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THE SELECTION OF A DISSERTATION TOPIC:
ELEMENTS INFLUENCING STUDENT CHOICE

DISSERTATION

Presented In Partial Fulfillment of the Requirements
for the degree
Doctor of Philosophy
In the
Graduate School
The Ohio State University

by
Marla Ann Barr, B.A., M.Ed.

*****

The Ohio State University
1984

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Dr. Robert J. Silverman
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Dedicated to my parents and my siblings. You worried, laughed and cried with me. Your support, encouragement, guidance and love helped steady my path. You provided the foundation for my growth and accomplishments. You always believed. You are my best friends.
ACKNOWLEDGMENTS

I shall be telling this with a sigh
Somewhere ages and ages hence:
Two roads diverged in a wood, and I –
I took the one less traveled by,
And that has made all the difference.
   from "The Road Not Taken" by Robert Frost

The individuals who have touched my life along the road I chose to travel, and to whom I am deeply grateful, are numerous. The seventeen doctoral candidates and seven faculty advisors who gave their time and willingly shared their experiences, feelings, and perceptions provided the substance for my efforts. Their interest and enthusiasm in this project helped to sustain me long after the interviews were completed.

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My parents have supported and encouraged me in many ways. They have shared the worry, fear, and pain that have accompanied my growth. They have also shared the triumphs and joys of my accomplishments. My brother, Avron, and my sisters, Diane and Candy, have each in their own way, contributed to my growth and development. Along with my parents and my uncle, Norman Gass, they provide the nest of family that gives life meaning.

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Without all of these individuals, I would surely have lost my way along the road.
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CHAPTER I

INTRODUCTION

Doctoral education in the United States, attributing its origins to the founding of Johns Hopkins University in 1876, is now over a century old. Based upon the German model for graduate education, the purposes of doctoral study have been a source of criticism and controversy from the beginning. Part of this controversy focuses upon the goals of doctoral education: preparation for college and university teaching versus preparation for research. Traditionally, doctoral programs have emphasized instruction for research (Berelson, 1960). Calls for reforming this emphasis claim that doctoral programs, with their emphasis upon research, do not prepare students for teaching which is "the principal activity in which they engage" (Packer, 1970, p. 50) during their professional careers. A related area of criticism centers upon the form through which students must establish their research competence: the doctoral dissertation. Spriestersbach and Henry (1978) declare that "the tenacious, unreflective commitment to the traditional rationale of the dissertation makes it one of academe's greatest monuments to non-thought" (p. 54).
According to Engel (1966), the origins of the dissertation requirement can be traced to the thirteenth century when applicants to religious orders were required to defend a point of doctrine before their prospective colleagues. The thesis gradually became a degree requirement in the form of a public examination used to determine teaching ability and to bestow the title "doctor" upon students.

The scientific revolution brought extensive change to German universities and, with this change, evolved the concept of the scholar-researcher, and a new meaning for the thesis requirement. This new emphasis became one in which each student "should add at least one brick in the ever-growing temple of knowledge" (Helmholtz, 1893, in Heiss, 1970, p. 173). Within this concept lies the source of criticism and controversy regarding the dissertation requirement in doctoral education.

For the past century the meaning of the terms "original" and "significant contribution to knowledge" have been a source of scholarly debate. In addition to the difficulties inherent in defining these terms, questions have been raised regarding whether the goals of the dissertation requirement, as suggested by the concepts of "originality" and "significant contribution to knowledge," remain appropriate to the present educational system. Berelson (1960) claims that students in the natural sciences are members of research teams, and are, therefore, not involved in independent research. Thus, the concept of originality comes into question, as well as the question of independence in research topic selection.
Additional questions have been raised regarding the selection of research topics for doctoral dissertations. In reference to originality in literary studies, Rubin (1963) states that "the student is supposed to select a topic so specialized and unimportant that even previous writers of dissertations have neglected it" (p. 222). Engel (1966) also alludes to the unimportance of dissertation topics, and to the extensive time students spend identifying their topics.

Even the best of students spend an inordinate amount of time "looking for a thesis topic," obsess over the value of the one chosen (or they dive counterphobically into a topic of limited importance), dread the examination by the committee, and once launched with their project, battle ambivalence at every turn. (Engel, 1966, p. 785)

Although scholars question the relevance of the dissertation requirement, and raise issues relating to dissertation topic selection, little research has been conducted to investigate the topic selection process. The purpose of the present study is to explore the process of research topic selection for doctoral students in four fields of study: chemistry, English, political science, and sociology. The intent is to both discover and describe the elements influencing research topic selection for the dissertation from the perspectives of students who have recently experienced the process of selecting them.
Problem Statement

Doctoral students' experiences during the process of research topic selection have received little attention in the research literature. Sessions (1971) conducted the only study that focuses exclusively on factors related to research topic selection. Some of the factors identified through his survey of recent degree recipients include publication potential, student interest, the time necessary for completion, potential for proposal acceptance, and the suggestions of faculty members.

Several studies indicate that faculty advisors are influential in the process of research topic selection for doctoral dissertations. Berelson (1960) and Heiss (1967, 1970) relate advisor influence to the amount of independence students experience in the selection of their dissertation topics. Additional focus upon advisee-advisor relationships, though not directly related to dissertation topic selection, defines the interaction in terms of symbiosis, power, collegiality, apprenticing, and mentoring. Based on interviews with Berkeley doctoral students, Heiss (1967) found that students' expectations of their advisors are descriptive of a broad range of behaviors. "Essentially, they expected him to be a critic but a constructive counselor, a relentless taskmaster but a supportive colleague, a model of scholarship but an understanding tutor." (Heiss, 1967, p.39)
Bargar and Duncan (1982) suggest that one of the difficult points in the advisee-advisor relationship occurs during the research problem definition stage and in determining "ownership" of the research problem. Seeman (1973) describes advisee-advisor interaction in terms of symbiosis; a relationship in which each character in the interaction is somewhat dependent upon the other. However, in Seeman's (1973) estimation the advisor remains the more powerful participant.

Discussion of doctoral student advising is not limited to the variety of roles advisors assume, or to the character of advisor-advisee interaction. An additional element in doctoral student advising directly concerns the formation of students' research topics. The implication has been made, both directly (Hagstrom, 1965), and indirectly (Lansbury, 1975), that the selection of an advisor is at one and the same time the selection of a research topic or a research area. Thus, the choice or assignment of advisors and advisor roles may have an influence upon the research work of doctoral students.

Studies of the graduate student experience and doctoral education suggest additional elements that may be influential in the process of research topic selection. Taylor (1976) suggests that programs may be designed specifically to mold individuals into characters appropriate to the particular discipline. The socialization process described indicates a potential influence upon students' research.

One must know how to speak the language of any one discipline, know the dominant ways of approaching a problem according to the disciplines, must appear to
know how to solve any problem correctly posed, and must know what the important people in any field think. (Taylor, 1976, pp. 129-130)

Becker and Carper (1956) identify elements such as the development of interest areas and skill development as part of the professional socialization of graduate students. Both Taylor (1976) and Becker and Carper (1956), in describing professional socialization, also allude to the personal development of doctoral students. Becker and Carper (1956) indicate that students experience a process of internalizing the values and norms of their fields.

The personal development of doctoral students has been explored from a variety of perspectives. Katz (1976) and Katz and Hartnett (1976) suggest that doctoral education is a stimulus for intellectual development. Kuh and Thomas (1983) and Lozoff (1976) indicate that doctoral students experience a process of psychological growth in which they confront developmental issues relating to self-confidence, self-motivation, and autonomy.

In addition to advisee-advisor issues and the developmental experiences related to doctoral education, peer interaction has been identified as an important part of the doctoral students' experiences. Wright (1965) alludes to the importance of peer relationships by indicating that the degree of integration into the social life of the graduate school may influence students' success in completing their
degrees. Heiss's (1970) respondents indicate that other students are often the best sources of information compensating for poor administrative orientation efforts.

One aspect of doctoral study on which no institution or discipline in this study escaped severe criticism was the manner in which students are oriented to their degree programs. Judging by the nature of their comments on this issue, a considerable aura of mystique envelops the Ph.D. process. . . . Others cited examples to show that their fellow students were a better source of information on such essentials as the available facilities and resources, fee or course waivers, sources of financial aid, outstanding courses, and other experiences which could enrich their programs. (Heiss, 1970, pp. 103-104)

In an earlier study Heiss (1967) found that graduate student interaction and ties become stronger as students move through their programs. Loewenberg (1969) and Heiss (1970) suggest that more advanced students serve as role models and guides for students involved in earlier program phases. An implication of these findings, as well as the framework utilized in other discussions of doctoral education (Bargar & Mayo-Chamberlain, 1983; Rosen & Bates, 1967) is that the structural phases of doctoral education, i.e., coursework, examinations, dissertation, have an influence upon the students' experiences both through changes in interactions with others and personal changes resulting from the requirements of the different phases.

In addition to the influence program structure has upon peer interaction, Heiss (1967) also found that peer relationships differed with the fields of study.
Interviews with students from various divisions strikingly emphasized that the experimental fields tended to generate stronger ties than did fields whose research was of a documentary nature. The latter generally worked in isolation and thus rarely had an opportunity to verify or fortify their insights and interests with other competent students. (Heiss, 1967, pp. 40-41)

Berelson (1960) and Heiss (1967) suggest that the fields of study also have an influence upon the process of research topic selection for doctoral students. Their findings indicate that students in the natural and physical sciences experience less independence in the selection of their dissertation topics than students in the social sciences and humanities.

The Kuhnian concept of paradigmatic development has been used in numerous investigations as the basis for differentiating between fields of study. Kuhn (1970a) states that a paradigm "stands for the entire constellation of beliefs, values, techniques, and so on shared by the members of a given [scientific] community" (p. 175). He indicates that degrees of consensus do exist among researchers regarding acceptable theories, methodologies, and research areas. A discipline is considered highly paradigmatic if there is a great deal of agreement among field practitioners, and nonparadigmatic if there are high levels of disagreement among practitioners.

One of the prominent features in the definition of a paradigm concerns research within fields of study. Several studies have explored the influence paradigmatic development has upon research in different
fields of study. Biglan (1973b), differentiating between subject areas on the basis of three dimensions, hard-soft, pure-applied, life-nonlife, indicates that the existence of a paradigm stimulates faculty member consensus regarding problems to be studied and methods for studying them. Lodahl and Gordon (1972) found that in high paradigm fields, characterized by easier communication among faculty, there is a greater willingness to work with graduate students and to use more teaching assistants.

In sum, the available literature suggests that elements such as program structure, peer relationships, faculty advisors, and the fields of study may be influential in the process of dissertation topic selection. There has been no systematic investigation focusing upon these elements or the discovery of additional elements influencing doctoral students' selection of research topics. Thus, the elements identified above are reflected in the research questions for this investigation.

This study explores the process of dissertation topic selection for doctoral students in the fields of chemistry, English, political science, and sociology. These four fields were chosen because of their inclusion in previous studies focusing upon paradigmatic development, and their representation as fields along a continuum of paradigmatic development in Biglan's (1973a) study results. The overall goal of this investigation is to discover the influential elements in the selection of dissertation topics from the doctoral students' perspectives. The following research questions are addressed.
1) What is the process of selecting dissertation topics in four academic fields: chemistry, English, political science, and sociology? What are the differences in the selection of dissertation topics across these four fields? What contributes to these differences?

2) What role does the advisor play in the selection of dissertation topics?

3) What role do peer relationships have in the selection of dissertation topics?

4) What influence does the program structure (i.e., timing of examinations, content of examinations, style of prospectus, curriculum requirements) have upon the selection of dissertation topics?

5) What influence does the academic field (i.e., type of knowledge created, paradigmatic development) have upon the selection of dissertation topics?

Questions one through four, which reflect the content of the interviews with students, are discussed in Chapter IV. The fifth research question, reflected in the propositions developed on the basis of the data, is discussed in Chapter V.

**Significance of the Study**

Each year thousands of students begin the task of "doing a dissertation." Yet, few studies have been conducted that explore the actual process involved in this research activity. The simple question, "How do doctoral students get their dissertation topics?" has never been addressed thoroughly.

Literature indicates, however, that the process of dissertation topic selection is by no means a benign experience for doctoral students.
The particular pressures, frustrations, and stresses of doctoral programs have been mentioned. Heiss (1967) states that "the selection of a research topic and the writing of the dissertation were painfully drawn-out processes done in frustrating isolation" (p. 38), and that some students regard the topic selection process as a stressful experience. Koefod (1964) suggests that dissertation topic selection is difficult for doctoral students because of their procrastination, indecision, and desires to identify topics of earth-shattering significance. Heiss (1967, 1970) and Hollis (1945) both indicate a need for counseling and improved orientation programs for doctoral students. Steinberg (1981) emphasizes the "survival" aspects of doing a dissertation in his account of procedures to follow. One of the reasons for investigating the process of dissertation topic selection is to discover the elements that may relate to the students' experiences of stress, psychological pain, and confusion. Perhaps, by better understanding the students' experiences, they may be better served by the educational system.

Further, the problem of doctoral student attrition has been related to the dissertation phase of the doctoral programs. Tucker (1964) indicates that doctoral student attrition is not "too high" in comparison to the attrition rate of undergraduate students. However, he claims that the attrition rate is different in both kind and importance for Ph.D. students.
the issue is more pressing at the Ph.D. level. Selection procedures are supposed to be more sophisticated and expenses of graduate education are proportionately higher. Moreover, at the undergraduate level most of the attrition occurs in the first year while at the Ph.D. level, there seems to be a special kind of attrition; attrition by "extended duration." There is a sizable group of doctoral candidates who have completed all the requirements for the degree except the dissertation. (Tucker, 1964, p. 5)

Berelson (1960) also discusses the attrition of doctoral students and indicates that it is a special kind of attrition, attrition by extended duration. In reference to these students, Berelson states that, "They are so numerous and so visible that they have been given a 'degree' of their own. They are the ABD's -- All But Dissertation" (p. 171). In addition, Berelson (1960) also identifies problems with the dissertation as one of the major reasons for the extended duration of doctoral study. Since this special kind of attrition occurs at the dissertation stage of doctoral students' programs, it is important to investigate what influence various aspects of the dissertation process have upon students' progress. Information on the elements influencing the process of dissertation topic selection may be useful in addressing this "special kind" of Ph.D. attrition.

Finally, in addition to the more "applied" reasons for conducting this study, there is also a more "basic" reason for the study's importance. This investigation focuses upon how researchers, in this case students, determine what body of knowledge is worthwhile investigating. It is also a beginning step towards identifying
similarities and differences in the knowledge creation process in fields where the structure of knowledge differs. As such, it will highlight the need to account for field differentiation and influence upon students, and contribute to the body of literature that discusses the process of knowledge creation.

Limitations and Assumptions

The respondents for this study were white, male, non-foreign doctoral students in four fields of study who were actively working on their dissertation research, and whose occupational goals were in either the academic or research arenas. Several limitations are suggested by this respondent group. First, caution must be exercised in attempting to generalize the results of this study to the experiences of female doctoral students, minority doctoral students, and foreign doctoral students. Studies suggest that female and minority doctoral students are influenced differently in the course of doctoral education (Adler, 1976; Berg & Ferber, 1983; Duncan, 1976; Holmstrom & Holmstrom, 1974). The same may be true for foreign doctoral students.

Second, the respondents' descriptions of the dissertation topic selection process are limited to their retrospective accounts. Thus, the influential elements identified are only as thorough as the students' recall provides. However, it should be noted that students did indicate remembering "little snippets of things" as the interviews progressed. Although there are some inherent limitations in retrospective accounts,
the dissertation topic selection process was a recent enough experience for the investigator to have confidence in the accuracy of the descriptions.

Third, only students in the departments of chemistry, English, political science, and sociology were interviewed. Although these fields represent "types" of subject areas in reference to Biglan's (1973a) dimensions, care should be taken in attempting to generalize the results to other departments along the same dimensions: hard-soft, life-nonlife, and pure. [The applied dimension is not represented in this study.]

Different departments within a single university, and different universities establish their own rules, regulations, and probably develop their own myths, regarding the dissertation topic selection process. Thus, broad-based generalization of these results is not advised.

Fourth, the students interviewed for this study reported that they were actively working on their dissertation research. In actuality, they were at various stages in the dissertation process. However, these students are likely to be among the group of "successful" doctoral students who complete their degrees. It is possible that those students who experience the ABD phenomenon also experience different elements as influential in the process of research topic selection. Thus, the descriptions offered by respondents in this study may not be applicable to unsuccessful students.

Fifth, the process of eliciting respondents for this study involved the generation of a list of potential individuals who met the established criteria. Only a few potential participants refused to participate in
the study. Thus, there should be no bias in terms of representation. However, because of the small number of respondents from each department, there is the possibility that other students in these departments experienced different elements in the process of research topic selection. On a few occasions, the respondents in the departments of English, political science, and sociology indicated that, in the past, there were students in their departments whose dissertation topics had been an aspect of their faculty advisors' funded research projects. This was not the case for the students interviewed from those fields of study. The implication from these comments is that other processes for dissertation topic selection have existed in the past, and have the potential to exist in the future. However, the students interviewed for this study do represent the research topic selection process for those individuals who met the participation criteria at the time the study was conducted.

Sixth, faculty advisors in the departments of chemistry, English, and political science were interviewed and provided the investigator with information that could be used to validate students' responses. However, the faculty advisors in the department of sociology were not available for participation. Of the two potential advisors (two students have the same advisor), one student refused to allow the investigator to contact his advisor, and the second advisor refused to be interviewed. Thus, validation through the advisor was not possible in the department of sociology.
Some concern regarding respondents' openness, honesty, and candor is suggested by the interview method and the advisors' participation. Since some of the information shared was both personal and had the potential to harm students in their relationships with their advisors, it is possible that the students were less than honest regarding their experiences, or that their descriptions have a halo effect. Positive presentation of their experiences could result from retrospective accounts in which the more positive elements of the doctoral experience are more easily recalled, while the negative aspects of this experience are more easily forgotten. However, the methodological tools employed, which include checking for consistency in responses, saturation of the categories developed, validation through advisor interviews, probing questions, reflection of understandings, and follow-up interviews all contribute to the investigator's confidence regarding the honesty and integrity of respondents. Further, the assurance of confidentiality and the students' positive reactions regarding the study's substance also help to assure the reliability of the respondents and their descriptions.

**Terminology**

Since language use is sometimes a source of confusion in communication, the following definitions of terms used in this study will help to clarify and explicate their meanings.

**Department:** Throughout this study, several words and phrases are used interchangeably when referring to the broad based subject content.
areas in which students were studying. These terms are: department, discipline, field, and subject area. There is no specific meaning attached to these terms except as they describe membership.

**Development:** Development is the term employed to describe the students' personal and professional growth and change.

**Dissertation:** Dissertation is the final, written product describing the problem, procedures, results and conclusions of a doctoral students' research which, when successfully achieved, leads to the award of the Ph.D. degree.

**Doctoral students:** All of the respondents in this study had successfully passed their candidacy examinations, and therefore, by all rights, should be referred to as doctoral candidates. However, the discussion of the dissertation topic selection process spans the period of time prior to program entrance through the dissertation phase of the doctoral experience. Rather than creating confusion by shifting the descriptive terminology in relation to program phases, the term "doctoral students" was used throughout the study when referring to the respondents.

**Faculty advisors:** Faculty advisors are the primary contact for students during their research activity. They are the official administrators for both the department and the graduate school during the research process. They act as chairperson of the dissertation committee and must indicate final approval of the research product.
Paradigmatic development: Paradigmatic development refers to the number of competing paradigms, which include theories, research areas, and methodologies, in a field of study. A field may be identified as having a single paradigm (highly paradigmatic), more than one paradigm (multi-paradigmatic), and without a paradigm (nonparadigmatic).

Peers: The word "peers" refers to the other doctoral students within the same department as the study's respondents.

Program structure: Program structure refers to the phases of students' academic programs. These phases include requirements that must be successfully completed for students to progress toward degree completion.

Topic selection: Throughout the study the verb or a form of the verb "to select" was used in relation to the dissertation topic. Additional terms could have been employed, and at times, may have been somewhat more descriptive. However, in an effort to maintain uniformity and to highlight the goal of discovery -- selection -- "to select" was used throughout the study.

Organization of Research Presentation

The following presentation is separated into four chapters. Chapter II is a review of the available literature related to the research questions posed and the Investigator's findings. Chapter III presents two philosophies of inquiry, the methodology employed, explanations for its use, and the procedures followed. Chapter IV is separated into four
areas: Program Structure, Advisor, Research Topic Selection, and Student Growth and Development. Chapter V includes a discussion of the presentation of the results as theoretical propositions, presentation of the findings in relation to the data and available literature, a brief discussion regarding the respondents' and investigator's use of language, and implications for future research and student personnel work. A bibliography and supporting appendixes conclude the presentation.
CHAPTER II

Review of Related Literature

This chapter will review the literature related to the five research questions posed and the findings in this study. A brief historical account of the development of doctoral education in the United States is provided. Sub-sections reviewing the literature relating to elements that have been identified as influential in the research topic selection process follow the historical account. These sub-sections review literature related to controversy and descriptions of the dissertation requirement, elements associated specifically with topic selection, advisor issues, personal development and professional socialization, peer relationships for doctoral students, and the academic program structure in doctoral education.

A second area of literature reviewed for this study concerns sociological aspects of academic disciplines within the university setting. Sub-sections within this area define the nature of a paradigm, the relationship between paradigms and education, and research findings concerning paradigms and academic disciplines. Finally, a summary of the major issues and concepts presented in the literature is provided.
Doctoral Education - Historical Perspective

The origin of graduate education in the United States has been traced to Yale University in 1847. Although the first Ph.D. degree was conferred by Yale in 1861, most historical accounts attribute the beginning of the present form of doctoral education to the founding of Johns Hopkins University in 1876 (Berelson, 1960; Hartnett & Katz, 1976; Hollis, 1945; Veysey, 1965).

Hollis (1945) states that the basis upon which Johns Hopkins University was founded was the result of "forward looking educators [who] had been interested, since the founding of the nation, in the intellectual developments particularly of the European enlightenment that were beginning to challenge the existing classical pattern of higher education" (p. 11). Though these educators are described as "forward looking," they also had the benefit of history as an aid in developing the graduate school at Johns Hopkins University. The groundwork for educational purpose as "the accumulation of knowledge" (Veysey, 1965, p. 23) versus the development of mental and moral discipline had been established. The standard curriculum emphasis of the classics had been questioned, and was gradually being replaced by areas of scientific, vocational, and professional education. The political and moral influence of church and state were giving way to the growth and development of an industrialized nation. Thus, in 1876 Johns Hopkins University was established as the first successful system for graduate education.
In an attempt to avoid some of the criticism of the past, the leaders in the development of Johns Hopkins University determined that omitting theological studies, and centering a curriculum on the study of medicine, "the applied social and earth sciences, certain of the physical sciences, and the modern rather than the classical languages, literatures, and philosophies," (Holllis, 1945, p. 9) would minimize some of the problems presented by opponents to educational reform. Although controversy continued, and as Veysey (1965) notes, there were at least two additional drives for defining educational purpose - utilitarian service and cultural refinement, Johns Hopkins University established precedent that other universities were soon to follow, and that serve as a basis for the present system and emphases in graduate study.

Based upon the German model of higher education, the elements of "pure science" and "academic freedom" entered the American university. Or, as Veysey (1965) describes,

Aspiring Americans who visited Germany and returned with the phrase "scientific research" on their lips compounded this phrase from elements of German theory and practice which had had very different contexts in their original habitat. The German Ideal of "pure" learning, largely unaffected by utilitarian demands, became for many Americans the notion of "pure science," with methodological connotations which the conception had often lacked in Germany.

... The practice of research became elevated into an all encompassing Ideal, while emphasis on professional autonomy - always somewhat grand and hollow on German lips - became translated into a much more down-to-earth, hard-hitting American campaign for academic freedom. (pp. 127-128)
Regardless of the problems in transferring the concept of "scientific research," research had won its dominant position in graduate education.

Graduate education has experienced several periods of growth and change since the late nineteenth century. First, from 1900 to World War I, a time of minimal growth, standards were established for the Ph.D. degree which included a decrease in honorary and unearned degrees. This period was a time of review for purpose, quality, and direction (Berelson, 1960). The period between World War I and World War II was a time of growth and diversification. According to Berelson (1960), the doctoral degree grew both in esteem and stature, as well as in the number of fields in which it was awarded. The period following World War II through to the early 1970's saw further growth both in numbers of students, numbers of institutions offering graduate degrees, and in financial support for research within the universities. Pelczar and Frances (1984) indicate that the awarding of doctorates reached a peak in the 1974-75 academic year. Since that time there has been a slight, steady decline in enrollment figures. Both the employment conditions for those holding the doctoral degree (Hartnett & Katz, 1976), and the shrinking of federal dollars for research and student support (Pelczar & Frances, 1984), are cited for the decline.

Through each of these periods of growth and development the purpose of doctoral education has been debated. One argument calls for a shift from the preparation of researchers to the preparation of teachers. The second argument maintains that research must remain as the emphasis in graduate education. Berelson (1960) suggests some of the reasons for the existence of this controversy.
The graduate school brought research into the universities, protected and fought for it there, and would not lower its claims. Partly this has been the victory of science; even science's term "research" has won out over "scholarship" or "learning" as the central undertaking. Moreover, it is important to recognize that the very people who have succeeded at the research game are running the show in the graduate schools, and it is hardly to be expected that they would voluntarily give priority to what the others want, i.e., those who have gone into college teaching. Here even more directly than in other professions, the recipients of one generation become the setters and guardians of requirements in the next, so that each new group of aspirants has to jump the hurdles "I had to face." (Berelson, 1960, p. 40)

One such requirement, alluded to above, passed from generation to generation with the emphasis upon research in graduate education, is the doctoral dissertation.

**Doctoral Dissertations**

With the emphasis upon research in doctoral education, the dissertation became part of the academic requirements for the Ph.D. degree from the very beginning. The dissertation, as originally conceived, "was supposed to be an original and significant contribution to knowledge" (Berelson, 1960, p. 173). Berelson continues in his discussion by describing some of the controversy that has been associated with defining terms such as "original," and "significant contribution to knowledge."

Problems with the concept of originality arise, according to Berelson (1960), because "quite often these days the author of a dissertation in the natural sciences is not really considered as an
Independent Investigator, but rather a member of a research team" (p. 173). In addition, the form of dissertations themselves have seen some revisions. In the physical and biological sciences, the form of the dissertation is changing from a large work containing a full review of the literature, to a collection of articles of the form used in scientific journals. The question of originality has also been addressed in the humanities. Berelson (1960) cites scholars who have indicated that it is dangerous to define the concept of originality too narrowly, and who suggest that what is more important in determining originality is that the dissertation work be independent rather than emphasizing its newness.

Additional difficulties exist in defining the concept of "significant contribution to knowledge." The controversy consists of arguments that claim that emphasis upon originality have undermined significance by requiring students to conduct research on questions so remote that they in no way address the significant problems of their fields. Berelson (1960) suggests that the emphasis on "original and significant contribution to knowledge" has shifted, somewhat, as the dissertation has come to be viewed as a training instrument that contributes "to the student's knowledge, not the world's" (p. 174).

Koefod (1964) defines "dissertation" by drawing a distinction between that term and "thesis." He claims that both terms represent a species of essay and that the dissertation's "function is to provide a systematic discussion of a subject or topic" (p. 20). Koefod (1964) continues,
The purpose of the dissertation is to establish a criticism, clarification, or refinement, that is, to establish an arguable view. To dissertate is to discourse, or argue, in a learned manner. In contrast to the formal, scientific logic of reasoning in the thesis, the dissertator treats his topic or subject more or less didactically. (p. 20)

Although Koefod suggests that either essay form is appropriate for the communication of doctoral research, the dissertation "proves his [doctoral candidate's] comprehensive understanding and control of the substance of some subject and reveals his capacity for originality and novelty by means of perceptive insights and imaginative innovation in recasting and synthesizing ideas and materials" (p. 98).

Much criticism has been directed toward the dissertation as "an original contribution to knowledge," and many scholars and researchers have called for reform with regard to this requirement (Berelson, 1960; Heiss, 1968, 1970; Packer, 1970; Sprilestersbach & Henry, 1978). Berelson (1960) suggests requiring that dissertations be done in fewer pages, and that a two year "doctor's" degree be instituted to certify individuals for undergraduate teaching. Heiss (1968, 1970) calls for a re-examination of several elements of graduate study including the course unit structure, examinations, grading system and the dissertation as evidence of original research. Heiss (1970) specifically addresses the issue of topic selection and states that "Ph.D. students should be given a wide degree of freedom in their choice of a thesis topic" (pp. 286-287).
Packer (1970) and Spriestersbach and Henry (1978) call for abandoning the concept of "original and significant contribution to knowledge" in dissertation research. Instead, these writers suggest that the dissertation be viewed as a learning instrument through which students come "face to face with the messy and lonely business we call 'research'" (Spriestersbach & Henry, 1978). Packer (1970) completely abandons the notion of dissertation and replaces it with a "research exercise" in which students provide evidence that they have mastered the methodology of their fields.

Originally used as an entrance examination during the thirteenth century for applicants to religious orders (Engel, 1966), the dissertation became a task in which each student "should add at least one brick in the ever-growing temple of knowledge" (Helmholtz, 1893, p. 29, in Heiss, 1970, p. 126). Regardless of the criticisms that have been lodged against the requirement, the doctoral dissertation remains as the culminating experience in Ph.D. degree programs.

**Topic Selection**

Although many scholars and researchers indicate that the dissertation is often a major reason for extended doctoral study, and the most difficult part of the doctoral experience (Berelson, 1960; Heiss, 1967, 1970; Jacks, Chubin, Porter & Connolly, 1983; Sales, 1975; Tucker, Gottlieb & Pease, 1964; Wilson, 1965), very little research focuses on the elements that influence the process of dissertation topic selection. Berelson's (1960) extensive study of doctoral education, which included a
national questionnaire survey of graduate deans, graduate faculty, and recent recipients of the Ph.D. degree, addresses the question of topic selection by focusing upon the question of student independence in the task. He found that the perception of independence in topic selection depends upon which party is asked. Graduate faculty indicate that in the majority of cases either the sponsor selects it or the student and sponsor jointly select the topic. Recent recipients of the Ph.D. degree indicate that the student selects the topic independently (46% of respondents), or the student and sponsor jointly select the topic (39% of respondents). Berelson (1960) concludes that, "What actually happens, probably, is that the typical student picks up several ideas for dissertations from his professors and then settles on one. To him, he selected it; to the professor who suggested it, it was at least a joint selection" (p. 178).

