledgling scientist in a personal apprenticeship (Edwards, 1983).

A third type of collaborative relationship centers around interdisciplinary research. Piaget (1973) states that "interdisciplinary research can result from two sorts of inquiry, one relating to common structures or mechanisms and the other to common methods, although both sorts may of course be involved equally" (p. 1). Interdisciplinary collaborative research should be especially appropriate for the allied health fields in which professional boundaries are often somewhat less than distinct.

Interdisciplinary research may involve individuals from relatively equivalent backgrounds, such as the various therapeutic disciplines, or may require connections between various levels of the medical hierarchy. Nurses have claimed a more widely accepted role as members of multidisciplinary research teams (Walker, 1984).
A fourth type of collaborative research allows for sharing across types of institutions, facilities, or geographic locations. This kind of shared research may lead to increased confidence in results or generalizability of findings. It may also facilitate finding a sufficient number of cases when the phenomenon to be investigated occurs rarely.

As dollars for research become increasingly scarce, collaboration with industry or the corporate sector becomes yet another appealing type of research activity. Stankiewicz (1986) suggests that universities have traditionally advanced the frontiers of science indirectly by processing accumulated information and by training students and researchers. He further states, however, that "universities can be viewed as pools of technical expertise and creativity to be tapped directly through the involvement of academic scientists and engineers in the process of industrial innovation" (p. 1).

While advocating the establishment of these more direct university-business ties, Thier (1981) raises some important concerns regarding the independence and ownership of such research. These types of collaborative activities have traditionally been useful in developing new products or techniques with marketable implications.
Cutting across all of these relationships are other more subtle kinds of pairings that are of interest in looking at the collaborative research process. These include collaboration between individuals with different levels of training and ability in conducting research. Personality factors may also be important, with different members of the team contributing unique skills and talents. These may be manifest in a variety of ways, such as ability to attend to detail, expertise in writing the report, or ease in interpersonal communications.

The question arose, therefore, from the dearth of information about what contributes to a successful collaborative research project in allied health fields. The focus has been on the nature of the collaboration rather than on the product that results.

The Research Question

To address these issues, the primary research question that guided the study was as follows: What are the factors that facilitate and inhibit collaborative research in allied health fields?

Scope of the Study

The present study has been limited to a look at collaborative research arrangements in which at least one
of the collaborators is an allied health professional.
In addition, the subject of the research was necessarily one of interest within the allied health field. This allowed a broad range of topic categories including basic medical research, applied clinical research, and research that focused more on social science aspects of health care, such as attitudes, educational issues, or administrative interests.

An effort was made to tap into as many kinds of relationships as possible given the limitations of time and money. Different size groups were contacted. Geographic diversity was sought in an effort to minimize any regional trends. No effort was made to select collaborative arrangements based on the quality of the research process or the product. A wider range of responses was anticipated if the variable of quality was not controlled.

The focus of the research was on the perceptions of the researchers themselves. Perceptions, while not necessarily consistent with objective criteria, are nonetheless real to the perceiver. Factors reported to be facilitative or inhibitive by the researchers reflected their personal interpretations of the collaborative experience.
Allied health fields were targeted for two reasons. First, allied health reflects the background and interest of the researcher. Second, many of the allied health professions are at a critical stage in the development of professional identity. The ventures into collaboration often represent efforts to test this new identity in larger contexts and relationships. The results of these initial efforts may have a lasting impact on the role of the allied health professions in the future.

**Importance of the Problem**

Knowing about collaborative research and how it works should be important to the continued growth and research credibility of the allied health professions. First, the experience of others may encourage budding allied health researchers to form alliances and initiate investigative projects that had previously seemed intimidating as solo activities. Second, learning from the "experts" may help others succeed in their research efforts.

Third, collaboration may bring to the research process some sense of clinical relevance - a very important dimension among allied health practitioners. Fourth, this sense of relevance may be applicable to teaching and learning research methods in the allied
health curriculum so that interest in clinical inquiry is increased. And finally, working collaboratively on research activities may also stimulate collaborative patient care as communications are established between diverse groups and individuals.
CHAPTER II

A REVIEW OF THE LITERATURE

In order to understand the origins of the issues involved in research, the review of literature will start from a broad perspective by looking generally at the tradition of science and what makes a scientist. It will then review the evidence on training individuals for research and the factors that influence participation in research.

The next section will shift its focus to the allied health fields. A look at the professionalization of health care fields provides a basis for understanding the special context provided by these relatively new disciplines.

The last few sections will delve into the literature on collaborative research as a process, exploring its origins and the relative advantages and disadvantages of team research. Some specific forms of collaborative arrangements relevant to allied health will then be discussed.
The Tradition of Science

The value of science lies in its ability to provide a basis for understanding the empirical world (Parsons, 1962). Science is an evolutionary process which transforms the lore of yesterday into the common sense and accepted knowledge of today. Research is frequently the means by which this transformation takes place.

Depth and Breadth of Science

Hardy (1978a) has provided a definition of three kinds of science. First, science can be viewed as a body of knowledge that consists of a defined set of theories and research findings accumulated over time. A second kind of science encompasses the methods of inquiry involved in the objective, empirical search for "truth." The third definition describes a social system of science comprised of interrelated structures, processes, and activities held in common by groups of persons engaged in developing bodies of knowledge using the scientific method.

The term "science," therefore, can be used in relation to a product, a process, or a scientific milieu or climate. Blalock (1984) reflects the process definition when he discusses the need to "be scientific" (p. 30). He then relies on the product definition when putting forth the two essential ingredients of an
intellectual core: 1) the formulation of general theory that transcends time or place and 2) systematic efforts to check theory. The third definition of a social milieu is consistent with Kuhn's (1970) notion of the scientific paradigm in which normal science takes place.

The search for simplicity is one of the driving forces in science. Argyris (1980) talks in terms of "research elegance" which he defines as "theories that have the greatest comprehension with the least number of concepts and untestable axioms" (p. 3). Sutherland (1974) suggests that the general system theorist is "always honing Occam's razor; searching for fewer, more encompassing constructs with which science may face the world" (p. 256).

Blume (1977) discusses the striving for theoretical monism from within a framework of theoretical pluralism. Arriving at one encompassing theory (monism) from among multiple theories (pluralism) can be achieved either by integrating aspects of the various theories or by rejecting other theories in favor of the accepted one. He suggests that this competition between theories is a source of development in science.

In describing the intellectual passion of science, Polanyi (1958) lays out several stages in scientific development. First is the valuing of new scientific
knowledge, during which time new facts and findings are embraced as precious to science. Second, heuristic passion leads to deepened understanding of phenomena. A third stage focuses on the elegance and beauty of science. Fourth, scientific controversy creates tension both at the theoretical and practical level. Finally, related beliefs and practices emerge as premises of science that serve as a new framework for the pursuit of science.

This discussion by Polanyi parallels Kuhn's (1970) more widely publicized description of scientific revolutions. Kuhn talks about "normal or paradigm-based research" (p. 25) which permits three foci for factual scientific investigation.

First, normal science values any attempt to increase the accuracy and/or scope of accepted facts about the nature of things. Reports of such attempts make up much of the literature of science and investigation. A second focus centers around efforts to demonstrate agreement between nature and the paradigm theory. These efforts are shaped by the paradigm and simultaneously tend to strengthen the paradigm through new findings. A third class of investigation consists of cleaning up any residual ambiguities so that the paradigm theory can be articulated clearly. These activities may be directed
toward determining constants, laws, or new applications of the paradigm.

These classes of problems contained within normal science correlate closely with the first three stages set forth by Polanyi: scientific value, heuristic passion, and scientific elegance. Kuhn calls these activities "puzzle-solving" in that there is an assumed solution to be found within the existing paradigm.

The scientific controversy discussed by Polanyi is equivalent to, using Kuhn's terminology, the appearance of anomalies leading eventually to scientific crisis. In both cases, resolution of scientific conflicts results in a reevaluation of existing theoretical structures and in the likely adoption of a new framework or paradigm within which science functions.

History of Science

The development of science has occurred within a broader historical context that is also developmental. The role of science has evolved, with the role of scientist undergoing corresponding changes. The Reverend William Whewell, Professor of Moral Philosophy in Cambridge University, has been credited with coining the term "scientist" in the early nineteenth century (Barber & Hirsch, 1962). However, many distinguished scientists refrained from using the term even late in the nineteenth
century because of their dislike of it. Likewise, the term "intellectual" was viewed as a pejorative one in the United States until around 1930 (Feuer, 1976).

The atomic bomb changed the situation of science and scientists completely and immediately. Until Hiroshima, most laymen had little reason to be concerned with or interested in science or scientists. However, after this dramatic event, "overnight to many people, scientists became charismatic figures of a new era, if not a new world, in which science was the new religion and scientists the new prophets" (Hall, 1962, p. 270).

Since that time, society has been ambivalent toward science and scientists. Social concerns have become increasingly important in evaluating science. The space program has attracted much public support for science while more military applications of science have been denounced.

In the medical field, science has been alternately acclaimed and damned for its contributions. In developing the polio vaccine, science has been hailed as a hero. The vote is still out on the fluoridation of water, although the advocates of fluoride seem to be winning. In the case of genetic research, Robert Sinsheimer, chancellor of the University of California at Santa Cruz, is quoted as stating that "biology is on a
collision course with social mores" (Winkler, 1985, p. 7). In this particular arena of research, he feels that people are not so much interested in what science is doing for them as when they will stop doing it.

Miller, Suchner, and Voelker (1980) report that "in general, the available data indicate a decline in the level of unreserved esteem for science and technology and a growing awareness of the doubled-edged nature of the enterprise, that is, its enormous promise for good and its equally significant potential for harm" (p. 24). Among young Americans, they found five independent variables to be useful in understanding the development of attentiveness to organized science: gender (men > women); educational plans (college students > college-bound > non-college-bound); occupational preference (science-related > non-science-related); politicization (high family and peer politicization > low family and peer politicization); and self-esteem (high self-esteem > low self-esteem).

**Pure versus Applied Science**

An interesting issue that keeps surfacing in the historical and philosophical literature on science centers around the relative merits of pure or basic science versus applied science. Shryock (1962) has described the general indifference to basic research in
the United States during most of the nineteenth century
as a "significant phenomenon in the history of modern science" (p. 98).

He attributes America's preoccupation with applied research to several possible causes. First, Americans could easily borrow science from abroad with no need to provide their own. Second, America was busy with "conquering a continent" and had no time for more theoretical activities. A possible third factor related to the clerical control of colleges and universities where more basic science would normally be generated. In particular, moral attitudes of the time precluded much medical research that violated the human body.

Probably the overriding factor, however, was the high valuation of utility and immediate usefulness. Both government and private philanthropy supported applied science with a "blighting effect of utilitarianism" (p. 104) on basic research. Business leaders finally came to appreciate the importance of basic research in the early 1900s with a subsequent growth in government support. The research institutes and universities have been primarily responsible for pure science since about 1890, with others being interested usually to the extent that it becomes valuable for application.
The debate continues. Argyris (1980) has stated that "knowledge for the purpose of understanding—a particular phenomenon can be quite different from that required to understand the same phenomenon in order to effect specified events" (p. 9). Indeed, Polanyi (1958) has defined science to be knowledge unrelated to purpose, while knowledge derived for an acknowledged purpose is defined to be technology.

Freidson (1986) addressed the difference between influential knowledge and formal knowledge. He suggests that if formal knowledge is to be made useful, it is necessarily transformed to a particular purpose. In the health care arena, practitioners transform formal knowledge to meet the day-to-day problems of the work environment while administrators transform knowledge in order to set standards and maintain practicality.

Merton (1962) skirts the "either/or" issue by dealing with the interdependence of basic and applied research. On the one hand, the exaltation of pure science is seen to be a "defence against the invasion of norms which limit directions of potential advance and threaten the stability and continuance of scientific research as a valued social activity" (p. 22). On the other hand, the practical uses of research are the
driving force within the very social system that sustains the research process itself.

What Makes a Scientist?

Kuhn (1970) states that "if science is a constellation of facts, theories, and methods collected in current texts, then scientists are the men who, successfully or not, have striven to contribute one or another element to that constellation" (p. 1). Goodrich, Knapp, and Boehm (1962) have described the making of a scientist to be a "more or less mysterious affair" (p. 160) with origins of famous scientists showing no discernible patterns. Paton (1979) suggested that the attraction of scientific research is ultimately "an idealistic one - a battle against things, if you like, but with and not against other men" (p. 512).

Beardslee and O'Dowd (1962) found the college student image of the scientist to include his high intelligence and driving concern to expand the knowledge base and discover truth. The scientist's work was considered to be of great value to mankind and to bring a sense of satisfaction to the scientist. On the negative side, scientists were viewed as being uninterested in people and less than successful in interpersonal relations. A scientific career was ranked high in
attractiveness by men, yet, few women wished to marry a scientist.

The twenty-five years that have elapsed since the Beardslee and O'Dowd research was conducted might render their specific results irrelevant. Yet, the tendency to stereotype scientists has most likely persisted beyond its usefulness. Blalock (1984) has more recently stated that "most of us are something of a cross between scientists and humanists" (p. 15).

Personal Attributes

In reality, the term "scientist" encompasses a broad spectrum of kinds of individuals and activities. Blalock (1984) has identified two kinds of ingredients that interact in the research process: the diverse intellectual backgrounds, interests, and behaviors of the researcher and the limits imposed by the nature of the subject matter. Mooney (1957) advocates that these two ingredients be integrated in such a way that the researcher becomes a producer of research rather than a consumer of it. The emphasis thus shifts away from characteristics of the product of research and more toward characteristics of the research process.

The literature provides some insights into the scientist/researcher component of the research process. Polanyi (1958) attempted to capture some sense of the
internal state of the researcher, describing the "ecstatic vision" that allows him to break out of fixed conceptual frameworks. He stated that "the scientist's urge to ponder new problems and break new paths in seeking to solve them, presents us with the essential restlessness of the human mind, which calls ever again in question any satisfaction that it may have previously achieved" (p. 196).

Sindermann (1982) described a good scientist as "an interlocking matrix of individual traits, some inherent and some learned" (p. 279) but starting off with a better than average core of intelligence, perception, and energy. Surrounding this core are sufficient quantities of insight, synthetic ability, enthusiasm, oral expression, written expression, analytic ability, and productivity. He then added a third dimension to his model of a "successful or complete" scientist, describing him as one who superimposes on the previous dimensions a layer of interpersonal strategies.

The cognitive components of research have received much attention in the literature since they relate to optimal research outcomes. According to Hayman (1984), these components include curiosity, creativity, and problem solving. However, she further identified noncognitive attributes that enable the investigator to
proceed successfully through the research process: "persistence and endurance, indefatigable follow-through, patience, the ability to take risks, and interpersonal competence" (p. 125).

Campbell (1981) has set forth six major characteristics needed by researchers. The list includes both cognitive and noncognitive traits: 1) interest and expertise in an area of specialization, 2) motivation, 3) creativity, 4) knowledge of research design, statistics, and measurement, 5) technical skills including instrumentation and use of the computer, and 6) ability to communicate orally and in writing.

**Typologies of Scientists**

The mix of cognitive and noncognitive traits determines the orientation of the scientist toward knowledge and research methods. Several authors have defined categories or typologies of scientists. These typologies differ in the criteria used for defining categories and in the number of categories defined.

The dimensions underlying the establishment of typologies include, first, the relative emphasis placed on prediction versus explanation. Prediction is reflected in data orientation while explanation values an orientation toward higher-level abstraction. A second dimension pits those interested in application against
those more concerned with theory building - the action-oriented versus the knowledge-oriented (Krathwohl, 1985).

Sindermann (1982) has proposed four kinds of scientists based on the kind of strategy used for negotiating the scientific career: professional, survivor, chairperson, and gentle manipulator. He has further typecast female and male scientists separately by looking at their strategies for interacting in the scientific world.

An analysis of the production of scientific papers and their quality resulted in four ideal types of scientists as described by Cole and Cole (1973). These they termed the prolific physicist, the silent physicist, the mass producer, and the perfectionist. The names are descriptive not only of the productivity of the scientists but of their relative influence on their field through scientific writing.

In his taxonomy of scientists, Nowakowska (1975) developed 16 categories using high/low values along four dimensions. These dimensions included: 1) preference toward scientific authority versus social power, 2) creative ability, 3) organizational ability, and 4) level of difficulty, a variable to measure need of achievement versus fear of failure.
Mitroff and Kilmann (1978), in their singular review of how scientists classify scientists, summarized typologies put forth by others before proposing their own classification. The typology of Liam Hudson places scientists along a spectrum with divergers and convergers representing the end points. Convergers prefer gathering impersonal facts and details. They are analysts. By contrast, divergers are characterized by their global perspective. They are holistic.

Gerald Gordon and colleagues used two variables to establish four theoretical kinds of scientists. They looked at the individual's ability to differentiate among stimuli and the ability to make remote associations or meaningful patterns from among diverse stimuli. By combining high and low values on each of these two variables, they formulated styles of scientific problem solving as follows: Integrators, Problem Solvers, Problem Recognizers, and Technicians.

A survey of Apollo scientists by Mitroff yielded three types of scientists based on the dimension of speculativeness. Type I scientists are highly conceptual and imaginative. Type II individuals, representing most scientists, are competent in technical skills while venturing at times into speculative arenas. Type III
scientists value precision and detail work and constitute the "number crunchers" of science.

Maslow's work classifies kind of science rather than kind of scientist. Healthy and creative science promotes the development of the scientist as a human being. This view is consistent with Mooney's (1957) notion of the researcher as producer. Unhealthy or compulsive science promotes defensiveness and anxiety and recalls to mind Mooney's description of the researcher as consumer.

Mitroff and Kilmann's (1978) discussion of other typologies concludes with an abbreviated description of Jung's concept of personality type. Jung's theory provides two mechanisms for perceiving the world - sensing and intuition - and two modes for making judgements about the world - feeling and thinking. By pairing these variables, four types of potential scientific approaches emerge: sensing-thinking (ST), sensing-feeling (SF), intuitive-feeling (NF), and intuitive-thinking (NT).

Based on their analysis of typologies, with particular emphasis on Jung's personality types, Mitroff and Kilmann (1978) devised four descriptive names of kinds of scientists: Analytic Scientist, Conceptual Theorist, Conceptual Humanist, and Particular Humanist.
The descriptions take into account the affective and cognitive qualities inherent in each type.

Krathwohl (1985) used Mitroff and Kilmann's (1978) work to develop a typology of research orientations of his own. The seven types that he has described include Pragmatist, Analyzer, Synthesizer, Theorizer, Multiperspectivist, Humanist, and Particularist.

**Importance of Diversity**

This lengthy presentation of kinds of scientists has been undertaken in recognition of the great diversity among persons engaged in research and the effect this diversity has on the research product and process.

Krathwohl (1985) stated it this way:

Researchers typically view problems through two screens: (1) their subject matter orientation and (2) their typology orientation. The first suggests what in the problem to focus on, the second the approach to studying it. (p. 175)

In a discussion of collaborative research, both of these dimensions are important. Differences between researchers stimulate creative tension as well as dysfunctional conflict. Sindermann (1982) has pointed out the importance of including both sexes in a research effort, stating that "a form of charged atmosphere is created in which the participants often feel larger and brighter than they do in comparable situations involving only one sex" (p. 222).
Krathwohl (1985) cites lack of acceptance of differences as a potential source of conflict. He states that similar orientations view each other more favorably while tending to distrust other orientations. However, there are also circumstances where differences are highly valued.

Diversity is found both within disciplines as well as when crossing disciplinary lines. Although certain types of individuals tend to self-select and be selected into certain disciplines, there are still substantial differences within fields. For example, Myers (1980) found that personality type was related to specialty within the field of medicine. And even if a discipline were quite homogeneous, it would be rare to remain completely isolated from those outside one's field.

Developmental Issues

Further complicating the issue of characterizing scientists is the developmental process, both personal and professional. Career development has been defined by Vondracek, Lerner, and Schulenberg (1986) as "a complex life-span process whose substance is determined by the developing person in interaction with his/her environment" (p. 44). This interaction occurs within four ecological structures. The microsystem most directly encompasses the developing person. The
mesosystem involves relationships between microsystems and implies participation in multiple settings. The exosystem does not directly contain the individual but helps shape his world. Finally, the macrosystem embraces the culture, subculture, and cohort effects.

Bargar and Mayo-Chamberlain (1983) have pointed out that both faculty and student are engaged in personal developmental processes that will affect their relationship as the student proceeds through a graduate program. Baldwin and Blackburn (1981) addressed the need for institutions to be aware of professional developmental issues regarding faculty members, specifically, the knowledge that research interests tend to decline during the course of academic careers.

The phrase "scientist in transition" (Sindermann, 1982) seems descriptive of the developmental process. Movement through the life stages of a scientist can be viewed as positive and natural when maturity leads eventually to the ability to assume multiple perspectives in response to the situation. Development of research style occurs through a socialization process such that capabilities grow and types become roles to be assumed as indicated. Mature researchers, therefore, should be able to bridge any differences in type more easily than novices (Krathwohl, 1985).
An Acknowledgement Without Apology

The preceding discussion of what makes a scientist is necessarily bewildering. The sometimes obsessive need to categorize researchers may indicate the elusive nature of the substance from which researchers are made. Attaching a designation permits further discussion and discovery from within an accepted structure.

In discussing the multiple models of social science, Sutherland (1974) suggests that "the appropriate paradigm for science seems to be that which finds us starting our efforts at understanding a phenomenon with the imposition of meta-hypotheses to initially discipline the subsequent learning processes" (p. 263). Thus, the establishment of boundaries and the articulation of a typology may be important in creating a framework from which to proceed, even if that framework is artificially constructed.

The lack of precision in defining a scientist and the proliferation of typologies of scientists may indeed be nothing more than a reflection of the complexity of the topic. Gottinger (1974) is reassuring when he states:

A high degree of preciseness usually is incompatible with a high degree of complexity of a system, hence complexity and preciseness seem to be inversely related in the sense that the more complex a problem, the less likely it can be formulated in precise terms. (p. 301)
Training Researchers

It may be helpful to recall a quote used earlier to bring things back into perspective. Sindermann (1982) stated that the good scientist was "an interlocking matrix of individual traits, some inherent and some learned" (p. 279). The previous section dealt with the inherent part of this definition. The present effort is aimed at finding out what is known about the learning and/or teaching of research.

As scientific research becomes increasingly complex, training is required to both participate in the process and to understand the findings of others. This is in part due to what Merton (1962) calls the "cult of unintelligibility" (p. 25) that separates scientists and laity. If allied health personnel are to be involved in research, training must be adequate to avoid the stress involved in role incompetence. Role incompetence "exists whenever a role occupant's resources are inadequate relative to the demands of his position" (Hardy, 1978b, p. 83).

Learning about research can take place within the curriculum through structured experiences or may develop through a process of role modeling and socialization. Quite often, both of these processes occur simultaneously.
Structured Experiences

Overfield and Duffy (1984) have identified three approaches to teaching research in the nursing curriculum. Students can learn research by doing, by proposing to do, or by critiqueing. The choice of method may be important not only for acquiring skills but in developing attitudes toward research. Swenson and Kleinbaum (1984) found that after a research methods course, student nurses were more confident in their ability to understand and critique research but expressed a decreased interest in participation and less enjoyment in reading and discussing research.

By contrast, Selby and Tuttle (1985) reported that students taught research by guided design, using clinical situations and support from faculty members, demonstrated improved attitudes toward research and its importance, in addition to enhanced confidence in skills. Involvement in clinical experiences in combination with classroom training has been cited as important by others (Levin, 1983; Powers & Smith, 1986). Parker and Labadie (1983) have stressed that "introducing the research process early in the program seems desirable if students are to be able to incorporate scientific thinking and identification of researchable problems into their practice" (p. 384).
Working with other professionals has been cited as one important method for gaining research skills, both among student groups (Levin, 1983) and among practicing professionals (Ballin, Breslin, Wierenga, & Shepard, 1980). An apprenticeship in research has been advocated by some allied health educators as one means of stimulating research interest while developing skills (Campbell, 1981; Clark, 1986). Learning research skills through collaboration sounds remarkably similar to modeling. Indeed the two concepts are strongly related although they need not occur simultaneously.

Modeling

Much of the early work on learning through modeling was done by Bandura (1969) who emphasized the importance of observational learning particularly in forming moral judgements and attitudes. The socialization process seems especially strong in the health fields which tend to "cloister" their students during training (Gartner, 1976). This permits a social transmission of knowledge and values such that the state of current theory determines the character of entering generations while perpetuating itself (Neyman, 1977).
Hislop (1975) was colorful in her assessment of the importance of modeling:

If you want a bee to make honey you do not issue directives and protocols on carbohydrate metabolism and solar navigation. You put him together with other bees. If the air is right, the science will come in its own season, like pure honey. (p. 1078)

Mentors, therefore, serve a valuable function in the learning of values and attitudes about research (Cole & Cole, 1973). Faculty and instructors were found to be the primary role models early in the training of student nurses (Betz, 1985). The importance of faculty as role models has been supported by Cerasoli and Watkins (1977) who stated:

The role model of the physical therapy educator interested in the answers to questions concerning various aspects of our profession may have a positive effect on students by helping them to delineate their own interests and motivating them to identify problems which may be adapted for study by the research process. (p. 26)

Neyman (1977) pointed out that generations in science are more related to time in the field than to age. He also underscored the dialectic nature of the mentoring relationship with younger generations providing input while learning from the experience of older generations. This mentoring relationship between professional generations applies not only to faculty/student relationships but also to relationships within faculties.
Megel (1985) looked at the role of mentoring among new nursing faculty. She found that advantages to the mentoring relationship included increased satisfaction and productivity, improved leadership and administrative skills, and enhanced development of clinical practice and research skills. Negative factors included the tendency to stifle innovation among new faculty members and the restriction of personal and professional growth opportunities.

For a faculty member or practitioner to serve as an effective role model for stimulating participation in research by others, it is important that the faculty member be personally engaged in research (VanBree, 1985). This is somewhat problematic in some health fields whose faculty lack experience and training in research. Scholarly activity of nursing faculty was found to be related to the type of institution housing the school of nursing. Those nursing schools affiliated with large institutions, those with health science centers, and those with graduate programs were most active in research. This relationship was attributed in large part to the increased number of faculty members holding doctorates in those settings (Baird, et al., 1985).

A recent national survey of research interests and needs of allied health educators found that less than
one-fifth of faculty members hold earned doctorates. In addition, approximately 45% of the faculty responding have never participated in a research project either as a principal or co-investigator (Ballinger, et al., 1986). It would appear that when trying to stimulate interest in research, many allied health faculty members may be limited to encouraging students to "do as I say, not as I do."

Krebs (1967) eloquently addressed the importance of quality in the teaching relationship:

So, above all, attitudes rather than knowledge are conveyed by the distinguished teacher. Technical skills can be learned from many teachers and, like a modicum of intelligence, are, of course, prerequisites for successful research. What is critical is the use of skills, how to assess their potentialities and their limitations; how to improve, to rejuvenate, to supplement them. But perhaps the most important element of attitude is humility, because from it flows a self-critical mind and the continuous effort to learn and to improve. Also of great importance is the enthusiasm conveyed from teacher to pupil: it is the root of a large capacity for work; it makes the research worker look on research not as work but as a hobby and it also induces him to say "No" when he is faced with tempting diversions leading him to the "corridors of power" or travel on innumerable trips abroad. (p. 1443)

**Determinants of Research Participation**

Beyond the inherent and learned attributes, however, lie the environmental and situational elements that are also important in determining research participation.
Neyman (1977) cited the importance of macrostructural factors and institutional-organizational ones in providing opportunities for research. Macrostructural factors were defined to be cultural, demographic, or political. Institutional-organizational issues included the social milieu of the scientific community as well as the formal, legal organization of science.

Brogan (1982) found that the best predictors of interest in research among graduate nursing students were previous research experience and more years of nursing experience. Previous experience with collaborative research was cited by Hord (1986) as seeming to be important in forming new collaborative relationships. It appears that research participation begets further research activity.

Significant relationships have been found between nurse educators' highest level of training and measures of research productivity (Nieswiadomy, 1984). A typology of nursing research activities outlined by Fawcett (1985) suggested appropriate levels of research involvement based on level of educational training.

**Inhibitors**

The decreasing pool of physicians choosing to go into research has caused some to investigate the causes of this decline. Several reasons have been suggested,
such as reduced grant funding, a de-emphasis of basic sciences during training, and a declining number of faculty members with credibility as investigators. Another plausible factor couples the indebtedness of many medical students with the lucrative opportunities in the non-research world of practice (Ferris, 1984).

Reasons for current non-involvement in research were reported by nurse educators (Nieswiadomy, 1984). In decreasing order of frequency, the reasons cited were as follows: lack of time, lack of skills, lack of interest, lack of support from employer, lack of funds, lack of facilities, and lack of study population.

Ballin, Breslin, Wierenga, and Shepard (1980) surveyed practicing physical therapists, 50% or more of whom indicated the following barriers to research: lack of administrative financial support, inability to give up revenue-producing time, unfamiliarity with the use of statistics, lack of outside funding, lack of equipment and facilities, unfamiliarity with the research process, unwillingness to make research a higher priority, lack of a research consultant, lack of a consistent patient load, and lack of administrative philosophical support.

Other lists of factors that inhibit research contain similar concerns using different terminology (Copp, 1984; Todd & Gortner, 1982). Although the order varied
somewhat, the clear winners in the "barriers to research" category were lack of time, inadequate skills, and poor administrative support.

Given information about barriers to research, Gioiella (1985) initiated a program in a school of nursing to remove barriers to research among faculty members. The results of her experiment indicate that direct positive action to remove perceived barriers can increase faculty research productivity.

Facilitators

Less has been written about the factors that serve to stimulate research. The practicing therapists surveyed by Ballin, Breslin, Wierenga, and Shepard (1980) cited salary increases as the strongest inducer, followed by fringe benefits, then by awards and recognition. It is interesting to note that facilitators of research are not necessarily the converse of inhibitors of research.

An analysis of the professional issues and administrative procedures associated with clinical research opportunities led Vraciu and Darnell (1982) to develop a model to make clinical research a reality. The three essential ingredients were defined to be 1) release time, 2) research support system, and 3) administrative endorsement.
Strategies to enhance nursing research were described by Batra (1983). These included the medical center climate, support of research by the chief of nursing service, an active Committee on Nursing Studies and Research, a monthly research forum, a course on nursing research, collaboration with an affiliated university, and, most importantly, nurses committed to conducting nursing research.

Copp (1984) ranked factors which facilitate nursing research. Although the list is quite extensive, it may be useful to look at the first few items: the valuing of research by the dean and establishment of a research priority; establishment of a position in the school of nursing such as associate dean for research; successful search for research funding; and adjustments of faculty work loads.

Professionalization of the Health Care Fields

Arriving at last to the area of allied health, it is important to have some understanding of the role of the allied health professions. This understanding will facilitate a discussion of the importance of research to these disciplines.

"The health professions as they exist today have developed in response to the demands of the technological
and population expansions of the first part of the twentieth century" (Allen, 1980, p. 1). In addition, the overall health care delivery system has become one of the most complex and rapidly expanding systems within society (Conway, 1978). This rapid growth and the proliferation of health care fields has resulted in some confusion and conflict between various components of the health care family. Competition has at times resulted in "interdisciplinary quarrels over areas of patient care" (Allen, 1980, p. 1).

**Professions Defined**

The criteria for being a profession as put forth by Abraham Flexner early in this century continue to guide and plague the various allied health fields in their search for professional recognition. Flexner's criteria include the following: the need for components of intellectual judgement; the possession of a large body of unique knowledge; the ability to apply that knowledge in real situations; the application of problem-solving skills that can be taught; the organization into associations for purpose of regulation, education, and protection of members; and the commitment to altruism.

Wenger (1976) has outlined five points that stand out as representative of "professionalized" occupations:

1) control of entry into the occupation by members
2) colleague orientation toward performance standards
3) an occupational code of ethics
4) "scientific-theoretical" basis for activity
5) high standards of remuneration.

From an analysis of the sociological literature, Greenwood (1966) isolated five attributes that all professions seem to possess: 1) systematic theory, 2) authority, 3) community sanction, 4) ethical codes, and 5) a culture. However, he was careful to caution that the true difference between professions and nonprofessions is more quantitative than qualitative since many occupations possess the necessary attributes but not in sufficient amounts to be considered professional.

Identity Crisis

These criteria, as well as definitions from other sources, have served to guide allied health fields by establishing standards which disciplines should strive to attain. On the other hand, these same criteria have contributed to the identity crisis of many fields by sending them on a quest for attributes that may be more evolutionary than immediately attainable. The true recognition of a discipline as a profession is a social process. "For a scientific field to be distinct and to have an identity, organizations have to legitimize its
status and encourage work which is distinguishable from that in other areas" (Whitley, 1977, p. 38).

The issue of professionalism is deeply felt and often hotly debated within and among allied health fields. The debate has frequently resulted in the establishment of barriers that create a distinction without much difference. The thoughts of Mills (1959) regarding the social science disciplines seem appropriately descriptive of the allied health professions of today:

In the first place, each of the disciplines involved has grown up on its own and in response to quite specific demands and conditions; none has been developed as part of some over-all plan. In the second place, there are of course many disagreements concerning the relations of these several disciplines and there are disagreements also about the appropriate degree of specialization. (p. 139)

Most of the allied health fields have attacked the multiple attributes of professionalization simultaneously, striving for public legitimacy, professional control, monetary reward, ethical practice, and scientific soundness. It is this last effort that is of primary interest in this review.

Role of Research in Professional Identity

According to Bullough (1978), professionalization is "basically a process whereby an occupation gains great power and prestige because it holds a unique body of
knowledge that is not shared by its clients" (p. 160). Research has been called mandatory for those allied health professions who wish to be identified as true professions rather than respected technologies (Basmajian, 1977).

As part of becoming professional, the various disciplines must "constantly evaluate their bases for practice and revise them through research. Practitioners must teach this information to students and experienced practitioners alike and must further disseminate new knowledge through journals and other publications" (Allen, 1980, p. 2). This quotation points out the two-pronged nature of the interest in research activities within allied health.

First and foremost, there is the concern for generating a body of knowledge from which to validate and revise practice (Barris & Kielhofner, 1985). This motivation toward research involvement is almost a "taken-for-granted" within the health care delivery system and has therefore received little attention within the literature. It is nonetheless an honest and pervasive incentive for research activity.

The second dimension that seems to be driving the increased interest in research is less tangible and less
obvious. It involves a series of subissues related to professional identity and professional survival.

One such issue relates to ownership of certain areas of practice. Krause (1977) describes this strategy for achieving professional autonomy as "seize the technology." Bing (1985) suggests that "we take a certain perverse pleasure in engaging in professional rummage sales (flea marketing might be a more distinguishing term), picking our way through each other's discards, and redistributing the newly found wealth" (p. 775). Publishing research findings about specialized areas of practice is one way to provide proof of ownership.

A second issue deals with the practical realities of health care delivery today. Christiansen (1983) has called research "an economic imperative" for two reasons. First, research-based practice may provide the edge that signals survival in the competition among allied health disciplines. There are only so many health care dollars to go around. Second, the luxury of overlapping services and unsubstantiated treatment practices may not be tolerated in an era of finite financial resources. Accountability has become a requirement of many who pay for health care services. Trust is out; proof is in.
Yet a third major issue centers around the whole topic of training new professionals to enter the field. The socialization of allied health practitioners, as mentioned previously, frequently resembles a "cloistering" of students who come together for a period of training (Gartner, 1976). This often includes geographically isolating students from the rest of the campus once they enter their specialized program.

The characteristics of professional socialization have been discussed by Lum (1978). Both formal and informal educational processes work to shape the role expectations and self-concept of the hopeful professional. Exposure to multiple agents either strengthens or hinders the process depending primarily on the degree of congruity between the various sources. Socialization is encouraged by the monopoly on students' time and by the fact that students within a discipline are usually relatively homogeneous. The learning of a technical language reinforces the commitment of the student to his profession.

Freidson (1986) claims that those who teach in institutions of higher education become "the authoritative custodians of the knowledge and skill claimed by the professions in constituting their credentials" (p. 82). These same teachers frequently
also serve as the primary producers of new research within the field. These teacher-researchers, therefore, "control the recruitment, training, and certification of their members and, as important, formal knowledge itself" (p. 211).

In general, the socialization of new recruits into the allied health professions has proven to be quite effective. This effectiveness is based on the consensus and clarity of the norms, values, and behaviors expected within the profession (Lum, 1978). The very strength of socialization, however, suggests a few potential problems.

First, the process can come to resemble a type of inbreeding which may in the long run weaken the profession. Second, "explicit anticipatory socialization seldom occurs after the initial professional socialization period" (Hardy, 1978b, p. 79) thus making transition to new roles or positions within the profession more difficult. A third potential problem related to a strong socialization process involves the binding of education and research. Training may determine a scientist's choice of what to study, or, conversely, what a scientist studies may predispose his teaching. Silver (1983), speaking to ethical issues in medical research, has suggested that it might be useful
to separate education and research, stating that "if research is to be the flower of medical science it will have to be replanted in a new environment" (p. 332).

**Up the Totem Pole**

Having presented the case for socialization within disciplines, it is important to place allied health fields within the larger context of the health care delivery system. For, indeed, one function of professionalization is the development of awareness of one's status within the hierarchy.

Few will be surprised to learn that "for the public the caduceus of medicine sits proudly at the top of the totem pole of science" (Withey, 1962, p. 159). The allied health professions are spaced out farther down the pole along with dentistry, optometry, nursing, and a variety of other health care fields.

The allied health fields are working to improve their relative positions. One strategy being actively pursued by some disciplines, such as physical therapy, and hinted at by others is that of increasing the educational requirements for entry into the profession. An increased interest in and need for research is one of the arguments being put forth in support of such a move (MacKinnon, 1984).
Bullough (1978) has provided some explanation for the stratification between health care occupations. First, the industry is large and growing. Some form of organizational structuring may be necessary. Second, the process of professionalization has created a knowledge-based separation between the high-status occupations and those whose workers receive lesser levels of training. A third explanation is based on the labor intensive nature of health care, with work being broken down into roles as a cost-saving mechanism.

Between and among the allied health professions themselves a second level of hierarchy exists. Parker and Chan (1985) found a high level of correlation between two different allied health professions when asked to rank the prestige of 13 allied health professions. The results validate the existence of such a hierarchy.

Yet a third level of hierarchy should be acknowledged. This is the structuring that occurs within a single discipline. It may take the form of intellectual intimidation based on amount of training or use of language not accessible to all within the profession (Blalock, 1984).

Collaboration versus Competition

The discussion of the process of professionalization and socialization has been intentionally extensive
because of its relevance to the broader topic of collaborative research. The issues embedded in becoming a professional in one allied health field are frequently diametrically opposed to the conditions necessary for collaboration with other allied health fields.

One side effect of strong professional training may be the development of an attitude of ethnocentricity. Ethnocentrism refers to "the attitude or outlook by which an individual or group holds that its own cultural values are the desired, preferred, or best ones" (Leininger, 1978, p. 259). It is dysfunctional to multidisciplinary or interdisciplinary efforts.

Although support for the hypothesis is limited, it appears that increased training tends to increase ethnocentrism. Feldman and Crook (1984) found that, among experienced health professionals, there was a negative impact of advanced training on attitudes toward working in teams. This is consistent with the notion that length of training is one factor in the development of medical hierarchies.

There are early indications, however, that the ethnocentric posture of allied health fields may be changing. Whether this is in response to forces in the external environment or whether this is a reflection of
maturity within the various allied health professions is not clear. Probably both factors are at work.

Brown (1986) has defined the challenge as that of becoming more fully integrated with physicians and other health care practitioners at a time when the natural response would be to become more isolated. Bing (1985) goes even farther in opting for collaboration over competition:

The time has come when we who are in related health professions (e.g., social work, physical therapy, and occupational therapy) should seriously consider implementing an Integrated Strategic Management Scheme (ISMS) wherein we come together with a collaborative long-range plan encompassing those objectives and action steps that respond to the collective business we should be in. Professional flea marketing would then become a quaint reminiscence of times gone by. (p. 775)

Collaboration as a Research Alternative

The current interest in collaborative research emerges from a rich heritage of research activity. A recent news item indicated that "ever since the 16th century, scientists have been pursuing more and more of their research in cooperation with other scientists. But only in recent years have they stopped fearing potential dangers in collaboration" ("Fears of Collaboration," 1985, p. 7).
Coming of Age

The dangers in collaboration awaiting the unwary scientist revolve primarily around the issues of freedom and creativity in research. In relation to the quotation above, Karl Hufbauer, professor of history at the University of California at Irvine, stated that even in this century many scientists were still afraid that "cooperation would endanger science by stifling individual originality" ("Fears of Collaboration," 1985, p. 7).

The solitary tradition of science is deeply embedded and regularly reinforced. Fox and Faver (1984) have stressed that freedom and independence are strong precepts among scientists and scholars. They report that studies of productive scientists consistently indicate the importance of independence, self-sufficiency, and self-directedness. The image of the solitary scientist, withdrawn from the world, is a popular one (Cottrell, 1962). This vision, though perhaps misleading, has been somewhat romanticized by the literature.

Much of science, particularly scientific thought, continues to be carried out by individuals working and/or thinking alone. However, it has been "generally recognized today that science in fact develops within a
The concern for the effect of collaboration on individual originality is a valid one to the extent that group process necessitates compromise. On the positive side, groups may foster opportunities for a "collective creativity" through the meeting of minds (Fox & Faver, 1984). Parker and Labadie (1983) discussed the possibilities for the "cross-fertilization of ideas," thus introducing the dimension of growth within a group framework.

The integrity of research is a recurring issue whether collaborative or not. Collusion may obstruct the need for independent verification and validation of research findings if collaboration is excessive. Or, abuse of a "nominal collaboration" relationship is also a possible threat when data are taken on faith by other team members (Fox & Faver, 1984).

The emergence of "big science," characterized by team research and complex arrangements, has been cited as "the single most important change in the practice of science in the twentieth century" (Miller, Suchner, & Voelker, 1980, p. 4). The use of scientific teams has been attributed to three sources: the explosion of scientific knowledge, the institutionalization of applied
science, and the increased complexity of scientific equipment.

Principles of Collaboration

Collaboration as a process seems to require certain underlying assumptions for success. Hall (1984), while acknowledging that the principles to guide participatory research are still evolving, articulated six guidelines to serve as conceptual and practical tools. The first of these is particularly relevant to collaborative research: "Research should involve people in the entire process beginning with identification of the issues, through discussion of how to get the information, to analysis and use of results within the context of action" (p. 291).

Hord (1986) drew from "the literature, my own personal experience, and common sense" (p. 26) to describe salient features of collaboration. First, the parties must share mutual needs and interests. Second, the necessarily-increased time needed for collaboration must be devoted. Third, individuals will need to commit large quantities of energy to initiate and sustain the collaborative spirit. Fourth, communications must be maintained through frequent interactions among the collaborators. Fifth, funds, staff, and other resources should be shared by the various parties as an investment in expected outcomes.
A sixth feature requires that participants attend to necessary organizational factors. Seventh, control must be shared within a flexible environment. Eighth, participants need to have empathy for others' viewpoint by checking their perceptions. Ninth, strong leaders should emerge. And, finally, the personal traits of patience, persistence, and willingness to share are to be highly valued.

A similar list of guidelines for collaborative work has been prepared by Lieberman (1986b). In addition to the general areas mentioned by others, she suggests the importance of activities, rather than goals, as being instrumental in getting projects started. She further emphasizes the importance of building mutual trust, respect, risk-taking, and commitment.

Darling and Ogg (1984) looked at the basic requirements for initiating an interdisciplinary process. Three types of value commitments were identified: to the interdisciplinary process, to risk taking, and to interdependence. These value commitments and interpersonal communication skills were thought to be essential to interdisciplinary endeavors. Other factors that influenced the form, direction, and speed of the process included the degree of similarity between
disciplines and the level of perceived threat held by group members.

All for One and One for All?

The relative pros and cons of collaboration have been reported or speculated about by several authors from a variety of settings. Some of the accounts express personal experiences in conducting collaborative research. It is probably fair to assume that the real failures have not been reported in the literature. Therefore, even though problem areas and disadvantages have been cited, they are most likely from the perspective of a researcher who has experienced some degree of success in collaborating.