Heiss (1967, 1970) found that "selecting a research topic was a stressful experience in the doctoral program" (1967, p. 38). Like Berelson, Heiss's (1970) questionnaire of doctoral students at ten major Ph.D. granting institutions focuses upon the degree of independence students experienced in the topic selection process. Sixty-five percent of her respondents indicate that they had experienced as much independence as they wanted in the selection of their topics.

Berelson (1960), Heiss (1967, 1970) and the Dissertation Review Committee at the University of Michigan ("Role", 1976) studied doctoral education by selecting respondents who were representative of a range of academic disciplines. Thus, their discussions of independence in topic
selection relate to the area of academic study. Heiss (1967) found that "Most of the physical science interviewees reported that their dissertations represented one phase in a research project for which their major professor was the principal investigator" (p. 38). Berelson (1960) also found that independence in the topic selection process differs on the basis of the area of academic study. "According to the faculty, the student selects his own topic in this many cases: physical sciences 2%, biological sciences 4%, engineering 7%, humanities 9%, social sciences 12%, and education 19%" (Berelson, 1960, p. 178). Like Berelson and Heiss, the Dissertation Review Committee at the University of Michigan ("Role," 1976) also found that the topic selection process in the life and physical sciences differs from the students' experiences in the social sciences, humanities and education. In their survey of faculty, alumni and degree candidates, they found that in the life and physical sciences, topics are more often suggested or assigned by the students' advisors. In contrast, they found that 75% of the students and alumni surveyed from the social sciences, humanities and education propose their own topics.

The most direct study available regarding factors influencing dissertation topic selection was conducted by Sessions (1971) as his doctoral dissertation. The primary focus for Sessions's study were the factors related to dissertation topic selection for students in the fields of student personnel and guidance. However, as part of his survey, which was constructed on the basis of literature and interviews with doctoral students, Sessions included small numbers of recent Ph.D.
recipients from the fields of history and chemistry to "provide a basis for checking the perspective of guidance personnel in relation to personnel in other fields" (p. 72). Chemistry graduates identified three factors in the survey as influential in their selection of dissertation topics.

1. The topic's potential for publication.

2. The topic's area should be one in which the candidate's interest is high.

3. The topic's being suggested by a departmental faculty member. (Sessions, 1971, p. 74)

History graduates, in addition to identifying the first two factors listed above, also identified nine additional factors as influential in the selection of their dissertation topics.

1. The topic's being in an area in which the candidate wants to become more expert.

2. The topic's potential for sustaining the interest of the candidate so that he would be likely to do a "follow-up" study on it later on in his professional career.

3. The length of time the candidate is likely to be required to spend in order to complete a dissertation.

4. The topic's being in an area in which the candidate has experience.

5. The topic's being in an area that is currently being overlooked by most researchers in the field.
6. The topic's having reasonably good chances of being accepted by the committee, advisors, department, or other group which determine official acceptance of proposals.

7. The topic's being compatible with the research capacities of the candidate.

8. The study's being a pretty "sound" venture; one not likely to collapse and require a new start.

9. The topic's being suitable for historical or other research design. (Sessions, 1971, p. 75)

Although Sessions did not ask his respondents to rank the influential factors on the basis of their degree of importance, he did ask them to indicate which factors they would consider as important in topic selection since they had completed their degrees. Responses to this question highlight the differences between the ideal and real elements, as noted after dissertation completion.

Chemistry respondents in Sessions's (1971) study indicated that students should consider publication potential, interest areas, areas of desired expertise, time necessary for completion, chances for acceptance, and research skills and abilities in the selection of their dissertation topics. Of importance in these recommendations to other students is that the graduates had considered a suggestion of a topic by a faculty member in their decisions; however they do not suggest that other students do the same. History graduates responding to this study recommend that students consider career elements via impressing faculty or others of influence, the respectability of the topic, and the enhancement of job opportunities because of research substance or skills developed. In
addition, they recommend practical concerns such as money for research, data availability, and sufficient background literature for the literature review. Thus, for history graduates both professional and practical concerns are highlighted in retrospective accounts as criteria that should be considered in the selection of dissertation topics.

Several other scholars provide commentary regarding factors influencing the selection of a dissertation topic or research topic. One area of comment and critique concerns the notion of topic identification as a process of introspection versus a process of searching outside oneself (Dunham & Lumsden, 1981; Mooney, 1957; Seeman, 1973). Dunham and Lumsden (1981) describe three possible relationships between the researcher and the research topic: elliptical, epicentric, and centroidal. They claim that in the elliptical relationship the research and the dissertation manifest task completion qualities rather than exhibiting evidence of genuine concern and investment in the problem. In the epicentric relationship the primary emphasis is method, technique and design. In the centroidal relationship "the central question, concerns, or mystery takes precedence over all other considerations and functions" (Dunham & Lumsden, 1981, p. 123). The centroidal relationship, according to these authors, is the preferred relationship as it generates commitment, identity and "makes the dissertation bonafide, its substance vital, and its contributions significant" (Dunham & Lumsden, 1981, p. 123).
Like Dunham and Lumsden (1981), Seeman (1973) indicates that emphasis on methodological issues diverts students' attention from issues of substance. Seeman (1973) states that students search for questions that exist outside of themselves and "disregard the possibility that a research problem might come from some question of their own" (p. 901). Mooney (1957) also differentiates between the researcher as part of the problem and the researcher outside of the problem in his descriptions of the research perspectives of "consumer" and "producer." Mooney (1957) suggests that the differences between the two perspectives concern the researcher's position as part of the experiential world and as a creative being in the research process.

Koefod (1964) suggests that doctoral students experience difficulties in research topic selection because of "their tendencies (a) to procrastinate, (b) to flounder indecisively, and (c) to wish for some unique problem or topic concerning which a classic may be written" (p. 52). In relation to Koefod's third explanation for difficulty in this area, Flores and Montemayor (1979) indicate that, "Two big mistakes students make in choosing research topics are that they select those which are too global to be manageable or too narrow to have any generalizability" (p. 45). Hagstrom (1965), in his study of teamwork in the formal, physical, and biological sciences, suggests that one of the factors influencing the selection of research topics is the status of the students. Because, "they have a precarious status, one in which they
receive few material rewards, and they therefore usually desire to obtain a degree in as short a time as possible" (Hagstrom, 1960, p. 136), students are less likely to engage in risky research or extended projects, and are attracted to productive, successful faculty members whose projects can be broken down into dissertation-size pieces that can be completed in a reasonable amount of time.

Chambers (1960), while not identifying particular fields, emphasizes student ownership and initiative as important criteria in topic selection. Lansbury (1975) indicates that, for chemistry students, the opportunity to explore the research of faculty members prior to selecting an advisor is an important criterion. Although he tittles his article "Selection of Thesis Research: The Most Important Course," the course described indicates that, for chemistry students, the selection of the advisor is at one and the same time the selection of the research question.

In sum, the available literature reveals a variety of factors that may be influential in the process of dissertation topic selection. Among these factors are: the amount of independence students experience, interests, the relationship between researcher and research problem, scope of the topic, and length of time necessary for completion. Some of these factors have been identified through research; others are proposed in scholarly discussions. Only one study, Sessions (1971), focuses exclusively on the factors influencing topic selection in three fields of study. Although the observation has been made that, "The method of identifying a dissertation project or topic varies markedly both among
Within disciplines, but its final selection is by agreement between the candidate and the research adviser (or advisory committee)" ("Requirements" 1979, p. 13), there is little empirical evidence to support this claim.

Advisor Issues

As alluded to in the literature on dissertation topic selection, the faculty advisor for doctoral students is a potentially influential factor in the topic selection process. Discussions of advisor issues are revealed minimally in the literature on doctoral education. Helss (1967) states that "the relationship between the doctoral student and his major professor is unequivocally the most sensitive and crucial element in the doctoral experience" (p. 39). Additional studies focus upon relationship variables between advisors and students. In a study that includes the perception of "collegiality" between students and faculty members in general, Gregg (1972) found that both academic and non-academic student satisfaction was higher if the relationships are perceived as more collegial. In his study he found that the perception of collegiality is a better predictor of satisfaction for doctoral students than for masters students. Hartnett (1976) found that the relationship between students and faculty members "is probably the single most salient feature of the graduate department climate" (p. 59). In his analysis of both questionnaire and interview data, Hartnett (1976) asserts that the two
broad areas that influence the faculty-student relationship are accessibility and the way students are treated, i.e., as adolescents or as colleagues.

As mentioned earlier, Berelson (1960), Heiss (1970), and the Dissertation Review Committee at the University of Michigan ("Role," 1976) all note advisor issues in relation to students' freedom and independence in selecting their own dissertation topics. In a study of personality variables that were hypothesized as sources of conflict between doctoral students and their advisors, Sorenson and Kagan (1967) also identify an independence-dependence theme through their interviews with doctoral candidates and advisors in the field of education. Although their study does not relate independence directly to topic selection, they do conclude that, as a personality variable, level of independence and dependence is a source of conflict between students and advisors. Two additional personality variables that are identified as potential sources of conflict involve the supportive nature of the relationship between advisor and student, and what Sorenson and Kagan (1967) have termed "epistemological preference" (p. 24). The supportive nature of the relationship is a source of conflict when there is a discrepancy between the amount of supervision and nurturance the students desire from their advisors and the amount of independence and distance from students advisors find appropriate to their roles. Finally, epistemological preference becomes a source of conflict when differences exist regarding "beliefs about the nature of truth and knowledge and how they are to be derived" (Sorenson & Kagan, 1967, p. 24).
Issues in the advisor-advisee relationship have also been associated with the extended duration of doctoral study (Berelson, 1960), and with doctoral student attrition (Jacks, Chublin, Porter & Connolly, 1983; Tucker, Gottlieb & Pease, 1964). Tucker, et al. (1964) conclude that problems often arise out of a conflict in emphasis (i.e., teaching versus research) or because of conflicts in personality. Jacks, et al. (1983) found that many ABD (All But Dissertation) students identify difficulty in their relationships with their advisors and other committee members as reasons for leaving their programs.

Berelson's (1960) study identifies lack of supervision, direction, and guidance on the dissertation area as a cause of extended duration of doctoral study. In addition, this study indicates that, for a significant number of students in the physical and biological sciences, exploitation by the advisor is a major problem. In contrast, Hagstrom (1965) suggests that exploitation of doctoral students' work and subordination of student interest to the professor's is, if anything, mild. In his study of teamwork in science, Hagstrom (1965) indicates that the role of the major professor does have an impact upon students. He states that, "The graduate student at a crucial point in his career depends for recognition primarily on a single individual; his self-image as a scientist is dependent on the personal reaction of his advisers" (Hagstrom, 1965, p. 136).

Issues related to the roles of the faculty advisor have been raised, either directly or indirectly, in several studies (Bargar & Duncan, 1982; Bargar & Mayo-Chamberlain, 1983; Berelson, 1960; Cameron & Blackburn,
1981; Dillon & Malott, 1981; Heiss, 1967, 1968, 1970). These studies suggest that conflict between students and advisors, and student's dissatisfaction with graduate study are a result of a discrepancy between the roles assumed by faculty advisors and the roles students want their advisors to assume. Heiss (1970) found that advisors provide information and direction to resources, act as an audience for and critic of the students' work, are at times a "catalyst or prodding agent" (p. 222), and generally act as supervisor, available if needed, during the dissertation task. In her study of Berkeley doctoral students, Heiss (1967) found that students desire advisors who will fulfill the roles of both professional expert and personal supporter.

Bargar and Duncan (1982) describe advisor roles as nurturers, counselors, critics, and protectors. They recommend the development of mentoring relationships, as described by Levinson, Darrow, Klein, Levinson and McKee (1978), between advisees and advisors. Levinson, et al. (1978) describe the mentor's roles as one who

... may act as a teacher to enhance the young man's skills and intellectual development. Serving as sponsor, he may use his influence to facilitate the young man's entry and advancement. He may be a host and guide, welcoming the initiate into a new occupational and social world and acquainting him with its values, customs, resources and cast of characters. ... the mentor may be an exemplar that the protege can admire and seek to emulate. He may provide counsel and moral support in time of stress. (p. 98)
Further, Levinson, et al. (1978) indicate that a critical role for the mentor is to aid the novice in realizing the "Dream" which consists of a long-range, deeply rooted vision of "self" in the future. Bargar and Duncan (1982) indicate that this description of mentoring, when applied to the advisor-advisee relationship, places the advisor in a role that supports and facilitates "the student's own self-actualizing efforts" (p. 30).

Bargar and Mayo-Chamberlain (1983) suggest that a primary role for the faculty advisor is to create "developmental settings for advisees" (p. 408). Dillon and Malott (1981) suggest a research supervisory system for faculty advisors that is designed to provide structure for advisees during the research process. Cameron and Blackburn (1981), by relating sponsorship to career success, allude to the advisors' role in job placement for their advisees.

Schwen (1976) indicates that one of the purposes of doctoral education is to provide the field with new professionals. Thus, faculty members are placed in a reproductive role as perpetuators of their fields. Similarly, Seeman (1973) refers to advisor roles as "advisers-policemen who assist the student, but who also make sure that the student obeys the law with respect to scientific procedures" (p. 901).

Finally, Loewenberg (1969), albeit a Freudian analysis of the transference relationship between student and faculty, states,
They [faculty and student] desire all those signals from each other that human beings want in any relationship: approval, acceptance, praise. The student wants sympathy, interest, and guidance; the instructor wants an audience, narcissistic supplies, and power. (p. 614)

Only a few studies mention advisor selection as a factor related to doctoral education or topic selection (Hagstrom, 1965; Heiss, 1967, 1970; Flores & Montemayor, 1979). Hagstrom's (1965) study of the formal, physical and biological sciences indicates that, because students work on a section of an advisor's research, choice of advisor is likely to be made on the perception of advisor reputation and productivity. Heiss (1967) refers to the advisor selection process as a "complex, anxiety-producing experience for many students" (p. 40), and indicates that a more satisfying selection process is needed. In her national study (Heiss, 1970), student independence in selecting an advisor was considered. She found that the majority of students, 58% of respondents, indicate a satisfactory level of independence in the advisor selection process. Flores and Montemayor (1979), in presenting a guide for education doctoral students, suggest that students consider four variables as part of their advisor selection process. These variables are: availability, the respect and influence the advisor shares among the professional community, the advisor's interest in the student's research topic, and the advisor's expertise and background in the topic area.
Thus, advisor-advisee issues, and more generally, student-faculty issues, suggest a variety of advisor roles and areas for potential conflict. Lauded as a critical element in the student's doctoral experience, the faculty advisor, the advisor's roles, the mesh of personalities, the advisor selection criteria and procedures, and the student's expectations are all associated with the student's success. Although the literature cited occasionally refers to a direct link between the advisor and the selection of a dissertation topic, no research exists that investigates, directly, the advisor's influence or the roles assumed during topic selection.

**Personal Development and Professional Socialization**

With the emergence of both student and adult development theories, several scholars and researchers have applied those theories to review students' experiences during doctoral education (Bargar & Duncan, 1982; Bargar & Mayo-Chamberlain, 1983; Clark, 1980; Katz, 1976; Katz & Hartnett, 1976; Kuh & Thomas, 1983; Lozoff, 1976; Taylor, 1976; Trivett, 1977). Some of these articles focus upon intellectual development during graduate education (Katz, 1976; Katz & Hartnett, 1976), while others focus upon personal, psychological developmental issues of graduate students (Kuh & Thomas, 1983; Lozoff, 1976; Taylor, 1976). The results of these studies and discussions indicate that, as a result of their educational experience, graduate students' developmental issues relate to: 1) self-confidence, 2) realistic perceptions concerning future career roles, 3) self motivation, 4) autonomy, and 5) authority.
Kuh and Thomas (1983), combining several adult development theories to study graduate student development, found that the adult development transitions described in the literature appear appropriate to graduate student development. They identify four developmental themes: redefinition of self, purposeful independence, exploration versus maintenance of a stable life pattern, and the dream (Kuh & Thomas, 1983, p. 17-18). Kuh and Thomas (1983) assert that "the responses of some of the younger students suggested behavior patterns more descriptive of older individuals" (p. 18). They explain this unanticipated finding by suggesting that younger graduate students, having spent the majority of their adult lives insulated within the walls of academe, are not yet fully cognizant of the realities, limitations, and impact of the outer world.

Clark (1980) interviewed twelve doctoral students in psychology and humanistic studies. In her review of the literature relating adult development theory to graduate education, in which she asserts that the area is lacking empirical evidence, she identifies five areas related to developmental tasks and student growth. These areas are identified by the rubrics: personal dynamics, crisis events, existential questions, dissertation meanings, and student-faculty relationships. Her review calls for the need to conduct further research within these domains of development.

Bargar and Duncan (1982) and Bargar and Mayo-Chamberlain (1983) apply the theories available in the developmental literature to the environment of scholarship and research, and the advisee-advisor
relationship. By indicating that both faculty members and students are engaged in stages of development, these scholars recommend both awareness of the developmental issues and the building of relationships and environments to enhance the development of both advisors and students.

While not specifically applying developmental theory to explain her findings, Heiss (1967) indicates that her survey respondents described that "their doctoral programs challenged them to think analytically" (p. 42), and that they had developed "their ability to think more systematically and critically" (p. 42). They regarded these abilities as a favorable aspect of their doctoral experience.

The use of developmental theory as a mode for exploring doctoral education speaks to the cognitive and psychological aspects of student growth. Several additional studies and theoretical discussions refer to doctoral students’ professional development and socialization into a field of study. These studies, for the most part, view doctoral education as "a process rather than an event" (Wright, C. R., 1965, p. 88), in which students are engaged in the process of becoming scientists and professionals within their chosen fields.

The socialization of graduate students has been discussed with regard to students' success or failure in achieving their degree goals (Hobish, 1979; Wilson, 1965; Wright, C. R., 1965). Hobish (1979), to compare successful degree candidates with ABD students, uses measures of personality variables relating to independence, achievement, masculinity,
femininity, caring, socialization, dominance and assertiveness, and concludes that psychological characteristics are related to success in doctoral programs.

Wright (1965) asserting that "the graduate school, as a social institution devoted to changing college graduates into masters or doctors of specialized fields of knowledge, is engaged in the process of adult socialization" (p. 91), explores accommodation into the graduate school milieu as a measure of socialization. He found that, for doctoral students, "social adjustment and integration into the graduate community were consistently, if not often significantly, related to success on the doctoral level" (Wright, 1965, p. 92).

One of the reasons offered for not reducing the length of time of doctoral education by doctoral graduates in Wilson's (1965) study was that the time was necessary for the development of "professional maturity" (p. 150). Seeman (1973), suggesting that scientists are active participants in creating knowledge, indicates that this personal effectiveness becomes linked with personal career goals for students. Their motivation to know, to become participants in the knowledge-generating process, will not take place in the abstract, but only as they can see themselves as scientists-becoming, as Inquirers. (p. 904)

Taylor (1975, 1976), drawing her conclusions from the analysis of student essays regarding their graduate school experience submitted for competition, found that students must learn both new behaviors and a new language. She found that,
all the hurdles of the Ph.D. program were designed to test students in ways that would devalue certain personality characteristics and upgrade others, so that in a real sense students are forced to become the kinds of people their discipline finds desirable. One must know how to speak the language of any one discipline, know the dominant ways of approaching a problem according to the disciplines, must appear to know how to solve any problem correctly posed, and must know what the important people in any field think. (Taylor, 1976, p. 129-130)

Hagstrom (1965), in introducing the concept of the scientific community as an agent of social control in science, indicates that the scientific training process isolates students, creates dependence on faculty, and leads, generally, to the formation of specific vocabulary and commitments.

Both Becker and Carper (1956) and Rosen and Bates (1967) describe the socialization of graduate students as a developmental process that occurs through the various phases of the graduate program. Becker and Carper (1956) identify elements such as the development of interest areas, skill development, investment and internalization of ideals as evidence of socialization. As a result of their interviews with graduate students in physiology, philosophy, and mechanical engineering, they suggest that movement occurs as a result of association with students, professors and the academic process. Similarly, Rosen and Bates (1967) discuss the advisor–advisee relationship as a socializing interaction in which the advisor transmits knowledge and the advisee receives and absorbs the information. These scholars also describe socialization as a sequential process in which there are "formal gateways" (Rosen & Bates,
1967, p. 79) through which the student must pass. As students progress through their programs, Rosen and Bates (1967) indicate that they develop increasing levels of professional identification, and their status as professionals increases both in the eyes of their advisors and other students.

Approaching the concept of socialization from a different point of view, Blackburn, Chapman and Cameron (1981) found that, from the advisor's perspective, students "who are regarded as most successful are those who replicate the mentor's experience. They are in essence, the mentor's 'clones'" (p. 320). Bucher and Strauss (1961) describe the socialization of medical students not only as a process of field identification, but as the development of identification and commitment with a particular segment or specialization within the field. In contrast, Bess's (1978) survey of faculty members, divided into two groups to control for development related to age, and incoming doctoral students reveals few differences in their preferences for tasks associated with the faculty role. Bess (1978) tentatively concludes that

... students entering graduate school have already anticipated the values and orientations which will be required of them as faculty members. They prefer pretty much the same sets of tasks as do present faculty. Graduate education consists, therefore, primarily in the gaining of cognitive skills and knowledge and the confirmation through socialization of preexisting behavior tendencies. (p. 312)
In another approach to the socialization of doctoral students, Toombs (1977) suggests that transactions between students and the surrounding environment are part of the socialization process. By investigating student awareness and use of departmental research in a broad range of fields, Toombs (1977) indicates that the process of socializing doctoral students is achieved through both direct interaction and indirectly through participation in the graduate school environment.

Finally, Toombs (1974) and Whitley (1981) discuss the socialization of doctoral students in relation to the level of formal structure within the discipline. Toombs (1974) indicates that in "fields where the corpus of knowledge has a sound structural framework" (p. 3), the socialization process is likely to be of a linear nature in the form of the "master-apprenticeship relationship" (p. 2). In fields where knowledge is not as formally structured, he suggests that socialization is more internally based and dependent upon the individual's perceptions, processing of those perceptions, and developmental readiness.

Whitley (1981) also relates socialization of students to the structure of knowledge within the discipline. His account is the only one to relate the discipline to both research topic selection and socialization. He states that in disciplines that are "highly formalised and integrated,"

... Ph.D. students are likely to be channelled into examining certain topics and developing certain skills in working on these and so commitments to particular domains and approaches will be strongly reproduced while others will be largely ignored except by a few "deviant" students and supervisors. (Whitley, 1981, p. 312).
In contrast, students in less formally structured disciplines develop commitments and skills that are varied and "diverse approaches to topic selection and formulation [will be] possible" (Whitley, 1981, p. 313).

In sum, researchers and scholars have explored doctoral education as both a developmental and socializing experience. The developmental literature suggests that experiences during doctoral education influence psychological aspects such as self-confidence, independence and autonomy within students. In addition, adult development theory has also been used to explore the intellectual or cognitive development of students, and advisee-advisor relationships.

The literature exploring the socialization of doctoral students has related socialization to program success or failure, professional development and identification, program phases, and advisee-advisor interaction. In addition, participation in the surrounding environment, and the nature of the discipline, have been discussed in relation to the socialization process. Although it is generally accepted that doctoral education promotes student development on both a personal and professional level, little research has focused upon the influence of development and socialization on the process of research topic selection.

**Student-Student Relationships**

Few studies have focused upon the relationships between doctoral students. Berelson (1960) indicates that doctoral students reported learning from one another, and many of his respondents reported learning more from other students than from faculty. In her study of Berkeley
doctoral students, Heiss (1967) reports that "there appears to be more positive, scholarly interaction among doctoral students in the biological and physical sciences than among students in the other divisions" (p. 40). She indicates that the group structure in the biological and physical sciences enhances peer interaction, while in other divisions research tends to be done in isolation. In addition, Heiss (1967) reports that ties between students appear stronger once they have achieved candidacy.

Loewenberg (1969) indicates that advanced students act as guides and support for students in the earlier program phases. Similarly, over half of the respondents in Heiss's (1970) study of doctoral education indicated that more advanced students serve as role models. Katz (1976) asserts that the opportunity for discussion among students is an important condition for the stimulation of intellectual development. And, Bargar and Mayo-Chamberlain (1983) recommend constructing formal support groups for peer networking.

Although there is no systematic study that explores peer interaction, and no study that identifies peer influence in topic selection, several authors do indicate that peer relationships on the doctoral level influence both personal growth and accommodation into the program. The suggestion has also been made that discipline affiliation may be a factor influencing peer interaction.
Program Structure

Although there is no direct study of the influence program structure has upon research topic selection, several studies and discussions do present program phases within their presentations. Rosen and Bates (1967) relate program phases to professional socialization issues. They identify program approval, committee formation, the completion of coursework and examinations, dissertation topic approval, and dissertation completion as "formal gateways through which each neophyte must pass" (p. 79). These "gateways" are sequential and provide opportunities for assessing students' progress.

Bargar and Mayo-Chamberlain (1985) discuss program phases as they relate to advisee-advisor issues. They describe modes of behavior and interaction that enhance both student and advisor development and the advisee-advisor relationship during the program phases - entry, program building, examinations, topic development, doing research, writing the dissertation, and the oral defense.

Heiss (1967) also identifies topic selection as a program phase, and, as mentioned earlier, identifies this phase as a stressful student experience. In addition, Heiss (1967, 1970) identifies insufficient orientation, the view of coursework as a hurdle, and the qualifying examinations as significant causes of stress during the doctoral experience.
Although no direct study specifically focuses upon program structure as that structure influences topic selection, the studies and discussions cited do indicate that structural elements are influential aspects of the doctoral experience.

**Sociology of Academic Disciplines**

Many of the studies referred to thus far in relation to the various issues in doctoral education identify a single discipline, several disciplines, or differentiate among fields on the basis of traditional rubrics, e.g., physical sciences, biological sciences, social sciences and humanities. Although the more traditional rubrics are a convenient classification system, recent research differentiates between subject areas on the basis of sociological qualities. The sociology of academic disciplines concerns the behaviors and interactions of members of the fields, and the influence the structure of knowledge within the fields has upon the practitioners. Kuhn's (1970a) concept of a "paradigm" is the basis upon which much of this research is formulated.

**Paradigm Concept and Education**

The concept of "paradigm," as discussed by Kuhn (1970a) in his historical account of normal science and scientific revolutions, has stimulated controversy and criticism (Lakatos & Musgrave, 1970). In an attempt to respond to this criticism, Kuhn (1970a) discusses the meaning of "paradigm" and identifies two uses of the term. In one sense the term paradigm, "stands for the entire constellation of beliefs, values,
techniques, and so on shared by the members of a given scientific community" (Kuhn, 1970a, p. 175). Elaborating upon this definition, which Kuhn (1970a) asserts is a sociological use and re-names "disciplinary matrix" (Kuhn, 1970a, 1977), he indicates that the concept includes four important components. These components, which are all commonly shared elements within a scientific community, include "symbolic generalizations," "beliefs in particular models," "values" and "exemplars" (Kuhn, 1970a, p. 182-186).

Kuhn (1970a) suggests, using this first definition of a paradigm, that periods of normal science include the use of facts made available by the paradigm to observe and understand nature, use of the paradigm to make predictions about nature -- establishing those problems to be addressed, and research conducted that helps to articulate and clarify the paradigm itself. He describes normal science as puzzle-solving activity during which the paradigm provides scientists with commitments involving concepts, theories, instruments, and methods to be used to solve the puzzles.

Scientific revolutions occur when research reveals facts about nature that cannot be explained with reference to the existing paradigm, and a different paradigm develops that gradually attracts adherents who judge the new paradigm to be sufficient in explaining both the phenomena covered by the old paradigm, and that which the old was not capable of explaining (Kuhn, 1970a). Thus, scientific revolutions become sociological events in which the shared values of scientific practitioners experience migration and change.
Kuhn's (1970a, 1977) second use of the term "paradigm" involves the use of exemplars or "the concrete puzzle-solutions which, employed as models or examples, can replace explicit rules as a basis for the solution of the remaining puzzles of normal science" (p. 175). Kuhn (1970a) indicates that, through the use of exemplars, students eventually learn to identify problems as similar to one another. Once this ability is achieved, the student has developed a way of seeing or perceiving that is accepted as the appropriate mode by the members of the scientific community. An interesting aspect of this second use of the term paradigm concerns its effect on normal science and scientific revolutions. If students are trained to perceive phenomena via the acceptable paradigm within their community, their capacity for perceiving events not addressed by the paradigm may be limited. Thus, when used as a way of seeing, the paradigm may limit the potential ways in which phenomena may be explained.

Both of these concepts of paradigm have implications for education. As Kuhn (1970a) states, "The study of paradigms, . . . is what mainly prepares the student for membership in the particular scientific community with which he will later practice" (p. 11). Students are taught via the accepted paradigms within their disciplines, and become perpetuators of the discipline's values, beliefs, and boundaries. Popper (1970) takes issue with Kuhn's description of education for scientists. He claims,
The "normal" scientist, as described by Kuhn, has been badly taught. He has been taught in a dogmatic spirit; he is a victim of indoctrination. He has learned a technique which can be applied without asking for a reason why. (Popper, 1970, p. 53)

Although Popper (1970) claims that such scientists do exist, he declares "Kuhn is mistaken when he suggests that what he calls 'normal' science is normal" (p. 53).

Barnes (1982), framing Kuhn's assertion in the positive, states that "the consequence of training is not that impediments to proper perception and inference are removed, but the specific competences in perception and inference are acquired: socialisation provides the resources appropriate to the practice of research" (p. 20). As such, students are trained on the basis of the accepted paradigms within their fields, and this training, rather than limiting their abilities to perceive phenomena, makes them able to both carry out "normal" scientific activity and recognize problems and results that cannot be explained using the accepted paradigms.