Advantages

The advantages and benefits of collaborative research are numerous. Rather than itemize multiple lists separately, categories will be presented with credit distributed to the ideas where possible.

The mutual stimulation and motivation of group members is an often-cited plus of collaborative research. This can take the form of intellectual stimulation with a resulting increasing in interpersonal energy (Fox & Faver, 1984; Iwasiw & Olson, 1984; Neyman, 1977). Or it may take the more mundane form of increased commitment to
the project due to the commitment to other team members (Fox & Faver, 1984).

An increased sense of collegiality is a second general benefit of many collaborative projects. This has been expressed as a decreased sense of alienation or isolation (Fox & Faver, 1984; Neyman, 1977). Iwasiw and Olson (1984) reported it to be advantageous to have a "sounding board." The importance of role empathy and adopting other's perspectives has been reported to lead to better relationships, improved understanding, institutional change, and personal growth (Huberman & Levinson, 1984; Kearney & Tashlik, 1985; Lieberman, 1986a; Weiss, 1984).

The joining of diverse levels and kinds of skills is yet another advantage. Myers (1980) has suggested that "any team, therefore, should include a sufficient variety of types to perform the required jobs effectively and with satisfaction" (p. 173). Role specialization and complementarily of team members can maximize the talents and resources of either individuals or institutions (Douglas, 1976; Snyder, 1985).

The ability to draw on multiple perspectives and data sources can be an advantage both in improving generalizability of findings and in increasing the number of subjects available. Opportunities for immediate or
concurrent replication can lend additional credibility to research findings (Bergstrom, et al., 1985; Rosenthal, 1976; Snyder, 1985).

Finally, the "multiplier effect" of team work (Douglas, 1976) can lead to an enhanced research product due to the integration of specialized knowledge (King, et al., 1985). Collaboration has been positively associated with quality of research among journal papers submitted (Fox & Faver, 1984). Cooper (1981) advocated the formation of new research coalitions in an effort to preserve the greatest natural resource - "the ideas and the concepts that are the products of the minds of men and women" (p. 491).

Disadvantages

General categories emerge to suggest the areas of difficulty in carrying out collaborative research as well. Logistical problems probably have been listed most frequently. These include scheduling meetings, possible increased costs (travel, phone, etc.), and obtaining multiple agreements (Bergstrom, et al., 1985; Feldman, 1981; Fox & Faver, 1984). Communication was a major underlying concern of this area.

Methodological problems constitute another category. When several individuals are serving as data collectors, the team must assume responsibility for ensuring the

Cultural differences were cited as problematic as were differing value systems (Cottrell & Sheldon, 1966; King, et al., 1985). Compromises of individual goals in an effort to reach consensus were also mentioned (Iwasiw & Olson, 1984; King, et al., 1985).

The issues of power, status, and competition seemed to blur in the reporting but were distinctly important in the relationships themselves. Leadership appeared as a related concern that was at times problematic (Bergstrom, et al., 1985; Cottrell, 1962; Cottrell & Sheldon, 1966; Feldman, 1981; Fox & Faver, 1984; Iwasiw & Olson, 1984; King, et al., 1985).

The problems of leadership were discussed humorously by some. Douglas (1976), for example, stated that "normally, the bag man (grantsman) is the leader by reason of money, and he spends most of his time misleading" (p. 211). Cottrell (1962) asked a relevant question about leadership but did not provide an answer: "How does one in fact lead a team of individualists?" (p. 392).
The remaining problem associated with collaborative research is a major one: the distribution of credit. The most common and obvious indicator of this problem is the ordering of names on research publications. Multiple authorship is a common phenomenon, representing a variety of kinds of relationships (Moustafa, 1985).

The tenure and promotion system within academia, with its "publish or perish" mandate, seems to have placed undue emphasis on this issue. However, there is also the matter of prestige within one's own discipline. The ordering of names is probably more important to the author than to the reader (Cole & Cole, 1973) but under any circumstances should be decided early in the collaborative research process (Sindermann, 1982).

An interesting phenomenon arising from the need for credit and publications is what Merton (1968) calls the "Matthew effect" whereby the scientist of greatest reputation receives the most credit regardless of his level of involvement. The "Matthew effect" derives from the Gospel According to St. Matthew (13:12) as follows:

For whosoever hath, to him shall be given, and he shall have more abundance; but whosoever hath not, from him shall be taken away even that which he hath." (King James Version)
Forms of Collaboration

Collaboration is dynamic rather than static. In fact, collaborative arrangements seem to go through developmental stages. King, et al., (1985) reflected on the process involved in their own collaborative experience and identified six phases of group dynamics whose resolution contributed to their success: goal establishment, group cohesion, definition of group roles, acceptance of leadership, establishment of norms, and goal achievement.

Trubowitz (1986) stressed the need to recognize the up-and-down nature of the collaborative process. His experience was with a school-college partnership that grew out of a jurisdictional controversy. He described the possible developmental progress of such a relationship as beginning with a stage of hostility and skepticism followed by one of lack of trust.

The third stage emerged as a period of truce. This was replaced with a fourth stage of mixed approval. Having gained acceptance in the fifth stage, the relationship might regress in stage six. Renewal of the relationship was found in stage seven. The final stage was defined to be one of continuing progress since partnerships are fluid with no absolute endpoints.

The structure and features of the collaborative process can allow growth either vertically or
horizontally (Bergstrom, et al., 1985). "Vertical building" occurs when the same question or modification of the question is asked in two or more subsequent studies. "Horizontal building" describes the situation in which a single theoretical area is investigated by individuals studying complementary pieces.

Speer, et al., (1985) reported two typologies of research collaboration. The first, identified by Benoliel, consisted of 1) expert consultation, 2) sponsorship, and 3) implementation. Expert consultation described a relationship between individuals seeking information, with either party being free to reject help or suggestions. Sponsorship relationships were thought to help move the project along by providing access to sites, subjects, or funding. The third type of relationship, implementation, was described as occurring among project staff who collect and analyze data.

The second classification system was put forth by Hagstrom. Once again, it consisted of three categories: complementary, supplementary, and master-apprentice. Complementary arrangements existed among equals without significant division of labor. Supplementary relationships involved division of labor based on expertise or access to resources. Master-apprentice
collaboration resulted in high division of labor and differential power within the relationship.

Several kinds of collaborative arrangements have been addressed either directly or indirectly in previous sections of this review. These include the apprentice/mentor relationship, interdisciplinary arrangements, and, to a limited extent, interinstitutional agreements. Two other types of relationships have gathered some significant body of literature about them which should be reviewed. These include agreements between different sectors of society and arrangements designed to bring theory and practice together.

Joining Diverse Sectors

The university/industry connection in research has received the most attention as an example of collaboration between sectors. It is worth mentioning, however, that other types of arrangements, such as those between universities and policy makers, can also prove beneficial (Burian, Boyden, & Hebert, 1985).

The trend toward increased university/industry cooperation has sprung from two sources, according to Stankiewicz (1986). First, the more scientific a technology becomes, the more sensitive it is to what happens on the frontiers of science. Second, the growing complexity of many fields has required input from large
numbers of scientific and technological perspectives. The complementary nature of university/industry arrangements can benefit both sides (Giamatti, 1983).

A third impetus has arisen from the unpredictability of government funding sources (Hackney, 1983). Guze (1983) described industry as the goose that laid the golden egg. Thier (1981) has stressed the need for diversification of support for research, including both private and governmental sources. Galtung (1983), while acknowledging the necessity of outside funding, values the ideal freedom associated with economic independence.

This comment points to one problem identified with university/industry collaboration: freedom of the research process. Indeed, many feel that "he who has the gold makes the rule." Circumventing the potential problem of interference in research freedom and integrity is primarily a matter of establishing rules and guidelines that both sides can support.

Hutt (1983) has suggested three rules to guide university-corporate relations. First, relations must exist in a spirit of mutual respect and mutual interest. Second, the operating agreements must cover explicitly all foreseeable aspects of the relationship, leaving little to chance or imagination. Third, both parties
must remain open and honest throughout the entire process, beginning with initial negotiations.

Current trends that are affecting relationships between sectors include the commercialization of university research, shifts in government funding, export controls of technology, collective industry research, and nonuniversity training (Fusfeld, 1983). The more rapidly these trends change, the greater the impact on university/industry collaboration.

The Theory/Practice Connection

Getting research-based theory into practice and practice-based problems into theory has been a persistent struggle in the applied disciplines such as the allied health fields, teaching, and social work (Greenwood, 1966; Rabin, 1985). Argyris (1980) has suggested the use of a double-loop system for integrating theory and practice. In such a system, theory influences practice which in turn affects the development of theory. Knowledge seems to move around a continuous figure-eight pattern, constantly evolving and responding.

The need for integration is apparent to both sides with mutual benefits accruing to each. One of the main benefits is a shared understanding and respect for the work and role of the other (O'Brien & Pulliam, 1984; Torney-Purta, 1985; Woodward, 1985).
Casey (1983) has stressed the importance of dialogue between researchers and practitioners in the field. An important result of this exchange could be a decrease in the time-lag between development of concepts and the application of them (Giamatti, 1983). This enhanced "technology transfer" would serve the public interest as well as the parties involved (Omenn, 1983).

Strategies to enable better exchange between the practitioner in the field and his counterpart in the laboratory or university include a bridging of the communication gap. The language of research needs to be relevant and understandable to the practitioner (Duckett, 1984; Parsons, 1962). On the other hand, practitioners need to be receptive to the application of research findings. Bohannon and LeVeau (1986) reported that "chief among the personal factors influencing research utilization may be the practitioner's failure to use the literature in which much of the available research is reported" (p. 47).

A second strategy involves the acceptance and recognition of differing value systems inherent in the academic and practice settings (Duckett, 1984; Freidson, 1986; Huberman & Levinson, 1984; Parsons, 1962). This process may take time, practice, and patience on the part of all concerned.
Direction for the Research

An attempt has been made to provide a context for the present study by looking at the historical tradition of science and scientists. The personal attributes of scientists and the training of researchers were reviewed. Factors relating to research participation were discussed.

Issues unique to the health care fields were presented within the framework of the need to establish professional identity. Collaboration as a research alternative was considered in relation to these issues. Included in the discussion of collaboration was information about advantages and disadvantages and different kinds of collaborative activity.

At the individual level, research participation relies on a complex array of factors. When researchers decide to work together, the complexity is magnified. To determine what facilitates and inhibits such relationships, it is necessary to focus on the process itself and the people who make it happen.

In the end, collaboration depends on people on both sides being willing to make it work. You can have as elaborate a mechanism as you like, but that won't carry things through. It's the people that matter. (DeBevoise, 1986, p. 12)

With this in mind, the research project went to the people involved in collaborative research to find out
who they were, how they felt about things, and what their experiences had been.
CHAPTER III
METHODOLOGY

The research process was qualitative in nature. When attempting to determine the nature of things, rather than the quantity thereof, qualitative methods are most appropriate. While dealing primarily with kind rather than number, the qualitative process often allows some assessment of the relative strength of factors based on frequency, order, and intensity of response.

Bogdan and Biklen (1982) have set forth five features of qualitative research as follows:

1. Qualitative research has the natural setting as the direct source of data and the researcher is the key instrument.
2. Qualitative research is descriptive.
3. Qualitative researchers are concerned with process rather than simply with outcomes or products.
4. Qualitative researchers tend to analyze their data inductively.
5. "Meaning" is of essential concern to the qualitative approach. (pp. 27-29)

Each component of the methodology has been divided into two sections. First, the plan describes what was done using the literature as a rationale for decision-making. Second, the reality provides an account of the actual research process as it was carried out. Combined,
the two sections furnish a complete recounting of what was done and why.

Data Collection

The Plan

The interview was selected as the primary means of data collection. Allport (1942) suggested that the best way to find out about people's interests and activities was to ask them. The interview allows one "to tap into the experience of others in their own natural language, while utilizing their value and belief frameworks" (Guba & Lincoln, 1981, p. 155).

The interview provides certain advantages as a mechanism for data collection. First, interviews frequently make available different kinds of data than those available through more quantitative measures (Currier, 1979). For instance, information can often be obtained regarding a person's reasons or motivations for doing or believing something (Kerlinger, 1973). Second, interviewing facilitates the collection of in-depth data by permitting follow-up on issues of interest (Gay, 1981).

Third, the interview allows both parties to share or negotiate the meaning of questions and answers so that understanding is more accurate and complete (Brønner,
Brown, & Canter, 1985). A fourth advantage of interviewing is its adaptability to the subject, circumstances, and prior responses (McGrath, 1970). This can lead to a tailoring of the data collection process. A final, and important, advantage of the interview as a data collection mechanism is its immediacy (Brenner, Brown, & Canter, 1985). If results are needed right away, interviewing may be a good choice.

On the down side, interviews are very time-consuming and labor-intensive (Brenner, Brown, & Canter, 1985; Gay, 1981). Second, interviewing can be prone to subjectivity and bias on the part of the respondent and/or the interviewer (Brenner, Brown, & Canter, 1985; Gay, 1981; McGrath, 1970; Payton, 1979). Third, the number of respondents may be limited due to financial and time constraints when interviewing is the primary mechanism for collecting data (McGrath, 1970).

A fourth problem identified by Gay (1981) relates to the level of skill required for successful interviewing in that it requires "not only research skills, such as knowledge of sampling and instrument development, but also a variety of communication and interpersonal relations skills" (p. 166). Finally, interview responses can be difficult to analyze. Brenner, Brown, and Canter (1985) cite the "possible distortions in data
transformation and/or the lack of conceptual or theoretical schemes to aid interpretation" (p. 4).

The Reality

In retrospect, the choice of interviewing was a good one that yielded much data otherwise unavailable. I was repeatedly amazed at the openness of the respondents and the expressed gratitude at having been asked to participate in the study - this, in spite of the fact that some considerable time was required from otherwise busy schedules.

Information about motives, experiences, and attitudes was obtained not only through direct responses to my questions but also through a sensitivity to word choices, spontaneity of responses, and expansiveness of replies. I soon identified key phrases that stimulated greater depth of data: "such as," "like what," or "Can you give me an example?" Equivalent mechanisms were used by the interviewees to solicit clarification from me.

In several instances, I was able to adapt the interview to the circumstance that presented itself. Douglas (1976), speaking from the context of field research, advocated an "entrepreneurial" approach in which the researcher plays each situation by ear and remains highly flexible. This idea was useful when,
unknown and unknowing, I initiated the interview process with each group.

For example, I was at times able to use information gathered from one researcher to gain additional depth of data from others involved in the same research project. It was also possible to shorten the interview time in a few instances through this use of prior knowledge of the project.

As another example of adaptation, there were a couple of times when the interviewee mentioned an appointment that would necessarily signal the end of the interview. I was able to restructure my questioning to address the most important and/or most personal issues in case time ran out before we were quite finished. Whether the appointment was real or a possible "out" for the interviewee, I did not know. However, the mentioned time constraint was never used to terminate the interview.

The issue of reactivity surfaced in my mind several times during the interview process. Since, in general, I was interviewing intelligent, educated people, I had expected some interest in my project. However, I had not anticipated that I would occasionally feel like the interviewee, with the researcher asking questions about my research process and commenting on its merits. This most frequently occurred at the end of an interview.
session and seemed to reinforce the collegial nature of our conversation.

Another instance of reactivity was noted when respondents appeared to reshape their perceptions of their research process using my questions. Phrases such as "As you suggested earlier..." gave clues to when this was happening. Mental shuffling seemed to occur when responses began with "I hadn't really thought about that..." or "That's an interesting question...." At first, these evidences of reactivity bothered me. However, I came to appreciate the fact that this was a hazard associated with interviewing intelligent individuals. I even came to value their occurrence in that they signaled a mutual respect and a trust that facilitated open and honest responses. Emerson (1981) has emphasized the importance of being aware of our effects rather than trying to eliminate them. My experience happily coincided with his advice.

**Respondent Selection**

**The Plan**

The respondents to be interviewed consisted of individuals who had recently completed collaborative research projects. They were selected using one of several procedures as described below.
First, recent allied health journals, such as *Journal of Allied Health*, *Physical Therapy*, *The American Journal of Occupational Therapy*, *Dental Hygiene*, and *Journal of Medical Technology*, were scanned to find research articles with more than one author. Since most journals provide some information to identify the educational background and/or institutional affiliation of authors, articles were chosen so that the authors represent the various kinds of collaborative arrangements described earlier.

Recent journals were used for two reasons. First, the identifying information about the authors was more likely to be current, thus facilitating contact. Second, due to the time-lag in getting research findings published in most journals, even recent journal articles may reflect a research process that occurred a year or more ago. Sudman and Bradburn (1974) have described two kinds of memory error that affect responses: omission error and compression-of-time or telescoping. By including only recently published research findings, these kinds of error should be minimized.

A second procedure for identifying respondents involved reviewing the list of presenters at professional allied health meetings or programs. Those whose
presentations represented collaborative research in allied health qualified as subjects.

A third group of potential interviewees consisted of individuals recommended or referred by others. Taylor and Bogdan (1984) suggest that one of the easiest ways of building a pool of persons to be interviewed is "snowballing." This process consists of "getting to know some informants and having them introduce you to others" (p. 83).

These methods of selecting respondents approximate what Bogdan and Biklen (1982) call purposeful sampling since no effort was made to establish representation of the sample with the population in general. Rather, the individuals were selected based on the appearance of different kinds of collaborative relationships. Guba and Lincoln (1981) stress the need to select respondents because of their special characteristics — those with special knowledge of, or familiarity with, the situation.

Whenever possible, all or several members of each research group were interviewed so that multiple perspectives on the relationship could be reviewed. The extent of agreement between reports served to lend credibility to the description.

The multiple perspectives allow for intersection or interference of the viewpoints in a manner reminiscent of
a holographic image. In discussing holograms, Wilber (1982) stresses the relationship of the parts to the whole: "The part is in the whole and the whole is in each part - a type of unity-in-diversity and diversity-in-unity. The key point is simply that the part has access to the whole" (p. 2).

The Reality

Nine research projects were ultimately used in the study. Seven of these were identified by perusing the journals, one came from a notice of presentation at a conference, and one was referred to me.

Determining the nature of the collaborative arrangement was not as clear-cut nor as helpful as anticipated. At times, the nature of the relationship was interpreted differently by the various individuals involved. I took refuge in Gottinger's (1974) discussion of "fuzziness" which "deals with the case where the object itself is intrinsically imprecise and/or lacks exact description" (p. 288). Blalock (1984) has suggested that we frequently impose "arbitrary simplifications" (p. 68) on phenomena in order to deal with them.

Rather than create such artificial categories, I decided to describe the groups on the basis of size - a
very tangible dimension. Of the groups studied, three were classified as large, containing six to nine researchers. Two groups were classified as medium since they involved three to five researchers. The remaining four groups consisted of only two researchers and were called small groups.

Thirty-six researchers took part in the nine projects of interest. Of these 36, 23 were interviewed. Some characteristics of the researchers and the subgroup who were interviewed are displayed in Table 1.

The issue of knowing when to stop data collection has been addressed somewhat humorously, but quite realistically, by Feldman (1981):

We stop collecting data when 1) we run out of money; 2) we have to meet a publication or contract deadline; 3) we run out of time; or 4) we run out of patience. At any of these points, the research is not really finished; rather the research ends. (p. 94)

Douglas (1985) provided three somewhat more traditional guidelines for creating a sample. First, the more common or basic the phenomenon to be studied, the fewer cases are needed. Universal phenomena require very few people. Second, the investigation should continue until the "pay dirt" of discovery disappears. And third, negative instances should be sought.

My assessment was that nine groups brought me close to meeting all of Feldman's criteria and within comfort
Table 1
CHARACTERISTICS OF RESEARCHERS WHOSE RESEARCH PROJECTS WERE STUDIED

<table>
<thead>
<tr>
<th>Relevant Educational Background</th>
<th>Number Who Participated in Research Projects</th>
<th>Number Who Were Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational Therapy</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Medical Technology</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Physical Therapy</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Medical Records Administration</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Dental Hygiene</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Medical Dietetics</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Radiologic Technology</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Circulation Technology</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Education</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Engineering</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Health Promotion</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Medical Communications</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Midwifery</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Nurse Anesthesia</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Physicians Assisting</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Psychology</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Rehabilitation Counseling</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Respiratory Therapy</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>36</strong></td>
<td><strong>23</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Highest Degree Earned</th>
<th>Number Who Participated in Research Projects</th>
<th>Number Who Were Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctorate</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Master's Degree</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>Bachelor's Degree</td>
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<td>3</td>
</tr>
<tr>
<td>Less than Bachelor's Degree</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>36</strong></td>
<td><strong>23</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number Who Participated in Research Projects</th>
<th>Number Who Were Interviewed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Female</td>
<td>25</td>
<td>13</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>36</strong></td>
<td><strong>23</strong></td>
</tr>
</tbody>
</table>
range of Douglas's guidelines as well. The clarity necessary for reconstructing relationships and impressions was starting to blur and my freshness in initiating contacts had waned. Regularities within the relationships were beginning to be predictable.

At the group level, knowing when to stop was more obvious. I continued contacting individuals within each group until either 1) responses became blatantly redundant; 2) individuals were not available given reasonable effort and/or time; or 3) all of the group members had been contacted.

In all three of the large groups, the first criterion applied after several contacts. The second criterion was applied in only two of the groups. In one of the medium groups, one participant had returned to school, was moving, and no one had her new address and phone number. In one small group, one member was away on prolonged leave and unavailable. All members were interviewed in the four remaining medium and small groups.

Instrument Development

The Plan

The degree of structure to be maintained in the interview is an early decision which significantly shapes
later decisions in instrument development and data analysis. The structure should be consistent with the researcher's data-collection goals (Dijkstra, van der Veen, & van der Zouwen, 1985).

Degree of structuring falls along a continuum with the highly structured or focused interview at one end and the quite unstructured, loosely formulated, exploratory interview at the other. Highly structured interviews frequently contain close-ended questions while less structured sessions are characterized by more open-ended questions. Sudman and Bradburn (1974) looked at degree of structure as it relates to accuracy and variance of response and found no general effect on responses to behavioral questions in face-to-face interviews whether the questions were open-ended or close-ended.