In an effort to define Kuhn's multiple uses of the term paradigm, Masterman (1970) identifies three distinct descriptors for the term. First, she utilizes the rubric "metaparadigm" or "metaphysical paradigm" in defining paradigm as a way of seeing. Second, "sociological paradigms" in Masterman's (1970) account refer to scientific achievements that are used as the basis upon which a scientific community develops and performs research. Kuhn's final use of the term paradigm, as described
by Masterman (1970), is the tool or system used for puzzle-solving in research. This definition is called "artefact paradigms" or "construct paradigms."

The concept of a paradigm, as originally developed by Kuhn in his 1962 version of *The Structure of Scientific Revolutions*, and revised in the 1970 version of this book, has an intuitively logical appeal that "opened the door for a sociological analysis of scientific development" (Whitley, 1974, p. 2). The literature reveals numerous applications of Kuhn's work in attempts to understand science and scientists' work as sociological phenomena. The paradigm concept is used in research and scholarly articles as a basis for exploring, in a sociological framework, such areas as the development of specializations (Chubin & Connolly, 1982), scientific discoveries (Brannigan, 1981), and the pattern of scientific development in different disciplines (Ball, 1976; Crane, 1980; Lewis, 1980).

Evident in the literature are references to Kuhn's work such as: "the Kuhnian model" (Crane, 1980, p. 24), "the Kuhnian revolution" (Mulkay, Gilbert & Woolgar, 1975, p. 198), and "the Kuhnian tradition" (Lewis, 1980, p. 285). Although Kuhn's (1970a) presentation of the paradigm concept is criticized for its lack of clarity (Masterman, 1970), and debates exist regarding his Ideas (Lakatos, 1970; Popper, 1970), his theory of scientific development has revolutionized the sociology of science (Weingart, 1974). The impact Kuhn has had remains evident
twenty-two years after the initial publication of his work, as the concepts he developed remain as a vibrant basis for research and scholarly discussion exploring the epistemology and sociology of science.

In sum, although the original use of the term paradigm has received critical review and contains multiple, related meanings, some distinct elements can be identified. First, a paradigm is a concrete system of acceptable technique or method for conducting scientific inquiry. Second, in the sociological sense, a paradigm is the accepted framework of beliefs and values that guide research activity within a scientific community. Third, a paradigm defines the accepted way of seeing or perceiving the problems within a scientific area. Each of these aspects of the paradigm concept have the potential to influence students' education, as suggested above, and the research topic selection process.

Paradigms and Academic Disciplines

In his discussion of the "paradigm" concept, Kuhn (1970a) indicates that degrees of consensus exist among scientific practitioners. If members of a scientific community agree on the theories, methodologies and acceptable research areas for their discipline, the discipline is considered highly paradigmatic. However, if there is a great deal of disagreement over acceptable theories, methodologies and research areas, the discipline is considered to be in a nonparadigmatic state. It follows from this position that a continuum may exist regarding the paradigmatic development of a variety of disciplines from the highly paradigmatic to the nonparadigmatic.
Several investigators have utilized the concept of paradigm development to study a broad range of phenomena in different academic disciplines. Lodahl and Gordon (1972, 1973a, 1973b) distinguish between disciplines on the basis of paradigmatic development to investigate the influence the paradigmatic development of a discipline has upon teaching and research in graduate departments, and research funding. Their findings indicate that differentiation among fields on the basis of paradigmatic development reveals differences in levels of faculty agreement regarding course content and degree requirements, work with graduate students, funding of university departments, and departmental and individual autonomy. Especially important are the findings by Lodahl and Gordon (1972) that indicate a greater willingness by faculty in high paradigm disciplines to spend time teaching and advising graduate students.

Thompson and Brewster (1978), using the same high/low paradigm distinction as identified in the Lodahl and Gordon (1972, 1973a, 1973b) studies, found that faculty in low paradigm disciplines are more likely to grant students greater freedom in determining degree requirements than faculty in high paradigm disciplines. Pfeffer, Leong, and Strehl (1977) investigated the use of particularistic versus univerallistic criteria in journal publication. Their study identifies differences in the use of these criteria on the basis of the paradigmatic development of the field.

between high and low technological development corresponds with Lodahl and Gordon's (1972, 1973a, 1973b) differentiation between disciplines along high/low paradigmatic dimensions, and therefore, with Kuhn's (1970a) differentiation between fields according to degrees of consensus among practitioners. Faculty success (Neumann, 1977a), research publication (Neumann, 1977b), funding (Neumann, 1978a), faculty job satisfaction (Neumann, 1978b), faculty salary (Neumann, 1979b), perceptions of power in university departments (Neumann, 1979d), and leadership styles of department chairpersons (Neumann & Boris, 1978), have all been investigated using the concept of high/low technological development to differentiate between disciplines. Each of these studies substantiate the influence of paradigmatic development in relation to academic disciplines along a wide variety of dimensions related to members' behaviors and reward systems.

Further substantiation of the difference between fields on the basis of paradigmatic development is offered by Neumann (1979a, 1979c, 1980) in his studies investigating faculty attitudes toward collective bargaining and perceptions of change in university departments. Again, differentiation between disciplines on the basis of paradigmatic development corresponds to differences in attitudes and perceptions.

Biglan (1973a), in his study of the characteristics of subject matter in different academic areas, identifies discipline clustering (i.e., discipline grouping on the basis of similarity on bi-polar adjectives) related to the existence of paradigms. Using faculty members
as judges of the similarity between subject areas, he found that "... 'hard' or science-oriented areas [clustered] at one end of the dimension, social sciences toward the middle, and humanities at the other end of the dimension" (Biglan, 1973a, p. 198). This study lends further support to Kuhn's (1970a) discussion regarding the paradigmatic development of scientific fields. Biglan (1973a) also identifies two additional dimensions for characterizing academic departments. These dimensions relate to "the degree of concern with application" (Biglan, 1973a, p. 202), differentiated as pure or applied, and interest in life systems, differentiated as life-nonlife.

Many studies have been conducted validating the characteristics of subject areas as described by Biglan (1973a). Biglan (1973b) found that scholars in different areas, differentiated on the basis of the dimensions identified in his model, differ in their degree of social connectedness, involvement with three faculty roles—teaching, research and service, the number of different types of publications (e.g., monographs versus journal articles), and the number of dissertations they supervise. Hard area scholars produce more journal articles, collaborate on research more often, and have a greater number of co-authors than scholars in soft subject areas. However, scholars in soft areas reveal a greater commitment to teaching and a greater number of publications as monographs.

Creswell and Bean (1981) validated the Biglan model in relation to research output, i.e., mode of publication for faculty in different
subject areas. They found that faculty in "hard" subject areas produce more journal articles, while faculty in the "soft" subject areas tend to publish more books and monographs. In addition, they found that measures of socialization do not distinguish between the subject areas as an alternative explanation for the Biglan groupings. Creswell, Seagren and Henry (1980) validate the Biglan model by differentiating between the perceived professional development needs of department chairpersons. Muffo and Langston (1981) support the validity of the Biglan model by investigating differences between faculty salary.

Smart and Elton (1975) found that the Biglan dimensions were valid when used to study differences in the goal orientations of department chairpersons. An especially significant finding in this study is that chairpersons in departments classified as "hard" have more goals emphasizing research and instruction than "soft" area chairpersons. This is also a distinguishing characteristic between chairpersons in the "pure" and "applied" subject areas. In a later study, Smart and Elton (1982) further validate the Biglan model in a study of faculty interest in research opportunities, faculty conservatism, and emphasis placed on certain undergraduate teaching goals. They found that faculty in hard subject areas perceive themselves as politically conservative and religious, tend to spend more time on research related activities, and emphasize cognitive development and career preparedness for undergraduate students. In contrast, faculty in soft subject areas place greater emphasis on personal growth and development for undergraduates and tend
to spend more time on administrative assignments. This study differentiates consistently between the eight clusters of subject areas consistent with the dimensions identified by Biglan (1973a).

Creswell and Roskens (1981), in reviewing studies that validate the Biglan model of academic subject areas, suggest that additional research is necessary to explore student-faculty relationships in relation to this model. Although this assertion is well founded, additional research is also necessary to explore the Biglan model, and more generally, the effect of paradigmatic development upon students within various academic areas. Although some studies explore the relationship between research and paradigmatic development of different subject areas (Biglan, 1973b; Creswell & Bean, 1981; Lodahl & Gordon, 1972, 1973a, 1973b; Neumann, 1977b, 1978a, 1979b; Smart & Elton, 1975, 1982), no study focuses upon the influence of the paradigmatic development of an academic area upon student research within that area.

The concept of paradigmatic development and the related research focus primarily upon faculty and administrator attitudes and behavior in relation to the functioning of academic departments, and indicate that the paradigmatic development of a discipline can and does have an influence upon the researcher, funding, communication and a variety of additional variables. However, studies investigating student attitudes, behavior, and research in relation to the paradigmatic development of subject areas have yet to be conducted.
Controversy regarding the dissertation requirement has existed since the beginning of doctoral education in the United States. The literature reveals debates regarding the purpose of doctoral education (i.e., teaching versus research), and indicates that research remains the primary emphasis in the Ph.D. process. In addition, questions concerning the dissertation as an original and significant contribution to knowledge have been raised. Recent literature suggests that the dissertation requirement be viewed as a training tool, rather than placing emphasis upon its substantive qualities with regard to originality and contributory capabilities.

Although only one study specifically explores the question of elements influencing the selection of dissertation topics, several studies and writers allude to influential elements in their discussions. The literature suggests that the advisee-advisor relationship, the roles assumed by faculty advisors, peer interaction, program structure, personal development, and professional socialization may all be influential in doctoral students' selection of dissertation topics. Further, individual personality variables and career outlook are also identified as potential sources of influence in dissertation topic selection.

Finally, studies investigating differences between academic subject areas, utilizing the sociological concept of paradigmatic development as a basis, indicate that the academic field influences faculty and administrator behavior in the areas of research and teaching. However,
the Impact of the academic field has yet to be associated with the research of students in different subject areas. This study begins to address this issue as it investigates the elements influencing dissertation topic selection in four fields of study.
CHAPTER III

METHODOLOGY

Two Philosophies of Inquiry

There exists, in the scholarly literature, a well-established debate concerning the advantages and disadvantages of two philosophies of scientific inquiry. These philosophies are known variously as: positivistic, empirical, rationalistic, and logical-technological inquiries versus phenomenological, naturalistic, descriptive, and ethnomethodological inquiries. These descriptors are by no means exhaustive. For discussion purposes, the following will distinguish between the philosophies by utilizing Guba's (1981a, 1981b) and Guba and Lincoln's (1982) distinction: rationalistic inquiry versus naturalistic inquiry. Choice of terminology is not indicative of substantive differences in the philosophies presented above. Rather, choice of terminology is based on the investigator's personal preference for these terms as descriptors of the two philosophies of inquiry.

Basing their discussion upon Kuhn's (1962) version of The Structure of Scientific Revolutions, Guba (1981a, 1981b) and Guba and Lincoln (1982) describe the two philosophies of inquiry as two distinct
paradigms. In so doing, paradigms are defined as "axiomatic systems characterized essentially by their differing sets of assumptions about the phenomena into which they are designed to inquire" (Guba and Lincoln, 1982, p. 233). Five axioms and the assumptions of each are used to make the distinction between the rationalistic and naturalistic paradigms.

The first axiom described by Guba and Lincoln (1982) concerns the nature of reality. Within the rationalistic paradigm,

There is a single, tangible reality fragmentable into independent variables and processes, any of which can be studied independently of the others; Inquiry can converge on this reality until, finally, it can be predicted and controlled. (Guba & Lincoln, 1982, p. 237)

Within the naturalistic paradigm a singular reality does not exist. Rather, the naturalistic paradigm describes that

There are multiple, intangible realities which can be studied only holistically (to dissociate the wholes is to alter them radically); Inquiry into these multiple realities will inevitably diverge (each inquiry raises more questions than it answers) so that prediction and control are unlikely outcomes, although some level of understanding (verstehen) can be achieved. (Guba & Lincoln, 1982, pp. 237-238)

Thus, the first distinction between the two philosophies of Inquiry is that the rationalistic paradigm emphasizes prediction and control,
therefore identifying reality as singular, fragmentable and tangible. The naturalistic paradigm emphasizes understanding divergent, intangible, multiple realities.

A second distinction between the two paradigms of inquiry concerns the relationship between the observer or researcher to the object of observation. Carini (1975) describes this distinction when discussing the relationship of the observer to the phenomenon under investigation. She uses the term logic in relation to rationalistic inquiry, and phenomenology in relation to naturalistic inquiry.

For logic as compared with phenomenology the assumed nature of the phenomenon is prefigured in the difference of perspective assumed in the relationship of the observer to the phenomenon in the two positions. The phenomenon, as an object separate and apart from the observer, is assumed to be knowable, i.e., objectifiable, through the predication, analysis, and summation of its parts. In those terms, it has one unchanging meaning and is, therefore, objectively knowable by all observers through its exhaustive predication.

... The phenomenon as it is participated in by the observer in the constitution of a shared meaning [the naturalistic position] is assumed to be thinkable but inexhaustible, and therefore, fundamentally ambiguous. Its multiple meanings emerge from its continuing transformation through the changing point of view, the thought, of the observer. (Carini, 1975, p. 10)

Thus, the second element distinguishing the two paradigms of inquiry concerns the position of the observer in relation to the object of observation. The rationalistic paradigm, with its emphasis on prediction and control, places the observer outside or at a distance from the object...
being observed. Neither the object nor the researcher are to influence one another. The naturalistic paradigm, with its emphasis on understanding, describes the object and observer in interaction. The researcher and the object of investigation interact to influence one another, leading to ever-increasing levels of understanding.

The third area of opposition between the two philosophies of inquiry concerns the importance of identifying general laws. The rationalistic paradigm emphasizes the discovery of "scientific laws." Patton (1975) describes this emphasis in a discussion regarding generalizability.

The thrust of the dominant paradigm [rationalistic] in evaluation research is a concern with discovery of scientific laws and theories. The Scientific Method is applied to uncover patterns of behavior; the Ideal is to so specify and identify factors of social causation that the research scientist can explain 100 percent of the variance in social phenomena.

... The dominant paradigm is directed at producing generalizations. The assumption that this is the goal of Science is so deeply ingrained that it is virtually true by definition. I have never seen this assumption questioned in the literature on Scientific Methodology. Science is the search for generalizations. (Patton, 1975, p. 35)

As the rationalistic paradigm regards science as "the search for generalizations," and emphasizes the discovery of scientific laws, the researcher controls phenomena, and observes phenomena that are context-free. That is, in order to predict and control phenomena towards the development of law-like generalizations, the object of observation is removed from its contextual reality.
In opposition to this element of the rationalistic philosophy, adherents of the naturalistic philosophy indicate that certain phenomena cannot be separated from the context in which they are embedded. By asserting context-dependence, the naturalistic paradigm claims that context-isolation changes the object of observation. That is, the context is intimately tied to the phenomena. Guba and Lincoln (1982) assert that the goal of inquiry, from the naturalistic perspective is,

... concerned first with developing an idiographic statement about the situation he or she is studying, accompanied by sufficient "thick description" to make judgments about transferability possible, should anyone care to ask that question. (p. 241)

A fourth area of distinction between the two paradigms of inquiry concerns the concept of "causality." The traditional rationalistic philosophy, with its emphasis on prediction and control, attempts to determine cause and effect relationships within the observed phenomena. This, of course, relates directly to singular, fragmented realities and the discovery of scientific laws. In contrast, the naturalistic philosophy does not attempt to define cause-effect relationships. Rather, this philosophy defines action as "patterns" and "webs" of interaction that must be viewed in their totality.

An action may be explainable in terms of multiple interacting factors, events, and process that shape it and are part of it; inquirers can, at best, establish plausible inferences about the patterns and webs of
such shaping in any given case. The best method for assessing these patterns and webs is the field study that deals with them holistically and in their natural contexts. (Guba and Lincoln, 1982, p. 238)

Finally, the fifth element identifying the distinctions between these two philosophies of inquiry involves the role of values. The rationalistic perspective claims value-freedom. Because of the controls and the external stance of the observer, adherents to this philosophy maintain that the researcher remains neutral and that, therefore, what is observed is objective.

The underlying assumption about the observer in logical, scientific inquiry is that the very requirements of his inquiry render him "objective," and thus the peculiar character of his own thought and being is vitiated. (Carini, 1975, p. 8)

The naturalistic philosophy describes inquiry as "value-bound." In describing the role of values in inquiry through the naturalistic paradigm, Guba and Lincoln (1982) identify five points.

1. Inquiries are influenced by inquirer values, especially as those values are expressed in the choice of a problem and the framing, bounding, and focusing of that problem.

2. Inquiry is value-influenced by the paradigm selected which guides the investigation into the problem.

3. Inquiry is value-influenced by the choice of substantive theory and methods used to guide the collection and analysis of data relevant to the problem selected in the interpretation of findings.
4. Inquiry is influenced by the values inherent in the context. Those values are not those that characterize individuals, but those that specifically characterize socio-behavioral, human, organizational phenomena.

5. ... Inquiry may be said to be either resonant (reinforcing or congruent) or dissonant (conflicting) with the nature of the problem to be studied.

   ... Problem, paradigm, method(s), and context must be congruent (value-resonant) with each other to produce meaningful findings. (Guba & Lincoln, 1982, pp. 238-239)

Thus, the naturalistic philosophy asserts that inquiry is value-bound by the nature of the problem, the researcher, and the methods and framework used in the study.

The five distinctions identified between the rationalistic and naturalistic paradigms: 1) the nature of reality, 2) researcher-phenomena relationship, 3) the development of scientific laws, 4) the determination of causal relationships and 5) the role of values, lead to differences in the research methods employed in inquiry. Most typically, the two forms of methodological orientation have been identified as quantitative - the rationalistic paradigm, and qualitative - the naturalistic paradigm. As could be anticipated, the scholarly literature also contains a continuous debate concerning preferred methods for doing scientific research.

Carini (1975) indicates that methodological preference develops as a result of the philosophical orientation of the researcher.
Adherence to logical models, and to the essentially reduced statement of the phenomenon which they reflect, is an attitude before it is a method. Equally, adherence to phenomenal meaning and to the fully elaborated statement of the phenomenon which it reflects, is also an attitude before it is a method. And attitudes are not without substance: they reflect belief and therefore shape thought. (Carlin, 1975, p. 42)

Given that choice of method is an attitude prior to becoming a method, what elements influence the choice of research methodology?

First, methodological orientation must be based on the investigative problem. That is, "different kinds of problems require different types of research methodology" (Patton, 1975, p. 13). Patton continues by offering an example of how problem framing influences methodology.

If all we want to know is the number of words a child can spell or the frequency of interaction of children of different races in desegregated schools, then statistical procedures are appropriate. However, if we want to understand the relevance of the words to that child's particular life or the meanings of inter-racial interactions, then some form of qualitative methodology (participant observation, in-depth interviewing, systematic field work) which allows the researcher to obtain first-hand knowledge about the empirical social world in question may well be more appropriate. (Patton, 1975, p. 13)

Both choice of method and problem cannot be separated from the individual conducting the research study. Mooney (1957) contrasts a consumer's perspective with a producer's perspective in the selection of
research problems. In so doing, he declares that problems need to be selected in relation to the researcher's personal position and connections with the world.

In creating a problem to work on, a researcher is wise to proceed in a way which is just the opposite of the way recommended in the consumer's outlook. To the consumer it seems that an individual's need for problem solutions is a very erratic base on which to build science. His advice is to "select a problem in relation to what science needs to know, not in relation to what I need to know." In a world presumed split to start with, a choice of this kind is called for, but in a world where I am within nature and nature is within me and the two are extensions within the same Integral system, there is no need for an arbitrary choice in these terms. Science is then seen as a pursuit by persons to clarify the extension of themselves into the universe. As the uniqueness of their personal position in the universe becomes clearer, their connectedness into universality becomes also clearer. This is one operation, made possible by investing oneself to the hilt and following out the clarifications.

Hence, the problem I create to work on is to be a problem of importance to me personally. (Mooney, 1957, p. 174)

Mitroff and Kilmann (1978) devised a psychologically-oriented typology of scientists based on Carl Jung's psychological system. They describe four "types" of scientists, and indicate that each "type" has a preferred style of inquiry that relates to psychological orientation. Thus, choice of research methodology involves both the problem to be investigated and the researcher conducting the investigation. Further, the framing of the problem to be investigated is also influenced by the researcher conducting the investigation.
Consideration of both the Investigative problem, and the researcher conducting this study, led to the choice of a qualitative methodological orientation in keeping with the naturalistic philosophy of inquiry. The Investigative problem seeks an in-depth understanding of the elements influencing doctoral students' selection of dissertation topics. Rather than approaching this problem with a pre-conceived theoretical perspective to identify influential elements in the topic selection process, this study seeks to allow the influential elements to emerge through the respondents' descriptions of their experiences, and through an understanding of the meaning they attribute to events and behaviors they encounter during their doctoral programs.

As suggested earlier, research problems are not isolated entities. They are influenced by researchers' framing of the problems. The initial impetus for conducting this study was a result of the Investigator's personal experiences in the dissertation topic selection process. Further, the choice of qualitative methodology reflects the Investigator's preference for personal involvement in the research process, and a style of inquiry that allows a holistic and meaningful perspective to be achieved. A description of qualitative methodology in general, especially distinguishing between those aspects that differ from quantitative methodological orientations, will provide further explanation for the Investigator's methodological choice in conducting this study.
Qualitative methodologies tend to support theory discovery over theory testing. That is, adherents to this orientation tend to immerse themselves within the multiple realities of the phenomena under investigation for the purpose of discovering and developing theory from their discoveries.

In all events, theory is more powerful when it arises from the data rather than being imposed on them. It is better to find a theory to explain the facts than to look for facts that accord with a theory. (Guba and Lincoln, 1982, p. 244)

Further, qualitative methodological orientations, because of the goals of inquiry, tend to support "open" research designs that occur in natural settings. Rather than specifying study design in its entirety prior to the study, these methodologies recognize that the research design may need to be altered as discoveries are made. However, research design should be specified as clearly as possible before the study begins. In addition, the setting for studies using qualitative methodologies should occur in natural settings. The philosophy of inquiry on which qualitative methodologies are based states that meaning is best derived from multiple realities in context. Thus, the real-world setting becomes important.

Further, qualitative methodologies tend to rely upon the researcher as the primary instrument for data collection and analysis. Technology has not yet created a device that functions and is capable of producing
and handling information as complexly as the human system. Guba and Lincoln (1982) indicate that use of the human-as-instrument is imperative because of the reliance on "tacit" knowledge.

The naturalist, intent upon the use of the human as the prime data collection instrument and wishing to utilize the capabilities of that instrument to the fullest, also admits and builds upon tacit knowledge—intuitions, apprehensions, "vibes"—which, although not expressible at any given moment, nevertheless occur to inquirers by virtue of their training and, especially, their experience. (Guba and Lincoln, 1982, p. 245)

The naturalistic paradigm and its associated methodologies has been described by Patton (1975) as "rather like an ignored, illegitimate stepchild lurking in the shadow of the dominant paradigm" (p. 1). As such, many criticisms have been directed regarding the "trustworthiness" of research findings resulting from qualitative methodological orientations. These criticisms focus upon questions of validity, reliability and objectivity.

Guba and Lincoln (1982) address these criticisms by discussing four analogous terms. First, the criticism regarding "internal validity" is discussed using the term "credibility." Thus, the question of "truth value"—How can one establish confidence in the "truth" of the findings of a particular inquiry for the respondent with which and the context in which the inquiry was carried out?" becomes "Do the data sources (most
often humans) find the inquirer's analysis, formulation, and interpretations to be credible (believable)?" (Guba and Lincoln, 1982, p. 246).

The second criticism, external validity or generalizability, is addressed using the term "transferability." Since one of the fundamental premises upon which the naturalistic paradigm is based declares that phenomena are context-bound and, therefore, are not generalizable, external validity is not of major importance from this perspective. However, it is possible that research results could be transferred to other, similar contexts if there is sufficient "thick description" available regarding both contexts (Guba and Lincoln, 1982, p. 247).

Third, the question of reliability or replicability has been an issue in relation to qualitative methodologies. As Guba and Lincoln (1982) indicate, since study design emerges in process, it is not possible to replicate studies using qualitative methodologies. However, in addressing this issue they use the term "dependability."

The naturalist defines the concept of dependability to mean stability after discounting such conscious and unpredictable (but rational and logical) changes [in study design]. (Guba and Lincoln, 1982, p. 247)

Finally, Guba and Lincoln (1982) use the concept of "confirmability" when addressing issues regarding "objectivity" in naturalistic research. They assert that researcher objectivity is not at issue. Rather, data confirmability is crucial.
... what is important is not that there be quantitative agreement but qualitative confirmability. The onus of objectivity ought, therefore, to be removed from the inquirer and placed on data; it is not the inquirer's certifiability we are interested in but the confirmability of the data. (Guba and Lincoln, 1982, p. 247)

In sum, the naturalistic paradigm and its associated methodologies have come under vigorous attack in the scholarly literature on both theoretical and methodological grounds. However, much of this criticism surfaces as a result of deeply imbedded beliefs from the rationalistic framework. Any competing style of inquiry would find need to defend itself against such a strong, historically grounded tradition.

Nonetheless, the naturalistic philosophy of inquiry has addressed many of the criticisms; primarily by reframing the criticisms in light of the theoretical bases upon which the philosophy is built. It may well be that science itself is experiencing a period of "scientific revolution" in which the former, established, and preferred style of inquiry is found to be inadequate for all research phenomena. This not to indicate that the naturalistic paradigm is better than the rationalistic paradigm. Rather, each has its own advantages and disadvantages. Given our present knowledge, an ideal paradigmatic construction would incorporate elements of each in a philosophy of inquiry. And, in light of the ever-increasing technological advances that are made via the rationalistic tradition, we would be well served to find better ways to study individual, social and psychological elements to better understand the humans who will make use of this advanced technology.
**Study Design**

The purpose of this study is to "understand" and "describe" the elements influencing the process of research topic selection for doctoral students in four fields of study from the students' perspectives. In keeping with this purpose, ethnography was the chosen methodology. Ethnography, a methodology rooted in the field of cultural anthropology, attempts to "understand another way of life from the native point of view" (Spradley, 1979, p. 3). In doing ethnographic research the researcher is concerned with the meaning of events and actions as they are expressed by the members of the systems studied.

The essential core of ethnography is this concern with the meaning of actions and events to the people we seek to understand. Some of these meanings are directly expressed in language; many are taken for granted and communicated only indirectly through word and action. But in every society people make constant use of these complex meaning systems to organize their behavior, to understand themselves and others, and to make sense out of the world in which they live. (Spradley, 1979, p. 5)

In order to understand the "meaning of actions and events" influencing the process of research topic selection in the four departments studied, a series of in-depth interviews were conducted with doctoral students in the four programs. Spradley (1979) describes three important elements related to the ethnographic interview. First, the interviewer must communicate the "explicit purpose" of the interview.
Since ethnographic interviews are direction oriented, i.e., "the talking is supposed to go somewhere" (Spradley, 1979, p. 59), the interviewer must provide an explicit account of the purpose and direction.

Second, it is important for the interviewer to provide "ethnographic explanations" regarding the interview. Spradley (1979) identifies five types of explanations: 1) project explanations, 2) recording explanations, 3) native language explanations, 4) interview explanations, and 5) question explanations (pp. 59-60). Providing information relative to these categories helps to direct the interview, provide an understanding of purpose, and, in general, aids in relaxing the interaction.

Third, Spradley (1979) identifies three types of "ethnographic questions" to be used in the interview. These three types of questions - descriptive, structural and contrast - correspond to the questions: What is being said?, How is the respondent arriving at that description?, and What is the meaning of what's being said to the respondent? (An example of the use of these question types in this study is provided in Appendix A.)

When using in-depth interviews as a methodological tool, it is important that the researcher approach the interviews as a "blank slate," i.e., with as few preconceived ideas as possible. The purpose of this "conscious attitude of almost complete ignorance" (Spradley, 1979, p. 4) is to allow the descriptions to emerge from the data rather than fitting the descriptions into a preconceived framework. Since the researcher conducting this study had recently experienced the process of selecting a
research topic, and a minimal amount of related literature had been read
in the preparation of a research proposal for the study, becoming a
"blank slate" was an impossible goal. However, recognizing this as a
potential limitation, as it would be for anyone who chose to study this
problem using this methodology, the interviews were conducted with the
awareness that the goal was to understand the respondents' experiences as
they understood them. Geertz (1975) describes this position, when
discussing the concept of "experience-near."

That is what experience-near means - that ideas and the
realities they disclose are naturally and indissolubly
bound up together. What else could you call a
hippopotamus? Of course the gods are powerful; why
else would we fear them? The ethnographer does not,
and in my opinion, largely cannot, perceive what his
informants perceive. What he perceives - and that
uncertainly enough - is what they perceive "with," or
"by means of," or "through" or whatever word one may
choose. In the country of the blind, who are not as
unobservant as they appear, the one-eyed Is not king
but spectator. (Geertz, 1975, p. 48)

It should be noted that, although the researcher's experiences prior
to this study may be perceived as a limitation in relation to "pure"
methodological use, these experiences were found to be an asset.
Respondents often expressed feeling at ease as they recognized the
commonality of our experiences. The interview process was relaxed, and
the investigator found the participants to be very open regarding their
experiences.
In keeping with the philosophy of an emergent study design, this study employed sampling procedures as described by Glaser and Strauss (1967) for the constant comparative method. The basic criterion for the selection of comparison groups using this procedure is their "theoretical relevance." Data are simultaneously collected, coded and analyzed. The categories that emerge and the properties of the data inform the researcher as to additional data sources. This process continues until a point of "theoretical saturation" has been reached. This is the point at which the researcher recognizes that additional data will no longer help to develop properties of the categories being studied.

Utilizing the methods of emergent study design and theoretical sampling contributed to the choice of unstructured, open-ended interviews as the interview format. An interview guideline was formulated prior to beginning the study and is included here as Appendix B. However, these questions were used to guide the interviews, primarily in the study's earliest phases. Their purpose was to aid the investigator. Often, answers to questions were given in the context of the interview without explicitly asking the participant. As the interviews progressed, and categories were formulated, questions were developed on the basis of the emerging data. An example of some of the questions used to guide the later interviews is included here as Appendix C.