Inherent in the degree of structure in the interview is the issue of control. The interviewer can channel responses into preset categories in structured interviews and therefore maintains much of the control over responses. The interviewee can be more influential in unstructured interviews.

Characteristics of the inquiry should primarily determine the amount of structure in the interview. Guba and Lincoln (1981) have identified two main factors to be considered: "(1) the extent to which one can, or cannot,
form a priori questions to be asked; and (2) the extent to which one does or does not know, in advance, what one does not know" (p. 158).

The interview in the current research project was semi-structured. The existing knowledge of collaborative research was adequate to frame some questions or categories of questions in advance. However, flexibility was maintained within the instrument to allow for inclusion of additional issues or items not previously anticipated.

The interview was prepared according to the guidelines put forth by Sudman and Bradburn (1982). The steps include defining the scope of the information needed, drafting and sequencing questions, and formatting the survey. The survey was reviewed for completeness and relevance by two experienced collaborative researchers.

It was then pretested for readability, clarity of questions, ordering, time commitment, and transitions. This pretest was made on individuals whose responses were included in the study. Feedback from the pretest calls and the review by researchers were used for revision of the interview guide.

The Reality

The issues included in the interview guide emerged from the literature. The ordering of questions and the
format of the document benefited from my personal experience. The interview guide included a face-page to furnish identifying information, introductory pages to initiate the call, and questions to guide the interview itself (Appendix A).

The experienced collaborative researchers who reviewed the document were helpful primarily in reexamining the underlying structures around which my questions were framed. The discussions with these individuals were useful later when trying to make some sense of the responses by grouping them into categories.

The questions were ordered so as to start the interview in a non-threatening way, focusing on the research rather than any personal activity. The first question was purposely broad to allow for expansiveness and stage-setting by the interviewee while giving me a chance to determine the most appropriate direction for the particular interview.

I made a conscious effort to include questions that varied the focus from a wide-angle look at the entire process to a more close-up view of the individual's involvement. This allowed me to keep the interview "safe" for the respondent and provide context for the questions.
It is hard for me to write questions that end in prepositions or otherwise violate normal acceptable writing practice, yet conversational questions are an important dimension in pulling off an interview that attempts to stimulate conversational responses. The upfront effort to develop conversational questions gave an impression of spontaneity to the questions while permitting me to maintain some semblance of consistency over the words and phrases that served as stimuli for responses.

The trial interviews resulted in a "cleaning-up" of the document, especially in giving me a sense for which areas needed more follow-up questions and which could be condensed. I also changed the order of questions somewhat to facilitate the flow of topics. Getting an approximation of the time needed for the interview allowed me to help gain commitment from others as well as plan my own schedule.

**Interview Implementation**

**The Plan**

Surveys, of which interviews are a special type, can be implemented in one of three ways: mail, face-to-face, or telephone. Stein (1984) has discussed the relative merits of these three approaches. Each may be most
effective on certain topics or among specific audiences. However, certain general strengths and weaknesses of each method should be considered.

Mail surveys are thought to be advantageous in allowing for a wider, more representative, distribution of the survey. No field staff is required. The cost per questionnaire is relatively low and respondents have time to "think over" their answers. If well written, mail surveys are thought to minimize researcher bias.

On the other hand, non-response bias can be a major problem. The written survey assumes a certain level of literacy and the interpretation of questions is left primarily to the respondent. Data collection is likely to be slowest of all methods.

In face-to-face interviews, nonresponse is seldom a problem. Control can be maintained over the sample and frame error is therefore minimal. Once trust is established, personal information can be solicited and data can be gathered in depth. Face-to-face interviews provide maximum flexibility and adaptability. Yet, personal interviews can be quite expensive. They require well-trained personnel and interviewer bias is also a hazard.

Telephone interviews have only recently become an acceptable means of collecting data. Kerlinger (1973)
dismissed telephone surveys stating that they had "little to recommend them beyond speed and low cost" (p. 414).

However, given the increased reliance on telephones as a normal means of communication, telephone surveys have been found to present certain advantages.

Larger numbers of individuals can be interviewed at a much lower cost than when personal interviews are used. Frame error can be easily identified and corrected, nonresponse is generally low, and callbacks are easy and relatively economical. Dillman (1978) has cited one advantage of telephone interviews over mail surveys as "the likelihood of getting far better responses to open-ended questions in telephone interviews" (p. 205).

Results are immediate.

On the negative side, telephone interviews require special care in being written and carried out so as to obtain and maintain the respondent's attention and cooperation. Interviews may need to be shorter in length, although prior notification of time commitment can help offset this problem. Scheduling mutually agreeable times to conduct the interview can also create difficulties.

The interviews for this research were conducted either face-to-face or by telephone. The primary determinant of which method was used was the
accessibility of the interviewee to the investigator. Given a choice, personal interviews were conducted.

When the interview was conducted by telephone, an advance letter was sent to potential respondents about a week ahead of the anticipated contact. "The aim of the letter is to strike a balance between being complete enough to relieve potential anxiety associated with the surprise of learning of one's inclusion in a survey, yet general enough to leave some questions unanswered and thus create a degree of curiosity" (Dillman, 1978, p. 246). The letter was used to lend credibility, increase response rate, improve quality of data, and establish rapport. These letters went out over the signature of the researcher who also conducted all of the telephone interviews.

Initial telephone contact with researchers was made randomly, and follow-up calls, when necessary, were scheduled at the convenience of the respondent. The narrative of the interview guide incorporated options for immediately initiating the interview, setting a return call time, or determining a more appropriate number to be called. An early question was used to validate the individual to be interviewed as meeting the definition of collaborative researcher required for participation.
Responses were recorded on the telephone survey form which was constructed to facilitate this process. Additional comments were noted in the context that stimulated them. As nearly as possible, responses were recorded in the words and phrases of the person being interviewed. Telephone calls were tape-recorded as a back-up. The interviewer's impressions and reflections were also documented.

When interviews were conducted in person, an appointment was scheduled in advance by telephone. In some cases, group interviews were held with several or all team members discussing the collaborative research process as it related to their shared experience. While presenting their own set of problems, group interviews allow the participants to "not only present a wide range of information but also help one another recall, verify, or rectify items of information" (Van Dalen, 1979, p. 159). With the participants' permission, the personal interview sessions were tape-recorded for authentic reconstruction later.

The two modes of interviewing, telephone and face-to-face, and the two structural arrangements, individual and group, served to increase credibility of results by minimizing problems intrinsic to any one methodology. The issues relating to the collaborative research process
should remain constant across these variables of data collection.

The Reality

I prefer face-to-face interviews over telephone interviews for three reasons. First, personal interviews allow me to put a face with the name and voice. Second, non-verbal cues are available as an additional data source. Third, and probably most important, I hate to make telephone calls.

I was fortunate to be able to schedule face-to-face interviews with seven of the respondents. The other 16 interviews were conducted by phone. This breakdown was purely a function of distance and the expense involved in traveling to locations for personal interviews. Due to problems of scheduling and geography, I was able to interview two researchers at the same time only once.

The plan as described above worked well. The personal interviews all preceded the initiation of the telephone interviews, serving to some extent as practice experiences for the telephone calls. The face-to-face sessions were surprisingly easy to schedule. The process was facilitated by the fact that I knew a couple of the people involved. Those to be interviewed were quite accommodating of my travel plans and limited time in the area.
I started documenting my impressions with the initial telephone contact. Some individuals were hard to contain, wanting to share their experiences immediately. Others seemed somewhat more reticent. These impressions were valuable to me in my approach to the individual at the scheduled interview time as well as when looking at the relationships within the groups.

Each person granted permission to have the interview audiotaped so that conversation could proceed without distracting notetaking. I then recorded the taped conversations on the interview guide in a manner similar to the notetaking used for the telephone interviews. The tapes were not transcribed word-for-word but were used instead to recover quotations used in reporting the findings. I also made notes immediately after each session of my impressions and of any personal reactions.

Advance letters were sent to those individuals to be interviewed by phone (Appendix B). The first call of the day was always the most difficult for me. Once I had placed the first call, however, subsequent calls were much easier. I learned to limit myself to a few calls a day to avoid information overload, fatigue, and frustration.

I also found it easier to concentrate on one group at a time rather than overlapping interviews that
represented several research projects. Some overlapping did occur, of course, because of the need to meet individual schedules and to adjust for time zone differences.

Once contacted, no researcher refused to be interviewed by telephone. The advance letter seemed to have worked to pique interest in my project as well as to engender empathy from those who had survived the dissertation process. About half of those contacted were able to spend time with me immediately while the others scheduled a more convenient time for me to call back.

I recorded responses directly onto the interview guide while the interview was taking place, taking care to include key words and phrases. Immediately after the interview, I returned to the guide to completely document words and thoughts as they had been given. I also noted my own thoughts and impressions on the form. Tape recordings of the conversations were again used to retrieve quotes for the report of findings.

The interviews averaged 30-35 minutes. Some were a little longer, with the face-to-face interviews in general taking a little more time. This increased time was due primarily to time spent on the niceties of introductions and getting acquainted.
I did not detect a difference in quality or quantity of the responses based on whether the interview was conducted face-to-face or by phone. All of the researchers seemed to be candid and open with me. In a few cases, the interviews started off a little reserved, but showed a definite warming trend as the conversation progressed. However, this pattern was noted regardless of the circumstances of the interview.

A letter of appreciation was sent to each person interviewed (Appendix C). It was important to me to acknowledge the investment of time and self that each of these individuals had contributed to my research effort.

Information Analysis

The Plan

Qualitative analysis is an inductive process in that "abstractions are built as the particulars that have been gathered are grouped together" (Bogdan & Biklen, 1982, p. 29). The important notion is that patterns flow from the data rather than being conformed to preconceived theories or models (Mostyn, 1985; Taylor & Bogdan, 1984).

Analysis of the information collected began early and continued throughout the data collection process. The ongoing nature of qualitative analysis was necessary and almost unavoidable due to the regular and intimate
involvement of the researcher in the data collection process.

Miles and Huberman (1984) have described the qualitative analysis process as consisting of "three concurrent flows of activity: data reduction, data display, and conclusion drawing/verification" (p. 21). These processes were undertaken simultaneously in this research project, with the emphasis shifting naturally from one component to another, but generally in a direction from data reduction toward conclusion drawing.

The information was coded into categories that emerged from the data itself. Categories were revised as new information required. The structure of the report conformed to the data generated and findings of the study.

The final document was written with sufficient depth and detail to allow for assessment by others of the credibility, transferability, dependability, and confirmability of the research. An expert in qualitative research methods with experience in collaboration reviewed the document for consistency, completeness, and coherence.

Wherever possible, the language of the collaborative researchers was maintained for an authentic rendering of the experience. Modifications made throughout the
research process have been documented to permit some sharing of the transformations which led to the final product.

The Reality

Despite the warnings of others and my own mental preparation, the volume of data soon became overwhelming. At first, each of the questions seemed to require a category of its own, yielding a string of related but relatively useless bits of information. An exercise that consisted of separating issues related to the project from the more personal issues resulted in a dichotomy that failed to represent the whole.

Part of the problem came from the fact that different issues arose within the different groups studied. It was necessary for me to step back to take a more global perspective, identify commonalities, and then refocus on the individual research projects within this framework.

Another area that I needed to deal with is what Webb, Campbell, Schwartz, and Sechrest (1975) call the "dross rate," defined as the proportion of the conversation that is irrelevant to the topic at hand. This included information about findings of the collaborative research, questions about my research, and the obligatory social conventions.
The method that finally worked approximates what Miles and Huberman (1984) call "pattern coding". Analysis of the interview data resulted in clusters of issues that defined the themes. The themes were then organized into categories that contained two or three themes each. This permitted a hierarchy of organization of the information.

Quotations were used as the means to illustrate the themes. This seemed appropriate since frequently the choice of words provided insight. For example, the use of "I" or "we" when discussing certain aspects of the research was often quite telling.

Each of the groups and individuals was given a code for purposes of identification. Having worked forward from the data to develop the categories and themes, I then worked backward to the data to retrieve relevant and meaningful quotes.

My next challenge became one of finding a reasonable way to display the data. I liked Miles and Huberman's (1984) use of matrices to lay out the categories and themes. However, my use of multiple groups made this process more complex. The question arose as to whether to display the data around the themes or around the individual projects.
I decided to cut across the projects within the matrices to allow for comparison along the various themes. I then addressed the emergent themes within the narrative, with the quotations in the matrices providing the evidence.

By looking at patterns within the themes across the various groups, the overlaying factors became evident. The relationship of the overlaying factors with the themes provided the basis for discussing the facilitators and inhibitors of collaborative research.

The analogy used in the final sections came to me unexpectedly. Miles and Huberman (1984) have words of advice for "metaphor-makers" that include knowing when to stop making metaphors. At the risk of oversimplifying the process of collaboration, the analogy seemed to take a complex process that is foreign to many of us and make it more familiar. If it helps in our understanding, it was worth the risk.
FINDINGS OF THE STUDY

The report of findings will largely allow the researchers to tell their own stories. In order to facilitate understanding and to emphasize main points and strong impressions, however, the findings will be presented in the following manner.

First, there will be a brief description of each of the nine groups who shared information. Some sense of the researchers and their situation will be provided for each collaborative arrangement. This first section will furnish a context for the quotations used in the second major section that lays out the categories and themes in tabular form. The discussion preceding each table will address the issues that emerged from the themes in the data display. Following the presentation of tables, a short section will look at the themes that did not emerge from the interviews and permit a look at the unique experiences of certain groups.

A third section will present evidence for the overlaying factors that seem to shape the themes. A framework for successful collaboration ties the themes
and overlaying factors together and rounds out the report in the final section.

Identifiers have been attached to each group to simplify referencing within the text and tables. Within size groups, numbers were assigned purely at random, with no rating implied. Also, within each research group, the various individuals interviewed have been identified by assigning a letter, "A," "B," etc. Once assigned, the letter remains consistent throughout the document. The ordering of letters does not imply position or importance within the group. They have been used to help confer anonymity.

Description of the Groups

All of the small groups consisted of pairs of faculty members. Beyond that similarity, however, there were substantial differences. The first group (SML) combined the efforts of junior faculty members who, at the time the project was initiated, taught together in the same allied health discipline. However, before the project was complete, both had changed positions. The male member had taken another university position out of state while the female member left academia altogether to work in the business world. They are not currently working together on any projects. Their research would
fall into the domain of social science research, dealing with applied educational issues.

One of the members of the second group (SM2) also changed positions and moved out of state during the course of the research project. However, the team has adjusted to this change and the relationship has continued into the present. The female partner in this group is an allied health faculty member who has teamed with a male non-allied health faculty member with special expertise. Their research tested the scientific basis for a common clinical procedure and involved the use of technical equipment not normally available in the clinical environment.

The third small group project (SM3) represents the work of two male senior faculty members from different disciplines in allied health. They were affiliated with the same institution at the time of the project. One has since moved away. No joint projects between the two are underway at present. They were involved in a meta-analysis research activity.

No one has moved away from the fourth small group (SM4). Both of the men in this partnership are faculty members in the same institution. The relationship was self-described by the two parties as being that of mentor/mentee. The senior member is in an administrative
position within allied health while the junior member is working toward tenure in a faculty position. Their research activities continue to branch and flourish. The project of interest to this research consisted of assessing attitudinal responses.

The first medium sized group (MD1) was comprised of all clinical practitioners within the same discipline. None were faculty members, although they did work with students in the clinical setting. There was a mix of male and female members within the group. One of the individuals listed as an author of the research report has since left the facility. Research continues to be a major activity within the group. The project of interest consisted of a quantitative analysis of the effect of treatment in the clinical setting.

The members of the second medium sized group (MD2) were all tenured faculty members in the same school of allied health. They were all female. Together, they represented two allied health disciplines. The research relationship is reported to be ongoing. The project centered around some activities in interdisciplinary education.

The first large group (LG1) provided an example of collaboration between the university and a non-affiliated clinic. All of the researchers were from the same allied
health background and all were female. One member of the group was a university faculty member while all others were practicing clinicians. One of the clinicians has moved to another position in an adjacent state. While there is no specific research activity being carried out by this group at present, the potential for future collaboration remains good, with both sides reporting an interest. The research compared the effectiveness of alternate treatment procedures in the clinical setting.

The other two large groups represent interdisciplinary research among university faculty. The first of these two (LG2) focused on fewer disciplines but used individuals with other specific expertise, e.g., a statistician, to round out their group. The group consisted of about half men and half women. Two different educational institutions, both in the same town, were represented within the team. One member has taken a position in another state. The larger group is not currently pursuing additional joint research, although some individuals within the group have ongoing collaborative arrangements. Their research compared several allied health groups along various behavioral and attitudinal dimensions.

The final large group (LG3) just barely met the criterion of having completed a research project. Final
touched were just being put on the research report. This group consisted of allied health faculty members, all working within the same university setting. Each represented a different discipline. Females significantly outnumbered males in the group. The participants in the group ranged from department heads to instructors and from experienced professionals to novices in the research arena. A second phase of the research project has been proposed but not initiated. They gathered descriptive data using a survey technique.

**Emerging Themes**

The six categories used to organize the interview data have been designated as follows: group formation, group structure, group process, impact of the collaborative process, pros and cons of collaborative research, and advice from the experts. Each of the categories contains two or three themes. Quotations from the various individuals representing the nine groups have been organized into tables to illustrate the issues that emerged from the themes.

The categories and themes serve, therefore, to organize the research findings. The raw data have been displayed in the form of quotations. The issues embedded
within these themes represent the perceptions of the researchers themselves.

Not all individuals, or even all groups, had something to say about each category or theme. This is primarily a function of the methodology in that the categories and themes were constructed based on the responses rather than the other way around. At times, the voids in the charts communicate in the way that silence sometimes speaks louder than words. These issues will be addressed where possible.

The explanation of tables will be used primarily to highlight the issues within each theme. The discussion that precedes each table will be purposely brief with the thought that the reader's time will be better spent reviewing the tables themselves. Groups and/or individuals will be cited in the narrative as providing examples of the issues but the full flavor of the themes themselves requires a more complete reading of the information contained in the tables.

Group Formation (Table 2)

Research Motivation

Often it is best to start at the beginning. Where the idea for the research project came from and how different individuals got involved were closely related.
Within the research motivation theme, two issues seemed to predominate: intrinsic and extrinsic motivation.

Examples of extrinsic motivation might be found in SMI where tenure was an important incentive. Group LG3 exemplified the extrinsic motivation of institutional priority-setting. LG2 provided evidence of a third kind of extrinsic motivation: money.

Intrinsic motivators also took a variety of forms. Clinical questions stimulated several groups toward relevant research (SM2, MD1, LG1). Intellectual curiosity seemed to be important to SM3 and SM4, while common interests and coincidence were influential to group MD2.

**Involvement Incentive**

The incentive for personal involvement was frequently tied to the motivation for the research project, falling along the same issues of intrinsic and extrinsic motivation. The interesting point of departure in this category revolves around those groups in which the personal motivations differ among group members.

LG3 probably provides the most diverse array of incentives for personal involvement. "A" was motivated by tenure considerations. "B" and "C" indicated departmental pressures were involved, while "D" reported an interest in developing a mentoring role.
The responses of LG1 members provide additional evidence of diversity in the area of involvement incentive. "A" was extrinsically influenced by the need for clinical verification, "B" was intrinsically motivated by the desire to learn, while "C" reflected a mixture of internal and external factors.

External Factors

The issues relating to external factors included financial support, departmental/institutional considerations, and support services. Once again, within groups, the importance of various themes seemed to differ in some cases. SM2 and LG2 indicated the importance of financial support while MD1 tended to downplay it. The positive effect of institutional or departmental support was expressed by SM4, MD2, and LG2. SM1 reported the detrimental effect of lack of administrative support.

Access, or lack of access, to secretarial and other support services was mentioned by several groups (SM3, MD2, LG1, and LG3). LG3 once again provided an example of a mixed bag of concerns about external factors.
<table>
<thead>
<tr>
<th>Group</th>
<th>Research Motivation</th>
<th>Involvement Incentive</th>
<th>External Factors</th>
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<tbody>
<tr>
<td>SM1</td>
<td>A: &quot;It was an outgrowth of our research projects for theses.&quot; B: &quot;We were both looking at tenure and wondering what to do to get started. We kind of looked at how we could share our research and get the most out of it.&quot;</td>
<td>A: &quot;Very little had been written on the subject. It seemed important to share what we had found with others.&quot; B: &quot;I needed to get on with some publications.&quot;</td>
<td>A: &quot;The Director of the School was very autocratic. We had to keep things going on our own time. Of course, we were able to use secretarial help and duplicating, etc.&quot; B: &quot;We were both instructors working on our masters. We had to keep up our course load.&quot;</td>
</tr>
<tr>
<td>SM2</td>
<td>A: &quot;I had an idea from my clinical work. I talked with [individual] who referred me to [B].&quot; B: &quot;[A] was familiar with a paper from our department and approached the former director who had written the paper about doing some collaborative research. The questions came out of [A]'s clinical work. There have been conflicting results reported in the literature.&quot;</td>
<td>A: &quot;I was interested in whether what we were doing at work was working with the kids.&quot; B: &quot;I was interested in what she was doing.&quot;</td>
<td>A: &quot;We now have a grant from the university.&quot; B: &quot;The pilot project was on our own but now we have funding from the university to carry on a larger project.&quot;</td>
</tr>
<tr>
<td>SM3</td>
<td>A: &quot;The impetus for that started quite frankly while I was doing a doctoral course. ... I talked to [B] about whether or not he had done any looking at what was being published.&quot;</td>
<td>A: &quot;I guess it was just an interest of mine. I had done some work in other areas using this method and was curious how it would apply here.&quot;</td>
<td>A: &quot;It was just an interest of both of ours. Of course, we had access to the resources of the school.&quot;</td>
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</table>
### Table 2 (Continued)

| SM4 | **A:** "Basically the idea came from me. I had been playing with some ideas in the area."  
B: "At first I was interested in studying only a smaller project. Then I talked to [A] who had a broader interest in allied health and introduced me to broader areas." | **A:** "[B] is a new boy on the block. ... We sort of decided concurrently that this would be a good way to get him on the road."  
B: "We work together. He is my mentor here." | **A:** "He didn't really need funding. We just went out and got bodies. When you've been in the vineyards as long as I have, you have contacts based on years of experience. ... Sure, the department and university have supported all our activities. That's what the academic game is all about."  
B: "[A] is really good at networking, getting participation and cooperation." |
| --- | --- | --- | --- |
| **MD1** | **A:** "It's hard to say. It probably came from reading and the literature. ... We had found some stuff cited, some basic research but removed from clinical reality. We were looking for a rationale for practice."  
B: "I don't remember who started this one. We're kinda different. We have ideas and go ahead and test them out. We don't discuss it a lot." | **A:** "[B] and I go back a long way. We work together and this is part of what we do in our practice."  
B: "I guess my interest was primarily clinical. We have lots of projects going on and just know what each others' interests are." | **A:** "I just wrote to [organization] about my idea and they sent us some support. The money helps but we would have done it anyway."  
B: "The money just makes things easier. I guess it might make a difference if you needed a lot of expensive equipment or something." |
| **MD2** | **A:** "I guess we just got to know each other when the offices were rearranged."  
B: "When they remodeled the building, we saw each other more often. It may have come out of one of the Student Council One Houses or something."  
C: "I think what had happened is we decided we should have a Christmas party. After they changed the office arrangement, we started seeing each other and getting along." | **A:** "The patient is always first and foremost. Whatever we can do to get these students to their highest level is ultimately important to us."  
B: "It's fun seeing things in practice - seeing them work."  
C: "I think this stuff is important enough so I made time in my course to work with it. ... I wasn't really getting stimulation from within my own faculty." | **B:** "He always had access to the equipment we needed. Our director was interested and supportive but didn't get involved."  
C: "The [department] did supply a lot of equipment and supplies. I hadn't really thought about this but it was supportive in a way." |
| LG1 | A: "I had done some work on this question but needed entry into a clinical setting. I basically ran an ad for clinicians to implement the study."  
B: "I think that [C] answered an ad or heard about this opportunity somehow - that [A] needed some people to work on collecting data."  
C: "I guess I got our staff involved. The staff had expressed interest in doing research. When I saw this ad it seemed like a good way to meet that need." | A: "I really wanted to get clinical verification of the ideas I had."  
B: "It was a terrific opportunity to work with [A] and gave me a chance to learn new things."  
C: "I guess there was a combination of personal interest and being involved because of my position here. To some extent I was responding to interest from the staff to get involved in research." | A: "I had secretarial support in typing reports, etc."  
B: "We had a lot of moral support but certainly no time off work."  
C: "There was a lot of internal commitment from the department. If we needed patients or something, we just negotiated it through our internal scheduling." |
| LG2 | A: "Somebody saw an RFP in the Federal Register. Myself, [B], and [C] got together and said 'why not go for it?'"  
B: "It was sort of a natural extension of a previous project."  
C: "It came about as a result of a grant initiative. We responded to a request for proposals."  
D: "I'm not sure. I think they got funding for a project." | A: "I guess I was called in mostly to write the proposal - I wrote about 80% of it. I wasn't too directly involved after that."  
B: "I guess I sort of brought the whole project forward."  
C: "I had both positional and personal interests. I served as the director for the entire project but I got involved in the first place because I was interested in it."  
D: "Our program was written in as one of the affiliated programs associated with the grant. As a faculty member, I represented the program." | B: "The grant provided the carrot to get the project going."  
C: "The team was really brought together after we received notice of funding."  
D: "[C] had support from his staff." |
Table 2 (Continued)

<table>
<thead>
<tr>
<th>LG3</th>
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<tbody>
<tr>
<td>A: &quot;From [D] who had done some work in this area. There's also been a goal in this school by our director that this become a center for collaborative research in allied health.&quot;</td>
<td>B: &quot;It was decided that they wanted to have - there was going to be a two-fold project.&quot;</td>
<td>C: &quot;I think [D] wanted someone to use the information on the survey that she had already put together. They sent a memo out to each division and asked if they wanted to participate.&quot;</td>
</tr>
<tr>
<td>D: &quot;It came out of the study that I presented last year. A group of faculty here got together and said we'd like to do that, can we use your instrument and will you help us.&quot;</td>
<td></td>
<td>D: &quot;I really entered it as an opportunity for me to help young faculty members whom I sympathize with.&quot;</td>
</tr>
<tr>
<td></td>
<td>A: &quot;I think that's the bottom line as to why a lot of us are involved in this project. There are quite a few of us who are approaching tenure who need to publish and who need to present.&quot;</td>
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<td></td>
<td>B: &quot;We only have three full-time faculty members and the others weren't interested and I felt that we needed to do it so I said I'd do it.&quot;</td>
<td>C: &quot;Nobody in my division but me wanted to do it when the memo was passed around.&quot;</td>
</tr>
<tr>
<td></td>
<td>D: &quot;I really entered it as an opportunity for me to help young faculty members whom I sympathize with.&quot;</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A: &quot;Secretarial support has been a real problem. ... There was no decrease in other responsibilities while we were working on this.&quot;</td>
<td>B: &quot;It was not externally funded. [Director] picked up the initial postage and duplicating. The psychometric costs were picked up, too. ... Our division sort of got volunteered. Our secretary has been the word processor.&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C: &quot;There was a lot of support in that 'good, that you're doing it' but there was no slack in my schedule. If we as a group are going to do collaborative research, then we need to make decisions on clerical support, maybe getting a GTA to do our library research.&quot;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D: &quot;The school supported the mailing, the questionnaire, and interpreting the data.&quot;</td>
</tr>
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</table>
Group Structure (Table 3)

Communication

The issues relating to intragroup communication can be separated into those mechanisms that were formal and those that were more informal. SM3, SM4, MD1, MD2 reported more informal communication systems consisting of casual meetings, lunches, and day-to-day activities.

The other groups indicated more structured arrangements, with the frequency of meetings varying with the stage of the project. SM1 and SM2 had to formalize their communications more because of the separation of distance.

In addition to maintaining communications within the group, meetings, in the more formal sense, were reported to serve several functions. These included "ironing things out" in initial phases (SM2, LG3), maintaining timelines (SM4, LG1), learning about research (LG1, LG2), guaranteeing quality of data (LG1), and sustaining motivation (LG1).

Responsibilities

Several issues emerged related to the distribution of responsibilities within the group. First, expertise was the primary criterion for assigning tasks in some cases (SM2, SM3, SM4). SM1 and SM4 cited interest as a second issue for determining responsibilities. The third issue, access, seemed most convenient to groups involved
in multidisciplinary research. Groups LG1, LG2, and LG3 all reported some assignment of activity based on the criterion of access to a certain population.

MD1 and MD2 did not really address the issue of distribution of responsibilities within the group. There is an implication of shared responsibility which may indicate a fourth issue within this theme. It is represented by the void in quotations in the area of responsibilities for these two groups. Some attention will be paid to these groups in the discussion of unique experiences.

Only one group (LG3) indicated any activity in which the group acted in concert: "the group totally reworked the survey design" and then later actually wrote sections of the report by group process. The more common model was that of individuals working autonomously within the group structure.

Agreements

Only two groups reported written agreements. Both of these groups involved individuals from more than one institution. The agreements primarily addressed the institutional need for documentation of participation levels and ownership of the product. The issues emerging from the theme of agreements, therefore, consist of the presence or absence of agreements.
## Table 3

### GROUP STRUCTURE

<table>
<thead>
<tr>
<th>Group</th>
<th>Communications</th>
<th>Responsibilities</th>
<th>Agreements</th>
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</table>
| SM1   | A: "We did all this by mail and long-distance because he had moved away. The only time we got together was at our annual meeting."
B: "Everything was long-distance. We had to send manuscripts back and forth." | A: "We sort of ran things independently of one another. After everything was done, we merged things."
B: "The breakdown was based on interest and personal needs. The survey was [A]'s responsibility. I took more of the literature review and analysis." | A: "The only written type of thing was the foundations review of protocol." |
| SM2   | A: "Right now we really need to communicate because we're just getting underway on this new phase. We need to iron things out."
B: "We usually get together at least every week. When we were testing, we met daily or three times a week." | A: "We divided things up based on our expertise."
B: "[A] was able to make the clinical contacts and do the clinical testing. On the other hand, she did not have the expertise and lab skills to test and did not have the equipment." | A: "Because I moved, we had to switch the role of P.I. from me to [B]. I got a letter from [B] that laid out the specifications of the change."
B: "We have an agreement with the university that we had to change when [A] moved away. Because I'm now the P.I., any papers that result if related to allied health will be published with her as first author. In other areas, joint publications will have my name first. It's all spelled out." |
| SM3   | A: "We mostly got together informally as we needed to. Being close here facilitated things." | A: "Really we divided out the tasks by area of expertise, as well as access to resources." | |


Table 3 (Continued)

<table>
<thead>
<tr>
<th>SM4</th>
<th>A: &quot;We meet at lunch almost every day. We update each other on what's going on in different activities and discuss problems. ... At one point we had so many projects we had to keep track of them by keeping a chart on the wall with timelines for various activities. Sort of management by objective.&quot; B: &quot;We meet every day for lunch. It's how we generate ideas and keep track of things.&quot;</th>
<th>A: &quot;I guess I'm most interested in looking at an idea and distilling it into a design. I like to create a study that is marketable and has some utility in the field.&quot; B: &quot;I do research with most all the faculty members here. They come to me because I have statistical skills.&quot;</th>
<th>B: &quot;There are no agreements except my need for tenure.&quot;</th>
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<tbody>
<tr>
<td>MD1</td>
<td>A: &quot;We don't have special meetings. We just start working on data collection and keep the project going. It is incorporated into our work day.&quot; B: &quot;We usually just sit around and discuss things we're working on and things we've seen.&quot;</td>
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<td>MD2</td>
<td>A: &quot;We just decided what we wanted to do as a starting point and looked at how we could fit it in.&quot; B: &quot;At first we were very structured. We had segments when we worked closely together, then we would work more individually.&quot; C: &quot;When we first started, we scheduled a couple of meetings. We got the students involved and the basic science faculty.&quot;</td>
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Table 3 (Continued)

<p>| A:  | “At first we met weekly, then as we began data collection, we met at least once a month. The meetings were necessary to keep the project moving. If we didn't meet, the data collection tended to get lost in a busy, very large department.” |
| B:  | “The meetings were very helpful. We discussed any problems we were having and practiced the skills we were using. We worked on inter-rater reliability and that reinforced the importance of precision. We even designed equipment to use.” |
| C:  | “The meetings were important for staff persistence. Day-to-day activities tended to get in the way of gathering data. We tried to make individuals feel accountable to the group. I think the meetings were helpful in learning about the research process.” |
| A:  | “I think the data collection was based on patient load - when someone could track down subjects. I did the writing but, before submitting articles, I asked the others for comments or editorial changes.” |
| B:  | “Everyone had certain activities assigned. The worst part was the repetition of procedures during data collection.” |
| C:  | “There was a random lottery assignment of various techniques.” |</p>
<table>
<thead>
<tr>
<th>LG2</th>
<th>A: &quot;I think they had regular meetings. I didn't attend later on.&quot;</th>
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<tr>
<td></td>
<td>B: &quot;We had several organizational meetings where everybody was involved. Then there were monthly meetings with individual groups and quarterly meetings that all groups attended. The meetings had three purposes. First, to report progress and circulate copies of reports. Second, we tried to target future activities. And then we had presentations by experts within the field. These were learning experiences for the participants in heightening awareness and providing a cross-fertilization of shared concepts.&quot;</td>
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<td>C: &quot;We didn't really have major issues at our meetings. We exchanged information freely.&quot;</td>
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<td></td>
<td>D: &quot;We met sporadically. We were really all too busy. Nobody was 100% time on the project. I never met [team member].&quot;</td>
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<thead>
<tr>
<th></th>
<th>A: &quot;As I said, I was the proposal writer.&quot;</th>
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<tbody>
<tr>
<td></td>
<td>B: &quot;I represented one of the disciplines in the study.&quot;</td>
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<td>C: &quot;We had four surveys. Each faculty member worked with me on his survey. I was involved in each and shared the statistical analysis and writing.&quot;</td>
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<td>D: &quot;Each of the specialists coordinated their own data.&quot;</td>
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<tr>
<th></th>
<th>B: &quot;We had letters of agreements between the institutions that set out the degree of participation.&quot;</th>
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<td></td>
<td>C: &quot;We have clearly specified expectations between the institutions and individuals. It involved purchasing time and effort. Certain individuals were named, how many days a year they would participate, etc.&quot;</td>
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</tbody>
</table>
| LG3 | A: "Communication has been our biggest problem."  
B: "We've been meeting more here at the end trying to pull this thing together."  
C: "Initially, we met quite often - at least every two weeks. ... Accessibility is a real issue. Maybe accessibility occurs by having meetings."  
D: "We met every week at first. The early working days were very important." | A: "The group totally reworked the survey design."  
B: "Each group was responsible for obtaining mailing lists and getting their surveys mailed out. In terms of writing and analysis, we have two areas and split the group up into two parts and each took a part."  
C: "There are two ways we did it:  
1) Everybody surveyed their own profession. Then eventually we divided the group in half and each was assigned a part to write up."  
D: "When it came time to write the paper itself, the group met and by lot decided who would write the various parts." |
Group Process (Table 4)

Leadership

The issues regarding the theme of leadership centered around the relative importance of leadership to the group, whether the leadership experience within the group was a positive one or not. The first issue downplayed the need or importance of leadership. SM1, SM3, MD1, and MD2 provided examples of this attitude. SM2 also minimized the leadership role but was required to deal with it due to funding requirements.

The second issue emerged from the three larger groups and acknowledged a greater need for structured leadership. LG1 seemed to have resolved their leadership question to the general satisfaction of the group members. Members of LG2 reflected some mixed feelings about their leadership arrangements. LG3 researchers expressed the most concern with leadership within their group, having experienced problems of "leadership by default."

Credit

The theme of credit stimulated a variety of responses that centered around two general issues: the criteria for awarding credit and the need or desire for credit. The salient point once again was that
individuals within the same group needed to agree on the distribution of credit.

When establishing criteria for credit, some individuals suggested that the person doing the writing should receive first credit (SM2, SM4, MD2). The amount of work contributed to the project was more important to other individuals (SM3, MD1). Yet other researchers looked to the more formal positions of individuals in deciding who would be listed as first author on publications (LG1, LG2). MD1"A" suggested that ownership of the original idea was important for receiving credit.

The second issue relating to the need or desire for credit incorporated a variety of factors. First, several researchers discounted the importance of credit to themselves personally, particularly when others needed or wanted the credit (SM1, SM4, MD1). Some groups appeared to have worked out a mechanism for sharing credit that almost involved taking turns (SM4, MD2).

Recognition within one's own field was acknowledged as being important by some researchers (SM2, LG3). The personal desire to receive credit was expressed in a positive sense by LG3"C" while LG2"D" reported the negative feelings associated with the withdrawal of credit.
Roles/Relationships

The issues included within this rather large category indicated a variety of orientations toward roles within the group. One theme focused on particular skills, such as writing (SM1"A", SM3"A", LG2"D"), organization (SM4"A", LG1"A", LG3"A" and "B"), and analytic ability (SM4"B").

Another issue centered around motivational roles. Sometimes these were quite specific (LG1"C", LG2"C") while at other times they related more to the general climate for research (MD1, MD2).

Several groups were able to identify a complementarity of roles within the group, defining yet a third issue. SM2 related this to personal style as well as expertise. SM1 and SM3 focused more on personal interest or preference for various parts of the research process.
<table>
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<tr>
<th>Group</th>
<th>Leadership</th>
<th>Credit</th>
<th>Roles/Relationships</th>
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</table>
| SM1   | **B:** "I more or less took the initiative. [A] was quite happy letting me take the lead especially once she left education." | **A:** "I'm not caught up on who's first and second. It was more important for him because he is in academia. The issue was who did the lion's share of the work." **B:** "It depends on who took the main part. The one who put the document together gets listed first." | **A:** "[B]'s a horrible speller or recognizing a problem in a sentence and I'm pretty good at that, so between the two of us, we were able to complement one another. ... [B] and I are pretty compatible." **B:** "I enjoy the beginning part - the literature review and looking at other people's theories. I like the analysis and drawing conclusions, too, but I hate data collection. ... We had a very good idea of where each other was because we had worked together."
| SM2   | **A:** "We had to switch roles. [B] is the P.I. now." **B:** "The P.I. changed from [A] to me when she left the university. This is really a joint effort, though." | **B:** "That was decided ahead of time. I think the person who writes the paper should go first, not the person who has the idea. This allows for recognition for each within his own field." | **A:** "I enjoy setting up the project, designing it. Data collection can be very frustrating. ... I did most of the public contact work. [B] was good at the hard science theory and the laboratory procedures." **B:** "I guess I see my role as I've tried not to let the project slip into too much non-quantitative or subjective observations. [A] has tried to keep things on time and going. ... I'm not a salesman. [A] has always done that part." |
Table 4 (Continued)

| SM3 | A: "He worked more as cohorts." | A: "My preference is that the person who has put the most planning, directing, writing effort into it should be named first." | A: "The part that I enjoy the most is writing. I like to string the words together. The part that I hate the most is locating the resources and that's where my partner obviously had all those things. It was a neat match that way." |
| SM4 | A: "I was the leader by virtue of age and being in the business for a long time." B: "I really follow his advice because he has experience." | A: "It's almost an unspoken thing - it's his project or it's my project. It's just an agreement. It's the least of our concerns." B: "It depends. If I wrote the whole article, then I do a draft and he reacts and vice versa. Senior authorship is based on the amount of writing for the article." | A: "One of my main jobs was to establish priorities within the projects. I more attended to time frames. [B] worked at getting things produced, for example, the computer print-outs, etc." B: "I was involved in the technical, analytic skills - the use of computers. [A] worked at networking and getting other people involved." |
| MD1 | A: "There's not really a leader of the research project per se. I'm head of the department. We come up with ideas and work together." B: "[A] is really good about things. We have a good staff and he is sensitive to the amount of time we have." | A: "It's no issue. If various members make a definite contribution to the project, their name is included. If it's my idea, maybe my name goes first." B: "I guess right now's as much as I've got. It's a real problem for a lot of people at universities but it's not here." | A: "If I weren't here, a lot of that would never be done. I'm not trying to exaggerate my own importance here, I just don't think anyone else would take on these things. A lot of people are interested and capable. They just don't have the "umph" to get things done. You need a "sense of urgency" to initiate and finish projects." B: "I met [A] when I was in grad school. He was so involved in his work and trying to find out why things happened. It was like 'Now, someone's willing to do all that!' that it made me want to do more. Now that we have a good core group, we can be more creative and flexible." |
Table 4 (Continued)

<table>
<thead>
<tr>
<th>MD2</th>
<th>LQG</th>
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<tr>
<td>A: &quot;It's really been a group process. It depends on whose schedule we need to fit.&quot; B: &quot;I guess the one person most interested in the beginning was [C].&quot;</td>
<td>A: &quot;I can't tell you what the order was now. It was no big issue among us. I'm much more interested in the project - writing is the painful part.&quot; B: &quot;I don't remember who's first and second. I think we've all had our turn.&quot; C: &quot;The person who had the time to take the lead in writing I guess goes first. We don't even discuss it. The others edit and critique.&quot;</td>
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<td>A: &quot;I was the leader because it was my project to begin with.&quot; B: &quot;[C] stayed in touch with [A] and coordinated things here. It worked well because it was our usual course of events.&quot; C: &quot;I was the leader here by virtue of my position. It worked well because it was part of our normal departmental scheduling.&quot;</td>
<td>A: &quot;I don't really remember the order of the other names. My name was first because I was the senior investigator and wrote the reports.&quot; B: &quot;I think it was alphabetical, wasn't it?&quot; C: &quot;I don't know what the order was. The people who were included as authors were those who stuck with the project throughout.&quot;</td>
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<tr>
<td>A: &quot;I think we've pretty much shared our roles.&quot; B: &quot;All three of us have been really enthusiastic. Maybe [A] and I were a little more into organizing while [C] was maybe a little more creative. She'd say, 'have you thought about this?'&quot;</td>
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</table>

| A: "I like to work out the organization of the project. ... I have invited them to go on with the project, but I would like to make it of more benefit to them. I think they might not have gotten as much as they wanted to from the process." B: "The group was really well-balanced. We're used to working in teams. ... The project really dragged out. At the end I was really anxious to collect enough data and complete the project. Repetition of procedures during data collection got to be boring." C: "One of the staff was a motivator. Her enthusiasm carried over to the others." |
Table 4 (Continued)

| LG2 | A: "[C] was the leader. It worked out well because of his background in health education and his good research background." | B: "[C] handled things because each of the co-investigators had to deal with curriculum and teaching loads. There was sort of a consensus - if you'll handle the paper work and budgets, more power to you." | C: "I think it worked out well. At least I had no feeling from others that they didn't want me to be leader." | D: "[C] wrote the grant. The problem was that we had several different groups that had different ways to go. ... He controlled the money and the purse strings." | A: "It wasn't a big issue." | B: "We worked it out ahead of time - the P.I., statistician, senior investigator, etc." | A: "I made the decision and no one complained." | D: "[C] chose the order because he led the group. We disagreed on some of the findings. ... I had my name removed from one study. It was painful because I had contributed to the work." | B: "I really enjoy the creative part - I'm an idea man. ... I hate data chasing, tracking down surveys. ... I guess I served as a 'peacekeeper' or 'stress reducer' at times. You sort of need someone to ruffle the feathers and another to smooth them over." | C: "I like getting the project started and writing up the report. I get frustrated trying to get responses from surveys. ... one individual in the group who was very motivated and thorough came to meetings with a lot accomplished. This made the others want to come up to level in a positive sense." | D: "Things went pretty well considering. We did have a problem with different writing styles." |
Table 4 (Continued)

| LG3 | A: "There was no leadership. [D] took the initial lead. Then [another member] took over for awhile. Then we had no formal or informal leader for awhile. Then I sort of picked up the ball because I have a presentation. ... But there was no recognition of that role, but people have been calling me about things."
|     | C: "Leadership was a real problem. We've kind of had leadership by default. What we've learned and we've talked about it as a group is that the person who wants to present or use the data will be in charge and will call meetings or whatever needs to be done."
|     | D: "The group was interesting because I don't feel like there's anybody here who felt the need to lead the group. There's no egotist - no one's really competing."
|     | B: "I don't know whose name would go first. We'd have to negotiate. ... Can you publish on your own? Yes. Each one of us has sort of accepted that as a commitment."
|     | C: "I feel like I have a slice of my life in it and I do want to be recognized for that slice."
|     | D: "We've not decided who's going to be first author. Any of these people can get a publication if they write a paper and send it in to their own organization."

|     | A: "I think we're going to have a meeting and discuss the issues of who the research belongs to. I hope we can resolve them."
|     | B: "I don't know whose name would go first. We'd have to negotiate. ... Can you publish on your own? Yes. Each one of us has sort of accepted that as a commitment."
|     | C: "I feel like I have a slice of my life in it and I do want to be recognized for that slice."
|     | D: "We've not decided who's going to be first author. Any of these people can get a publication if they write a paper and send it in to their own organization."

|     | A: "I guess I contributed a little organization to the group. ... There have been no real turf problems. They've just sort of put it aside. Also the people who tend to be more involved in turf issues have not been involved in this project."
|     | B: "I tried to keep their mailboxes filled with documents - facilitator of getting things in typewritten form. ... I don't think we needed a peacemaker. There were times when I became irritated and there still are. Everybody's a little disappointed that everybody didn't participate at the level that all of us did."
|     | C: "We have some people with really strong feelings about certain things. Some of the others are more loose, and that's the hardest thing - adjusting to others' personalities. I don't think we really fought. ... As a presenter, I'm representing collaborative work and I need to represent all the people, not me. And I need their input. I just feel like I've been handed information and dumped on."
|     | D: "The time that I noticed stress the most was this last time we met and the comment was made 'why is it that we're doing this today - we were supposed to be doing this last month.' It was the only time I felt frustration."
Impact of the Collaborative Process (Table 5)

On the Individual

The consensus of the researchers seemed to be that the collaborative process was a good experience, one from which they personally benefited. The kinds of benefits framed several issues within this theme.