Respondents for this study were doctoral candidates from the departments of chemistry, English, political science, and sociology, in a large mid-western, land-grant university. It was initially hoped that five students from each of the academic departments would be interviewed.
However, because of the small number of students meeting the established criteria, this was not possible. Five students from the departments of chemistry and English were interviewed. Four students were interviewed from the department of political science, and three students were interviewed from the department of sociology. The established criteria for study participation and their corresponding explanations are as follows.

1. Only white, male, non-foreign students were interviewed. By limiting this study to same sex, race, and nationality, it was believed that differences found in the research process would not be influenced by differences in the students' sex, race, or nationality. White male students were chosen because doctoral education has traditionally been masculine and caucasian.

2. Only doctoral students whose age fell within the average age range for doctoral students within that department, as reported by the department chairpersons, were to be studied. By restricting the age requirement, differences found in the research process would not be influenced by differences in the students' research perspectives as a result of their personal and professional development.

3. Only doctoral students whose future occupational goals lay in the academic or research arenas were to be studied. It was assumed that students with occupational goals in administration may have a different type of investment in their dissertation research than students whose occupational goals lay in the academic or research arenas. Thus, this restriction was an attempt to interview students whose investment and perspective toward research was similar.
4. Only doctoral students who had completed general examinations, had a dissertation topic, and were actively working on their dissertations were to be studied. Students were determined to be actively working on their dissertation research by their self reports. This criterion was to restrict the study to students' retrospective accounts of the question formation phase of their dissertations. This was to avoid gathering information from students who were still involved in the question formation phase of the research process or were too far removed from this phase, i.e., by having completed their dissertations.

In an attempt to generate a list of potential students for inclusion in this study, the researcher requested the assistance of an Assistant Dean of the Graduate School. What followed from this request was a series of activities conducted by the researcher in the summer of 1983.

1. The researcher was given access to the Graduate School records of students who had passed their general examinations in the departments of chemistry, English, political science, and sociology.

2. These lists were then checked against lists of foreign students and minority students to eliminate students not meeting the established criteria.

3. Finally, the remaining names were checked against current registration information. Male students with a local address, recent registration (either Spring 1983 or Summer 1983), who had given permission to the Graduate School to release information, were maintained on the list of potential participants.
The lists of students who had passed general examinations, and the lists of foreign students and minority students, were checked beginning with the most recently completed quarter, Spring 1983. The researcher then moved backwards in time, by quarters, to generate the names of potential participants. The lists of students completing general examinations in the department of chemistry were checked through Spring, 1982, a total of five quarters. This resulted in the names of fifteen students from the department of chemistry. The lists of students completing general examinations in the departments of English and political science were checked through Spring 1981, a total of nine quarters. This resulted in the names of eight students from the department of English and six students from the department of political science. The lists of students completing general examinations in the department of sociology were checked through Winter 1980, a total of fourteen quarters. This resulted in the names of three students from the department of sociology. Students who had failed their general examinations in their first attempt were immediately omitted and are not included in the numbers reported above. It was felt that the failure experience may have influenced the advisor-advisee relationship in ways that were qualitatively different from students who had not had this experience.
In the original design for this study, it was decided that the faculty advisors for each of the study participants would be asked to participate. The advisors were interviewed following the interviews with their students. An interview guideline for advisors was also prepared prior to beginning the study. It is included here as Appendix D.

The advisors are included in this study because it is believed that the advisors' behaviors are likely to be part of the students' research process. In addition, the interviews with advisors are a source of validation for the students' descriptions. For these reasons, advisors were interviewed regarding their methods of working with students during the question formation phase of the research process. An attempt was made to differentiate as much as possible among the advisors, i.e., to interview as many different advisors as possible. This effort influenced the selection of student participants in the department of chemistry as described below.

The names of potential participants, as generated from the lists of students who had passed general examinations, were placed in alphabetical order according to their department affiliation. Students were then sent a letter requesting their participation. (See Appendix E.) The following lists describe the contact and responses in relation to the students. (Chart 1 displays the number of students and advisors interviewed in each department.)
Chemistry - (15 potential participants)

-the first 10 students, alphabetically, were sent request letters.

-2 names from further on the alphabetical list replaced 2 names in the first 10 to allow for greater differentiation among advisors.

-2 students responded voluntarily.

-8 students were called by the researcher.

-a total of 7 students agreed to participate.

English - (8 potential participants)

-all 8 students were sent letters.

-2 students responded voluntarily.

-6 students were called by the researcher.

-a total of 5 students agreed to participate.

Political Science - (6 potential participants)

-all 6 students were sent letters.

-2 students responded voluntarily.

-1 student called did not have a topic or topic area.

-1 student called agreed to participate.

-2 students were away for the summer. One of these students called the researcher upon his return and was interviewed after the other interviews had been completed.

-a total of 4 students agreed to participate.

Sociology - (3 potential participants)

-all 3 students were sent letters.

-2 students responded voluntarily.

-1 student was called by the researcher.

-a total of 3 students agreed to participate.
Chart 1

Number of Students and Advisors Interviewed by Department Affiliation

<table>
<thead>
<tr>
<th>Department</th>
<th>Students</th>
<th>Advisors</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry</td>
<td>5</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>English</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Political Science</td>
<td>4</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Sociology</td>
<td>3</td>
<td>0(a)</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>7</td>
<td>24</td>
</tr>
</tbody>
</table>

\(a\) - Two students in the department of sociology shared the same advisor. This advisor indicated that he was unable to participate in the study. The third student interviewed in the department of sociology refused to allow his advisor to be contacted for participation in the study. Thus, there were no interviews with advisors in the department of sociology.

Because of the small number of available participants, the age restriction, originally established for student participation, was omitted. Although the majority of students fell within the average age range for doctoral students in their departments, on three occasions students were older than the specified range. It was believed to be more important to increase the number of interviews than to enforce the age restriction in these cases. On two occasions students indicated that they had research topic areas but had not yet specified their
dissertation topics. Since they were actively working to do so, and since the number of potential participants in their departments was small, they were included in the study. Finally, because of an error on the part of the researcher, one student indicated at the end of the interview that his future occupational goals were not related to the academic or research arenas. The data from this interview was still included in the analysis as it was not found to be significantly different from other students within the same department.

When students responded to the letter requesting their participation, or when they were called by the researcher, a screening interview was used to determine their eligibility. (See Appendix F.) The students were then told that the order of the interviews was to be random. Once the total list of participants was generated, the researcher would re-contact the students to set up an interview time.

Of the seven students in the department of chemistry who agreed to participate in the study, only five were to be interviewed according to the original design of this study. One student was omitted because he was unavailable for at least one month. A second student was omitted because he indicated that contacting his advisor would be impossible because the advisor was to be out of the country for the summer. Thus, the names of the sixteen students who agreed to participate (one student, who was out of state for the summer, did not respond until the initial sixteen interviews were completed) were placed in alphabetical order. A table of random numbers was then used to determine the interview order. (Chart 2 describes the sequence of the interviews with both students and
advisors by their departments. With minor exceptions, this is the actual order in which they were interviewed. Some slight changes had to be made in the original random order because students occasionally canceled an interview which could not be rescheduled until after another scheduled interview.)

### Chart 2

**Interview Sequence for Initial Interviews**

<table>
<thead>
<tr>
<th>Week 1:</th>
<th>Week 2:</th>
<th>Week 3:</th>
<th>Week 4:</th>
<th>Week 5:</th>
<th>Week 6:</th>
<th>Weeks 7 &amp; 8:</th>
<th>Week 9:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry</td>
<td>English</td>
<td>English</td>
<td>English</td>
<td>English</td>
<td>Sociology</td>
<td>No Interviews</td>
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</tr>
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<td>Political Science</td>
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</tr>
<tr>
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<td>aChemistry</td>
<td>Chemistry</td>
<td>aChemistry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>aEnglish</td>
<td>Sociology</td>
<td>English</td>
<td>Sociology</td>
<td></td>
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<tr>
<td>aPolitical Science</td>
<td>aEnglish</td>
<td>aEnglish</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*a* - denotes an advisor interview
After the list of student participants was finalized, their faculty advisors were sent letters requesting their participation. (See Appendix G.) One student in the department of sociology refused to allow his advisor to be contacted because, as he states, "It may recall his perceived academic duty to become involved in my dissertation. I like the freedom I've had to do what I want to do." This was unfortunate as the other two students in this department had the same faculty advisor and he refused to participate in the study. Of the remaining fourteen advisors, seven agreed to participate. Their department affiliations can be determined from Charts 1 and 2.

The first round of interviews with students and advisors were conducted during the months of July and August, 1983. The interviews lasted from one and one-half hours to three hours. All interviews were tape recorded and field notes were taken as the interviews were in process. In addition, following each interview, notes were made to begin formulating descriptions and to develop further areas of inquiry. During this period of time, field notes were used to generate categories from the data. Also, the investigator maintained a personal record of methodological, theoretical and personal reactions. (See Appendix H for some examples.)

Following this initial round of interviews, it was decided that some follow-up interviews with the students were necessary to "saturate" the categories that had emerged. Transcripts were made of the initial interviews and follow-up interviews were scheduled during October, 1983. The number of students available for follow-up interviews was limited.
Several students had graduated and others indicated that time constraints forced them to refuse. A total of nine follow-up interviews were conducted with the students. The department membership for the follow-up interviews follows. (See Chart 3 for the sequence in which they were conducted.)

Chemistry - 4 students  
English - 3 students  
Political Science - 1 student  
Sociology - 1 student

<table>
<thead>
<tr>
<th>Week 1: Chemistry</th>
<th>Week 2: Chemistry</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td>English</td>
</tr>
<tr>
<td>Sociology</td>
<td>Chemistry</td>
</tr>
<tr>
<td>Chemistry</td>
<td>English</td>
</tr>
<tr>
<td>Political Science</td>
<td></td>
</tr>
</tbody>
</table>

Chart 3  
Sequence of Follow-Up Interviews with Students

The follow-up interviews were all tape recorded and field notes were taken during the interview process. These interviews lasted approximately two hours.

The interviews with faculty advisors were used primarily as a source of validation of the descriptions offered by students. At times, these interviews also provided the researcher with important departmental
procedures not addressed by students. After the follow-up interviews were transcribed, each transcript was reviewed for information relating to the categories that had been generated, and they were coded by department membership. An example of how the data were coded is included as Appendix I. The coding sheets for each department were then compared to one another and similarities and differences were identified.

During the interview process and during the coding of the data, the researcher took special note of any description that seemed unique to a particular student. The method of coding the data made it easy to determine both the number of students who had described a particular influential element in the research process, and the nature or quality of that description. If all of the students in a particular department had described an influential element, it was included in the descriptions. In addition, if only three or four students, in those departments where four or five students were interviewed, explicitly described an influential element, and the researcher determined that the same element was implicitly identified by other students, it was also included in their descriptions. If only one or two students identified an influential element, it was considered to be case specific and was not included as part of the descriptions except where the researcher determined that its uniqueness served to highlight a significant contrast.

During the initial round of interviews, the emergent categories led the researcher to believe that reviewing the students' research proposals might offer valuable insight into the research process; especially their
relationships with faculty advisors and committee members. Thirteen students were called following the initial interviews and were asked to send a copy of their proposals to the researcher. (Two students could not be reached and two students did not yet have proposals written.) Nine proposals were received and reviewed. This review did not result in any information that contributed to the data either by enriching a category or developing new categories.

The initial round of interviews stimulated the development of twenty-three categories of data. Following the second round of interviews, four of these categories were eliminated. The remaining nineteen categories were then separated into four area divisions that provided the framework for coding the transcripts. In addition, these area divisions provide the framework for the descriptions found in the next chapter.
CHAPTER IV

Descriptions of the Elements Influencing Research Topic Selection

Introduction

The process of selecting original research topics for students in the departments of chemistry, English, political science, and sociology involves a complex set of elements that range in time from experiences prior to program entrance, through program experiences, to the students' career projections. The combination of influential elements may occur either simultaneously or sequentially. Regardless of the order, many elements have an impact upon the research topic selection process.

This chapter is separated into four major area divisions. These divisions are: Program Structure, Advisor, Research Topic Selection, and Student Growth and Development. Each broad area is sub-divided into sections that differentiate between specific descriptive topics or specific disciplines.

The first area division, Program Structure, describes the structural phases of the doctoral programs in the four departments studied as they relate to the selection of research topics. This area is divided into two sections. The first section describes the program phases in the
department of chemistry. This section is sub-divided in relation to the
six phases of the doctoral programs in this department. The second
section within this area describes the program phases in the departments
of English, political science and sociology. This section is sub-divided
on the basis of the three phases of the doctoral programs in these
departments.

The second area division, Advisor, describes the process for
selecting faculty advisors, the roles of the advisors, and how each of
these elements relates to research topic selection. The section
describing advisor selection is divided into two sub-sections - chemistry
and English, political science and sociology, in which the system for
advisor selection is discussed. Following each of these discussions is a
section describing the criteria used in advisor selection for students
within those departments. The second half of this area, advisor role, is
divided according to the discipline distinctions identified above.

Research Topic Selection, the third area division, is a discussion
of the specific elements students identify as influencing the selection
of their research topics. This area is divided into four major sections.
The sections discuss: 1) elements found common to all four departments,
2) elements found in the department of chemistry, 3) elements found in
the departments of English, political science, and sociology, and 4)
additional influential elements. The section describing the elements
found in the department of chemistry is sub-divided by those elements
related to the oral portion of the General Examinations, and those
related to the dissertations.
Finally, the last area, which describes Student Growth and Development, is divided into two sections. The first section describes professional development. The second section describes personal development.

As is evident from the sections identified, there are both similarities and differences among the elements influencing research topic selection in the four departments studied. However, except for a few specific elements related to topic selection, and the professional and personal growth that is experienced, the descriptions offered by students in the department of chemistry are the most distinct. The students' descriptions of their experiences in selecting research topics in the other three departments are more similar than different.

Finally, although the following chapter is divided into four major areas, these areas are intimately tied to one another. When appropriate, the related areas are identified and the suggestion is made that those areas be consulted for greater detail and elaboration on a specific topic. Following this suggestion will help to clarify specific discussions, as well as establish the interrelatedness of the areas described.
Program Structure

The structure of the doctoral programs in the departments of chemistry, English, political science, and sociology may be viewed as phases of educational experience. These phases are not always demarcated with clear beginnings and endings. Instead, they may be seen as cumulative, providing increasing levels of complexity in learning. Students in the four departments studied describe how the phases of their programs and the requirements of each phase influence their selection of research topics.

This section highlights the basic structural phases of the four doctoral programs studied. In addition, the elements relating program structure to topic selection are described. Elaboration upon these elements will be found in the sections to follow. This section will provide the format within which the additional influential elements may be inserted. Finally, since the program structure in the department of chemistry is different from the other three departments, it is described separately.

Chemistry

The program structure in the department of chemistry may be divided into six phases. These phases are: coursework, advisor selection and the research groups, qualifying examinations, General Examinations divided into two portions -- cumulative written examinations and oral examinations, and laboratory research. Each phase has an established purpose and provides learning experiences that are influential in the
research topic selection process. In addition, the phases of the
doctoral program in the department of chemistry have an influence upon
the students' personal and professional development.

This section discusses each phase in the doctoral programs for
students in the department of chemistry. The time sequence attributed to
each phase is described, as well as the purpose and influence each has
upon the research topics selected. Although a time sequence is
attributed to each phase, an attempt is made to describe how the phases
are interrelated. Finally, additional elements are discussed as they
enter the phases of the students' programs.

**Phase 1 - Coursework**

The initial phase of doctoral education found in the department of
chemistry involves coursework. Students indicate that, for the first
year (three or four quarters) of their programs, they take courses within
a specified core curriculum for their areas of specialization. As
described, coursework provides students with a broad knowledge base
within their areas of specialization.

Dr. A would rather you study for the first year and get
all the basics down. The basics are the things that
every [particular area] chemist should know. Naming
the name to the reaction is not easy for me. I've
memorized them all now.

The coursework phase of doctoral education within the department of
chemistry also helps students to develop knowledge of the field itself.
A broad-based understanding of what "chemistry" is and what is involved in doing "chemistry" develops as a result of coursework.

The coursework gave me the tools I need to do chemistry. They gave me a basic understanding of chemistry itself - basic tools for understanding and looking at chemistry.

Finally, as a result of their grades from coursework, students acquire a cumulative grade point ratio. This grade point average is used by faculty members when determining whether to accept students into their research groups as advisees. In addition, advisors consider the students' academic performance, via grades, when advising them regarding pursuing a masters degree before continuing along the phases of the doctoral program.

They [faculty members] do look at GPA [grade point average]. When I got into his group I had a 3.85 average. After that I started pulling B's. I did well the first two quarters here and then things started to turn. I have a 3.7 now which isn't terrible, but for his group it is.

In sum, the coursework phase of the doctoral program in the department of chemistry provides students with broad bases of knowledge of their field and their areas of specialization. In addition, the students' performance during this phase is assessed by faculty members when determining group acceptance, and in making recommendations for students' progress through their programs.
Phase 2 - Advisor Selection and the Research Groups

By the end of the spring quarter of the first year of study, doctoral students in the department of chemistry must have selected faculty members as their advisors. [See Advisor Selection (pages 150-161) for a description of the process of advisor selection and the criteria used in the decision.] Once advisors indicate their acceptance of students as advisees, the students enter their advisors' research groups. Although advisor selection and entrance into the research groups are not clearly demarcated along a time continuum, the research groups are an important structural part of the doctoral students' experience. As such, it is important to describe the time frame for group entrance and the significance of the research group as a phase of the students' experience.

As stated earlier, students must select an advisor, and must be accepted as a member of a research group prior to completing the spring quarter of their first year of study. However, students indicate that advisor selection is a competitive process, and that the earlier this is done in their programs, the more likely they are to be admitted to their chosen groups. Although departmental restrictions upon group size no longer exist in the department of chemistry, advisors do maintain some limitations on their numbers of advisees. Therefore, if students receive any indication, usually by rumor, that significant numbers of students want to gain entrance into the same group, they begin the advisor selection process prior to the spring quarter of their first year in their programs.
The timing for advisor selection, and the research groups that are entered, influence the sequence of the phases of the doctoral programs in chemistry. In an attempt to describe the influence these two elements have upon the phases of the students' programs, individual differences in their experiences warrant description.

Four of the five students interviewed in the department of chemistry indicate that, by rumor, they found that many other students intended to select their chosen advisor. Because of this rumor, they selected their advisors early in their programs. One student selected and was accepted into a research group during his first quarter of study. Two students selected and were accepted into their research groups during their second quarter of study.

The fourth student attempted entrance during his second quarter of study. He was not admitted into the research group because, at the time, departmental restrictions were placed on group size, and his chosen group was filled to capacity. This event significantly altered his program progress because, rather than selecting another group within his area of specialization, this student opted to pursue a masters degree in another division of the department of chemistry. A year later, after departmental restrictions were dissolved, he was admitted into the group of his choice.

Two of the students who selected and were accepted into a research group early in their programs indicate that their chosen advisors required that they begin laboratory research immediately upon entering
their research groups. Thus, the sixth phase of the doctoral program in chemistry can begin as early as the students' first or second quarter of the coursework phase of their programs.

He's usually done a lot of your initial library work. There are two emphases in the department. "I want you in the lab 60 hours a week. Don't waste your time over at the library," or "Go to the library. Use it, learn from it, and then come back to the lab." Anyway, he's done a lot of your library work because you usually have a pretty heavy course load, and that way you can go right into the lab and start getting experience there.

When I first worked for him, I didn't even know what he did. I didn't understand his techniques or the theory behind anything. For the first six months, I just learned how to use the equipment.

In contrast to the Influence of early selection and group acceptance described above, one student indicates that, although he chose early, he did not begin laboratory research until completing his first year of coursework. In this case it was the advisor's requirement that the first year of coursework be completed prior to beginning laboratory research. The fifth student interviewed, selected and was accepted into a research group during the spring quarter of his first year of study. Neither of these students began laboratory research until after they had taken their qualifying examinations, given during the summer following the first year of study.

The experiences described above exemplify the Influence advisor selection has upon the structural phases of the students' programs. This task, i.e., selecting advisors, may cause students to begin laboratory
research early in their programs, postpone laboratory research until after their qualifying examinations, or pursue a masters degree with the hope of re-entering the chosen group after its completion. Regardless of its influence on the phases of the students' programs, once students select advisors and are accepted as advisees, they become members of their advisors' research groups.

Faculty members in the department of chemistry have research laboratories in which the members of their groups do research on the advisors' projects. Students indicate that introduction to the laboratory was, symbolically, their entrance into the research groups. This introduction involves being given "space" within the laboratory.

The real reason you're there is to do the research because that's where the thesis [dissertation] comes from. So when you get your bench, that's when you have the first tools to start generating the data for the thesis.

I attended the meetings. I showed up to do routine little things, but I didn't have a project. I didn't do any research until after I took the qualifier, but I had a desk in the lab.

Members of the research group may influence students both developmentally and in their research endeavors. First, research group members offer "pre-oral" examinations for students prior to their oral examinations. [See Research Topic Selection (pages 209-211) for more detail on this subject.] In addition, interaction with group members is a primary source of learning for students in the laboratory atmosphere.
After you're initially introduced into the lab, you learn most of what you learn from people in the lab. You spend most of your life in the lab. I spend at least 65 hours a week in the lab. So the laboratory essentially becomes the center of your life. Initially, the conversations you have with those people are about the technical aspects of chemistry. Later on, a little more theory. You're usually put in an aisle with someone with experience and there are other people in the lab. So, there's a lot of interaction with those people in terms of developing the ability to do chemical reactions, to analyze the products.

I was put in an aisle with a post doc. She was a very competent chemist. She shaped a lot of my initial laboratory experience, my experimental technique. She also shaped a lot of the approach I took to solving a research problem, mainly just by watching the way she did it and by discussing the way she did things. She helped nurture the desire I already had to be independent. In other words, every time you have a question, don't run to ask someone. First, try to figure it out on your own. In becoming independent, in nurturing that desire to be independent, by watching, by seeing how she solved her problems, I adopted some of those techniques.

I wanted to solve problems on my own. I learned by experience and if there is someone in your lab who does the same thing, you watch them do it. You find out if I have a problem, the first step is this. If that doesn't work, the second step is this.

The group structure also influences learning through weekly group meetings held with the advisor and his group members throughout the course of their doctoral programs. The group meetings offer an opportunity for group members to discuss both the "housekeeping" needs of the laboratory and the research being conducted. In this arena, research findings are communicated to the group, and problems with particular projects are explored. The research groups function as sources for
problem identification, problem resolution and new research ideas. In addition, group meetings are also a forum for faculty advisors to assess student progress.

We have a weekly group meeting where anybody can get up and talk about anything. It's for the entire group. First we talk about instruments of the group, our own lab. It's called housekeeping. Then he says, "Let's talk about chemistry." Very interactive. You learn a lot about everyone else's chemistry in a big hurry because they're asking you questions. He's sitting there and we're all talking.

After you do an experiment, you never tend to forget it so you build up your arsenal of [particular area] reactions. Dr. A bombard you so much; expecting you to know all this stuff. It really is an arsenal. It's a way to survive. The more reactions you know, the more you know, the longer you're going to survive. It's my counter to his questions - the arsenal of knowledge. It meant when I went to the blackboard I couldn't get tricked. That arsenal of [particular area] reactions really gives you confidence. I've been to the blackboard and been rattled so bad. The next time you get up there, you don't rattle so much.

In sum, membership in research groups is an important structural element within the department of chemistry. Initially, group membership offers students "space" within the research arena. Second, interaction with group members is an important source for learning. Finally, group meetings provide an opportunity for learning about other research projects within the group, identifying problems, generating new ideas, and assessing student progress.
Phase 3 - Qualifying Examinations

The qualifying examinations, given at the end of the first year of study, test the students' broad-based knowledge of the field of chemistry. The examinations are scored using three grades—pass, provisional pass, and failure. These distinctions are determined on the basis of the range of scores on the test for that year.

Students indicate that their qualifying examinations are used as tools by faculty advisors when assessing whether students should continue into the next phase of their programs, i.e., cumulative written examinations, or whether they should pursue a masters degree prior to continuing in their doctoral programs. Pursuing a masters degree has the effect of adding one year to the total doctoral program.

The qualifying exam is to determine if you're going to get a masters first, or a terminal masters, or whether you leave then.

One student interviewed indicates that his performance on the qualifying examination, coupled with his academic performance during coursework, caused his advisor to recommend his pursuit of a masters degree prior to continuing through the phases of the doctoral program.

He left it up to me. He said, "You can go either way. I know people who have tried to go straight through and have missed." Then he gave me an example. Then he gave me the example of the person who went through and got his M.S. and then got his Ph.D. For me it wasn't so important exactly how long I spent here, but that I finally got through with a Ph.D.
Although this student agreed with his advisor's recommendation and chose to pursue a masters degree prior to continuing through the phases of the doctoral program, the experiences he associates with his "lower than standard" academic performance during coursework and the qualifying examination warrant discussion.

Students' performance during coursework, the qualifying examinations and the cumulative written examinations may have an affect upon their standing both within their research groups and in their advisors' estimation of them. This can be seen by comparing the experiences of the student who did poorly on the qualifying examination to the experiences of students who performed excellently on the cumulative written examinations. In the former case the student describes experiencing both humiliation and the assignment of menial tasks. In the latter cases, performance places students in a "favorable light."

It became a joke around the lab. We called ourselves the "PP's" [provisional pass]. The joke was the "PP's" screwed up. The other two students who got provisional pass were M.S. candidates to begin with. It seemed more acceptable for them than a Ph.D. student.

The first year I worked for him, I admit, he picks one person in each class, and you become the class idiot, the group idiot. Basically, you have to do odds and ends. I painted a lot of the equipment. You wind up keeping track of things. It lasts for about a year and then you get out from underneath it. Unfortunately, that's what I became after I became a "PP."

Basically, he's slowing you down even further because you're doing these odds and ends, and then he wonders why you're not getting your research done faster.
I happened to do very well in the coursework and the monthly exams [cumulative written examinations]. I passed the first four exams for eight; you only need seven. That put me in a favorable light with him. I think he was impressed with that and he was glad it was one of his students. If you're working with someone and they do well, it's a good reflection on them.

In sum, the qualifying examinations, given at the end of the first year of study to test students' broad-based knowledge of the field of chemistry, are used by faculty members to determine students' continuation through the next phases of their doctoral programs. Students' performance on their qualifying examinations may affect their progress as the examinations are used as an assessment tool by faculty advisors.

If you get a provisional pass on the qualifier, you can go and take your cumes but you've had your one favor.

There is some indication from the experiences described by students that academic performance during coursework, the qualifying examinations and the cumulative written examinations, influences standing within their research groups and their advisors' estimation of them. It should be noted that the poor performance experience, described earlier, may be advisor-specific as there is no similar case for comparing poor performance. The other four students, however, do indicate that their "good" performance on the cumulative written and oral examinations had the affect of ingratiating them with their advisors. Thus, a parallel may be drawn to poor performance.
**Phase 4 - Cumulative Written Examinations**

Students who continue through the phases of their doctoral programs, without first pursuing masters degrees, take cumulative written examinations during their second year of study. The point at which students begin their cumulative examinations is determined by advisor-student agreement. Those students who pursue a masters degree prior to continuing through the phases of their doctoral programs, take the cumulative written examinations during their third year of study. The cumulative written examinations, given each month, test the students' knowledge within their areas of specialization. Students indicate that these tests cover materials within their areas of specialization that they learn as a result of coursework, seminars, and through the literature of their field areas.

Cumes cover anything that has to do with [particular area] chemistry from courses, literature, seminars that you should know.

The cumes made you study all the undergraduate and graduate courses.

The cumulative written examinations are taken while students are either beginning or continuing their laboratory research. Each test consists of two parts, i.e., two different questions written by two different faculty members from within the students' divisions of specialization. Students may score one point for each part passed. A
total of either seven or eight points is needed for successful completion, and students have either fourteen or sixteen point opportunities depending upon their areas of specialization.

In one area of specialization, the cumulative written examinations are not required. Within this division students must write and submit extensive research proposals on original experimental ideas. The proposals are then defended before their examining committees. The distinction between the proposals submitted for this area of specialization and those that must be submitted for the oral examinations, as described in the next section, is the comprehensiveness of the written proposals themselves. In addition, within this division, the students must have their research topics approved by their faculty advisors. In the other areas of specialization, advisors are not to be consulted regarding topic selection. [See Oral Examination (pages 112-117) and Research Topic Selection (pages 195-218) for further detail.]

Students indicate that "practice" taking cumulative examinations, using the previous years' questions and as they take their examinations, helps them to pass through their examinations. In addition, knowing which faculty members are writing the questions for any given month helps students to anticipate the question areas that may be on the examinations.

A lot of passing cumes is just learning how to take them. A certain extent is background - acquiring the ability. A lot is just learning how to take that test.

Knowing who wrote the questions helps you to anticipate what they're going to ask.
The cumulative written examinations are scored by comparison. That is, students' answers are compared to each other. Thus, passing the examinations may be influenced by how well other students did on the same questions, and, therefore, is a competitive experience. Because of this, students may delay beginning their examinations, anticipating that "brighter" students will have already successfully completed the necessary number of tests. In addition, students who have been involved in laboratory research from early in their programs indicate that, due to the competitive nature of the examinations, they are at a disadvantage because of limitations in their available study time. Thus, early advisor selection and laboratory research may hinder students' progress through this phase of their programs.

I chose to start exams in January. Most of the smart people want to get cumes over and done with fast so they start in September. You have to pass four, so they're done by December. The people that are left are of my caliber so I can get in and out.

I needed some time off to study for cumes. I knew that no one else had done research. Or, if they did, it was however much they wanted to do. People in other groups that I was competing with in these cumes, there really were no demands placed on them in terms of having to do research. At that point, being involved in research so early wasn't an advantage.