First, there were professional benefits such as improved teaching (SM1"A", MD2"B"), enhanced clinical practice (MD1"B", LG1"B"), and greater departmental involvement (SM4"B", LG3"A"). A second issue centered around increased interpersonal opportunities (SM2"A", MD2"C", LG3"B"). Getting to know other team members as persons seemed to be important.

Third, some researchers cited the importance of learning through collaborative arrangements (SM2"B", LG1"B", LG3"A"). Included in this notion was the opportunity to work with specific individuals of renown in their field.

A fourth issue suggested that facilitating the learning of others was reinforcing to some researchers (MD1"A", MD2"C", LG3"D"). A final issue provided the refreshing outlook from some researchers that they were just proud of their involvement and their accomplishment (MD2"A", LG1"C").
On the Product

Collaboration was reported to have a positive impact on the research product in several ways. The first issue suggests the importance of combining knowledge and skills as research resources (SM1"A", LG3"C"). Clarification and refinement of the process and product were cited in several ways as a second issue (SM4"A" and "B", MD1"A", LG3"C"). The written document in particular was cited as benefiting from the process.

The scope and quality of the research itself emerged as a third issue of importance. This included improved sample size (SM3"A", LG1"C", LG2"C", LG3"C"), enhanced confidence in the data (SM3"A", LG1"A" and "B"), and access to new fields of endeavor (SM2"A" and "B", MD2"C").
Table 5
IMPACT OF THE COLLABORATIVE PROCESS

<table>
<thead>
<tr>
<th>Group</th>
<th>On the Individual</th>
<th>On the Product</th>
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<tbody>
<tr>
<td>SM1</td>
<td>&quot;I really enjoyed getting back the questionnaires - hearing what people had to say. I picked out critical responses and used them as real-life situations in the classroom. It helped my teaching.&quot;</td>
<td>&quot;I've always operated on the assumption that I would get better ideas and spar off another person and end up with a much better end product. I know what I know, but taking what I know and coupling it with someone else's knowledge, we're going to get a much better product.&quot;</td>
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<td>&quot;Being able to talk freely, our friendship, improved each other's work.&quot;</td>
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<tr>
<td>SM2</td>
<td>&quot;I like doing collaborative research. I enjoy it. It gets you out of your own little world.&quot;</td>
<td>&quot;We were able to expand our field of endeavor and perspective.&quot;</td>
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<td></td>
<td>&quot;I enjoy it most when it's all finished. It's all for a purpose and when we accomplish that purpose, that's when I enjoy it the most. ... I've enjoyed this arrangement. I think I've learned quite a bit from the experience.&quot;</td>
<td>&quot;There would not have been a product. We could not have done this without each other.&quot;</td>
</tr>
<tr>
<td>SM3</td>
<td></td>
<td>&quot;The product should be enhanced by different eyes looking at it and we will benefit from the increased generalizability. Also, we're increasing the n's available.&quot;</td>
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<tr>
<td>SM4</td>
<td>&quot;As an up-and-coming faculty member, it has helped me to team up with a mentor in my department because he knows what's going on.&quot;</td>
<td>&quot;We are able to clarify each other's thoughts, for example, relative advantages and disadvantages of certain statistical procedures, and the research product is better for that discussion.&quot;</td>
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<tr>
<td></td>
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<td>&quot;When we write our own drafts, they always look good. When other people look at it, they find lots of ways to improve it.&quot;</td>
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</tbody>
</table>
| MD1  | A: "I enjoy the opportunity to develop a culture of involvement. A lot of people are interested in what we're doing. There is a positive view of this kind of activity."  
  B: "I like making application to the way I treat patients. One treatment procedure - it blew my mind. We got the data and here it wasn't what I thought it would be."  
  A: "The more heads, the more right the product." |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MD2  | A: "I guess I enjoy planning and the product about 50-50. We do want it to be successful. It keeps us going."  
  B: "Doing it. Teaching is my favorite thing in the world. Seeing it in practice - seeing it work. I guess we've never set out to do something in order to get an article. Things have just evolved from our interest and the set-up here."  
  C: "I like the "hands on" doing something. Everybody is learning. Everyone is getting involved."  
  B: "If there's more than one idea, you get a better product. One of us plays the devil's advocate."  
  C: "This project wouldn't be done. I would not have started it on my own." |
| LG1  | A: "It's been a wonderful experience for me and it's got to be done. The answers are in the clinic."  
  B: "This has changed my perspective on how I do my clinical skills. I've learned a lot about the importance of research to clinical work. I've had a chance to read and respond to [A]'s incredibly well-written reports. I have a new awareness in reading them."  
  C: "We really had something at the end. The publication made it worth it."  
  A: "This is part of the reality of the clinic setting."  
  B: "Input from varied groups is better. It increases your awareness of the importance of precision."  
  C: "By virtue of the way the team was set up, it was helpful in creating a sample." |
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<th>Table 5 (Continued)</th>
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<tbody>
<tr>
<td><strong>LG2</strong></td>
</tr>
<tr>
<td>C: &quot;I think the product would have been different without the team effort. I'm not sure about getting a good response rate unless the disciplines themselves were represented.&quot;</td>
</tr>
<tr>
<td><strong>LG3</strong></td>
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<tr>
<td>A: &quot;I'm more comfortable about this project and this presentation because of not doing it alone. I'm getting out of the project what I wanted to - a couple of presentations, a couple of publications, and I think I've learned a lot.&quot;</td>
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<tr>
<td>B: &quot;It's been interesting. We haven't really gone to lunch but there have been discussions where you'll be at the same deli - I enjoy that - getting to know the other faculty members.&quot;</td>
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<td>D: &quot;I've enjoyed the recognition that I started this a year ago ... and then have people take the idea and have it come to fruition.&quot;</td>
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<tr>
<td>B: &quot;The report is much clearer because several different people are reading and contributing to it.&quot;</td>
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<tr>
<td>C: &quot;I think the product is definitely better as well as bigger.&quot;</td>
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</table>
Pros and Cons of Collaborative Research (Table 6)

Advantages

Underlying several of the quotes about the advantages of collaborative research is the whole notion of challenge and support. This is an important dimension in personal and professional development and constitutes the first issue in this theme. Some individuals, such as SM1"B", SM2"A", LG1"C", and LG3"A", appreciated the safety found in working with others. Other researchers reported the importance of the challenge of working with others as being motivational (SM1"A", LG2"B", LG3"C").

A second issue was somewhat related to the first, but focused more on the commitment to the project engendered by being involved in a group (SM3"A", LG3"C"). This sense of group involvement seemed to be important to bringing completion to projects.

The importance of access to expertise came across as a third issue in the advantages category (MD2"A" and "B", LG2"C"). SM2"B" cited the advantage of gaining personal expertise through collaboration.

The potential for increasing the scope of research activities constituted a fourth issue (SM4"A" and "B", LG1"A", LG3"B"). Both horizontal and vertical building options were implied in the advantages of collaboration.

Issues relating to time were mentioned in both the advantages and disadvantages themes. In the advantages
area, the issue of time centered around the ability to share the work load and carry out tasks concurrently (SM3"A", MD1"A" and "B", LG2"A", LG3"B").

**Disadvantages**

The issue of time as a disadvantage involves the need to coordinate multiple schedules (LG2"A", "B", "C", and "D", LG3"B"). The comments of MD1"A" addressed this concern in a slightly different way by stating that single research is more "expedient" since "no one gets in my way."

Differing levels of commitment from team members emerged as a second issue among disadvantages. These problems were especially noticeable in the responses from the larger groups. A sense of group accountability or involvement was one dimension of this (LG1"C", LG2"A" and "B"). Differing priorities among projects and responsibilities was another aspect of the problem (LG2"C", LG3"A" and "C"). Thus, group commitment, that was suggested as an advantage of collaborative research, can apparently be problematic when it is missing.

A special, perhaps unavoidable, case of differing commitment was suggested by SM3"A" when he mentioned that team members may move away. The groups in this study, as described in an earlier section, indicate that this is indeed a reality with many collaborative groups.
Quality control emerged as a third issue. This concern was expressed in both clinical and educational settings when multiple people were involved in data collection (MD1"B", MD2"B").

Communication problems were cited as a fourth issue that was disadvantageous. These problems were noted when geographic distance was involved (SM1), when educational backgrounds differed significantly (SM3, LG2"D"), and in a more general sense (SM4).

Yet a fifth issue hinted at by some researchers was the possible stifling effect of collaborative research on individual interest or areas of expertise. This was suggested in two ways. First, the thrust of the collaborative project might not coincide completely with personal interests (SM3"A"). Second, involvement in collaborative research might preclude significant involvement in more personal areas of research interest or expertise (LG3"D").
### Table 6

**PROS AND CONS OF COLLABORATIVE RESEARCH**

<table>
<thead>
<tr>
<th>Group</th>
<th>Advantages</th>
<th>Disadvantages</th>
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| SM1   | A: "We both challenged each other."  
B: "I guess support - for each other and what we were doing." | A: "If there's a geographic distance, that certainly creates a problem. Also, if you don't have that match of personality, it would be hard."  
B: "There's a definite inconvenience of not being close geographically." |
| SM2   | A: "We had somebody to bounce ideas off of. Having a group was good for problem-solving, when changes were needed. We also provided support for each other."  
B: "First, you gain expertise you don't have. There is so much overlap between the disciplines and at some point we've all lost contact with each other. I guess this gets us back in contact." | A: "There can be a lack of clarity in a lot of ways. In roles, who is going to do what. In outcomes, the way things will be presented, and so forth. There can also be disagreements on how to proceed."  
B: "There is sometimes a disadvantage in communication because of our different training. We may approach things differently." |
| SM3   | A: "Being able to spread out the tasks is a real advantage. Also, there clearly is a component of, if you're working with someone, there's a professional, a mutual obligation to proceed on with the task. It makes target dates more concrete." | A: "There are some disadvantages in that we would perhaps hold others back. Also, we may look at more aspects or different aspects than what a personal interest might be. Another thing, team members may move away." |
| SM4   | A: "You can get more mileage by spinning off various projects. You need to rehash thoughts. Doing single research is like a monk in a monastery. It really can't be done anymore. It has little social utility."  
B: "You can triple output in a year by working with other people. It cannot be done alone anymore. There is only so much time to do research and still teach and carry on with other things." | A: "There can be communications problems." |
<table>
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<tr>
<th>MD1</th>
<th>A: &quot;You can cut down the time commitment for data-collection. An important advantage is that you can build team spirit - build a culture that says an objective basis for practice is important.&quot; B: &quot;It's a lot quicker. You can collaborate with ideas and perspectives in terms of adaptations.&quot;</th>
<th>A: &quot;One advantage of single research is expediency and getting on with things. No one gets in my way.&quot; B: &quot;We can't always be sure of our own data when it is collected independently by several people. Writing styles may be different. And, of course, you always have to make sure everyone meets the deadlines.&quot;</th>
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<tr>
<td>MD2</td>
<td>A: &quot;Expertise. Also, a more experienced person can add insight into the process. Sometimes you want guidance and assistance because you're blind to your information needs.&quot; B: &quot;A team approach allows for pulling together various areas of expertise. It's easier to keep perspective on what you're doing. Also, it adds relevance in interdisciplinary areas.&quot; C: &quot;The others were good writers.&quot;</td>
<td>A: &quot;I can't think of any disadvantages in our case. I've heard of others' experiences - wanting to be primary author or getting hung up on things.&quot; B: &quot;The only thing, we need to have a little control over what's going on so we can make sure of the quality of things.&quot; C: &quot;Nothing.&quot;</td>
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<td>LG1</td>
<td>A: &quot;I could not have had access to the data without the team. They were able to absorb it into the treatment program and collect data without disruption. This made the data more valid.&quot; C: &quot;Peer support is important.&quot;</td>
<td>C: &quot;I guess one disadvantage is needing to keep everybody involved. There was no individual accountability. There was supposed to be, but sometimes there was a feeling that others would pick up the slack.&quot;</td>
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<td>Table 6 (Continued)</td>
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<tr>
<td><strong>LG2</strong></td>
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<tr>
<td>A: &quot;First, you can spread the work around. You get a broader perspective. Input from people with different sets of experience enriches the process.&quot;</td>
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<td>B: &quot;The team approach constantly forces me to look farther than I thought my ideas were. I suddenly realize I have to rethink my ideas. I need all those folks to give it structure.&quot;</td>
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<td>C: &quot;The collective expertise is important.&quot;</td>
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<tr>
<td>D: &quot;You're forced to find a common ground to work together. You really learn respect for others' experiences and disciplines.&quot;</td>
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<td>A: &quot;Basically, there are problems of coordination. Keeping the project on track. It's easy to let things fall by the wayside. Another thing, things are not always equitable in the distribution of work and responsibility.&quot;</td>
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<td>B: &quot;It's hard to keep after everybody else to get the project off the ground. It really frosts my cupcake—waiting for people to work through their own agenda. There are some problems of scheduling things.&quot;</td>
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<td>C: &quot;Time. Getting the schedules together. Also, setting priorities. If the project is more important to some than others, this can cause problems.&quot;</td>
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<td>D: &quot;It takes time. If the group is too diverse, you have a lack of communication. You can't get depth with too many professions. You have to speak in elementary language because others don't understand.&quot;</td>
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<td><strong>LG3</strong></td>
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<td>A: &quot;It has given me a sense of security.&quot;</td>
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<td>B: &quot;The time is cut down but then more is expected because it's a larger project. Too, no one person is responsible for any one section so the criticism is diffused.&quot;</td>
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<td>C: &quot;We spur each other on and we make each other do this. It made me feel like I would be letting everybody else down.&quot;</td>
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<tr>
<td>A: &quot;This project was a low priority for some of the senior faculty and it was hard to get them to get their data in.&quot;</td>
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<td>B: &quot;Things take longer due to more people and the need to get a group together.&quot;</td>
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<td>C: &quot;This project was not a priority for some people.&quot;</td>
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<tr>
<td>D: &quot;Individuals need to develop their own expertise and their own area.&quot;</td>
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Advice from the Experts (Table 7)

**Personality Factors**

Certain personality traits emerged to form one issue among the quotes. Flexibility, receptivity, and open-mindedness were valued by several (SM1"A", SM4"B", MD2"B", LG3"C"), as was creativity (SM2"A", LG1"B"). Additional traits that were mentioned included consistency, reliability, dependability, persistence, and meticulousness (LG1"B" and "C").

Attitudinal concerns formed a second issue. Evidence of enthusiasm for the project surfaced as one dimension (MD2"A"). An eagerness to learn and a desire to know the answer was mentioned by several researchers as being important (SM2"A", MD1"A" and "B", MD2"A", LG1"A" and "C", LG2"C").

A third issue combines issues of self-confidence and ego. MD1"A" and MD2"C" stressed the need for self-knowledge and positive self-regard which can be used constructively in the group arrangement. Others addressed the same issue from the standpoint of needing to avoid feelings of superiority, to suppress big egos, and to refrain from pretentiousness (SM1"B", SM2"A", SM4"B", LG2"A"). These issues are manifest in a spirit of cooperation and compromise rather than competition (SM2"A", LG2"C", LG3"B").
Expertise, and the respect for same, seemed to emerge as an issue separate from the more personal dimensions mentioned above (MD2"A", "B", and "C", LG2"C"). LG2"B" expressed the opinion that expertise was ultimately more important to the group than other personality factors.

The importance of matching or complementing members of the group were mentioned by several researchers. SM3"A" mentioned the need for a mix of individuals, while SM1"A" advocated matching group members on the basis of similarity. LG3"D" indicated that the importance of matching might depend on the nature of the relationship to be established.

Organizational Factors

One major issue involving organization dealt with clarifying roles within the project (SM2"A", SM3"A", MD2"B" and "C", LG2"D"). LG3"C" advocated using a flow chart. Leadership responsibilities were specifically mentioned by SM3"A" as needing clarification.

The need to set realistic time lines and obtain commitment to them emerged as another important issue (SM1"B", SM2"A", MD2"A", LG1"B" and "C", LG2"C" and "D", LG3"B"). Time commitments were related to both the length of the project and the day-to-day requirements of the research.
Checking out the people involved, their expertise, and their motivations for being involved was put forth as an important prerequisite activity to joining a collaborative arrangement (SM2"B", MD2"B" and "C", LG2"A", "B", "C", and "D", LG3"D"). This issue of assessing the project prior to involvement also included looking for relevance, both professional (MD1"B") and personal ("SM2"A"). The need for congruence of personal and group goals and interests was stressed (SM1"A", SM2"B", MD2"A" and "B", LG3"D").
## Table 7
### ADVICE FROM THE EXPERTS

<table>
<thead>
<tr>
<th>Group</th>
<th>Personality Factors</th>
<th>Organizational Factors</th>
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<tr>
<td>SM1</td>
<td>A: &quot;I like to work with someone who's open-minded. Someone who's as flexible as you are. There are workers and there are slackers. It's important to match up with someone at the same level you are or you'll end up feeling frustrated. I guess you both have to have the same background or knowledge.&quot; B: &quot;You need a compatibility of personality. It's important to feel comfortable. If one is pretentious, it is intimidating to the other. Also, they need some expertise on the area to be studied.&quot;</td>
<td>A: &quot;Get a task list set up of who's going to do what, when, where, and how and not go by vague plans. Find out how the other person approaches their work.&quot; B: &quot;Appreciate the time it takes. The more fingers in the pie, the longer it takes. Question the involvement of others in the project. Set up a timeline. Have things laid out.&quot;</td>
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<td>SM2</td>
<td>A: &quot;Avoid someone who is overcommitted - who says yes but then doesn't follow-through. Avoid someone with a superior attitude. You need an equal pace without too much competition. It should be someone with an inquiring mind. Creative. Someone who wants to find out the answers.&quot; B: &quot;Find someone so you can support each other and at the same time push each other at some level.&quot;</td>
<td>A: &quot;Get your roles clarified - what do you hope to get out of this project. Maintain communications. Specify the time lines. Decide what is going to be done with the product.&quot; B: &quot;I would say to know about the area of the other person's specialty - to learn more about it. It would be advantageous if we could see things from each other's perspective.&quot;</td>
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<td>SM3</td>
<td>A: &quot;It requires a mix of individuals. Someone who is a leader that everyone else acknowledges as the P.I., someone who is co-investigator.&quot;</td>
<td>A: &quot;There needs to be someone basically in charge of shepherding the project. A spelling out of roles would probably facilitate things. Also, an agreement on the product being owned by everyone who's involved.&quot;</td>
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<tr>
<td>SM4</td>
<td>A: &quot;It's a matter of matching. What happens is a younger person has energy and an older person has experience.&quot; B: &quot;You can't have a big ego. I use the idea that you need to be flexible and know that other people will help you. You need to be respectful of your colleagues. People are basically fair and it will all even out in the long run.&quot;</td>
<td>A: &quot;I liken it to a love affair. One minute you're annoyed, another, intrigued. You've got to work at it to make it happen.&quot;</td>
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### Table 7 (Continued)

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<tr>
<th>MD1</th>
<th>A: &quot;They need a positive regard for themselves and what they are doing. Like in In Search of Excellence. Money is usually not a real problem. Often the best funded are the least productive. Sure, it takes time and money but you can usually handle things if there's a desire to know the answer. Mostly a person needs a desire and interest.&quot; B: &quot;We look for certain types of people when we hire them. They need a willingness to learn. Humbleness. An eagerness. An openness to new things. People make time for things that interest them. We try to find out what they're interested in.&quot; A: &quot;Try to get philosophical support from administrators and others.&quot; B: &quot;Emphasize applying the research findings. Gear everything to results and outcomes.&quot;</th>
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<tr>
<td>MD2</td>
<td>A: &quot;First, you need a respect for the competency of others. Our project would never have happened if one of us had thought she was better than the others. Second, appreciate the different roles of others. And, I guess, an enthusiasm. This has to do with personality - it shows what you care about. We all carry the same kind of trend. If we were not as enthusiastic, it wouldn't be as much fun. I guess I would try to see if they were equally interested. I'd look for some demonstration of interest.&quot; B: &quot;You have to respect what the other person knows. It won't work if you're being forced to do it. You have to go in with an open mind. Some people are receptive and others think they don't need others.&quot; C: &quot;First of all, you have to be okay about yourself in your own area to be able to extend yourself to others. You have to see the importance of other people and their viewpoint. You have to compromise some.&quot;</td>
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<td>A: &quot;Look for a common interest - what's it all about and what are the expected outcomes. Make a time commitment to the project. Ask yourself, is this something I'm really interested in.&quot; B: &quot;Know the main purpose of the experience. Find out if it's going to accomplish something. Be extremely well organized. Use everyone's opinion. Limit the number of people making decisions. Determine the objectives, time frames, resources, materials, job responsibilities. Go to others for details on backgrounds and/or limitations. Take your ideas and make them applicable.&quot; C: &quot;What you have to do is plan it so you can meet your own needs and their needs as well. Work it out. I have to be able to look at the other person's need to meet theirs and mine.&quot;</td>
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</table>
| LG1 | A: "Find someone who is wanting to find out the answers to the questions. There needs to be a commitment to the importance of the outcome."  
B: "Consistency. Methodical. Creative."  
C: "You need someone with reliability, dependability, persistence, meticulousness. Someone who is not easily discouraged. They need a true commitment to research and a far-sighted sense of the value of research."  