In sum, the cumulative written examinations, given each month, test students' knowledge within their areas of specialization. Both anticipating question areas on the basis of information regarding which
faculty members are writing the questions, and practice taking the examinations, helps students to pass their examinations. Finally, because of the competitive nature of the examinations, both delaying the examination and increasing the time available for study by decreasing laboratory research, are strategies used by students to successfully complete their cumulative written examinations.

Phase 5 — Oral Examinations

Within six weeks to one quarter (ten weeks) following successful completion of the cumulative written examinations, depending on the area of specialization, students must submit an original research proposal to their examination committees, and defend those proposals before their committees in a two-hour oral examination. [An in-depth discussion of the elements involved in this process can be found in the section entitled Research Topic Selection (pages 204-215).] This section will review the oral portion of the General Examinations as a phase within the structural framework, and discuss them experientially as the students describe.

The "official" process for determining the members of the examining committees has been that faculty advisors are responsible for selecting the committee members. However, in spite of this policy, students indicate that they are responsible for putting their committees together after consultation with their advisors. The advisors do suggest faculty members to be considered. Students also indicate that there has been a recent "push" to enforce the "official" policy for committee
determination. In addition, the Graduate School assigns a faculty representative from another department who becomes part of the examination committee.

Students indicate that for their oral examinations they had to be familiar with the most recent literature within their areas of specialization. Because of this, and because of the time restraints within which their oral examinations must be completed, students begin the topic selection process prior to completing their last point requirements on their cumulative written examinations.

For the orals you have to be up to date on what's going on in the literature now.

You have to do your oral six weeks after you pass your fourth cumes. So you start looking for ideas after you've passed your third.

Students describe the purpose of doing their proposals as the point at which they learn the skills necessary for identifying and developing a research project. They relate this experience to the dissertation requirements for students in other departments.

The oral exam is where you pick up the techniques and all the things you need to know about researching out a project.

Obviously, the first year you're not as familiar with everything, with how the system works. Actually, that's what you find out taking the oral. The examination is to get your familiar with the procedure of figuring out how you design a [particular area] strategy, how you research a project.
It's something that no one else has done or come up with. It's original in the sense that no one has thought of it before and you're proposing something that should work or should not work. It's all of your own ideas, just like your thesis [dissertation] supposedly should be in other departments.

Students indicate that anticipating their oral examinations creates high stress levels.

My entire purpose in life my first two years was to pass my orals. I'd been living for the day of the oral. After that I knew it was all downhill.

The oral examinations are seen as potentially intimidating; requiring students to develop confidence in their own knowledge levels in order to defend their ideas before field experts. Although intimidating, students recognize that the skills developed as a result of their oral examinations are valuable preparation for their future careers.

You have to have confidence in what you've been taught. You can't crack or crumble during the oral. Here was this expert in the field telling me he didn't think these compounds could be made. And here I am, Joe Shmoe, and I said, "Yes, they can and here's how." I understand why I went through the oral now. I assure you, the day of that oral, I knew more chemistry, more about more things than I will know the rest of my life. You have to understand everything. You have to be able to think on your feet. That's what you have to do in industry. If you went into academia, you have to write research proposals.

As a result of passing the cumulative written and oral portions of their General Examinations, students are admitted to candidacy for their Ph.D. degrees.
When you pass qualifying exams, you're sort of initially accepted that you might make it. Then you go through cumes. Once you pass those, that's another step. You might make it. You're closer to making it. But after you pass your orals, then you've made it.

Admission to candidacy is only one result of passing the General Examinations. Students also indicate that they had changed as a result of their oral examination experience.

You think differently after you pass orals. Maybe it's more logically.

My attitude has changed since orals. I'm more aware of what I can do with results rather than just results.

The cumes and the orals taught me how to teach myself.

Students describe being treated differently by their advisors and other faculty members after successfully completing their oral examinations.

They treat you a little differently after your oral. It's sort of an unsaid rule: after you pass your oral you're probably going to graduate. Up until that point there's no guarantee they'll let you graduate. It's really up in the air. So, after you pass, you've pretty much made it at that point.

Following successful completion of their oral examinations, students indicate that their faculty advisors gradually decrease their role as research supervisors. It is at this point that students are expected to assume increasing levels of responsibility for their laboratory research.
It's not really clear when he lets you go, but after the oral, that's when he expects you to come up with very good ideas for what you want to do. After the orals he starts relaxing exactly how much control he has over you. That's when he just says, "How are you doing?"

It really became my project about five to six months after my candidacy oral. He has certain expectations for where your research is headed, certain questions he wants answered. I answered those. But, as far as development of where the project is headed, it's all on your shoulders.

Reflecting upon their experiences during coursework and the various examination requirements, students indicate how these factors influence their primary goal - doing laboratory research. Although they may begin laboratory research as early as their first quarter of study, their most significant and productive research work occurs following successful completion of their oral examinations.

The coursework, the cumulative exam and the orals were the toughest thing I ever had to do. They were the pinnacle of any struggle I ever tried to do. When you get through with it, you know something.

A graduate student is maturing, getting educated. He's taking coursework. He's taking cumes. He's taking all this other stuff. He's being distracted quite a bit. They really don't get down to business until after the oral.
In sum, the oral examinations in the department of chemistry are the point at which doctoral students select original research topics and design projects on the basis of those topics. They do this for the purpose of defending those ideas during two-hour oral examinations before their examining committees. They describe the purpose of their oral examinations as learning the techniques and methods needed to develop research projects. In addition, the oral defense of their ideas helps them to gain confidence in their own knowledge levels as scholars of their field.

Although the oral examinations do not occur until after successful completion of the cumulative written examinations, students begin preparation during their written examinations. Thus, students may be involved in written examinations, oral examination preparations, and laboratory research simultaneously. In addition, research group members offer "pre-orals" so that students may practice the defense of their ideas. [See Research Topic Selection (pages 209-211) for greater detail on their "pre-oral" experiences.] These experiences, coupled with the knowledge that they must defend their ideas before field experts, create high stress levels as their oral examinations approach.

Students recognize that their experiences with laboratory research change following their oral examinations. These changes are a result of their own learning and development from their oral examination experiences, and changes in their advisors' supervisory role. Passing the cumulative written and oral portions of the General Examination admits students to candidacy for their Ph.D. degrees, and symbolically passes them over the final hurdle of their programs.
Phase 6 - Laboratory Research

Following their oral examinations, students spend approximately two years involved in laboratory research only. Although students may begin laboratory research as early as their first or second quarter of study, it is important to understand how this phase of their programs relate to their dissertations and the students' personal and professional development. First, it is the research work done within the laboratory setting on one or more of their advisors' research projects, that is the source of information for the students' dissertations. As students in the department of chemistry complete phases of their laboratory research, they co-author journal articles on their work with their faculty advisors. Their dissertations are elaborations upon their accumulated research articles.

The dissertations in chemistry will just be putting the papers together after we'd published; just turning each publication into a separate chapter.

Experiences during laboratory research reflect the cumulative nature of the phases of the doctoral programs in the department of chemistry. Students' descriptions of their experiences exhibit the application of broad-based learning to their laboratory research. This learning goes beyond detail to a more generalized "understanding" of the field of chemistry.
What you're trying to do here is familiarize yourself with a bunch of different processes, different equipment, different reactions. I see it as a learning experience. Not that it's critical to make this particular molecule, but it's critical to get a wide range, a variety of things under your belt so that you understand a lot of different techniques. That way when you go to industry, you have this advantage.

When I made the transition I was much more confident about my work, not only talking about it, but talking about chemistry in general. A lot of coming up with your own ideas has to do with turning that corner, becoming independent. You have a better understanding. You start reading more. You start finding out more. You really start understanding more of what's being done and it happens naturally.

I got to the point where I became competent enough to make intelligent decisions, to think up experiments, above and beyond his direction. The more and more you learn about the physical nature of what you're doing, physically and chemically, there is so much chemistry you can't learn it all. When you get to learn about it, when you hear these guys talk, when you've read the papers, you keep working on it. It starts to sink in. It really does sink in. So, there's a point where you start to think on your own.

Students' descriptions of their experiences doing laboratory research reflect their developmental starting points and the process of change. In addition, their descriptions of the changes in their advisors' supervision is also reflective of their development.

So, after a while, I began to understand what it was, in my opinion, what I was doing and why I was doing it. Making these [particular techniques] on compounds is one thing; understanding where they're headed, what they're for, how they're used and how important they can be is something else. I started thinking about it one day and realized what I needed to do, what
Information I needed to have. I had an idea. I thought it might work and I went ahead and tried it. I made the compound. It's going to be a nice chunk of my thesis. That was my own thinking. That kind of an idea doesn't come to somebody until you understand the chemistry. So it took a while to really understand what it was that we need to know as a whole, learning more and more about our chemistry.

I spent the first nine months making a lot of mistakes trying to come up with ideas that never seemed to work because I didn't know enough about it. About one full year after choosing him, I was able to think of my own ideas and test them. Which is what you're supposed to be able to do if you're in a doctoral program.

He's leaving me by far more alone. It's my decision, my problem. Before it was his problem, more of a learning experience. Now it's more for me to just get in there and do it. I'm supposed to be smart enough now that I can handle everything. I know where to get the analogies from. I can draw on past experience to figure out ideas to get me where I want to go. I talk to people in the group. I gather ideas that way. It's by far more up to me. There's less interaction. He simply asks me how I'm doing. If I had a major breakthrough, I tell him. If not, I say everything is okay. He's there if I need him, but he doesn't push himself on me.

Finally, involvement in laboratory research helps students to gain confidence in their abilities, approach their research as professionals, and assume the leadership role with other students. The students interviewed indicate that they are now in the position to offer "pre-ormals" to the students behind them in their programs, and to function as role models and teachers for those just entering their research groups.
You develop a certain reasoning ability. The ability to apply logic to solve a problem in a different way than you apply logic on a written test. It's like a transfer from being able to use the knowledge you learned in the classroom to being able to use it in a practical way and solve problems in a practical way.

I think I'm a lot more confident. I'm capable. I can get things done. If someone says, "Work on this," I can do the project. You start taking on the leadership role he's looking for in the final year or so. Everything sort of builds and you become more of a person that can handle situations.

To summarize, the doctoral programs in the department of chemistry involve six structural phases. These phases are: coursework, advisor selection and the research groups, qualifying examinations, cumulative written examinations, oral examinations, and laboratory research. Although these phases are not always demarcated with clear beginnings and endings, the requirements of each phase are cumulative and build upon the experiences of previous phases to increasing levels of both skill and knowledge. (See Diagrams 1 and 2.)

Students' progress through the phases of their programs may be altered by their performance during earlier phases. Also, the combination of phases may influence student performance during successive phases. Students indicate that, although their learning experiences were intense, the first two years of their programs were stressful.

I learned more in two years here than I did in my entire life altogether in terms of vocational or educational knowledge. That's because of the outrageous pace you're put through.
Diagram 1
Typical Phase Sequence for Students Pursuing Doctorates in the Department of Chemistry

Key:
--- indicates no fixed beginning or ending points
- - - indicates clearly fixed beginning or ending points
Diagram 2

Typical Phase Sequence for Students Pursuing Masters Degrees Prior to Continuing Through the Phases of the Doctoral Program in the Department of Chemistry*

Key:
--- indicates no fixed beginning or ending points
-- indicates clearly fixed beginning or ending points
*usually adds 1 year to total program
During the earlier phases of their programs, the assessment of students' performance is often based on comparison to the performance of others. During the later phases assessment is made on a more individual basis. Although the students' progress through the phases of their programs is cumulative, each level requires increased knowledge and skills, and behaviors that are indicative of increased levels of personal and professional development. Thus, students develop reasoning abilities, confidence, and independence as they travel through the phases of their programs.

The roles of the faculty advisors change both as a result of their students' development and as a stimulus for student development. In addition, the roles of the students change both in relation to their advisors and in relation to other students. During the earlier phases of their programs, more experienced students act as role models and teachers for their less experienced group colleagues. During the later phases, the lesser experienced students have developed to the point where they now become role models for their less experienced counterparts.

Thus, the structural elements of the doctoral programs in the department of chemistry promote both personal and professional development. These elements are intimately tied to students' abilities to identify and develop research ideas. On the individual level the phases of the doctoral programs may be viewed as a ladder of achievement requiring increasing levels of knowledge and sophistication within the field. Internally, the structure is circular as students develop and become part of the earlier phases of experiences for other students.
English, Political Science, and Sociology

The structural elements of the doctoral programs are similar in the departments of English, political science, and sociology. The program structures in these departments may be identified by three distinct phases. These phases are: coursework, the written and oral portions of the General Examinations, and dissertation research. As in the department of chemistry, each of these phases has distinguished characteristics and, at times, the phases may interrelate. However, in comparison to the program structure described in the department of chemistry, the phases of doctoral education in the departments of English, political science, and sociology are more clearly identified by beginning and ending points.

This section describes the three structural phases of doctoral education in the departments of English, political science, and sociology. The elements within each phase are discussed, especially as those elements relate to successive phases of the students' programs, and as they relate to research topic selection. In addition, this section highlights the attitudes with which students pursue the various phases of their programs, and how the program structures influence students developmentally.

Phase 1 - Coursework

The first phase of the doctoral programs in the departments of English, political science, and sociology involves coursework. The coursework phase of the students' programs may fall within a two to three year time frame. The amount of time spent in coursework is
determined by two factors. First, some of the students who entered their doctoral programs with masters degrees in their fields took less coursework than those who entered without masters degrees. Second, the number of years spent in coursework is influenced by the students' abilities to identify early in their programs, their major and minor areas of study.

In the departments of English, political science, and sociology students are required to identify major and minor areas of study. These areas of concentration serve three purposes. First, they are used as sources for determining what classes students will take during the coursework phase of their programs.

In the beginning they mapped out some things. Primarily they're interested with areas for the generals, but in the process they determine your major area. It comes primarily with registration. What kinds of courses to take to help you study for your generals. (English)

If I could change one thing, I'd do it faster. Five years is a long time out of your life. I would have tried to plan earlier what courses to take, what not to take, how to push towards generals as fast as I could. (Political Science)

First of all I had to think of something to take a minor in. Without that impetus I may never have gone back to the area. I had to have some areas to take generals in and when I looked at what was being offered in the department, there was nothing that really grabbed me enough to devote that much effort to it. There were some areas I had taken a course or two in just to see if I liked it and it usually just didn't appeal to me that much. I was running out of things to do. (Sociology)
Second, the declaration of major and minor areas of study is used to determine the areas on which students will be tested for their General Examinations.

It was explained to me that generals would be the exams you would take following coursework which would test your general knowledge of the work you had studied as a doctoral student. You take them in four areas, three areas and a literary historical field. (English)

You have to declare a major and a minor in political science when you go for exams. Within your major you have to select four sub-fields to be tested in. Within your minor you have to select two. (Political Science)

Even at the time I was finishing my masters thesis, I was thinking about what I wanted to do for the generals areas. I had done so much methodological work, I had taken so many courses in that area, that I figured that's a clear choice to take. Before finishing my masters I had decided I would take that for generals. It's also something you get jobs for. (Sociology)

Third, members of the examination committees for the written and oral examinations are selected on the basis of their areas of specialization, in correspondence with the students' areas of specialization. That is, committee members represent the various declared major and minor areas, and ask examination questions within those areas.

I had an interest in [subject area A], so I decided he would be on my committee in my minor area. Then for my major area I chose the best person for [particular area] literature in this department. Then for [subject area B], there were only a couple of people available
and one was as good as another. I just chose one because his exam questions seemed more fair. And, for [subject area C], I picked someone other people had recommended to me. (English)

You have to have taken the courses before you're ready to take exams. You have to have also asked people to test you in these areas. (Political Science)

Before I finished my masters I had ruled out two areas for generals. Another area I was interested in I ruled out because I wasn't sure there was anyone I wanted to test with. (Sociology)

Students in the departments of English, political science, and sociology indicate that their programs do specify a core set of courses they are required to take. However, the major amount of coursework is taken within the students' particular areas of focus.

They'd recommended that I take certain courses to fill in gaps in my historical knowledge. (English)

I picked up the area quickly because that's the way the department is set up. It's a stronger sub-field. (Political Science)

Usually the graduate committee will allow people to put together their own minor outside of the department, as long as it's approved. (Sociology)

Students in these three departments indicate that once they have determined their major areas of coursework, it is within those areas that they focus their attention for their research topics. With a few exceptions, students indicate that they do not identify their
dissertation topics during this phase of their programs. They do, however, indicate that their coursework has an influence upon the topics they eventually chose.

I started thinking about doing my dissertation on [particular author] during a seminar that I took with Dr. A when I realized that I knew about five times more about [particular author] than anybody else in the seminar. (English)

I had an idea of what I wanted to do. The course sort of reinforced that. We were encouraged at the time I was taking courses, if I was going to stay in [particular area], see if there is something you want to delve into more, in more detail. (Political Science)

When I started to pick up a minor in [subject area], it sort of all ran together. (Sociology)

In the department of sociology, students indicate that their curriculum is very loose and unstructured. They also indicate that they sometimes feel restricted by the courses being offered within their departments. The curriculum structure gives them the freedom to pursue and develop their interests both within and outside of the department of sociology.

When I met Dr. A I began to see a way to make that connection outside of the department. I hadn't really thought about making it an area of specialization until then, because there was nothing in the department, no one in the department who understood it. (Sociology)
The curriculum is haphazard. I didn't know what I was interested in so I decided to take courses until I found what I was interested in. I think the course offerings in sociology are very restricted. There isn't an awful lot I'd be interested in. I was trying courses I thought would be interesting and I was picking tool courses, methods courses. (Sociology)

The program is very loose. If it had been more focused I may have gone in a different direction. The curriculum looseness gave me the freedom to pursue my own interests. You get a chance when you read on your own to do more of what you want to do. (Sociology)

In the departments of English, political science, and sociology, students are encouraged to develop "programs of study" early during the coursework phase of their programs. Their "programs of study" specify all the classes they will be taking as preparation for their General Examinations. As well as developing their "programs of study," students are also encouraged to select advisors, and identify their examination committee members during this phase of their doctoral programs. Their "programs of study" must be approved by their examination committees prior to taking the General Examinations.

People take a year to study for exams after coursework. They make up their own reading lists. The lists have to be approved. They're from four different areas, four historical periods. I think there are seven to choose from. (English)

You can take the exams when there's a consensus that you're ready to take them. You have to complete the coursework. You file a program of study listing the areas and courses you've taken. That has to be approved by your graduate studies committee. (Political Science)
I was done with generals after three years. I took them in the spring of my third year. I probably could have taken them earlier. But, part of the whole thing was, if you want to get through your program in any efficient manner, you decide in advance exactly what you want to do. Now I know all this. And you contact an advisor who, for some reason, you know is going to be able to guide you there. You put together a committee real fast and you work out a reading list for your generals. The courses you take are pretty much irrelevant unless they can get you through your general exam. That's not the way I looked at it. I was fishing around for things I was interested in. As a result, I didn't get up to generals in the most efficient manner because, what it came down to was, all the methodological courses I had taken were irrelevant because I didn't test in methods. (Sociology)

In sum, students in the departments of English, political science, and sociology spend from two to three years in the coursework phase of their doctoral programs. Within this phase they identify major and minor areas of specialization, select their faculty advisors, and identify their examination committee members. Their coursework is identified by major and minor areas of specialization which become the areas on which they are tested during their General Examinations. Students are encouraged during the coursework phase of their programs to focus upon their areas of interest in relation to the selection of their dissertation topics.

Phase 2 - Written and Oral Examinations

After completing the coursework phase of their programs, students in the departments of English, political science, and sociology prepare to take the written portion of the General Examinations. As stated earlier,
these examinations focus upon the students' areas of specialization and the knowledge students have gained within these areas. Examples of areas of specialization include: in the department of English - American literature, twentieth century British literature, and drama; in the department of political science - American politics, public policy, and international relations; in the department of sociology - social psychology, complex organizations, and social theory.

In the department of English students identify four areas for their General Examinations. These areas are either four historical periods or three historical periods and a particular genre. The students are responsible for declaring one of these four areas as the major area of focus. The other three areas are minor areas. Students generate reading lists for their written examinations in their four areas of focus. These lists must be approved by the examination committee members for the specified areas.

Students in the department of English indicate that they spent up to one year following the completion of coursework studying for their General Examinations.

I spent a year studying for generals. The department has since formally tightened up the time. (English)

The English department's new requirement is that students begin their written examinations within three quarters after completing coursework. In addition, they must finish their written and oral examinations within ninety days after they are begun.
In the department of English, students have the option to sit for their written examinations in the classroom or to take them home for either twenty-four hours or over a weekend. If students choose the classroom option, they are given four written examinations over a four-week period of time. Each examination is four hours long except in their major area, for which they are given six hours.

You have the option with exams to either take four hours in the classroom, then they don't expect a lot of detail, or take them home overnight. Then they expect more detail. I took them home, one each week for four weeks. (English)

In the department of political science, students must identify one major area and one minor area of specialization for their General Examinations. The major areas of specialization are divided into four sub-fields. For example, if a major is declared in American politics, the sub-fields that could be identified might be judicial politics, congressional politics, political socialization and voting behavior. Within their declared minor students must identify two sub-fields of specialization.

The examination structure in the department of political science involves two days of writing on the major area and one day on the minor area. All the examinations are given within the confines of the university grounds.
Exams are three days. For each field, a total of six fields, I had someone testing me. For the majors it was two days, six hours each day, writing on two fields morning and afternoon. The next day two others; a total of 18 hours. (Political Science)

In the department of sociology students must declare one major area and two minor areas for their General Examinations. They take three written examinations, one on each area. These examinations are four hours each and must be taken within one quarter of study. The students in the department of sociology must take their General Examinations within the confines of the university grounds, and they usually opt to take one examination per week. Students in both the departments of political science and sociology usually take no more than one quarter to study for their General Examinations following their coursework.

Although the precise area divisions and time allotments for the General Examinations are not identical in these three departments, the basic structural elements of the written examinations are similar. Students in all three departments must identify major and minor areas of specialization and test within those areas. They are tested on their accumulated knowledge from classes, seminars, and the literature of their fields.

Students in the departments of English, political science, and sociology indicate that, as preparation for their General Examinations, they review materials from the coursework phase of their programs. They describe the General Examinations as the point at which they are
required to integrate their learning experiences. This includes not only presentation of literature, but also their understandings and positions with regard to the literature.

After coursework you start thinking about generals; about putting all this information you cranked out and your own intuitions and understandings together. (English)

You've got a very large volume of literature and they ask the sort of question where you have to put together different answers from different sources. They're not so much interested in your being able to tell them who said what, but in being able to know this has been said and it's been accepted as a reason. (Political Science)

A little bit of creative input is nice on generals after you get down the answers they want. It's more important to get down the answers they want than it is to have the creative input. If it's all creative input they ask, "What's the matter? Didn't you understand the question?" So you tell them what they want. (Sociology)

Students in these three departments indicate that they are encouraged during this phase of their programs to give serious consideration to ideas for their dissertations. However, they also indicate that, at the time, they felt this was premature as they were focusing their energies on their General Examinations.
The timing of generals influenced the time I had to work on the dissertation. (English)

All through my exams professors were encouraging me to think about a dissertation topic. "You can hit the ground running when you're through with exams." I still thought it was premature. (Political Science)

I had given it some thought but I tried not to push myself completely. I needed energy for exams. (Sociology)

In the departments of English, political science, and sociology, students indicate that their General Examinations are a stressful experience. Although they found the experience rewarding in retrospect, anticipating General Examinations creates high levels of stress. This can be seen as students describe the communications they receive from other students in their departments regarding the General Examinations. In addition, students describe the "let down" they experience after they complete their General Examinations and feel the pressure relieved.

You get the official, party-line information on generals. Then you have this whole mythic structure of legend; people who have gone through it and what's happened to them. It would make a great book - The Life and Legend of General Exams. Not until I started writing the exams did I get the sense that it was something worthwhile by itself. For the most part I felt it was something I had to go through and get done so I could start what I really came to do anyway. I came to write my dissertation. (English)
The dreaded generals. That is not communicated so much by the instructors, as it is by other students. While there's not a whole lot of contact, there is enough that you realize how important generals are. There's a lot to study; all the coursework over the past three years. Generals are something most students learn to dread from their first quarter here. You always hear about it. It's something you dread until it's over with and then there's a let down. (Political Science)

The past few months I really haven't felt much like doing anything. I haven't really felt myself since preparing for generals. I don't have quite the drive I might have had before that. They disrupted normal process. My schedule is out of kilter. You have this steady process - taking courses, working on papers. Suddenly, you have to drop all of this and devote yourself entirely to generals. (Sociology)

In contrast to the descriptions offered by chemistry students in which the cumulative written and oral examinations are seen as two distinct examinations, students in the departments of English, political science, and sociology describe their written and oral examinations as one General Examination. Students do have two-hour oral examinations, usually within two to three weeks following their written examinations. The oral examination is an oral defense of the written examinations before the examining committees which consists of the students' advisory committee and a faculty member from another department who functions as the Graduate School representative. However, students rarely differentiate between the written and oral portions of their examinations as do students in the department of chemistry. Instead, they speak of the two experiences as a single examination process in concert with the criteria for the General Examination as established by the Graduate School.
Students in the departments of English, political science, and sociology indicate that successfully completing their General Examinations results in both an increase in their self-confidence and a change in their relationships with their advisors. They indicate that they develop confidence in their own abilities as a result of successfully completing their General Examinations. These examinations help them prove to themselves that they had learned something, and that they are able to communicate their positions as scholars within their chosen fields.

Confidence developed as I was writing my exams when I realized I did know the answers to those questions. I knew a lot more than just the answers to those questions. (English)

It's a relief to get them over with, but it also indicates to you that you can handle that large amount of information and do something with it. (Political Science)

You reach a point where you're very much on your own. You're not terribly influenced by what people think. You know what needs to be done. (Sociology)

In addition to developing confidence as a result of their General Examinations, students in these three departments also found that their relationships with their advisors and other faculty members change as a result of their passing the examinations. Students feel, and are treated, more as professional equals once they successfully complete this phase of their programs.
Generals is supposed to be a conversation with your colleagues. It's supposed to be the last time you're a student. After you've taken your orals then you become, spiritually, a colleague. With Dr. A you are a colleague. He makes you feel that way. (English)

I don't see myself as someone running around for approval all the time but there is that sense of approval once you pass generals. You feel accepted, that you rate, that your work is good enough. The relationship has changed because I passed generals. I'm through being a student for all practical purposes. It's no longer a teacher-student relationship. (Political Science)

At this point I think my advisor and I are much more equal. There's some movement towards not giving me as much direction. (Sociology)

In sum, following the coursework phase of their programs students in the departments of English, political science, and sociology take their General Examinations. Successfully passing these examinations admits students to candidacy for their Ph.D. degrees.

These written and oral examinations are structured around the students' declared major and minor areas of specialization. Their advisors and examination committee members are selected on the basis of their expertise in relation to the students' areas of specialization.

The examination time period usually lasts from two to four weeks, depending upon the department and the students' chosen mode for taking their examinations. In the departments of political science and sociology, students typically take one quarter to prepare for their
examinations. In the English department students have taken up to one year involved in examination preparations following coursework. The department has recently established a policy that limits the students' preparation to three academic quarters.

Students in these three departments indicate that anticipating their General Examinations is a stressful experience. This stress is created, primarily, as a result of communication with other students who had already completed this phase of their programs. Although they found the experience stressful, students in the departments of English, political science, and sociology experience an increase in self-confidence as a result of successfully completing their General Examinations. In addition, they find that their advisors and other faculty members treat them more as professional equals following their examinations.

Finally, students in these three departments indicate that, during their examination preparation periods and during their examinations, faculty advisors encourage them to begin focusing their attention on their dissertation topics. Although students do consider their areas of interest as they review the literature in their major areas of specialization, they report that they view the dissertation as a separate process that follows their General Examinations. They are unwilling during this phase of their programs to devote the time or energy necessary for identifying their research topics.
Phase 3 - Dissertation Research

Following their General Examinations, students in the departments of English, political science, and sociology begin the dissertation research phase of their doctoral programs. This phase lasts between one and two years and includes: identifying and narrowing original research topics, writing and submitting proposals (or prospectuses) to their dissertation committee members for approval, conducting the research and writing their dissertations, and defending their dissertation research before their committees. As this study concentrates on topic selection, and as the students interviewed were still involved in conducting their research and writing their dissertations, only the first two parts of this phase will be discussed.

As described earlier, students in the departments of English, political science, and sociology are encouraged, during both the coursework phase and the examination phase of their programs, to consider ideas for their dissertations. Also, the students in these three departments feel that it is premature for them to focus upon this task prior to completing their examinations. Because of these feelings, and because of the stress relief they experience following their General Examinations, students enter this phase of their programs without clearly defined research topics.

Students describe the first two to three months following their examinations as a period of time in which they read literature related to their interest areas and think about ideas for their research topics. They indicate, however, that there is no significant "push" towards
developing their topics. In addition, they also recognize that, during this time, there is no clear communication regarding how to do a dissertation.

I knew a subject but I didn't know a topic. I didn't know what to make of it. There were several months there when I was just wandering around. I was very dissatisfied with it. I didn't know what to do with it. (English)

The program leaves it to the individual to come up with a topic, to lay out the timetables. Your chairman sort of prods you and pushes you from time to time but there really isn't anything that forces the topic after you've taken generals, and there's nothing that forces you to take generals at a particular time. I think that sometimes there's too much left up to the individual student. They're willing to lay back and wait for you to come to them. (Political Science)

The process of developing a dissertation topic is the sort of thing that people don't talk to each other about very much. You just sort of fall into it. I never had a real sense of how you go about doing it. (Sociology)

In retrospect, students in these three departments recognize that, although they are continually encouraged by their advisors and suggestions regarding literature are being offered, they are ultimately responsible for identifying their research topics. They view this period of time as a learning experience in which they learn to identify and narrow original research ideas.
People that have known him better, I've asked, "Why did he let me go off?" He wants you to be the scholar, whatever scholar is. Limiting your topic is number one. You have to know how to do that. So he lets the student do that. After you pass your generals you're one of them, a colleague. He makes you feel that way. (English)

In our department I think it really is an independent thing. They can offer suggestions but ultimately you have to decide. (Political Science)

After I got the topic I began to focus on the literature. A few people recommended some things to me, but most I dug up myself. (Sociology)

Students in the departments of English, political science, and sociology must submit research proposals to their dissertation committees. The dissertation committees usually include the same faculty members who are on the General Examination committees. At times, students change faculty advisors for their dissertations. However, the committee membership is determined by mutual agreement between the students and their advisors. Submitting their proposals often results in some minor alterations of their research ideas. However, significant changes are made rarely.

In the department of political science, students are required to hold a "colloquium" with their dissertation committees for formal approval of their research proposals. Students in this department indicate that they are often encouraged by their faculty advisors to hold their colloquia as soon as possible following their General Examinations. The Graduate School has a five-year limitation that begins
after admission to candidacy, on the completion of the dissertation for all doctoral students within the University. As there are no immediate time limitations for submitting proposals in the department of political science, students feel that the pressure they experience to hold their colloquiums is their advisors' attempt to keep them moving through this phase of their programs.

A couple of days after generals I sat down and started thinking about it. I was getting pressure from my advisor to get my colloquium done right away. (Political Science)

In the department of English, students indicate that they are given six months following their General Examinations to submit their research proposals. This time limitation is related to their registration as they must be considered to be making "sufficient progress" towards their degrees.

You have six months after exams to be considered making sufficient progress, to hand in a prospectus. (English)

Students in the English department also indicate that, following their examinations, their faculty advisors do inquire about their research ideas. They view these inquiries as an attempt to keep them moving through this phase of their programs.
I started discussing the topic right after generals. I was at the Faculty Club, celebrating passing generals and my advisor asked me about it, what I was thinking about. (English)

Students in the department of English do not have formal meetings for proposal approval. However, they do discuss their ideas with their advisors, and their advisors may show other committee members the written proposals. In addition, all research proposals in the department must be approved by the department’s graduate studies committee.

I submitted the prospectus. My advisor handed it back and said it was fine. He had a few suggestions but they were minor. I knew he knew he’d get everything in good time. He gave the prospectus to other people and let me know what their responses were. (English)

In the department of sociology, students do not describe any time limitations for proposal submission, and they do not have a formal committee meeting for approving their proposals. They do, however, indicate that their advisors suggest that they submit their proposals. These suggestions do act as a stimulus for the students to define their ideas, and keep them moving through this phase of their programs.

The idea got crystallized when it was suggested that I get a proposal together. (Sociology)
Students in the departments of English, political science, and sociology, like students in the department of chemistry, indicate that other students, who had been through the various program phases, are often sources of information for their experiences. During the final phase of their doctoral programs they become sources of information for students that follow. It should be noted that, in opposition to the descriptions offered by chemistry students, peer communication and support in these three departments is primarily concerned with rules, regulations and experience sharing rather than learning related to substantive areas of study. Although coursework is discussed, students found that during this phase of their programs it is difficult to discuss their research areas with others. This is attributed to the specialized nature of their research.

There are some things that you learn about the department that you only learn by word of mouth from other students. (English)

Other people in the program were very helpful. Misery loves company. I learned from the experiences of other people. (Political Science)

At this point I really don't find it that useful to be involved in the sorts of discussions that I found very useful when I was a masters student, the "how to survive in the department" discussions. At the very beginning those things were very important to me. I'd pick up on those things and talk to people who were a couple of years ahead of me. At this point, when I'm involved in those discussions, I'm on the other end of it. I feel that other people benefit from the discussion but it's not really benefitting me directly. I sort of have a duty to help people along from where I used to be. (Sociology)
In sum, the structure of the doctoral programs in the departments of English, political science, and sociology can be identified by three phases. These phases are: coursework, general examinations consisting of both written and oral portions, and dissertation research. (See Diagram 3.) During the coursework phase of their programs, students identify major and minor areas of study, and select their advisors and examination committee members in relation to their interest areas.

Students in these three departments are encouraged, during both the coursework phase and the examination phase of their programs, to consider dissertation research ideas. However, although students do give some thought to their research interest areas prior to their examinations, they view the third phase separately and are not overly concerned with identifying their topics prior to completing their examinations.

Following their examinations, students often experience a "lag" time before writing their proposals. They do think about their ideas, read the literature to focus and narrow their topics, and receive encouragement and direction from their faculty advisors. However, it is usually several months before they intensify their efforts towards writing their proposals.

Although the structural phases of the doctoral programs in the department of chemistry are considerably different from the other three departments, some important similarities in the students' experiences do exist. First, students in all four departments are required to independently identify research topics. Second, students in all departments studied experience increased stress levels as their
Diagram 3

Typical Phase Sequence for Students Pursing Doctorates

In the Departments of English, Political Science, and Sociology

Key:

--- indicates no clear beginning or ending points

— indicates clear beginning or ending points
examinations approach. In addition, their retrospective accounts of their General Examinations include descriptions of the value of the examinations as learning experiences.

Third, following the completion of these examinations, students in all four departments describe changes in their relationships with their advisors. These changes indicate a greater degree of collegiality between students and their advisors, and the expectation that students will pursue their research in a relatively independent manner. Fourth, students in all four departments express feeling more confident about themselves and their work after completing their examinations. And, fifth, students in these departments describe learning from more experienced students during the earlier phases of their programs. As they enter the later phases, they become sources of information for the students that follow.

In conclusion, the structural phases of the doctoral programs in the departments of chemistry, English, political science, and sociology are related to the development of students both personally and professionally. Generally, the phases include the development of broad-based knowledge, narrowing into specific interest areas, examination entrance into the field of scholars, and conducting research as field scholars. As students travel through these phases they gain confidence in their own abilities, assume responsibility for their research efforts, and develop their own identities as scholars of their field. Thus, the structural phases of the doctoral programs in the four departments studied influence the development of students, and are therefore influential in the selection of their research topics.
Advisor

During doctoral education students are required to specify faculty advisors for their graduate school records. Faculty advisors are the official administrators, both departmentally and through the graduate school, during the research process. Because of the centrality of advisors in the research process, they have both a direct and indirect influence upon the selection of the dissertation topics.

In the four disciplines studied the selection of the advisors, the criteria students use for making the selection, and the factors used in the decision-making process, all contribute to the choice of research topics. The roles of the advisors, including the student-advisor relationships and changes in those relationships, also contribute to the selection of research topics. The aspects of advisor selection and advisor roles are described as they relate to the selection of dissertation topics during the doctoral students' experience. Within these discussions aspects of the student-advisor relationships influential in dissertation topic selection are revealed.

Advisor Selection

Chemistry

In the department of chemistry the system for advisor selection involves a formal interview process. Students are required to interview from six to eight faculty members (depending on the students' areas of specialization), regarding the faculty members' areas of research. The faculty members interviewed must sign a form that indicates that the
Interviews occurred. After the interviews have been completed, the students indicate their first, second, and third choice of advisors on the same form. The form is then submitted to the department of chemistry. Department staff then notify the faculty members, in specified order of preference, and ask the faculty members if they accept or reject the students in question as members of their research groups. The department then notifies students regarding their acceptance into the research group. This process must be completed before the end of the first year of study. It is an unusual case in which a student does not receive his first choice of advisor.

Criteria Used in Selection

In the department of chemistry the two primary factors involved in the choice of faculty advisors are the students' research interests and the reputation of the individual faculty members. During the interview process students are able to identify which faculty member has a research project that is of greatest interest to the student. Research completed on an advisor's research project(s) is, eventually, the substance of the students' dissertations although, the project defines a research area rather than specific research content. Thus, the choice of advisors, based on research interests, is the first step towards influencing the dissertation topic. It is important to note here that it is the research area that is of primary concern in the advisor selection process. The dissertation and its content do not become important until much later in the student's program.
No one else had anything that interested me. The fact that I really wanted to do this project was the main reason for choosing this group.

In addition to research interests, the national reputation of faculty members is an important criterion upon which students base their choice of advisors. The national reputation is most important as it relates to students' future professional considerations.

It's going to be two things once you get out of graduate school: what you did and who you worked for in that order. Who you worked for is very, very important.

There is a perception in the chemistry department that the faculty advisors have a direct influence upon the students getting a job once they complete their degrees.

You basically talk to the students who know Dr. A and talk to the students who know Dr. B and find out who's been placing people where.

This "placement perception" occurs because national reputation is seen as directly linked to the number of potential employment contacts in the advisor's realm.

Who you select as your preceptor makes a big difference. You don't want to work for someone obscure because then he doesn't have the contacts in industry to at least get your name in the pile.
Other people in the group have gotten good jobs. A job won't be too much of a problem. He does seem to know quite a lot of people.

The national reputation of the faculty advisors is also an important criterion for selection because of the relationship between the fame of the advisors and their ability to generate the necessary funds for research projects and equipment.

The first reason I chose him is because of how famous he is. He's a very famous chemist so he has a lot of research money. He also has the most research equipment of anyone in the chemistry department. He can also help me get the best job if I get my degree under him. The area that he's in is also the one I'm most interested in.

It is important to note that, although the criteria that have been identified are all important considerations, students must weigh factors in their choice decision. Research interest may take priority over an advisor's national reputation or his ability to generate research money.

People in the group tried to get me to change my mind. They told me that he was along the lines of closed minded. It was hard to get him to change his mind. He didn't have any outside grants. He was dependent on the chemistry department for support. He doesn't have a lot of equipment. I'm using someone else's equipment. People in his group take longer to get out - typically 7-8 years. My interest in doing this project overrode the group dissuasion.
In addition to research interests and national reputation, students in the department of chemistry use several additional criteria in their advisor choice decision. Many of these include various quality ratings of individual faculty members. Aspects of individual personalities, teaching styles, and professional elements such as knowledge level and publications are all considered.

Students consider aspects of teaching style such as "genuine concern," "ability to explain," and faculty expectations for performance in the selection of their advisors. Concern with these aspects of teaching style indicate students' desires to understand their work, and their uncertainty with regard to their abilities. As such, they select advisors who appear to reassure, create understanding for the novice, and establish standards that mesh with their preferred style of learning.

He seemed fairly interested in his students. He was genuinely concerned about them. He was in the lab a lot making sure we're not messing up. He really takes care of his students.

I was going to continue with the cookbook kind of chemistry until I met my advisor who I get along with very well. He seems very normal. You can have a nice relationship with him. You don't feel intimidated with him, yet he was interested in this totally obscure area; but he had this certain flair for explaining these things. He made it look simple.

Not so much getting to know him through talking with him, but through talking with other students. You find out through other students who's demanding, who's not very demanding, who has money, who doesn't have money, who's nice, who's not nice. Some people, when they expect you to do research, expect you to work pretty
Independently right off the bat. Some people realize you probably don't have any experience at all so they're starting from zero with you.

The personalities of faculty members are also considered in students' selection of advisors. Personality is an important factor for students because it influences the advisors' teaching styles as well as the potential relationships between the students and advisors.

Personality is an important thing because while you do independent research, you still have to interact with that person a lot. And, some people's philosophy of research and of teaching graduate students is much different than others. You have to take those things into account and find someone you can get along with. Either get along with or suffer through for 4 1/2 years. So, personality was a factor.

You feel like you can be yourself with him. You can talk to him like you would a fellow graduate student. I feel very much at ease to tell him how I feel about anything - just like I tell any of my friends.

Students also use elements of professional impressions of faculty members in making their decisions. To determine faculty members' productivity, research interests, and peer regard, students review, assess and consider publications, presentations, and knowledge level in their advisor selection decisions.

I was impressed by his resume. Lots of publications. He's the only author. He's well quoted. He seemed very competent. He knows what he's talking about. His papers are well received and he criticizes a lot of papers that he gets to review so he knows what he's doing.
He's brilliant. Look at his research, look at what he's done - what he's done in the past 30 years. He's done the first in many, many areas. I knew every publication he had ever written at the university. I had read or seen a title of everything. I knew everything he was doing.

In sum, a combination of criteria are used in the advisor selection process for students in the department of chemistry. These include interest in a particular research area or project, the national reputation of the advisors as it influences their ability to generate research money and as that reputation interfaces with employment opportunities, and, finally, a combination of quality ratings or assessment of faculty members including professional impressions, teaching styles, and individual personalities.

The elements presented thus far address the question: What criteria are used in the selection of advisors in the department of chemistry? However, how students actually arrive at their decisions is of importance. In the department of chemistry who you select as an advisor also includes a rationale for who is rejected and why the particular faculty member(s) is rejected. Elements used as a basis for comparison include interview impressions, elements related to the research groups, national and departmental reputations of the faculty members, research interests and productivity, and individual student needs.

Impressions that are made during the interview process offer students bases upon which they are able to compare potential advisors. These impressions include both elements of research presentation, the
faculty members' perceived interest in the students, and the students' abilities to understand the research that was presented.

There was a big scare that everybody wanted to work with the same guy (my first choice Dr. A) so I interviewed early. I interviewed with Dr. B just to get his signature. I was put off by my original choice. He kept saying "Don't feel like you have to work for me. I won't hold it against you if you don't." And the other guy, Dr. B, who I wasn't going to work with was so nice about everything and he was so encouraging and he really bent over backwards to get me to work for him. I decided if I had to choose I wanted to be in a group that I felt wanted in and that's why I chose him.

He's a great talker. We talked for 4-4 1/2 hours. Other people talked about things that I didn't know too much about. After I heard about [particular area of chemistry], I talked mainly about that. Nothing else was interesting. The interviews were frustrating. They were talking way over my head. Their work seemed quite a bit removed from what I had learned. Dr. A talked about something I knew a bit about. It wasn't completely foreign.

A second criterion students use as a basis for comparing potential advisors includes elements related to the research groups, including previous interaction with a particular group and comparison based on group size.

His group is fairly small. It's ten people. The only other person I really considered was Dr. B and his group is like 29.
Everyone in the group was incredibly nice. It was a smaller group. There's more individual attention in Dr. A's group. The people seemed more personable. They're enjoyable people to work with and that is obviously a key factor.

Students also compare potential advisors on the basis of their reputations, both intra-departmentally and as it relates to career opportunities. Potential advisors are evaluated on the basis of how they use their students' time and their success record both in getting students through the academic program and in placing them upon completion.

Dr. B has the better name. He's more well-known. But, Dr. A is fairly well-known in industry. Probably equally to Dr. B. Dr. B's more well known in academics, but I was leaning toward industry so it made no real difference.

Dr. A has a better track record for getting his people through cumulative exams. He takes more of an interest, as far as I can tell, than Dr. B. So that was a plus. If you go into Dr. B's group, you've got to be incredibly intelligent to begin with because he isn't going to give you any time to study. He wants you in the lab and working hard. Whereas Dr. A is the other way around. He'd rather you study for the first year and get all the basics down and then really crank on the research.

I was told by the people of [undergraduate school] that if I didn't come and work with Dr. A it wasn't worth coming to this university. That is kind of interesting. I don't think that's true. Dr. B has gotten his people jobs. Dr. A has missed two of his people who are staying around an extra year because they didn't get a job. If you're last on his list that year you're in trouble whereas Dr. B has one or two to place.
Another area of comparison for potential advisors includes research interest and the outlook for longevity of the advisors' research. Students consider the type of research being done as well as the productivity of the faculty members.

I liked what Dr. A was doing more. Dr. B was more theoretically oriented. Make a molecule and figure out all the principles behind it — why it does certain things. Dr. A says, "Here, make this molecule. I think it's important because it has anti-cancer properties perhaps." Dr. A appears to be more application to things — more synthetically oriented — synthesis of natural products.

The other person that I was initially considering working for over this person, but I didn't because he's much older and he's sort of phasing out his research. He doesn't have as much money. He's just phasing the whole thing down whereas this is still a very active research group. So it's the particular area, the money and equipment considerations.

In the department of chemistry the selection of advisors involves a formal process of interview and choice. Positive selection is based upon criteria such as research interest, national reputation, group size, the faculty members' perceived interest in the students, the personalities of faculty members, and quality ratings of individual faculty members. Each criterion is also used as a basis for comparison between faculty members. (See Diagram 4.)

Although primary consideration is usually given to research interests, students prioritize the criteria on the basis of their own interests and concerns. As Diagram 4 reveals, Student B gives highest
<table>
<thead>
<tr>
<th>Potential Criteria Considered</th>
<th>Advisor 1</th>
<th>Advisor 2</th>
<th>Advisor 3</th>
<th>Advisor 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Interests</td>
<td>++C (1)</td>
<td>+ (1)</td>
<td>- (9)</td>
<td>+ (9)</td>
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<td>+ (10)</td>
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<td>+ (11)</td>
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<tr>
<td>Career/Placement</td>
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<td>- (11)</td>
<td>+ (7)</td>
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<td>++ (10)</td>
<td>+ (6)</td>
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</tr>
<tr>
<td>Group Size</td>
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<td>- (8)</td>
<td>+ (8)</td>
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</tr>
<tr>
<td>Previous Group Interaction</td>
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<td>N/A</td>
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<tr>
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<td>+ (3)</td>
<td>+ (3)</td>
<td>- (3)</td>
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<td>+ (2)</td>
<td>++ (1)</td>
<td>- (1)</td>
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<tr>
<td>Teaching Styles</td>
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<td>- (4)</td>
<td>++ (4)</td>
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<tr>
<td>Use of Student Time</td>
<td>++ (5)</td>
<td>- (5)</td>
<td>+ (5)</td>
<td>+ (5)</td>
</tr>
<tr>
<td>Interest in Student</td>
<td>+ (6)</td>
<td>- (6)</td>
<td>++ (2)</td>
<td>- (2)</td>
</tr>
</tbody>
</table>

- advisor 1 selected by Student A and advisor 2 rejected by Student A.
- advisor 3 selected by Student B and advisor 4 rejected by Student B.
- symbols (-), (+), and (+++) indicate students' evaluation of the advisors on the criteria.
- (-) = negative rating; (+) = good rating; (+++) = excellent rating.
- numbers in parentheses indicate the relative order of importance student gave the criteria in the selection of their advisors. 1 = highest priority.
- N/A = not applicable as a criterion considered for this student.

Diagram 4

Sample of Criteria Evaluation and Priority Order of Criteria in the Selection and Rejection of Advisors for Two Doctoral Students in the Department of Chemistry
priority to advisor personality and the other criteria related to advisor-student interaction. While this example reveals students' abilities to prioritize the criteria on the basis of individual interests and concerns, it should be noted that the other four students interviewed in the department of chemistry give research interests the highest priority. Thus, the selection of advisors in the department of chemistry involves the identification of various criteria, evaluation of these criteria in relation to potential advisors and individual interests and concerns, and a rationale for accepting or rejecting particular faculty members.

**English, Political Science and Sociology**

In the departments of English, political science, and sociology there is no formal interview process for the selection of advisors. Students are required to select advisors before their General Examinations. The advisors are chairpersons for the students' committees during the General Examinations, approve the students' programs of study, and prepare the examination questions in the students' major area of study. The advisors are selected on the basis of the major area of study.

The advisors for the General Examination usually remain advisors for the dissertation. However, in a few cases the students changed advisors for the dissertation. In these departments all students have the option of changing advisors for the dissertation. This is not true in the department of chemistry.
Criteria Used in Selection

In the departments of English, political science, and sociology students choose advisors on the basis of similarity of their interest areas. By the time advisor selection is necessary, students have identified a major area of focus, e.g., American literature, congressional voting behavior, complex organizations, and choose advisors on the basis of their interests within that area.

I chose a professor that I had had in a seminar. He does not have a real strong national reputation, but he is probably the best one for [subject area] literature in this department. (English)

I chose him primarily because he is in [subject area]. There are two people here in [subject area] and his things were a bit more in the areas I was interested in. He has published widely and has won teaching awards, so he became a role model for me. In that respect he was doing both things that I was interested in doing. I took some courses with him; I liked his approach. He was closer to the things I was interested in than the other [subject area] person. (Political Science)

In the area of [subject area], if not across the board, he's the biggest name in the department, if you count out the criminologists. (Sociology)

As is evident in the above quotations, the criterion students use to select advisors in these departments includes a mesh between interest areas. However, the choice of advisors on the basis of this criterion is
really an unwritten rule within each department. Students must choose advisors who have similar interests. They learn this rule by associating with both faculty and students in their departments.

[Dr. A] was tempting me to do my dissertation on [particular author] because I did those two papers on him. He wanted me to write my dissertation under him. He said if you want to get your dissertation done quick, you could do it quick with him. I mentioned that to a guy on the faculty who is a friend of mine - that maybe I'll just get my dissertation done really quick in [particular author] or something like that - and he said whatever you do your dissertation in, you're going to be known as that particular type of person. If I'm going to be known as a man of some sort I guess it would have to be an [particular author-B] man. I have no desire to specialize in [particular author-A]. (English)

There's nobody in the department that would have fit in with my dissertation ideally. There's nobody in political science that deals with [subject area-A]. It's probably because of my advisor that I'm interested in [method], but his substantive area is [subject area-B]. It would have been better if there was someone in [subject area-A]. (Political Science)

You learn from peers real quick who to go see and who to stay away from. You learn that you have to choose someone you can trust. Someone who has similar interests. (Sociology)

If advisors are chosen on the basis of some other criterion, students must then choose a research area within the advisors' areas of interest.

I picked the professor I liked best because of coursework. [Subject area] became my area because that was the area he would supervise. In asking him to be
my advisor, I took it for granted that it would be that area. It's not my favorite area. Probably my least favorite area. (English)

For students in the departments of political science and sociology, research interest area is the primary criterion upon which they must base their choice of advisors. Combined with this criterion, students must also consider the mesh between their methodological orientation and the advisors'. The methodological orientation used in the research must be acceptable to the chosen advisors. Therefore, students must select advisors with similar methodological interests.

[Subject area] is also one of Dr. A's areas, too. He and Dr. B overlap to a great extent. They both do [subject area] and [subject area]. It's just that Dr. B's a lot more into [method] as well. But it wasn't out of Dr. A's area by any means, except for some of the aspects of [method]. It wasn't that he didn't know it, it's just that Dr. B, having written books on it, knew it much better. He really would have been the person in the department. In that sense he had to be on the committee. It was [subject area], it was [subject area], it was [method]. It points to him in every sense. But I knew that I could see Dr. A more frequently, that I had a better relationship with him, that it would be easier to work with him. (Political Science)

It sometimes narrows the options. Something you explicitly take into account in picking your advisor. You try to find someone that is interested in the area, has similar values in terms of methods and theoretical perspective. Also, somebody you can get along with and somebody you can respect. (Sociology)
In the English department, methodological orientation did not emerge as an element for consideration in the students' choice of advisors. Students do indicate that it is helpful if the advisors chosen ascribe to their approach to the study of literature. However, there appears to be a greater tolerance for "difference" in this area.

Dr. A hinted that I may have an advantage if I chose a [particular] approach because he knows everything that happened for every year during that time. But then we admitted that my temperament is somewhat different than his. He asked how I would classify my approach to literature in general. I said I'm probably a structuralist. So he indicated that his expertise was available but he was willing to tolerate perhaps a slightly different approach that I might want to take. (English)

In comparison to students in the department of chemistry, students in the other three departments indicate that previous contact with faculty members is an important consideration in their choice of advisors. This contact includes having faculty members for coursework, as examination chairpersons, or as employers.

I never consciously made the decision. They were asking me who was going to sign my card for next quarter and I just casually said Dr. A because he had been my advisor for my exams and so I mentioned that after that - asking him to direct my dissertation. I had to put somebody down for the record for next quarter when I was registering and that does seem like the best choice because I'd had a seminar with him and he's probably the most reputable person here in his field and we have similar interests; we don't always agree on everything, but we are interested in the same issues. The seminar that I had with him was the seminar on a certain writer and that writer will likely be the topic for my dissertation. (English)
Dr. B is the one I had the [method] class with. He's not my chairman by design; I worked for Dr. A. I get along a lot better with him. I know him much better. Even though I did a [method] thing and it came out of Dr. B's class. I wanted Dr. A to be chairman. (Political Science)

I pretty much buttonholed Dr. A. I had this idea before I took my generals. I picked him to sit on the committee mostly because he was the only person I had taken [subject area] courses with at the time. The point is I knew something about him and I had designs on getting him to chair my dissertation. (Sociology)

Like students in the department of chemistry, students in the departments of English, political science, and sociology use various quality ratings of faculty members as criteria in their advisor choice decision. These quality ratings include aspects of teaching style, positive professional regard, and relationship potential.

I admire him and respect him as a scholar. (English)

He's one of the two best classroom teachers that I had in the graduate program. He makes people come up with ideas and challenges them. He's very rigorous. He makes it clear that he really listens to you. And he's very supportive, when you're being challenged it's clear that it's the idea being challenged, not the person. (English)

Dr. A was the first instructor I had here. I liked the way he taught. He is very clear, succinct. He's good at bringing out the major points. He pretty much always lets you know where you stand. If you're screwing up he lets you know you're screwing up. (Political Science)
Also having seminars with the man. When you hear him speak you say to yourself, this is someone who knows his stuff. When he says something you listen. So my experience with him in the classroom had something to do with this. (Political Science)

The graduate advisor said to get someone you can talk with over time. It's generally known around the department that he has a reputation for being trustworthy. (Sociology)

He knows his stuff. I went out and dredged up a couple of his books which showed me that he knows his stuff. (Sociology)

The national reputation of faculty members is also a factor considered in the advisor choice decision for students in the departments of political science and sociology. Like students in the chemistry department, these students associate the national reputation of the advisors with their personal professional outlook. In addition, national reputation is also used by students as a measure of faculty members' knowledge level and abilities. If the advisor is well known, it is to the student's benefit to have his name associated with the advisor.

There's no doubt who I should have picked for several reasons - in terms of him being one of the foremost authorities. Given that he should be guiding a dissertation on implementation. Job reasons - to have said that your advisor at the dissertation level is someone of the stature of Dr. A who has written this many books, who has a high degree of required intelligence from his students and if you can succeed under him that must mean that you are capable as a political scientist. (Political Science)
I tried to pick people that I have a lot of respect for. People I thought were extremely capable in the discipline. People that sort of pinpoint my needs. People who have influence nationally within the discipline — that you can make contacts with other people across the country as far as getting jobs. That know the ins and outs of publishing. (Sociology)

The national reputation of faculty members do not emerge as a criterion for consideration in advisor choice for students in the department of English.

Students in the departments of English, political science, and sociology also consider their personal needs as part of the criteria used in the advisor selection decision. Individual needs for direction and relationship potential are considered as part of the criteria for selection. Students evaluate their own need for support and the advisors' ability to provide the necessary support.

Specifically, I wasn't one of the glib ones who could write voluminously. Writing was difficult. If he could see that - I knew I was going to need someone who didn't just leave you on your own. I was going to need help. (English)

I really wanted someone I could sit down with fairly regularly and say here's how things are going. There were a lot of things throughout the process that I knew I would have to sort out. I wanted somebody who I could say, "Here's what I've done with the first stage." I wanted someone I could sit down with and say, "Doesn't this make sense?" (Political Science)

He was the one person on the faculty that I knew I could trust and would be supportive of me. (Sociology)
Finally, although in a more limited manner than students in the chemistry department, students in the other three departments also narrow their choice of advisors through an omission process. For students in the English department this involves omitting coursework because of an inability to find a model in the subject area or because requirements had been completed elsewhere.

I had taken all the [subject area] requirements at another university and didn't here, so I didn't know any faculty in that area here. (English)

I didn't choose [subject area] literature because I did not have a model in the field - an advisor or a guide in the field in this department. (English)

For students in the department of political science and sociology, "narrowing by omission" takes the form of comparing potential advisors as it does for students in the department of chemistry. These students use elements such as perceived interest and involvement with the student or success rate with previous advisees as the basis for comparison.

Dr. A kind of shied away as exam chair. He seems to be getting less involved these days. (Political Science)

Her courses were not going to lead me anywhere unless I did the dissertation with her which I wasn't going to do. Two people working with her had gone away and were still working on their dissertations. (Sociology)
In sum, the data presented thus far indicate that the primary criterion for consideration in the selection of advisors involves a mesh between the students' and faculty members' research interest areas. (See Diagrams 5 and 6.) For students in the department of chemistry, choice of advisor indicates a willingness to conduct research on one of the advisor's research projects. In the other three departments, students identify a major area of interest and choose an advisor whose interests correspond. In two departments, political science and sociology, students also consider their preferred methodological orientation when selecting an advisor.

Students in all departments also use some form of quality rating in the choice decision. Personalities, teaching styles, expectation levels, and prior success rate are all important criteria for evaluation. Students also evaluate the various quality ratings as they relate to personal needs. Aspects of potential relationship, need for supervision (or lack of supervision), and support are all considered. (See Chart 4.)

The national reputation of faculty members is important to students in all departments except English. For chemistry students this is a critical element. Students associate the fame of their advisors with their potential career opportunities. The advisors' "letters of recommendation" are directly linked with job placement.

In each department but chemistry, previous contact with faculty members often influences students' choice of advisors. Students often become familiar with faculty members through coursework and work
### Potential Criteria Considered

<table>
<thead>
<tr>
<th>Potential Criteria Considered</th>
<th>Advisor 1&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Advisor 2&lt;sup&gt;b&lt;/sup&gt;</th>
<th>Advisor 3&lt;sup&gt;c&lt;/sup&gt;</th>
<th>Advisor 4&lt;sup&gt;d&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest Areas</td>
<td>++C (1)&lt;sup&gt;d&lt;/sup&gt;</td>
<td>+ (1)</td>
<td>++ (1)</td>
<td>- (1)</td>
</tr>
<tr>
<td>Personality</td>
<td>+ (4)</td>
<td>+ (4)</td>
<td>- (7)</td>
<td>+ (7)</td>
</tr>
<tr>
<td>Teaching Styles</td>
<td>++ (3)</td>
<td>- (3)</td>
<td>+ (6)</td>
<td>++ (6)</td>
</tr>
<tr>
<td>Previous Contact</td>
<td>++ (6)</td>
<td>+ (6)</td>
<td>- (2)</td>
<td>++ (2)</td>
</tr>
<tr>
<td>Availability</td>
<td>N/A&lt;sup&gt;e&lt;/sup&gt;</td>
<td>N/A</td>
<td>+ (5)</td>
<td>+ (5)</td>
</tr>
<tr>
<td>Supervision Needs of Students</td>
<td>++ (2)</td>
<td>- (2)</td>
<td>+ (4)</td>
<td>+ (4)</td>
</tr>
<tr>
<td>Interest in Student</td>
<td>++ (5)</td>
<td>+ (5)</td>
<td>+ (3)</td>
<td>++ (3)</td>
</tr>
</tbody>
</table>

<sup>a</sup> advisor 1 selected by Student A and advisor 2 rejected by Student A.