| LG2 | A: "The ability to suppress ego, to share the credit and the responsibility. Someone who's organized, who will keep track of things that come in pieces. They also need interpersonal skills, the ability to get along."  
B: "Having folks with expertise - a statistician, a sociologist, a social anthropologist. If I can get expertise, I can deal with the personalities. If personality becomes a problem, you need to work it through. Territorial bounds can create problems if you're not willing to share."  
C: "Look for someone who's interested in the subject, has a willingness to cooperate. It should be someone with expertise with some contribution to make."  
D: "You need someone who's really particular and has writing skills. Watch out for those who bring a hidden agenda based on some unknown factors."  

| LG1 | A: "Look for mutual respect. What one brings to the research and what one takes to the clinic need to be mutually valued. Neither person should be at a lower level or a higher level. You have to understand each other's problems, for example, clinical time constraints. It helps to know the other person's language."  
B: "Check the time commitment - over how long a period of time. What are the expectations? There should be an awareness of the overview of the kind of project."  
C: "Find out the approximate amount of time to generate the sample. Maintain staff interest."  

| LG2 | A: "Know the other players - who they are, what they can produce. Find out about them by checking with someone who knows them. Second, establish a time frame. Get commitment."  
B: "Find out who are the people involved, who will be representing institutions, what areas of expertise do they represent. Often you bring people with titles in but they don't know how. Once you come together, find out how easy or difficult they are to work with."  
C: "The group should be cooperative and cohesive. Check for time and priorities. It's difficult to assess the difference between verbal commitment and follow through but it's worth the effort."  
D: "Find out who's authoring the report. Make sure how people think about things - common interests and goals, common philosophy. Respect each other's ability. Make clear who's responsible for what. Set deadlines from the beginning."
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<tr>
<th>LG3</th>
<th>A: &quot;Someone who will accept responsibility. Everyone has to have the same interest and priority.&quot;</th>
<th>A: &quot;Maybe a session on group process, team work, collaboration would have been very helpful at the beginning. ... I would look for a smaller group next time.&quot;</th>
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<td>B: &quot;They need to be willing to share. You have to get along - give and take.&quot;</td>
<td>B: &quot;Establish a realistic time frame. Establish routine meetings.&quot;</td>
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<td>C: &quot;I think you have to be flexible. That's the key. Yet if you feel strongly about something, you have to stand by what you feel. If you're going to participate in a group, you've got to accept responsibility.&quot;</td>
<td>C: &quot;Set up guidelines. Obtain commitment and participation level of the others. Have a flow chart.&quot;</td>
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<td>D: &quot;If I were working with colleagues at my own level, we would be constantly competing. Personalities would be much more important.&quot;</td>
<td>D: &quot;I'd want to know do they have a clear idea of what they want to do. Do they already have something that holds them together? Do they have a common interest and is that interest strong enough? The nature of the collaboration should be identified early on.&quot;</td>
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Missing Themes

Some themes were conspicuous for their absence. Territoriality or turf protection was one such theme. LG2"B" (Table 7) stated that "territorial bounds can create problems if you're not willing to share" but did not relate such problems to the research group in question.

In another example, LG3"A" (Table 4) addressed the potential for turf problems:

There have been no real turf problems. They've just sort of put it aside. Also the people who tend to be more involved in turf issues have not been involved in this project.

Factors that are frequently seen as barriers to research participation also did not emerge as a theme from the discussion. To some extent, this is not surprising in that these were projects that had overcome any possible barriers. However, some of the researchers went out of their way to diminish the importance of some of these factors. For example, the role of money or funding was consistently downplayed when mentioned at all.

SM4"A" (Table 2) indicated that "we didn't really need money." Both "A" and "B" in group MD1 (Table 2) indicated that, while money facilitated the research process, it was not a prerequisite. As LG2"B" (Table 2)
put it: "The grant provided the carrot to get the project going."

Lack of time is often suggested as a barrier. Although time was scarce for these researchers, it did not inhibit their involvement. Rather, time was seen as a variable which accommodated activities deemed to be important. MD1"B" indicated that "people make time for things that interest them."

Junior faculty members seemed to have the most difficulty adjusting their time schedule to accommodate the research. SM1"B" (Table 2): "We had to keep up our course load." LG3"A" (Table 2): "There was no decrease in other responsibilities while we were working on this." LG3"C" (Table 2) supported this assessment of the situation.

Lack of administrative support was mentioned by only one researcher (SM1"A", Table 2). Others either cited support as being available or simply proceeded on the assumption that what they were doing was important. Support from others was not necessarily a relevant criterion for participation or success.

Another missing theme was that of inadequate research skills or lack of training. The researchers were asked to address this issue in the interview. Most responded with the fact that they had had the "usual"
graduate school experience and training. Most also indicated that they would value additional skills, particularly in the analytical area.

However, none indicated that their limited experience or training had hindered their research participation. They cited instead the opportunity to learn about research that had been provided by the collaborative process (LG1"C", Table 3; SM2"B", Table 5; LG1"B", Table 5; LG3"A", Table 5).

**Unique Experiences**

Each group provided a character of its own. All of the projects were ultimately successful in that they produced a research product through a collaborative effort. However, the path to that product differed within the groups. A few of the groups will be given some individual attention in that their particular situation may have been lost in the artificial structuring of categories and themes.

The first group singled out for consideration was one of the larger groups (LG3). As mentioned earlier, this group was still in the throes of completing its project within the constraints of a deadline. The members were feeling stress. The other projects had all
lost the edge of anxiety, having completed their activities some time ago.

The comments from members of LG3 reflect an intensity and personal involvement long since forgotten by the other groups. Phrases indicating that "communication has been our biggest problem" (Table 3) coupled with statements such as "leadership was a real problem" (Table 4) relate the nature of some of the issues within this group very clearly.

The words "stress," "frustration," and "disappointment" appear more often in the quotes of this group than in those of others. The fact that these individuals consented to be interviewed at all, however, attests to the importance and pride they attached to their project.

The two medium sized groups also deserve some attention, for their relationships to each other and their project appear to be unique. The fact that both groups were medium sized appears to be purely happenstance. What set these groups apart was hard to grasp and even harder to articulate.

At first glance, the comments and attitudes of the individuals involved might give an impression of naivete and disorganization. However, the conversations themselves, the consistency among the individual
researchers, the obvious enjoyment of the process gave a sense that good things were going on here.

The work of Morgan and Ramirez (1983) on action learning was helpful in defining the nature of their relationships. Their description of the holographic metaphor produced an amazing fit with the activities of the two groups. These two research projects seemed to reflect self-organizing systems whose aim is "to create systems that are able to learn from their own experience, and modify their structure and design to reflect what they have learned" (p. 5).

Principles of the holographic metaphor put forth by Morgan and Ramirez (1983) require that certain conditions be met. First, there must be a requisite variety within the system so that the various components or individuals are multi-skilled and interchangeable. This redundancy of function can then be used in the interest of effectiveness. Both of these groups seemed to reflect this. Neither group was able to define areas of responsibility within the group as evidenced by the voids in Table 3.

The second condition within the holographic metaphor requires that the system or group engage in double-loop learning "which monitors and questions the appropriateness of what is happening in a system and its
context" (Morgan & Ramirez, 1983, p. 7). Both MD1 and MD2 had difficulty defining the origins of their research except in the context of their work environment. The sense of their quotes in Table 2 is that the research was almost happenstance. This impression is reinforced by the information contained in Table 3. Work and research were hopelessly intertwined and hard to separate.

And third, the system or group must operate under the principle of minimum critical specification which allows as little pre-design as possible. The aim is to promote inquiry as the fundamental route to structuring. MD2"A" (Table 3): "We just decided what we wanted to do as a starting point and looked at how we could fit it in." MD1"B" (Table 2): "We're kinda different. We have ideas and go ahead and test them out. We don't discuss it a lot."

The extra attention paid to these few groups does not diminish the unique nature of each of the group relationships. Rather, the unique features of the other arrangements seemed more readily apparent from a reading of the quotes and did not require additional explanation.

**Overlaying Factors**

The themes, with their accompanying range of issues, point to three major factors that shape the conditions
that facilitate and inhibit collaborative research. The issues that contribute to success vary within these three dimensions. Each of these dimensions constitutes an overlay for the collaborative research process.

**Size of Group**

First, the size of the group appears to be important, particularly when addressing issues of group structure and group process. Two themes provide good examples of the influence of group size.

The theme of communication (Table 3) contained issues of whether the mechanism for communication should be formal or informal. With the exception of the two small groups who had to deal with geographic distance (SM1 and SM2), all of the small or medium groups reported informal communication mechanisms. SM3"A": "We mostly got together informally as we needed to." SM4"A": "We meet at lunch almost every day." MD1"A": "We don't have special meetings."

The larger groups indicated greater structuring in their communications, referring regularly to "meetings." The frequency of meetings was important within these groups. LG3"B": "We've been meeting more here at the end trying to pull this thing together." LG3"D": "We met every week at first. The early working days were very important."
The theme of leadership (Table 4) provides a second example. The small and medium sized groups minimized the importance of leadership within the group. SM3"A": "We worked more as cohorts." MD1"A": "There's not really a leader of the research project per se." MD2"A": "It's really been a group process."

Two of the large groups experienced some difference of opinion about leadership within the group. LG2 members consistently reported leadership by the grantsman in the group. However, one of the members, "C", stated that the "problem was that we had several different groups that had different ways to go ... He controlled the money and the purse strings."

LG3"A" indicated that "there was no leader." "B" agreed that "leadership was a real problem." Although not viewing lack of leadership in a negative light, "D" also reported that "the group was interesting because I don't feel like there's anybody who felt the need to lead the group."

**Nature of Collaborative Arrangement**

A second overlaying factor, the nature of the collaborative arrangement, imposes certain considerations upon the group. The salient point here is that all members of the group should have the same understanding of the kind of collaborative arrangement. Differing
expectations of the relationship lead to conflict and lack of cohesiveness within the group.

The theme of responsibilities provides some evidence for the importance of the type of relationship. Multidisciplinary studies such as LG2 and LG3 tended to distribute the workload based on the discipline represented, providing a somewhat horizontal arrangement. Expertise was important in determining work responsibilities to the researchers in SM2 that combined diverse specialized areas. The team members seemed to work parallel to each other. The mentor/mentee relationship exemplified by SM4 encouraged a more vertical distribution of the workload.

Motivations for Research and Involvement

The third overlaying factor indicates that the motivations for the research and for personal involvement strongly influence the subsequent issues to be resolved. Activities that are intrinsically motivated seem to elicit fuller enjoyment and fewer problems than those that are driven by external motivations. Those projects arising from intellectual curiosity or clinical questions create the best environment for research.

The evidence to support the importance of motivational factors is not as clearly demonstrated by the themes. This is in part attributable to differences
in motivation within the groups themselves, thus confounding any comparison of groups. One indication of the importance of the motivation for research might be the history of a continuing relationship.

SM1, motivated by tenure, is no longer working together. LG2, with its extrinsic motivation of funding, has not continued in research activities beyond the financial support. Groups brought together by common interests tended to stay together more (SM2, MD2, MD3).

Framework for Successful Collaboration

The information supplied by researchers from a variety of collaborative research groups has provided a complex set of variables that, together and separately, affect the collaborative process. The interview data were organized around six categories: group formation, group structure, group process, impact of collaborative research, pros and cons of collaborative research, and advice from the experts. Overlaying these categories and their attendant themes, three factors were identified that seemed to shape the course of the collaborative research process. These included the size of the group, the nature of the collaborative arrangement, and the motivations for the research.
To borrow from the terminology of quantitative research, the situation resembles a factorial design in which multiple variables exist in a crossed arrangement. The main effect of any one variable may be less important than the effect of that variable as it interacts with one or more other variables.

Gay (1981) defines factorial designs as those that "involve two or more independent variables, at least one of which is manipulated by the researcher" (p. 234). In collaborative research, the overlaying factors can to a large extent be controlled or manipulated by the researcher as represented by the collaborative research group. In the process, the effect of interaction with the issues contained in the themes becomes more predictable and somehow more manageable.

Perhaps working through an example will help in clarifying the nature of the relationship. The theme of communications was found to have two levels or issues of importance: formal and informal. In a simple relationship, one might expect to look at collaborative groups and come out with evidence to support one of two statements: "formal communication arrangements facilitate collaborative research" (Figure 1) or "informal arrangements facilitate collaborative research" (Figure 2).
Figure 1
Possible Relationship Between Type of Communication and Successful Collaboration

Figure 2
Possible Relationship Between Type of Communication and Successful Collaboration
What appears to be the case, however, is that formal arrangements are facilitative in some cases, while informal arrangements are more helpful in others. Specifically, as discussed earlier, large groups may require more formal arrangements to maintain communication. Smaller groups may be able to get by with less formal communication arrangements.

Figure 3, using hypothetical data, illustrates the interaction of type of communication arrangement with size of group as these variables affect successful collaboration. Which type of arrangement is preferred depends on, or varies with, the size of the group.

To add one more layer of complexity, if additional overlaying factors were superimposed on the present picture, interactions could also take place with either or both other factors. An example from the present study may help.

The importance of leadership has been put forth as varying with the size of the group. Yet, LG1 did not seem to have problems with leadership in spite of the fact that they were a large group. It may be that another overlaying factor, the nature of the collaborative arrangement, is overriding the importance of size in determining leadership needs.
Figure 3

Suggested Interaction Between Type of Communication, Group Size, and Successful Collaboration
The evidence from this research suggests that there is no single set of conditions that can be described as facilitating or inhibiting collaborative research among allied health professionals. Rather, the factors that facilitate or inhibit participation are determined by the context made up of larger overlaying factors, some of which have been identified as size of the group, nature of the collaborative arrangement, and motivation for the research process.
DISCUSSION AND IMPLICATIONS

The findings of the present study will be related to the literature and the research findings of others in the first major section of this chapter. The second section will use an analogy to connect the results to circumstances in the known world and to give them some additional significance. A final section will suggest directions for further research.

The Findings Within a Research Context

The researchers in the present study are indeed scientists in that they have successfully striven to contribute one or another element to the constellation of facts, theories, and methods collected in the current literature (Kuhn, 1970). As allied health personnel, they provide excellent examples of the cross between scientists and humanists described by Blalock (1984).

Many of the personal attributes of a scientist were evident among those interviewed. The "essential restlessness of the human mind" suggested by Polanyi (1958) surfaced in the discussion of research
involvement. These were individuals who embodied more than the usual levels of intelligence, perception, and energy as demonstrated by their insight, synthetic ability, enthusiasm, oral expression, written expression, analytic ability, and productivity (Sindermann, 1982). Several of the researchers appeared to be producers of research rather than just consumers of it, with the process becoming paramount (Mooney, 1957).

Categories, Themes, and Issues

The limited time spent with each researcher precluded any verification of the various typologies of scientists. However, there was some indication of differences when the researchers identified their preferences for various aspects of the research process.

Some enjoyed the conceptual work: "I guess I'm most interested in looking at an idea and distilling it into a design" (SM4"A", Table 3). Others were more involved in analytic activities: "I do research with most all the faculty members here. They come to me because I have statistical skills" (SM4"B", Table 3). Still others derived pleasure from the data collection process: "I really enjoyed getting back the questionnaires - hearing what people had to say" (SM1"A", Table 5).

The importance of diversity within the groups was acknowledged by the researchers who were able to
appreciate the complementary functions performed by their co-researchers:

The part that I enjoy the most is writing. I like to string the words together. The part that I hate the most is locating the resources and that's where my partner obviously had all those things. It was a neat match that way. (SM3"A", Table 4)

On the other hand, diversity probably contributed to tension in some groups: "We did have a problem with different writing styles" (LG2"D", Table 4). These findings are consistent with Krathwohl's (1985) notion of the dual function of diversity.

The indications of developmental issues within the research process were subtle but nonetheless real. Whether the developmental differences were related primarily to time in the field, as suggested by Neyman (1977), or were also a function of chronological age is not clear from the present research since information on age was not solicited.

There seemed to be a mellowing among more experienced researchers that allowed them to be fully involved yet somehow removed from the process. It allowed them to step back a little and enjoy their participation from a different angle. At a superficial level, there was almost a patronizing tone: "I really entered it as an opportunity for me to help young faculty members whom I sympathize with" (LG3"D", Table 2).
The familiar saying "Angels fly because they take themselves lightly" comes to mind in this context. The more experienced researchers were able to take themselves lightly because they could already fly. Younger researchers, struggling to strengthen their wings and develop a rhythm, often experience anguish and pain while learning to fly.

At the risk of belaboring the point, this difference in developmental perspective seemed important in some of the research projects, specifically the larger, interdisciplinary ones. Some within-group tensions appeared to derive from these differences: "This project was a low priority for some of the senior faculty and it was hard to get them to get their data in" (LG3"A", Table 6).

These indications give support to the notion of career development put forth by Vondracek, Lerner, and Schulenberg (1986). They also reinforce the responsibility of mature researchers to bridge differences within groups in that they have access to multiple roles based on their more extensive socialization (Krathwohl, 1985).

Some of the researchers indicated that they had entered the collaborative research process with the hope of learning about research. Of the three approaches to
learning research - by doing, by proposing to do, or by critiquing - put forth by Overfield and Duffy (1984), these responses give strength to the notion of learning by doing: "I like the 'hands on' doing something. Everybody is learning. Everyone is getting involved" (MD2"C", Table 5).

Some identified the opportunity to work with a specific individual as being important in their involvement: "It was a terrific opportunity to work with [A] and gave me a chance to learn new things" (LGl"B", Table 2). This is consistent with the writings of several authors (Ballin, Breslin, Wierenga, & Shepard, 1980; Levin, 1983) who have cited the importance of working with other professionals as an important method for gaining research skills.

Mentoring is alive and well and valued as a helpful mechanism for junior faculty members: "As an up-and-coming faculty member, it has helped me to team up with a mentor in my department because he knows what's going on" (SM4"B", Table 5). Indeed, both parties seem to benefit: "It's a matter of matching. What happens is a younger person has energy and an older person has experience" (SM4"A", Table 7).

The factors normally reported to inhibit research participation were minimized by the researchers who were
interviewed. These include lack of time, inadequate skills, poor administrative support, and lack of funding (Fallin, Breslin, Wierenga, & Shepard, 1980; Copp, 1984; Nieswiadomy, 1984; Todd & Gortner, 1982).

It appears that certain conditions are necessary but not sufficient for research participation. Once a minimum level has been achieved, these factors are no longer important as determinants of research involvement: "Sure, it takes time and money but you can usually handle things if there's a desire to know the answer. Mostly a person needs a desire and interest" (MD1"A", Table 7).

Most of the strategies reported in the literature to increase research participation were designed to achieve this minimum level (Batra, 1983; Copp, 1984; Vraciu & Darnell, 1982). Perhaps the researchers in the present study were no longer concerned with achieving minimum conditions. The literature does not provide much background to address the issues of what conditions are not only necessary but also sufficient to encourage research participation.

The factors related to professional identity and its potential effect on collaboration did not surface in the present research. The individuals involved in the collaborative activity seemed to be more important than the disciplines that they represented: "There have been
no real turf problems. They've just sort of put it aside. Also the people who tend to be more involved in turf issues have not been involved in this project" (LG3"A", Table 4).

Whether ethnocentrism (Leininger, 1978) was truly not a problem within these research groups or whether the research process was not sensitive enough to pick up on these factors is unclear. It may also be that, by focusing on successful research groups, the present research filtered out those groups who had less happily dealt with such issues.

The advantages and disadvantages of collaborative research cited by the researchers were generally in agreement with the literature. The effects of mutual stimulation, motivation, and support were readily acknowledged as beneficial (Fox & Faver, Iwasiw & Olson, 1984; Neyman, 1977): "Find someone so you can support each other and at the same time push each other at some level" (SM2"B", Table 7).

The collegial benefits mentioned by the researchers were also consistent with previous findings (Fox & Faver, 1984; Neyman, 1977): "We haven't really gone to lunch but there have been discussions where you'll be at the same deli - I enjoy that - getting to know the other faculty members" (LG3"B", Table 5).
The positive effect of multiple perspectives and data sources on the research product was suggested both by the researchers and previous literature (Bergstrom, et al., 1985; Rosenthal, 1976; Snyder, 1985): "The more heads, the more right the product" (MD1"A", Table 5).

The "multiplier effect" of collaboration (Douglas, 1976) was supported by the researchers both in terms of integrating specialized knowledge and in networking to design new projects: "You can get more mileage by spinning off various projects" (SM3"A", Table 6).