<sup>b</sup> advisor 3 selected by Student B and advisor 4 rejected by Student B.

<sup>c</sup> symbols (-), (+), and (++) indicate students' evaluation of the advisors on the criteria.

<sup>d</sup> (--) = negative rating; (+) = good rating; (++) = excellent rating.

<sup>e</sup> numbers in parentheses indicate the relative order of importance student gave the criteria in the selection of their advisors. 1 = highest priority.

N/A = not applicable as a criterion considered for this student.

---

**Diagram 5**

Sample of Criteria Evaluation and Priority Order of Criteria in the Selection and Rejection of Advisors for Two Doctoral Students in the Department of English
<table>
<thead>
<tr>
<th>Potential Criteria Considered</th>
<th>Advisor 1a</th>
<th>Advisor 2a</th>
<th>Advisor Ab</th>
<th>Advisor Bb</th>
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</thead>
<tbody>
<tr>
<td>Interest Areas</td>
<td>++c (1)d</td>
<td>++ (1)</td>
<td>++ (1)</td>
<td>+ (1)</td>
</tr>
<tr>
<td>Methodological Orientation</td>
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<td>++ (2)</td>
<td>+ (2)</td>
<td>++ (2)</td>
</tr>
<tr>
<td>Personality</td>
<td>++ (7)</td>
<td>+ (7)</td>
<td>- (5)</td>
<td>+ (5)</td>
</tr>
<tr>
<td>National Reputation</td>
<td>+ (5)</td>
<td>++ (5)</td>
<td>++ (3)</td>
<td>- (3)</td>
</tr>
<tr>
<td>Teaching Styles</td>
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<td>+ (10)</td>
<td>- (9)</td>
<td>+ (9)</td>
</tr>
<tr>
<td>Previous Contact</td>
<td>++ (4)</td>
<td>+ (4)</td>
<td>- (10)</td>
<td>+ (10)</td>
</tr>
<tr>
<td>Career/Placement</td>
<td>+ (6)</td>
<td>++ (6)</td>
<td>+ (4)</td>
<td>- (4)</td>
</tr>
<tr>
<td>Availability</td>
<td>++ (3)</td>
<td>- (3)</td>
<td>+ (6)</td>
<td>+ (6)</td>
</tr>
<tr>
<td>Supervision Needs of Students</td>
<td>+ (9)</td>
<td>- (9)</td>
<td>+ (8)</td>
<td>+ (8)</td>
</tr>
<tr>
<td>Interest in Student</td>
<td>+ (8)</td>
<td>+ (8)</td>
<td>+ (7)</td>
<td>++ (7)</td>
</tr>
</tbody>
</table>

a - advisor 1 selected by Political Science and advisor 2 rejected by student.
b - advisor A selected by Sociology student and advisor B rejected by student.
c - symbols (-), (+), and (++) indicate students' evaluation of the advisors on the criteria. 
   (-) = negative rating; (+) = good rating; (++) = excellent rating.
d - numbers in parentheses indicate the relative order of importance student gave the criteria in the selection of their advisors. 1 = highest priority.

Diagram 6
Sample of Criteria Evaluation and Priority Order of Criteria in the Selection and Rejection of Advisors for One Doctoral Student in the Department of Political Science and One Doctoral Student in the Department of Sociology
Chart 4
Criteria Considered in Advisor Selection by Doctoral Students in the Departments of Chemistry, English, Political Science, and Sociology

<table>
<thead>
<tr>
<th>Criteria Considered</th>
<th>Chemistry</th>
<th>English</th>
<th>Political Science</th>
<th>Sociology</th>
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<tbody>
<tr>
<td>Interest Areas</td>
<td>XXX a</td>
<td>XXX</td>
<td>XXX</td>
<td>XXX</td>
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<tr>
<td>Particular Project</td>
<td>XXX</td>
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<td></td>
<td></td>
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<tr>
<td>Methodological Orientation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longevity</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Money</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personality</td>
<td>X</td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
</tr>
<tr>
<td>Career/Placement</td>
<td>XX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>National Reputation</td>
<td>XX</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Department Reputation</td>
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<tr>
<td>Group Size</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous Group Interaction</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Previous Contact</td>
<td></td>
<td>XX</td>
<td>XX</td>
<td>XX</td>
</tr>
<tr>
<td>Interview Impressions</td>
<td>X</td>
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<td></td>
<td></td>
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<tr>
<td>Teaching Styles</td>
<td>X</td>
<td>XX</td>
<td>XX</td>
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<td>Availability</td>
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<td></td>
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<td>Use of Student Time</td>
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<td>Interest in Student</td>
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<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Supervision Needs of Student</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Key:
XXX - Extremely Important
XX  - Very Important
X   - Important

a - The levels of importance attributed to the criteria are based on the overall descriptions of the students interviewed. For examples of differences in prioritizing these elements on an individual basis, see Diagrams 4, 5, and 6.
situations. They use this familiarity as a criterion in their choice decision.

Finally, in the four departments studied, the selection of advisors involves a rationale for who is rejected and why they are rejected. These criteria are evaluated and used as the basis for comparison. In the English department, omission occurs as a result of omitting certain areas of coursework.

The advisors, in all departments studied, impact upon students in a variety of roles. These roles are discussed in greater detail in the following section. However, as a beginning step toward this impact, the advisor selection process and evaluation of the criteria used for selection begins to illuminate the relationship between advisors and research. The advisors not only influence dissertation topics through their roles directly, they also influence through the system in which they are selected and the criteria used in that selection process.

**Advisor Role**

Doctoral students' faculty advisors assume a variety of roles in relation to their advisees. Various aspects of these roles may be classified as elements related to administrator, employer, teacher, and friend. The advisors appear to shift roles both in relation to students' development and in relation to the students' point in the program.

In the four departments studied, the primary advisor role is research supervisor. The actual manifestation of this supervision is more clearly defined in the department of chemistry than in the other
three departments. However, the overall supervisory role remains intact in all departments. This is explained more fully in the following discussion.

Both the advisors and the doctoral students are responsible for defining the advisors' roles. That is, the potential for all roles, administrator, employer, teacher, and friend exists. The actual appearance of the various aspects of these roles involves a process of negotiation, acceptance, and rejection between the individuals involved. In addition, some elements related to the roles of the advisors are defined by departmental requirements. Finally, as in advisor selection, the roles of the faculty advisors appear more distinct in the department of chemistry. Therefore, these data are presented separately.

**Chemistry**

In the department of chemistry, the first advisor role is defined by the advisor selection process. The faculty members must interview students, present their research areas, and accept (or reject) students into their research groups. These tasks are the first indication that faculty advisors in the department of chemistry fulfill the roles of project directors and research group leaders.

Part of what we do is interview professors in the department. Then, when we find one in our area, they define particular projects and then we choose from those and ask to be accepted into that group. Basically the professor just presents possible research topics that you would work on. If you work in my group these are the projects we have. You could work on one of these projects.
After a student is accepted into a research group, it is the advisor's responsibility to provide the student with a research project on which to work. The selection of a research project may be the student's choice from several different projects, the advisor's choice through the manner in which alternatives are presented, or an agreement between advisor and student because of some specific expertise on the part of the student. Regardless of the process in which a research project is selected or assigned, the student ultimately works on one of the advisor's projects.

After you're accepted in a group, you sit down and he lays out usually the same projects he's laid out at the initial interview. You decide which one you want to work on and he gives you a bench. Everyone has a bench that they work on and the process begins.

He has an idea what he wants you to do. He words it so you appear to have choice in the whole matter but I don't think anybody takes the alternative. He told me what he wanted me to do and basically I had to do it.

He wanted me to learn the techniques this post-doc had developed so I could carry on that type of research. I was already familiar with some of the equipment I'd have to use.

In addition to some particular expertise on the part of students, it is also possible that advisors assign the research project because of the state of a particular project or because another student, already involved in a project, is leaving.
Throughout their doctoral programs, students in the department of chemistry work on one or more of their advisors' research projects. In some sense the "ownership" of the project shifts as the student becomes more responsible for the direction of the research. However, it is evident from the students' comments that the advisors are the ultimate authority.

I'm on a flyer now. If he thinks it's important, I'll try it. I have a month to get somewhere on this project. If I don't get somewhere it gets dropped. It's his project.

In the chemistry that you start on, he gives you a very, very broad idea of what he would like to see accomplished. Now, when you go to work for someone you're going to do that type of research. That is why you're there. That's why you're in the group. That's why you picked him.

Chemistry students remain consciously aware of the fact that the research project ultimately "belongs" to the advisors. The faculty advisors become the students' employers. This is true regardless of whether students are paid through the project as research assistants or through the department as teaching assistants. In both cases, the students are working for their advisors.

We just call him the boss. He's my research director, my advisor. In the strictest terms he's advising me through my maturation in graduate school. You work for him because it's his research. It is under his guide that I am doing this research. In the strictest sense, he pays me. I am making money from his research data. He's the boss because he is the head of my research.
Besides working on the advisors' research projects, the employer/employee relationship is enhanced by the work system. The work setting can be seen as pseudo-industrialized. This helps to emphasize the need for research results and prepare the students for the real-world work setting. In establishing this system, the advisors act as employers and research supervisors.

You don't have as much personal contact with the person you work for and so he really sets it up more as a job type relationship. I guess they feel that that's a more productive setting. Maybe it's also because in a lot of ways it's more like a company in that you have to get results so they can generate money. Even though this is academics, everything still revolves around money.

As the students' employers and research supervisors, faculty advisors assume many research-related roles. As research supervisors, they provide direction and offer suggestions regarding the research projects. There is a visible shift in the quality and quantity of this supervision as the students gain more experience.

For the first year he takes more interest to make sure you're doing what he thinks you ought to be doing.

In the beginning of these supervisory relationships, the advisors provide guidance and direction. They see to it that the research is running smoothly and assign tasks as they find necessary. As the students gain experience, the supervisory function diminishes and the students take greater responsibility for the direction of the research.
He's got the money. He tells me what he wants me to get into. The first one he sits down and says "We're going to make this, this is how I want you to do it." As you get older you're supposed to get more intelligent, so then he says, "We want to get into this kind of molecule, design a synthesis that you think is going to work. I'll take a look at it; we'll work it out." Basically that's what you do, at least for the second one, and then you collaborate with him back and forth and try to figure out if it's going to work or whether he doesn't think it's going to work or what the problem is.

Although the supervisory role may decrease, the students are ultimately responsible to their faculty advisors and, at all times, must be accountable for the research projects.

He got mad when I did this one thing. He said, "We just don't do that sort of thing."

During the day he'll be in and out of the lab and periodically he will ask, "What are you doing in that flask?"

Part of the faculty advisors' responsibilities are to communicate performance expectation levels to their students. These expectation levels include both concrete research performance efforts and a more generalized developmental expectation. On the more concrete level the advisors might communicate the number of hours they expect the students to work in the laboratory or their preference for the students to do laboratory research over library research.

He tells me, "I expect you to work hard. I expect to see you in 70 hours a week."
The person that I work for wants you in the lab. Once you get more experience, then you do all the library work yourself. It's important that you recognize the need to do the library work.

Developmental expectations are communicated in a much more direct manner. In this role the advisors communicate their expectation that the students assume increasing levels of responsibility for the research endeavor. This expectation is communicated primarily through interaction regarding the research project.

He comes in and says, "Have you got this result?" You say, "No." He says, "Well, what are you going to do now?" The first time you say, "I don't know," and you never say that again. He says, "Well, why don't you know? That's what you're here for. You're supposed to know." So, it's pretty clear.

... he has the tendency to probe you to find out how much you know. He's probing you to find out how much you've dealt with the area. And if you don't know anything about it, he'll blow you off. You know when you're being insulted. Go back and work it out yourself. He doesn't want to spoon feed you and he doesn't want to tell you you're wasting my time and get out of my office! He'll just start talking at a rate of speed you can't keep up with.

As part of the expectation for students' independence in the research effort, the advisors challenge the students to take control of the research direction. At some point the advisors stop answering the students' questions and clearly indicate their expectation that the students take control of the research. With this developing independence
the students are also expected to develop some concept of the total research picture. Once the broader picture is understood, the students should have an awareness of when they will be able to complete their programs. However, students remain keenly aware that they are ultimately responsible to the faculty advisors and, regardless of their levels of independence, they cannot complete their program without their advisors' approval.

Talk got less and less. Talk about where this project was headed. One day I went in to talk to him. I said, "Where is this headed?" And he said, "What? I don't know. You tell me. Where is this headed?" Around the same time I asked him when I'd be done. He said, "It's not up to me. You should know when you've got enough. You come to me some day and say 'I'm done' and I'll see if you are... He's the one who's going to sign my dissertation.

Getting done is part of the bargaining process and it's mainly a function of time. When it gets to be about 3 months before I think I should get out, I will say so. He'll say, "I want you to do this," and the bargaining process will begin and then we'll actually arrive on a time.

The faculty advisors, by establishing performance expectations, are making a direct contribution to the students' development as scientists in their field. However, although the advisors communicate their desire to have the students assume increasing levels of responsibility for the research direction, they still maintain ultimate "ownership" of the research projects. Because of this "ownership," the students must produce research results and must be willing to address the advisors' questions.
In my group you know you have to get results two ways: harassment, and part of the harassment is flat out asking, "Where is the result? How long is it going to take?" Not so much an interest in "What's the problem? Where is the result?" I like to think sometimes that he looks at it like by doing this [harrassing] he could push you further than you thought you could go. But whether he does this for purely selfish reasons or whether he also has the student in mind, I don't know.

He has certain expectations for where your research is headed and he also has certain questions that he wants answered. I answered those questions that he had, not all of them. If he really wants to see something done, he'll tell you. "I'd like to know the answer to this problem or this question. Why don't you see what you can do with it?" But as far as development of where the topic is headed, where the project is headed, it's all on your shoulders - total - at least in my case. It's been on my shoulders where this is going.

As part of establishing developmental expectation levels, the faculty advisors stress the importance of publications. Students must learn to recognize the amount of research necessary for a publication and the methods for writing a research article. By establishing the expectation that students learn these two skills, the advisors roles are three-fold. First, they fulfill their role as teachers. Second, the publication of research articles is important for maintaining the advisors' professional roles as research scientists. And, third, the advisors' roles as mentors become important. Both quantity and quality of publications aid the student in their future job search. The faculty advisors, as well as the students, are keenly aware of the importance of research publication to the students' future careers.
Once he got me going he would always encourage me to do things on my own. In fact, the papers we write have to be written by me first.

He wants you to keep working on something new so you can get as many articles published as you can.

What the goal essentially is is how much information is needed to write a paper and send it to a journal. As you get into the project a picture begins to develop, so you both sort of know how much you need to do.

The faculty advisors' role as "teacher" in the department of chemistry can be divided into two primary functions. The first, that of program directors, involves assessing students' academic progress and making recommendations on the basis of that assessment. Within this role it is the advisors' responsibility to determine the students' readiness to progress through the various stages of the academic program, including program completion as discussed earlier.

It was suggested to me by my advisor to get an M.S. first. . . . He didn't think I was ready. I wasn't smart enough to pass the cumes. Getting a masters put them off for a year and a half.

We had a discussion about taking cumes after I passed my qualifier. It was by mutual agreement when I'd start.

In assessing the students' abilities to progress through their programs, faculty advisors are also determining the students' dedication and supervision needs. By making this assessment, faculty advisors are
able to gauge the best methods for working with students, and they are
able to determine how to establish their expectation levels. In
addition, they are protecting their own professional reputations by
setting quality standards for performance.

Some people, when they expect you to do research,
expect you to work pretty independently right off the
bat. Some people realize you probably don't have any
experience at all, so they're starting from zero with
you.

He knows what industry is looking for and realizes that
if you're not prepared, you're not going to get a job
when you get out. The first year I think the attitude
is to break you and if you don't want it, get out.
That seems to be pretty standard. However, if you go
for it, he sits behind you. He really finds out just
how dedicated you are. If you really want it, he's
behind you.

He tests you the first couple of years. That's what he
was doing to me because I was a borderline candidate
and he wasn't sure I was going to make it. Basically,
he doesn't want a student who comes out as a nitwit
because that ruins his reputation and everyone else
who comes along behind me. So he's got to make sure I've
got everything down and to do that he tests you.

The second aspect of the faculty advisors' "teacher" roles involve
their becoming role models for students. Although the role modeling is
not an explicit communication to "do as I do," students learn how to
approach their research by watching the methods used by their faculty
advisors.
The way he presented something. It made good sense to ask questions that way. You just learn how to ask by using his questions as examples. He doesn't tell you.

After you have the answers to all those basic questions and you have deeper, more interesting questions, then you really begin discussing things with him. Then you really begin learning about his ideas, his philosophies. Initially, it's more the people in the lab who shape you, not in opposition to him, but in addition to him.

By using their faculty advisors as role models in the research process, students are also learning to be successful professionals in their field. They watch their advisors to learn their methods and approaches, and then imitate those behaviors. The rationale used in this transfer of skills includes knowledge of their advisors' success and, therefore, by imitation and adoption, their own potential success.

I'm beginning to think like him, as far as he would go about approaching a problem. He's a role model that you have to learn to imitate. It works for him as far as his being able to be a faculty member, so that's how I gauge myself.

You don't see him doing lab work. You're not in a laboratory with him. You don't see him encounter a problem and solve it. But, to the extent that when you talk with him, and especially at group meetings when people present their results, present their problems and he offers suggestions. So, you see the process or the steps he uses to solve problems in that way.

Finally, and providing an interesting balance in relation to the advisor selection process, the faculty advisors in the department of
chemistry are also responsible for helping the students get jobs upon program completion. Students are cognizant throughout their program of the fact that their advisors' letters of recommendation and employment contacts are an important aspect of their advisors' roles.

There's really only one reward after you pass your oral. The whole thing rests on how much help you're going to get getting a job. And what type of recommendation you're going to get. That's really the handle. The punishment is no help.

I'm interviewing now and he's already talked to me quite extensively about how the interviews are going. I've given him two mock interviews to make sure I'm giving the interviewer what they want to hear. He's also given me feedback that I'm not aggressive enough.

In sum, the primary role assumed by faculty advisors in the department of chemistry is research supervisor. Within this role they assign or negotiate the assignment of research projects. In addition, they supervise the research endeavor by providing direction and offering suggestions. This includes task assignment, keeping research moving by checking for results, and establishing performance expectation levels in terms of student priorities and time spent in the laboratory.

The faculty advisors in the department of chemistry become the students' employers. The students are accountable to their advisors. They must follow directions, fulfill requests, and, in total, measure up to the performance expectation levels as established by the advisors.
Included in these expectation levels is the need for the students to assume increasing levels of responsibility for the research endeavor while continuing to recognize their advisors' ultimate authority.

The faculty advisors become both mentors and role models. They help to shape the students' development as research scientists by both establishing expectation levels, requiring the mastering of necessary skills for professionals in the field, and by example. Students watch their advisors for cues regarding appropriate methods and behaviors of professionals within the field. There is an awareness on the part of students in the department of chemistry that their academic performance is tied to their professional future. Their faculty advisors become models to help them achieve a successful career future, as well as having a direct impact through their letters of recommendation.

**English, Political Science, and Sociology**

The primary role of faculty advisors in the departments of English, political science, and sociology, as in the department of chemistry, is that of research supervisors. The advisors in these three departments provide direction and offer suggestions both in regard to research topic selection and throughout the research process. However, in these departments, the advisors' roles in relation to research supervision appear more fluid. There is less direct guidance and a greater reliance upon students' initiative. The advisors' contribution appears to be based more upon students' needs and requests.
In the departments of English, political science, and sociology, the faculty advisors maintain a greater distance from the actual research being conducted than advisors in the department of chemistry. Issues related to project "ownership" do not emerge in these areas. The students "own" their research. In chemistry, if it appears that the students "own" their research, this must be coupled with the knowledge that the faculty advisors "own" the students. This employer/employee relationship does not exist in the other three areas where the relationships between advisors and advisees appear to be defined on a more collegial basis.

The advisors in the departments of English, political science, and sociology also assume the role of field representatives. They set limits upon dissertations as well as establish both quality and professional standards within the research product. In addition, as department representatives, the advisors are responsible for formal approval of their students' work. In their primary role as research supervisors, the faculty advisors in the departments of English, political science, and sociology assume a variety of roles. One of these roles involves working with the students to explore possible research areas during the topic selection phase of the doctoral programs. It is the students' responsibility to define the topic. However, by suggesting that the students begin this process, the advisors are providing the necessary structure to keep the students moving through their doctoral programs.
I was intrigued by the book. I liked it a lot. My advisor said, "There's not been a lot done on this, why don't you consider this kind of book in connection with a dissertation topic?" (English)

As I was preparing for exams, he was encouraging me to look at ideas. He said it should be doable and I should get it done as quickly as possible. (Political Science)

He said he could suggest some ideas but would rather me bring the ideas to him. Then he'd ask questions. He told me that I'd want a topic that I'm interested in. (Sociology)

While working with students during both topic selection and the actual research, advisors in these three departments tend to be non-directive. They require a great deal of independence from students in the research endeavor. From the students' point of view, by allowing this independence, their advisors are actually teaching them necessary research skills.

He wants the person to be the discoverer; to do the work, read the books; to make those discoveries. So that it is our discovery. So that it's not just a product, it's a process; how to find and discover information. We're being taught how to look and see what we have. He was teaching by letting me flounder; letting me go off. I was actually teaching myself. He's teaching me about what it takes. You don't realize it's instruction at the time, but I was taught something. (English)
The program leaves it to the individual to come up with a topic, lay out the timetable. Your chairman sort of prods you and pushes you from time to time, but there really isn't anything that forces the topic after you've taken generals. (Political Science)

When I want to, I'd like to be able to go to the people I'm working with and say what do you think about this. Read this and see what you think. Just to get reactions from them. But I'm happy that I'm not in a position where they're having to suggest things to me in a fairly elaborate, direct way. (Sociology)

In addition to providing structure and allowing independence, faculty advisors in these three departments offer students suggestions in relation to their research. Most often these suggestions direct students to additional literature to review in connection with their research areas. The advisors remain the subject area experts for the students to consult.

My advisor makes enough comments, directs me to literature, suggests ideas. He creates a dialogue. (English)

I narrowed down three broad areas I was interested in. He told me his own view of the field within those areas, ways I could go. He gave me a list of things to read. This was something that made us both happy. (Political Science)

He sort of directed me to certain things to read, usually not by saying, for your dissertation read this and this and this. More usually in a general way. These readings will lead you to other things by the same author or the people that they cite. (Sociology)
As research supervisors, the advisors act as consultants for the students' ideas. They suggest reading material and asks questions that help the students to focus their ideas. In a non-directive manner the advisors guide the research endeavor. In this role they provide challenge and support, as they perceive necessary, to keep the students moving along the research process.

I go to him for two reasons: Here, what do you think of this, and I want him to read it. The other reason is when I'm stuck; to get me straightened out on some stuff. What he does well is ask questions. He just asks questions basically. If he makes a suggestion, it's very general or very abstract. I mean to be positive about his contribution. He asks questions and then he makes methodological suggestions such as, "You've got to be careful not to do this." Those are the two main things he does. When he does that he's reminding me, like I said, it's very easy to get away with committing all kinds of logical errors. He catches some of that. (English)

He was just trying to get me moving. After generals there was a real temptation not to do anything. The one time that comes to mind was about five minutes after I found out I passed my generals and at the time I thought I didn't need to hear that now. Since then he has called up generally in the context of something else and "Oh, by the way, how much have you gotten done?" That sort of thing. The only other example I can give you is that he's constantly pushing for me to get the first couple of chapters out at least. "If you don't get those out, you can't be on the job market for next year." ... The rest are just kind of nagging, harping at me, gotta get this done, gotta get moving. He's never actually said you're not producing enough, but what he has said comes down to that. (Political Science)
He reacts to my Ideas, the papers I write. There's some movement toward not trying to give me direction, maybe just reacting after I've done it. (Sociology)

Although the faculty advisors in the departments of English, political science, and sociology do act as research supervisors, their roles may be described better as consultants. They do provide direction, guidance, and offer suggestions to keep the research moving. However, the advisors in these three departments are also responsible for establishing quality standards for the work produced. Students must satisfy the performance expectation levels as defined by their advisors. With all the independence in the research endeavor, the advisors still maintain the role of providing formal approval.

He didn't think a dissertation needed to be publishable, but he was concerned about some of the content. He really specified what I had to include. (English)

The first prospectus I thought I could do it. Two members disagreed. My advisor thought I could. I decided to cut it back to just [subject area]. I was overly cautious with the second prospectus. Every few pages I went in to make sure it was okay. I wanted to avoid what happened the first time. He's always pushing me to do a little bit better; rewrites, redrafts. He really has a willingness to stay with you, help you improve. (Political Science)

He was making sure that what I did was in accord with good practices, with certain acceptable standards that he felt were important. He wants the dissertation to be written well enough so that at least one article can be written from it. He wants work done well enough so it can have some professional acceptance. (Sociology)
The roles of faculty advisors in the departments of English, political science, and sociology differ significantly from the advisors' roles in chemistry. (See Chart 5.) Although in all departments the advisors act as research supervisors, in the department of chemistry their involvement in the research process is much more involved and direct. The students in the department of chemistry are actually working on one or more of their advisors' research projects. Therefore, the advisors maintain ultimate ownership of the research endeavor and their students are directly accountable to them. Like the other three departments, the chemistry advisors provide direction and offer suggestions. However, in this department there is a sense that the direction and suggestions must be followed.

In the other three departments the advisors are much more removed from the research process. They act as consultants, sounding boards, and as guides. They help to provide structure and keep the students moving along the research path. However, the students "own" their research. They are expected to take initiative and independently discover and produce. The advisors act as support and guides in this process.

In all four departments the advisors act as representatives of both the departments and the fields. As such, they communicate the expectation levels and quality standards they have established for their students. Students in all departments must achieve these standards as the advisors maintain ultimate authority for approval.
### Chart 5

**Potential Advisor Roles by Program Phases in Which They Occur in the Departments of Chemistry, English, Political Science, and Sociology**

<table>
<thead>
<tr>
<th>Advisor Roles</th>
<th>Chemistry</th>
<th>English</th>
<th>Political Science</th>
<th>Sociology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Supervisor</td>
<td>1,2,3,4a</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>- Direct</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Research Supervisor</td>
<td>6</td>
<td>c</td>
<td>c</td>
<td>c</td>
</tr>
<tr>
<td>- Consultant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employer</td>
<td>1,2,3,4,5,6</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Group Leader</td>
<td>1,2,3,4,5,6</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Project Director</td>
<td>1,2,3,4,5,6</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Performance Expectations</td>
<td>1,2,3,4,6</td>
<td>a, b, c</td>
<td>a, b, c</td>
<td>a, b, c</td>
</tr>
<tr>
<td>Quality Standards</td>
<td>1,2,3,4,6</td>
<td>a, b, c</td>
<td>a, b, c</td>
<td>a, b, c</td>
</tr>
<tr>
<td>Teacher</td>
<td>1,2,3,4,6</td>
<td>a, b, c</td>
<td>a, b, c</td>
<td>a, b, c</td>
</tr>
<tr>
<td>Assessment</td>
<td>1,2,3,4,5,6</td>
<td>a, b, c</td>
<td>a, b, c</td>
<td>a, b, c</td>
</tr>
<tr>
<td>Role Model</td>
<td>1,2,6</td>
<td>a, c</td>
<td>a, c</td>
<td>a, c</td>
</tr>
<tr>
<td>Field Experts</td>
<td>1,2,3,4,5,6</td>
<td>a, b, c</td>
<td>a, b, c</td>
<td>a, b, c</td>
</tr>
<tr>
<td>Provide Structure</td>
<td>x</td>
<td>b, c</td>
<td>b, c</td>
<td>b, c</td>
</tr>
<tr>
<td>Placement</td>
<td>6</td>
<td>c</td>
<td>c</td>
<td>c</td>
</tr>
<tr>
<td>Formal Approval</td>
<td>5,6</td>
<td>a, b, c</td>
<td>a, b, c</td>
<td>a, b, c</td>
</tr>
</tbody>
</table>

a - numbers correspond to program phases in the department of chemistry as described in the section entitled Program Structure.

b - X indicates role not assumed by faculty in that department.

c - capital letters correspond to program phases in the departments of English, political science and sociology as described in the section entitled Program Structure.

1 = coursework, 2 = advisor selection and research groups, 3 = qualifying examinations, 4 = cumulative written examinations, 5 = oral examinations, 6 = laboratory research

A = coursework, B = written and oral examinations, C = dissertation
Research Topic Selection

The selection of research topics is a process that develops as a result of both circumstances and experiences. Research topic selection, although a single phase within doctoral education, cannot be separated from the students' experiences prior to their doctoral programs or from their experiences during their doctoral programs. The process itself may be thought of in terms of layers in which broad bases of experience are gradually refined and narrowed until the actual topics are identified.

In the departments of chemistry, English, political science, and sociology, there are several common elements influencing topic selection. These elements include the literature of the fields, the originality of the topics, and the significance or importance of the topics. However, other elements, such as previous experience, the influence of coursework, or concern regarding future employment, can be identified as factors in two or three departments and not in the fourth.

In the following section the elements found to be common to all four departments are discussed first. Following this, because the requirement in the department of chemistry is structurally different, the elements that influence topic selection for chemistry students are explored. Finally, the elements found in the other three departments, as they relate to one another and as they are distinct, are described.
In the departments of chemistry, English, political science and sociology, students identify three elements that influence research topic selection found common to all four departments. The first of these elements concerns the need for the originality of the research topics selected. The students define this requirement as the need to produce research topics that had not been produced previously. Their research ideas have to be new, novel approaches. They cannot reproduce previous research or previous research ideas. However, the particular descriptions students give in describing "originality" differs among the departments studied.