The logistical problems of collaborative research have been documented in the literature (Bergstrom, et al., 1985; Feldman, 1981; Fox & Faver, 1984) and were reported in a similar vein by the researchers. These included problems of scheduling, multiple agreements, and communications:

Basically, there are problems of coordination. Keeping the project on track. It's easy to let things fall by the wayside. Another thing, things are not always equitable in the distribution of work and responsibility. (LG2"A", Table 6)

Concerns about the reliability of data were mentioned by the researchers in parallel fashion to the issues mentioned by some authors (Bergstrom, et al., 1985; Rosenthal, 1976): "The only thing, we need to have a little control over what's going on so we can make sure of the quality of things" (MD2"B", Table 6).
The literature deals extensively with the issue of leadership (Bergstrom, et al., 1985; Cottrell, 1962; Cottrell & Sheldon, 1966; Douglas, 1976; Feldman, 1981; Fox & Faver, 1984; Iwasiw & Olson, 1984; King, et al., 1985). Problems of leadership were related primarily by members of the larger groups:

Leadership was a real problem. We've kind of had leadership by default. What we've learned and we've talked about it as a group is that the person who wants to present or use the data will be in charge and will call meetings or whatever needs to be done. (LG3"C", Table 4)

Despite the attention in the writings about collaborative research and joint authorship (Cole & Cole, 1973; Merton, 1985; Moustafa, 1985; Sindermann, 1982), the issue of the distribution of credit turned out to be a non-issue among the researchers interviewed:

I can't tell you what the order [for authorship] was now. It was no big issue among us. I'm much more interested in the project - writing is the painful part. (MD2"A", Table 4)

**Overlaying Factors**

The first overlaying factor, group size, was not addressed specifically within the literature on collaborative research. Rather, the importance of this issue became apparent from the types of principles that were put forth as guiding the collaborative process.

Stepping outside the specific literature of collaborative research, Barker's theory of behavior
settings suggests "relevant behavioral differences between the inhabitants of small behavior settings and the inhabitants of large settings" (Walsh, 1973, p. 32). Changing the terminology from "inhabitants" to "participants" in research groups allows an adaptation of Barker's principles to the process of collaborative research.

Participants in small groups function in a wider range of activities with more opportunity to assume positions of responsibility and importance. They volunteer for activities more frequently and are more satisfied with their activities. They are pulled toward a fuller involvement within the group, are absent less often, and are more productive.

Smaller groups exhibit more group cohesiveness and demonstrate an increased ease in communication. Participants in smaller groups report more frequently on participation as having been meaningful.

The second overlaying factor dealing with the nature of the collaborative arrangement coincides nicely with the typology of research collaboration developed by Hagstrom (Speer, et al., 1985). Groups classified as complementary tended to be more collegial, a joining of equals. Personal characteristics such as age, sex, race,
rank, and personality traits were influential in the formation and success of such groups.

Groups classified as supplementary were formed primarily on the basis of expertise or access to resources. Roles within such a model tended to be unequal or equal but separate.

The third type of group was described as the master-apprentice. In this model, there was usually differential power among the members with the apprentice doing much of the work in exchange for knowledge or other kinds of rewards.

These three types of relationships encompass most of the kinds of structural arrangements found in collaborative research. Each is appropriate in certain circumstances. Each helps define the issues that need to be addressed with the group.

The motivations for research and personal involvement were merged into a third overlaying factor. Evidence of the importance of this factor was also found outside the domain of collaborative research. Berman, Greenwood, McLaughlin, and Pincus (1975) evaluated federal programs supporting educational change and found that the type of implementation procedure was important.

A key characteristic of successful implementation
revolved around the "the motivations and circumstances involved in the project's initiation" (p. 11).

The collaborative research literature also supports the importance of motivation (Hall, 1985; Hord, 1986). The work of Darling and Ogg (1984) on the types of value commitments required for initiating interdisciplinary processes is particularly relevant.

An Analogy

Taking the unfamiliar and discussing it in terms of the familiar frequently aids understanding. The analogy, as a form of metaphor, is one mechanism for accomplishing this. The metaphor serves as a decentering device that allows a certain distancing from the phenomenon, thus providing a new perspective (Miles & Huberman, 1984). Analogies focus on the similarities of relations or functions through implied or expressed comparisons (Gordon, 1968).

The findings of the present research project will be discussed using the same themes identified from the interviews but this time placed in the context of musical groups. Musical groups, like collaborative research groups, are involved in a joint effort that produces a joint product. Individuals have some room for personal expression and for developing individual talents while
contributing to the larger work. The product rewards both the participant and the recipient.

If the themes and issues can be transferred in this way, it gives strength to the findings. It also helps in grasping the nature of these issues and accepting their reality. The interaction effects suggested to occur between the themes and the overlaying factors may become more apparent in the process. The intent is that there will be an "expressed or implied comparison which produced simultaneously meaningful intellectual illumination and emotional excitement" (Gordon, 1968, p. 104).

**Group Formation**

A musical group that gathers around a common interest or goal probably works best together. It is even easier for those who have worked together in the past to take on new projects, thus avoiding the need to start over each time. Intrinsic motivations are as important for creating good music as for producing good research.

When the individual need to make music coincides with the purpose of the group, the relationship is most fortunate. The primary extrinsic motivator for musicians, that of making a living, runs parallel to the need of many researchers to publish.
The purpose of the group and the nature of the relationship among participants should be clearly understood. A group of experienced musicians gathering to make a recording will be subject to different relationships than a group of budding musicians attending music camp. The first situation implies a collegial relationship among relative equals. The second may end up approximating a teacher/student or mentor/mentee arrangement. The expectations of participants within these two situations would be quite different.

One arrangement is not necessarily better or worse than the other, just different. In research, the type of arrangement may not be as readily apparent as in the musical example above. Misunderstandings can result when some members of the group operate under the assumption of one type of relationship while others operate under another.

The choice of musical affiliation is related to preference and style as much as to expertise and need. A classical violinist, while possessing the skill to fiddle with a country band, would probably be happier joining a chamber music group. The differences in research groups are somewhat more subtle than the extreme example just cited. However, the principle remains a valid one. Individuals need to affiliate themselves with research
groups that have styles and interests similar to their own.

The most well-rehearsed musicians may come to naught on the night of the performance if no one brings the music or if the sound system does not work. The importance of support services cannot be overestimated in the successful completion of a performance or a research activity.

While financial support may be important to the long-term future of a musical group, lack of money seldom keeps dedicated musicians from banding together to play. The level of skill, while important, may relate more to the individual's relative position in the group than to his inclusion in the first place.

Group Structure

Specific times need to be set aside for working together. In the world of music, these are called rehearsals. In the world of research, they are called meetings or work sessions. The frequency of these sessions will vary depending on many factors, but must be frequent enough to accomplish the task to the satisfaction of all. The smaller the group, the more likely that these sessions might occur extemporaneously. Larger groups are most likely to require a predetermined and somewhat fixed schedule.
The symphony program specifies not only who is playing what instrument but the relative position of each player. Such delineation is probably not appropriate to most collaborative research efforts. However, there should be a general understanding of who is playing what role within the group.

Just as some musicians are able to play a variety of instruments but are expert at one, so many researchers can fulfill a variety of functions. It is important to clarify the roles of the various team members, drawing on the expertise of each individual. The ability to assume a variety of roles makes a researcher a valuable team member just as a musician who can occasionally fill in for others may be an asset to his group.

Group Process

A symphony orchestra has very different needs than does a piano duo, especially in the area of leadership. While the duo may work well as equal partners, essentially leaderless, the orchestra needs a conductor. The person serving as conductor may change, but someone needs to be in front of the group to coordinate the individual players. Smaller groups fall somewhere between these two dimensions. Someone needs to set the tempo and coordinate efforts.
The analogy seems to break down in the issue of credit. The conditions of promotion and tenure within academia have created an artificial system that distorts the importance of distribution of credit.

The rules or guidelines by which the group operates are often unstated. Norms are often helpful for establishing acceptable behavior and for handling deviance or exceptions. Large groups afford less room for variation than smaller groups who can retrench more easily. A symphony member who misses too many performances or rehearsals does not remain long with the group. In research, we seldom discuss such issues, let alone enforce them. Instead, we often tolerate and frustrate.

Impact of the Collaborative Process

Musicians seem to derive many of the same personal benefits from working with others that researchers do. The learning that results from working through musical challenges should enhance individual musical skills. Making new friends with similar interests is important to musicians as well as researchers.

The joy and pride of accomplishment may be more readily acknowledged by musicians than by researchers. Frequently, individuals involved in more scientific
activities tend to downplay or deny personal pleasure, focusing more on the value of the work itself.

To some extent, collaboration may be more important to the product in music than in research. This is due to the relationship between group formation and potential group product.

Often, a musical composition requires multiple musicians with specific abilities. Many musicians are not involved in defining the scope of the project, since the composer has built this definition into the work itself. A work written for four hands at the keyboard is not easily adapted to the combined skills of a drummer, a clarinetist, a vocalist, and a French horn player. In essence, the group is formed around the potential product.

Researchers, on the other hand, are usually in the position of writing their research project around the resources available to them. The product is framed by the research group that gathers.

This distinction breaks down, of course, when musicians begin composing their own works and when researchers are involved in projects with specific technical needs. In both cases, the needs of the project and the resources of the participants can be negotiated
to maximize the results. The effect on the product is obvious.

The musical product may benefit from the multiple ears of several musicians in the same way that the research product is better for the multiple eyes of researchers. Various interpretations and clarifications of musical passages should result in an enhanced performance.

Pros and Cons of Collaborative Research

Musicians receive the same challenges and supports from their musical cohorts that researchers do from their research partners. Musicians value the group structures that facilitate completion of projects and encourage personal skill development. They also appreciate the feedback on their performance by their peers.

Opportunities to venture into new kinds of music or to form new affiliations are expanded when musicians become involved in groups. Access to musicians with special talents or experience is also viewed as beneficial.

Issues of time are common to both musical groups and collaborative groups in that multiple schedules must be accommodated. The time saving advantage expressed by researchers may not occur with musicians since the
distribution of tasks is often defined by the project rather than by the number of persons involved.

On the down side, differing levels of commitment can affect musical groups in a way similar to the undermining of morale in research groups. Quality of the joint product relies on the quality of the individual contributions of the members of both kinds of groups.

As in research, musicians may become comfortable within the group situation and fail to maintain or improve individual skills. Areas of personal interest may lose out to the demands of the group project and the skills needed for group participation.

Advice from the Experts

In their book Can This Marriage Be Saved?, Papolos and Herring (1986) provided interpersonal and organizational guidelines for musical ensembles. Among others, the topics include "Coming together: who and why," "Is there life in a leaderless group?" and "How to divide the work load." Sound familiar?

The issues of working with other people seem to be universal. Whether the scenario is played out in a conference room, a clinical setting, or the concert hall, working collaboratively requires professional interest, concentrated effort, and human consideration. But the music can be beautiful.
Implications for Practice

Those interested in participating in collaborative research should know that they are entering a complex process. The complex interaction of multiple factors needs to be understood if the venture is to succeed and be satisfying.

Factors that facilitate research include, but are not limited to, the proper management of issues relating to external factors, communications, responsibilities, agreements, leadership, credit, and roles and relationships. The advantages and disadvantages of a team approach need to be weighed and understood. The impact of the collaborative process on the individual participant and the research product should be assessed realistically. Personal and organizational factors need to be taken into consideration. The same issues that facilitate collaborative research can inhibit group activity when they are either misunderstood or mismanaged.

The salient point is that facilitators and inhibitors of research are found within a rich context of factors that determine the ideal arrangement for each unique situation. An understanding of the overlaying factors and their impact on subsequent decisions should
help clarify the issues involved and the appropriate strategies to be used.

The overlaying factors emerging from this research, while not necessarily all-inclusive, provide some initial guidance for decision-making. First, potential collaborators should look carefully at the size of the group to be sure that organizational factors are adequate to meet the needs of multiple participants.

Second, the nature of the collaborative arrangement needs to be defined, agreed upon, and embraced by the researchers to be involved. And third, the motivations for the research project and the incentives for individual involvement require close examination for congruence between these two dimensions.

By addressing these factors prior to initiating collaborative research, the issues that comprise the range of facilitators and inhibitors can be channeled in positive directions. Informed and thoughtful decision-making should lead to successful and satisfying collaborative relationships.

**Directions for Future Research**

As is often the case, the results of one research effort result in additional questions to be studied. Several aspects of collaborative research seem to warrant further investigation.
First, additional groups of allied health researchers need to be studied to verify the findings of the present study. The themes and issues, the overlaying factors, and the suggested interactions should provide sufficient stimulus for any number of activities to extend the scope of the current project. Looking for unsuccessful groups might add a new dimension to the depth and breadth of information.

A second area of study could concentrate on certain models of relationships or certain size groups to verify the importance of these factors as suggested in the present study. By holding some variables constant, the impact of other issues could be more readily understood.

A third area of interest might include a longitudinal study of research involvement by allied health professionals to follow the path of their participation. The issues of career development and prior participation could provide interesting information about the perspectives of various researchers and their relationships with others.

Fourth, more indepth study of the relationships within collaborative groups could be useful, particularly when dealing with troublesome situations. Finding out how others have resolved certain types of problems could be most helpful to researchers who are trying to prevent
or minimize interpersonal problems within their group process.

Fifth, parallel studies with other professions might yield interesting information. If professional identity is a problem within allied health, these issues might be sorted out by looking at differences and similarities with groups who have a more established tradition and historical identity.

And, finally, exemplary groups involved in action research could be studied to determine the critical issues involved in this recently recognized research area. In terms of making change and having an influence on the field, the individuals involved in action research may be on the forefront. In any event, these individuals are worth getting to know.
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Appendix A

Interview Guide
RESEARCHER INTERVIEW

Name _____________________________ (Title) _____________________________ (First) _____________________________ (Last)

Phone Number ( ) ________________________________

( ) ________________________________

( ) ________________________________

Institutional Affiliation ________________________________

Position ________________________________

Allied Health Field ________________________________

Number of Years in Field ________________________________

Title of Research ________________________________

Type of Collaborative Arrangement ________________________________

Date Interview Completed ________________________________

Time Started ___________________________ Time Stopped ___________________________

Record of Attempted Calls: ________________________________

______________________________

______________________________

______________________________

______________________________
HELLO. THIS IS MARTHA RADER. IS THIS ______________ ?

(If YES, continue with [1])
(If NO, proceed to [2])

[1] I HOPE YOU HAVE RECEIVED MY LETTER ABOUT MY STUDY OF COLLABORATIVE RESEARCH IN THE ALLIED HEALTH FIELD. YOU WERE SELECTED TO BE CALLED BECAUSE YOU HAVE RECENTLY CO-AUTHORED AN ARTICLE IN ______________ . FIRST, LET ME CONGRATULATE YOU ON YOUR PUBLICATION. SECOND, LET ME ASK IF, IN FACT, THE ARTICLE REPRESENTS A COLLABORATIVE RESEARCH PROJECT THAT YOU WERE INVOLVED IN. IS THAT A FAIR DESCRIPTION?

(If YES, continue)
(If NO, terminate)

I'M WONDERING IF YOU WOULD SHARE YOUR EXPERIENCES IN THE COLLABORATIVE RESEARCH PROCESS BY ANSWERING A FEW QUESTIONS FOR ME, PLEASE?

(If YES, continue)
(If NO, terminate)

WOULD THIS BE A CONVENIENT TIME FOR YOU?

(If YES, continue)
(If NO, proceed to [3])

THANK YOU. YOUR ANSWERS WILL, OF COURSE, BE KEPT CONFIDENTIAL AND WILL NOT BE USED IN ANY WAY THAT IDENTIFIES YOU AS AN INDIVIDUAL. FEEL FREE TO ASK ANY QUESTIONS YOU MIGHT HAVE ABOUT THE STUDY, EITHER NOW OR LATER. OKAY?

(Proceed to Question 1)

[2] IS HE/SHE THERE, PLEASE?

(If YES, return to [1] when researcher answers)
(If NO, proceed to [4])

[3] I WOULD BE HAPPY TO CALL BACK AT YOUR CONVENIENCE. WHEN WOULD YOU SUGGEST?

(Record Date______________ Time______________)

I APPRECIATE YOUR HELP. I'LL TALK TO YOU AGAIN THEN ON (date and time as above). THANKS AGAIN. (Terminate).
[4] IT IS IMPORTANT THAT I SPEAK WITH ______________________. (Researcher's name)
ABOUT HIS/HER RESEARCH ACTIVITIES. IS THIS THE NUMBER WHERE
I AM MOST LIKELY TO REACH HIM/HER?

(If YES, proceed to [5])
(If NO, proceed to [6])

[5] I WONDER IF I COULD SET A DATE AND TIME TO CALL AGAIN
TO BE SURE I REACH _______________________. WHAT WOULD YOU
SUGGEST?

(Researcher's name)

(Record Date __________ Time __________)

THANK YOU FOR YOUR HELP. WOULD YOU LET
(Researcher's name)

KNOW THAT I WILL BE CALLING AROUND THAT TIME? THANKS AGAIN.
(Terminate)

[6] DO YOU HAVE ANOTHER NUMBER THAT I MIGHT TRY?

(If YES, record new number ( ____)___________________ and
continue)
(If NO, terminate with: THANK YOU FOR YOUR HELP. I'M
SORRY TO HAVE BOthered YOU.)

WHAT TIME WOULD YOU SUGGEST I TRY HIM/HER AT THIS NEW
NUMBER? (Record time ____________________) THANK YOU FOR YOUR
HELP. (Terminate)
1. First, I would like to find out a little about how the whole thing started. Where did the idea for your research project come from?

2. About how long did the research take from start to finish?

3. How did the members of the research group get together?

4. At what point in the research did the group form?

5. Has the group stayed the same throughout the project or have there been changes?

6. What got you personally involved?

7. Did you have outside funding for your project?

   Yes

   No

   Was the team formed before or after you received funding?
8. WERE YOU EMPLOYED OUTSIDE THE RESEARCH PROJECT WHILE CONDUCTING THE RESEARCH?

- No
- Yes

- DID YOU RECEIVE ANY SUPPORT FROM YOUR EMPLOYER — TIME OFF, ENCOURAGEMENT, FINANCIAL ASSISTANCE, PERSONNEL?

- DID BEING EMPLOYED CREATE ANY UNDUE DIFFICULTIES FOR YOU?

9. DID YOU HAVE ANY WRITTEN AGREEMENTS RELATING TO YOUR RESEARCH PROJECT?

- No
- Yes

- WOULD AGREEMENTS HAVE BEEN HELPFUL?

- WHO WERE THE PARTIES TO THE AGREEMENT AND WHAT KINDS OF THINGS WERE INCLUDED?

- WERE THEY HELPFUL?

10. GETTING BACK TO THE RESEARCH ITSELF, DID A PARTICULAR MEMBER SERVE AS LEADER OF THE GROUP?

- No
- Yes

- HOW WAS LEADERSHIP HANDLED?

- HOW DID HE/SHE BECOME THE LEADER?

- DID THIS WORK OUT WELL FOR THE GROUP?
11. While we're on the topic, how did you decide on the order of names for publication?

12. How were the various research tasks divided up between the team members in your case?

13. Did this breakdown of responsibilities remain fairly stable or did it change over the course of the research project?

14. Did members of the team meet at regularly scheduled times or more on an "as-needed" basis?

15. About how often did you get together?

16. How would you describe the meetings? Were they useful? Was discussion open and free? Formal or informal?
17. When you think of the various parts of the research process - finding the problem to be studied, doing the background research, collecting the data, analyzing the data, writing-up the report - at what stage did the team work best together?

18. When did you feel the most tension within the team?

19. What part of the research process did you personally enjoy the most?

20. What part was most stressful to you?

21. Other than the project we're discussing, how much experience have you had in conducting research?

22. How much formal training in research procedures have you had?
23. Are there areas of research methodology you would like to have more training in?

____ No
____ Yes

What are they?

Given your current situation, what would be the easiest way for you to receive training in this area?

24. Often in group activities, individuals take on unofficial functions such as keeping the group on task or on schedule, peacemaker, etc. What do you think was your most important contribution personally as a member of the research team?

25. Can you think of specific roles that other team members played that were especially helpful to the research process?

26. We're almost finished. In this particular research project, can you think of any part of the research that was made easier because you were part of a team?
27. WERE THERE PARTS THAT PROBABLY WOULD HAVE BEEN HANDLED EASIER BY ONE PERSON WORKING ALONE?

28. IN A MORE GENERAL SENSE, CAN YOU THINK OF ADVANTAGES TO USING A TEAM APPROACH TO RESEARCH?

29. HOW ABOUT DISADVANTAGES?

30. WHEN YOU THINK OF YOUR RESEARCH PRODUCT - THE FINDINGS AND ANY IMPACT THAT THE STUDY MIGHT HAVE - DO YOU THINK THAT HAVING A TEAM APPROACH TO THE PROBLEM MADE A DIFFERENCE?
   
   ____ No
   _____ Yes
   
   IN WHAT WAYS?

31. COULD THE PROJECT HAVE BEEN ACCOMPLISHED AS AN INDIVIDUAL EFFORT?
32. What personal characteristics do you think make a person a good research team member?

33. If you were to be involved in another collaborative research effort, are there things you would do differently next time?

34. What advice would you give to a person thinking about getting involved in a collaborative research project?

That's really all the questions I have for you except to confirm your present position and title. (Record) You have an allied health background in __________? And how long have you been in that field?

Are there any comments, questions, or suggestions you have? Any important issues I forgot to ask you about?

Thanks so much for your time and patience. Your answers have been most helpful. Good luck with any future research you get involved with.
Appendix B

Sample Advance Letter
182 Water Oak Drive
Ponte Vedra Beach, FL 32082
Date, 1986

Dear (Researcher):

Within a week or so, I will be calling you as part of a research study. I am a physical therapist currently completing work on my doctorate at The Ohio State University. My dissertation research will focus on the process of collaborative or team research within the allied health fields.

Having recently published research findings, you are in a unique position to share your experiences in conducting collaborative research. I will be contacting not only members of your research team but members of other collaborative groups as well so that multiple viewpoints can be gathered.

Altogether the interview should not take more than a half hour of your time. If I should happen to call at a bad time, I will be happy to call back at your convenience. You may prefer to schedule a time for my call through the person who maintains your appointments.

Your help and that of others with expertise in collaborative research is important to those who will become involved in research in the future. I appreciate your willingness to share your experiences.

If you have any questions, please don’t hesitate to call me at (904) 285-5400. I am looking forward to speaking with you soon.

Sincerely,

Martha C. Rader
Appendix C

Sample Appreciation Letter
Dear (Researcher):

Thank you so much for sharing your time and expertise with me recently. Your insights and experiences in collaborative research have been combined with those of other researchers, resulting in a wealth of information about the process.

I am now working with the data with the goal of putting the information into a form that will be useful to others. While sharing some commonalities, your group and individual experiences remain unique and interesting. I am encouraged that a lot of good things are going on out there in the field of allied health research.

Thank you again for your openness and cooperation.

Sincerely,

Martha C. Rader