For students in the department of chemistry, originality is described as the integration of ideas that lead to a new or novel extension along a research path.

I started pulling out the literature and looking at what had been done and what hadn't been done. This hadn't been done. I started to develop the idea and then I had to make sure it hadn't been done. I mean make sure no one on this planet had ever done this before. It has to be totally original. (Chemistry)

Students in the department of English describe originality in terms of using a new framework or perspective in addressing a piece of literature or literary area.

What I want to do is dangerous to me. Another interpretation of [particular author]. Everyone has their point of view, so this is his point of view.
What I want to do is a solution to the whole problem. Not just biting off a small chunk, but trying to get to the structure underneath that is operating. (English)

In the departments of political science and sociology, students indicate that originality is determined by the use of a new theoretical perspective or new combination of perspectives as a framework for observing some group or system. In addition, originality in these two departments can also be the use of a particular methodology in studying a set of data that had not been used previously with the data.

Original research is research on a topic or looking at a topic in a way in which it’s never been looked at before, never been studied before. So you can’t go out and reproduce somebody else’s study to see if they did it right the first time. (Political Science)

I just stumbled across it. There was a big media thing. When I started checking it out and found out that sociologists had pretty much ignored the area, I thought, “There you go buddy.” I’d hit on something. I did a literature search and came across a couple of recent works and found that no one had done what I wanted to do. (Sociology)

A second aspect of research topic selection found to be common among students in the four departments studied involves the criterion that the topics selected be of some significance or importance. Students choose research topics that make contributions to knowledge in their fields. They indicate that they are required to specify how their research topics can be considered as contributory to their disciplines. As in the
Descriptions of "originality," differences exist in the ways in which the students in different departments describe "significant contribution to knowledge."

In all four departments a research topic is considered to be significant or important if it adds information to the scholarly field as determined by field scholars. In the department of chemistry, a research topic is described as a "significant contribution to knowledge" if it can be shown to contribute to what is already known by members of the scientific field.

I had to choose something that would be new, that could feasibly be done and that was a contribution to science. Those were the guidelines I had to work with. (Chemistry)

In addition to the field scholars' determination of significance, students in the department of English indicate that part of declaring topics as "significant contributions to knowledge" involves indicating that previous research was of little or no value.

There's very little agreement in my discipline about what constitutes an additional piece of useful knowledge upon which we can build because of this mania for originality. You have to be original. Originality is valued more than rigor or usefulness. In order to be original you've got to claim that nothing anyone did before you was really valuable -- or very little was. (English)
Finally, students in the departments of political science and sociology describe the determination of their research topics contributory nature on the basis of both field and practical significance. If the information can be used to achieve a better understanding of the fields, or if they can be used to help the groups or organizations studied, the topics are considered "significant contributions to knowledge."

I wanted to do something that was interesting to me. Secondly, something I felt was important to the field on a broader scale. Important in the sense that it adds to knowledge. (Political Science)

It's important because it will tell you something not only about [subject area], but something that's going to be of interest to other people in the field generally. Working toward more general theories - not just applied to the sociology of the family or sociology of religion, something of more general relevance. (Sociology)

The third and final element related to research topic selection found in the four departments studied involves the students' use of research literature. The research literature of the field is used to generate ideas within the students' interest area. In addition, the research literature is used as a source for narrowing and focusing particular research topics. The actual methods used in research literature exploration exhibit some slight differences across the departments studied. However, it is important to note that research literature is a vital element in identifying, narrowing, and focusing upon research topics for students in all four departments.
In the department of chemistry, students indicate that journal articles, in the major field journals and journals in areas of specialization, are the primary research literature used in the selection of topics for the oral examinations and in the development of their ideas for laboratory research. Chemistry students use the research literature to integrate and synthesize ideas and generate the next phase along a research path.

The process I used was simply going to the library for hours a week. Go to the library and simply read the journals. Years and years of journals. You just keep reading them until you find an interesting reaction—this might work with something else I saw. Then you try to remember where you saw the last idea. Then you get your notebook out and write down the two ideas and try to piece together what you think will be an interesting topic. (Chemistry)

Students in the department of English indicate that books were the primary sources of research literature used. The books are used to explore areas that have been discussed previously in an effort to identify new questions for discussion. In addition, the literature provides the basis or substance for the presentation of new frameworks for discussion.

I went to the stacks with some questions in mind. They were very vague. I took out some books and poured through them. Then whatever caught me eye from that came more questions. Then the questions became reformed and revised from the things I read. (English)
In the departments of political science and sociology, students indicate that both journal articles and books are used in the development of their research topics. In addition, they also identify their use of journals from fields outside of their own. In these departments students describe that the literature is used to integrate ideas through the identification of gaps, holes, or voids that provide the source of focus for their ideas.

As I was beginning to look around for a dissertation topic, I looked in the literature and a lot of people had used these data sets and had done a fairly quick and dirty kind of analysis. Nothing was very sophisticated. So it became apparent to me that there was a void in the literature. (Political Science)

My topic stems from my interest in the relationship between [subject area] and [subject area]. I was looking in the literature for a way to focus this. (Sociology)

In sum, three elements influencing research topic selection are found to be common to the four departments studied. These elements -- orginality, significance, and use of research literature, although described differently in the four departments studied, all contribute to the process of research topic identification and refinement. Students learn how to utilize the research literature in their fields, and how to recognize the need, criteria, and identity of topic originality and significance. (See Chart 6.) These learning experiences are all components of research topic identification and selection in the four departments studied.
<table>
<thead>
<tr>
<th>Chemistry</th>
<th>Political Science and Sociology</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>-new or novel extension along a research path</td>
<td>-new theoretical perspective or combination of theoretical perspectives</td>
<td>-new perspective or framework used to discuss literature or literary area</td>
</tr>
<tr>
<td><strong>Originality</strong></td>
<td>-method use on data set that had not been used previously with data set</td>
<td></td>
</tr>
<tr>
<td><strong>Significant Contribution to Knowledge</strong></td>
<td>-contributing to what is already known by the scientific field</td>
<td>-contributing by declaring that previous discussion in the area was not contributory</td>
</tr>
<tr>
<td></td>
<td>-contributing to a better understanding of the field</td>
<td>-contributing by addressing a question considered important by field scholars</td>
</tr>
<tr>
<td></td>
<td>-contributing to groups or organizations studied</td>
<td></td>
</tr>
<tr>
<td><strong>Literature</strong></td>
<td>-major field journals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-journals in specialized areas</td>
<td>-journals in specialized areas</td>
</tr>
<tr>
<td></td>
<td>-books</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-major journals in other fields</td>
<td></td>
</tr>
<tr>
<td><strong>Literature Use</strong></td>
<td>-integrate</td>
<td>-identify gaps, holes, and voids</td>
</tr>
<tr>
<td></td>
<td>-synthesize</td>
<td>-use gaps, holes, and voids to focus topic</td>
</tr>
<tr>
<td></td>
<td>-extend along research path</td>
<td></td>
</tr>
</tbody>
</table>

*the elements of originality, significant contribution to knowledge, and literature were described as influential in the research topic selection process by students in the four departments studied.*
Many additional elements contribute to the research topic selection process in the departments of chemistry, English, political science, and sociology. Among these additional elements are Internal Identification with a research area, experiences prior to doctoral education, timing of the topic identification requirement, data availability, the influence of both peers and advisors, and future career outlook. The variety of influential elements create a complexity in which they are manifested. The following sections highlight the influential elements in the research topic selection process in the four departments studied. In addition, an attempt is made to establish the relationship between these elements so that the research topic selection process may be perceived in its complexity.

Chemistry

In the department of chemistry, students are not required to identify an original research topic for their dissertation research. Their dissertation research is an accumulation of work done on one or more of their advisors' research projects. [See Advisor Selection (pages 150-161).] Instead, students in the department of chemistry are required to select original research topics for the oral examinations that follow their cumulative written examinations. The selection and development of these topics are limited to research proposals only. Students are not required to, and, in fact, they are not expected to actually complete the proposed research.
Because of the apparent structural difference for this requirement in the department of chemistry, the research topic selection process that occurs for the oral examination was investigated. This section explores the elements that influence the students' selection of research topics for their oral examinations. In addition, the purpose of this requirement is discussed as it relates to their dissertation research efforts.

Oral Examination

In the department of chemistry, students select original research topics for defense during their oral examinations. There are several elements that influence the selection of these research topics. These include the literature of the field, the topic's relationship to other research being conducted by the students, input from peers and advisors, and the potential success of their research ideas.

When attempting to select original research topics for their oral examinations, students in the chemistry department indicate that immersion in the literature of the field is an important aspect. Familiarity with current research trends, noted through journal publications, is an important aspect of topic selection. Becoming familiar with the literature of the field also includes the development of research skills. Chemistry students indicate that the task of selecting original research topics helps them to become more familiar and efficient in their library research skills. They develop knowledge of available resources and methods for their use.
You read article after article to get your dumb little idea that you can sell to professors. You learn where every journal is in the library. You learn how to use the chemical abstracts efficiently. You learn all the basic techniques of designing an idea; getting an idea, designing it, and then going about how you would actually sell an idea to a company.

When chemistry students begin their search for original research topics, they are aware of several "rules" that impact upon the topics selected. First, students are made aware of the fact that research topics selected for their oral examinations cannot be related to the students' actual research activities within the department. That is, the research topics selected cannot be related to their advisors' research projects.

I looked through journals until I found something that was interesting enough to write on that wasn't related to my Ph.D. thesis work.

What you're working on in lab cannot be connected to the oral topic.

A second "rule" students learn in relation to the research topic selection process concerns advisor input. Faculty advisors are not to be consulted in the selection of research topics or the development of proposed studies. (In one area of specialization within the department of chemistry, students do not take cumulative written examinations. Instead, they are required to write a more thorough research proposal for their oral examinations. In this area, faculty advisors must approve the topics selected. However, that is the full extent of their input.)
The oral is a key variable. They set up the system that way. For the first time you have to come up with your own idea. You're being tested on something you came up with. This is the first time you're proving to them you're capable of coming up with your own idea. You don't have someone telling you what to do.

Your advisor can have nothing to do with the oral. They're afraid it will be his idea and not yours.

The third "rule" students are aware of as they approach the literature in search of original research topics concerns the actual success or proof of the research ideas they develop. First, students are not required to conduct, via actual experimentation, the research ideas proposed for their oral examinations. Second, students are aware of the fact that their original research ideas do not have to "work" in actuality. Rather, students are required to show evidence regarding why they think their ideas should and could be successful if they were subjected to experimental proof.

The nice thing about these proposals is that they don't have to work, just as long as you can give a good argument. So it sounds like it might work.

You try to connect two ideas that are remote enough that no one has done it before. There was a lot of concern that it wouldn't form and I had to prove that it would form - by showing why I thought it had a chance.

You have to prove that some reaction should - will - work. You go to the library and you find analogies. You find similarities between other reactions. You make sure nobody has done it before. You find out what good it would be; what the possible uses are. All this
using the Information in the library, as though it were a real project. You never actually do it. You simply present all the details.

Because the research ideas proposed for the oral examinations are not subjected to proof through experimentation, students indicate that their emphasis in selecting research topics is originality rather than significance. This is not to say that topic significance is not considered in the topic selection decision as indicated in a previous discussion. Students must indicate why their research topics are important areas for study in relation to their field. However, the scope of its significance is not as important as its originality.

The idea doesn't have to be earth-shattering.

You're supposed to be smart enough to think of a brilliant idea. Obviously, no one ever thinks of a brilliant idea. You just think of an idea. As one of the people on my committee said, "You get a stupid little idea and you try to sell it to the professors the best way you know. You make a nice presentation. You try to make it sound good." It is a stupid idea, but they don't worry about that so much as long as you can answer questions about it.

In review, the process of research topic selection for students in the department of chemistry occurs as a result of the oral examination requirements rather than the dissertation requirements. Students approach this requirement with knowledge of several "rules" and "criteria" for the development of their topics. The three basic "rules" are:
1) The research topics selected for the oral examinations cannot be related to the students' research activities that are being conducted as a result of their work on their advisors' research projects.

2) Faculty advisors are not to be consulted in the selection of the research topics or the development of the proposed studies.

3) The research studies proposed for the oral examinations are not to be subjected to experimental proof.

In addition, two criteria are to be considered in the selection of the research topics.

1) The topics must be original. That is, students cannot reproduce previous research or use available research ideas.

2) The topics must be of some significance or importance to the field of study.

Finally, because the research ideas selected for the oral examinations are not to be subjected to the burden of experimental proof, the students indicate that the scope of their proposed studies' significance is not a crucial variable. That is, although they must consider and present their projects' practical significance, the breadth of their ideas may be limited. They approach the task of research topic selection with the
knowledge that it is the defense of their ideas that is crucial, rather
than the successful outcome of those ideas or the scope of their
significance.

Armed with knowledge of the "rules" and "criteria" used in the
research topic selection decision for students in the department of
chemistry, it is important to discuss two additional elements. First,
how are the students made aware of these "rules" and "criteria"? And,
how does this system for learning the necessary information influence the
topics selected? Second, how do students in the department of chemistry
utilize the research literature of their field in the development of
original research ideas?

In the department of chemistry students are not given any "official"
guidelines or documents that offer information regarding the "rules" and
"criteria" for the oral examination research topic selection. Students
indicate that their primary sources of information regarding both process
and content are "more experienced students." Doctoral candidates who had
already experienced their own oral examinations guide students through
research topic selection, development and defense. Part of this guidance
includes sharing information regarding graduate school and departmental
administration requirements.

The oral is a very relaxed thing. There are no rules, there are no notes, no anything that tells you this is
how you go about an oral. You have to ask other
students. There are a lot of funny rules; rules from
the Graduate School about the abstract, the time
requirements, what the oral idea is, what it can and
cannot contain.
More experienced student colleagues act as consultants regarding the research process.

A lot of learning what you had to do for orals was asking other people who had gone through it.

Once students identify potential research topics, more advanced doctoral candidates offer advice regarding the best topic to choose for the oral examinations.

I had three topics I thought I could go with. People who have done their orals decide which one's the best for you to go with.

In addition to offering administrative guidelines, process information, and advice regarding the students' choice of topics, doctoral students and candidates within the departmental area also offer "pre-orals." Pre-orals are practice sessions in which peers challenge the students' research ideas and their defense of those ideas. Students indicate that their pre-orals are vital experiences for refining their ideas and as preparation for their oral examinations.

One of the biggest assets of my entire proposal were fellow graduate students. When I say that fellow graduate students were important, without them I wouldn't have passed.

We had pre-orals - practicing in front of other graduate students. They would ask questions that they thought the faculty would ask based on what they had gone through.
Ph.D. candidates who have already done it give lots and lots of pre-orals. They ridicule you - where it's going to go wrong, where it's going to go right, where you'll have problems. That's the critical part about an oral. The students, by far, gave me a much harder time on my orals than the committee.

Thus, since faculty advisors are excluded as sources of information regarding research topic selection and development, peer colleagues become consultants for the chemistry students. Students who have successfully experienced their oral examinations offer guidance, advice, and support to those who follow behind. And, finally, students have several pre-oral examinations with their peer colleagues in an effort to more thoroughly refine and defend their research ideas.

One final element, related to the research topic selection process for oral examinations in the department of chemistry, remains for discussion. That is, how do students make use of the literature of their field in the development of their ideas? As discussed earlier, students in the department of chemistry indicate that familiarity with current field literature and extensive library research are two important aspects in their abilities to develop original research topics. However, the reasoning students exhibit for the selection of particular pieces of literature, and how they combine the ideas presented in the literature used offers insight into the topic selection process.

First, in their reading of journals and article abstracts, students are looking for something that "strikes" them as interesting.
No one ever tells you how you do it. It's not easy. I had to read incredible amounts of journals just to see if I could find something that looked bizarre enough or interesting enough so I could apply it.

As they approach the articles they find interesting, students are armed with a variety of questions. These questions lead them to extend the articles into unknown areas, i.e., into new research ideas.

Find an area you like, read up on it, and ask yourself some questions - What hasn't been done? What you think should be done? That's why giving the oral defense was such a good idea. It forced you to be that way, to come up with an idea that hasn't been published yet, work on your own, and then stand up in front of five professors and defend it and say why you think it is going to work.

Finally, students synthesize ideas from various articles in the development of their own research topics.

I read major chemistry journals and went through abstracts of articles until I found an article that looked interesting. That's the one I'd read. Then I picked pieces from various things that were interesting and put them together in one project.

An interesting aspect of the development of the research topics involves their evolutionary nature. As students are immersed in the literature of their field, their research topics are continually refined. Thus, the literature acts as the initial stimulus for their ideas and as a catalyst for refining those ideas.
I spent seven to nine weeks doing a literature search. I had a goal to this type of project, to learn this type of thing and it changed dramatically, over the fourteen or fifteen weeks I was working on it.

In sum, doctoral students in the department of chemistry are required to select original research topics for defense at their oral examinations. (See Chart 7.) In the process of their programs they learn, primarily from peer colleagues, certain "rules" and "criteria" for the selection of their research topics. The "rules" and "criteria" that are learned are:

1) The research topics selected must be original.
2) The research topics selected must have some significance or Importance to the field.
3) The significance of the selected research topics may be limited. The critical element is the students' abilities to defend their Ideas.
4) The research topics selected are not to be subjected to experimental proof.
5) The research topics selected cannot be related to the students' laboratory research or any other of their advisors' projects.
6) Faculty advisors are not to be consulted regarding the selection of the topics or their development.

In addition, peer colleagues act as consultants to students during their research topic selection experiences and offer students opportunities for "pre-oral" defense of their Ideas.
Chart 7
Elements Influencing Research Topic Selection
for the Oral Examinations for Doctoral Students
In the Department of Chemistry

<table>
<thead>
<tr>
<th>Rules</th>
<th>Skills</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Originality</td>
<td>Question Development</td>
<td>Field Literature</td>
</tr>
<tr>
<td>Field Significance</td>
<td>Integrate Literature</td>
<td>Familiarity with Literature</td>
</tr>
<tr>
<td>No Relation to Laboratory Research</td>
<td>Identify Personal Interest Areas</td>
<td>Peers/Pre-Orals</td>
</tr>
</tbody>
</table>

No Input from Advisors
Not Subjected to Experimental Proof

\(a\) - the established standards for the research topics selected, and the advisor role in the selection process.

\(b\) - abilities needed to accomplish the research topic selection task.

\(c\) - sources of information for both content and procedure used in the research topic selection process.
Students in the department of chemistry make extensive use of the literature of their field in the selection and development of their research ideas. They immerse themselves in the field journals looking for areas that stimulate their interests. When such areas are identified, they ask themselves questions that extend the published material. Finally, as a result of their exploration, they combine aspects of various materials in the development of their ideas.

Although students in the department of chemistry are not required to develop original research topics for their dissertations, there is some relationship between their experiences during their oral examinations and the laboratory research they conduct for their dissertations. The following section explores some of these relationships and how research ideas for their dissertations develop.

**Dissertation Research**

In the department of chemistry, students' work on one or more of their advisors' research projects becomes the substance of their dissertations. The choice of advisors is related to their research interest areas. [See Advisor Selection (pages 150-161).] However, although advisors define the original research projects for their students, the students become increasingly responsible for the development of those projects. [See Advisor Role (pages 174-187) and Student Growth and Development (pages 249-263).] As such, students must develop the ability to generate research ideas and new directions
for their advisors' projects. Their experiences in research topic selection during the oral examination phase of their programs contribute to their abilities as researchers on their advisors' projects.

Students indicate that the learning experiences for their oral examinations help them to achieve skills that are then applied to the research being done for their dissertations. One of these skills involves making use of the literature of the field. They learn how to integrate ideas presented in the literature to develop new ideas.

The oral exam is the first chance to apply integration skills.

Students discuss the purpose of their oral examinations and how, as a result of that experience, their approach to their dissertation research changes.

It [the oral examination] makes you get an idea and find support for your idea and how to back up your ideas, how to keep your bases covered.

Students find that, as a result of their experiences during their oral examinations, they are better able to develop ideas for their dissertation research and defend those ideas.

He [advisor] gave me the [dissertation] topic but he didn't tell me how to go about solving it. Once you figure out the approach, it mushrooms out and can be applied to other things. Having to do that oral really
sets you up good for that because it makes you ask questions that haven't been asked to get an idea and see what you can do to defend it.

After orals I had about three or four ideas of my own that we could examine. I guess preparing for the orals sort of got me in that frame of mind. Then I was able to critically read a paper and ask questions about it.

Finally, students also apply their oral examination learning experiences to the types of activities they will be involved in for their careers.

The oral is where you pick up the techniques and all the things you need to know about researching out a project. If somebody in industry said, "Here's $50,000. Think of something interesting to do that will make us money and get back in two months on what you'd like to do," you'd be able to think for yourself and accomplish something. Ph.D. candidates are supposed to be able to do that. That does happen in an interview. "If I give you $50,000, what would you do?" Most people give their oral idea.

The goal of research topic selection for the oral examination is to teach students how to generate and defend their research ideas. Once students develop this ability, they are expected to apply those skills to their dissertation research. In so doing, they gain greater "independence" from their advisors' supervision. However, they remain aware that their dissertation research project originates as a result of advisors' ideas. They are required to extend those ideas, and they are not permitted to conduct unrelated research based on their own ideas.
In no case that I know of did we come up with the original idea. In no case that I know of is the research being done because of us, because of our idea. It is my research because I generate ideas on my portion. But, it's our research because the direction was really set down by the advisor.

What happens many times, as students become third and fourth year students and you begin to develop the ability to come up with ideas on your own. Sometimes a problem arises between your advisor and yourself because you're still working on his ideas, but now for the first time you've got ideas. But you didn't get the research money. You didn't write the research grant. So, sometimes you're not interested in his ideas anymore. You've got your own ideas.

If my ideas relate to what I'm doing then of course, I can use them and that is what's supposed to happen. In other words, he would give me a molecule and I would come up with a way to make the molecule and then I would also come up with ways to study it on my own. So, his input isn't very strong at this point. I own the research and he owns me.

In sum, students in the department of chemistry transfer and are expected to transfer the abilities they develop as a result of their learning experiences during the oral examination phase of their programs to their dissertation research activities. They are better able, following their oral examinations, to generate research ideas, defend those ideas, and find support for their ideas. They assume greater "independence" in their research efforts, require less supervision, and relate their learning to future career tasks. However, they also maintain an awareness of their advisors' "ownership" of their dissertation research projects. As such, the research ideas they develop and work on remain within the confines of those projects. Their dissertations do not include their own original research ideas or research that is unrelated to their advisors' projects.
English, Political Science, and Sociology

In the departments of English, political science, and sociology students are required to identify and select research topics for use as their dissertation research. Students are not required to identify their dissertation research ideas until after their oral examinations. [See Program Structure (pages 125-149).] However, students may select ideas at any point in their programs. In contrast to the department of chemistry, the research topics that are proposed by students in these three departments are intended for completion.

In the departments of English, political science, and sociology, as in the department of chemistry, the research topics selected must be original, and they must have some significance or importance to the fields of study. In addition, as stated in a previous section, students utilize the research literature of their fields in the identification and selection of their research topics. However, the literature of the fields is used in a variety of ways and influences the topic selection process on the basis of its use. This is elaborated upon in a later discussion.

Several elements influencing research topic selection are identified as common to the departments of English, political science, and sociology. These include the influence of experiences prior to doctoral education, the influence of coursework, the importance of interest or liking of the topics selected, especially as this relates to personal identification with the topics, the rejection of interest areas or particular topics, and concern with the relationship between career
outlook and the dissertation topics students choose. These elements are not influential in the research topic selection process for students in the department of chemistry.

There are additional elements that influence the students' selection of research topics in the departments of English, political science, and sociology. However, the additional elements are not found to influence research topic selection in all three departments. In the departments of political science and sociology, students' use of the research literature of their fields and other fields is to integrate ideas through the identification of gaps or holes. Students in the department of English describe that their field's literature is used to identify new areas for discussion, and as substance for the presentation of new perspectives. Several additional literature-related elements emerge as criteria for consideration in the topic selection process for students in the departments of political science and sociology that do not emerge for consideration by students in the departments of English and chemistry. Additional distinctive elements include skill development during doctoral coursework as described by students in the departments of English and political science, and an experience of "sudden awareness" of their topics for students in the department of political science.

The distinctions between and among the departments of English, political science, and sociology, identified above, begin to highlight the complexity of their similarities and differences in the research topic selection process. This section describes the similar elements found in these three departments. In addition, this section delineates
the differences found in the students' research topic selection process between and among these departments. The description of influential elements found common to three or two departments, or found in a single department, will help to illuminate the complexity of criteria and experience that enter into research topic selection. In addition, this section also highlights how the fields of study influence research topic selection within their areas.

In the departments of English, political science, and sociology, the requirement for students to select original research topics occurs at the dissertation phase of their programs. In these three departments, research topic selection follows the students' General Examinations which occur after the third year of coursework. [See Program Structure (pages 125-149) for an elaboration of the phases of doctoral education.]

Students are expected to complete the proposed research. In addition to the "structural" similarities between these departments, there are five elements that influence research topic selection that are found to be common among students' experiences and descriptions in the three departments.

First, students in the departments of English, political science, and sociology indicate that their experiences prior to the pursuit of doctoral education influence their selection of research topics. Both undergraduate and graduate coursework, done prior to their doctoral coursework, tend to plant "seeds of interest" that carry through their programs. These "seeds of interest" are embellished during the students' doctoral coursework and bear upon their selection of dissertation research topics.
The interest in the area of literature came as a result of my association with a professor at [another university]. He became my thesis advisor. When I was looking for a thesis topic for my master's thesis, I was taking a couple of courses from him and he stressed [particular area of] literature. I took a lot of [particular area of] literature and [particular area of] literature courses. I became interested in [particular area of] fiction and poetry. (English)

I was always interested in [particular area of] history and government. I did my undergraduate work in history and then went to [professional] school for a year. I had always been interested in [subject area], but during my time in [professional] school my interest in teaching was kindled. So I left [professional] school and took up political science through a series of accidents. Through trial and error I found things like [subject area]. I was interested in different fields in [subject area] through some courses I enjoyed and books I enjoyed reading. (Political Science)

I didn't actually think about taking a minor in [subject area] until I did. Mainly I had ethical concerns that led me to be interested in it. I had taken a course early as an undergraduate which challenged a lot of the conventional thinking about [subject area]. I think those ideas sort of hung with me. When I started working on the Ph.D. after I finished my master's thesis, I thought it might be something good to get into again. It would be something very relevant to do. (Sociology)

Previous educational experiences also influence research topic selection as a result of the skills students develop during their training. In the departments of English and sociology, students indicate that their learning experiences as masters students, especially those who develop thesis topics, help them to develop the skills necessary for the selection and development of their dissertation research topics.
Choosing a topic, really playing around with topics I learned both here and as a masters student. I learned it in seminars, in developing ideas for writing those papers. (English)

I have a pretty good idea from just doing a masters thesis how to go about coming up with something like this, as far as just having a feel for it. So I never had any worries about coming up with something for a dissertation. (Sociology)

Finally, experiences that occur prior to doctoral education often spark an interest that re-surfaces during the students' doctoral programs. Although there is little consistency among these experiences, students in the departments of English, political science, and sociology often allude to prior experiences that relate to their chosen research topics. Examples of these experiences include associations with political factions, interest groups, a particular piece of literature, and personal interest areas that develop independent of their educational experiences.

At the same time I got involved with a political group. I think both things happening at the same time had an influence and I became interested in [particular area of] literature. The two things happened simultaneously. My advisor's (MA) approach had awakened me to things I had been thinking about, confirmed for me things I had been leaning towards in the politics. The [political] group made me aware of the politics. He was giving me the [area of] literature. Both of them spoke to two basic forces in [the] literature, an obsession, politics and poetry. In the poetry I was able to see things a little more evenly. Poets seem to be a little more honest.
When I was breaking off my association with the political thing there was a void in a sense. The void had to be filled up. I couldn't do anything less than [particular area of] literature. (English)

Even in elementary school I wondered why the way I understood a story was different from other kids and the teacher, and why I could predict what they were going to find. That's kind of what I'm studying. (English)

I've been a member of [Interest group] for eight years. I have a long standing commitment to [subject area]. That played a part in my choosing this topic. (Political Science)

When I was in the service I read a [particular] book that had a great deal of influence on me. It got me interested in reading and in [subject area]. (Political Science)

I assume it's when [subject area] started to come out in the media that I started looking at that. About the same time I began picking up a minor in [subject area] and that's when it all ran together. It became really obvious. And it merged with a lot of things I'd been interested in before. (Sociology)

In sum, in the departments of English, political science, and sociology, students' experiences prior to beginning their doctoral programs have an impact upon the research topics they select. These experiences, both educational and outside of education, serve to stimulate interest areas and commitments to particular subjects, and help students to develop skills that are used in the topic selection process. In addition, prior experiences also provide a connection between the students' past and present realities.
A second aspect of students' experiences in the departments of English, political science, and sociology, that influences the research topics they select for their dissertations, occurs during the first phase of their doctoral programs. Students in these three departments indicate that particular courses stimulate interest areas that eventually become a part of their dissertation research topics.

My interest in [subject area] began with a required course for graduate students the second quarter I was here. That class sort of opened my eyes, and I discovered that there are systematic ways to go about talking about literature. There are methods for argument and ways to agree. (English)

The end of my first year I took two seminars that really started me thinking about [subject area]. I learned about the [particular] program in another seminar. Then I did a literature review on [subject area]. I synthesized a lot of ideas in a paper for one of those seminars. I went over that paper with the professor and she encouraged me to pursue it further. (Political Science)

A lot of it was exposure to things to read; ideas presented in courses. The coursework seemed to have a major influence on what I came up with. (Sociology)

In addition to experiences prior to entering their doctoral programs and experiences during the coursework phase of their programs, students in the departments of English, political science, and sociology identify an element that influences topic selection that is related to the specific research topics they choose. An important criterion they
establish for the topics selected is that the topics must stimulate personal interest or liking. This is also a criterion for topic selection that is communicated from advisors and other faculty members.

It was something that was interesting to me. If you're going to live with something for a year or so, it shouldn't be something you dislike. (English)

I wanted to do something in [subject area] because that is my advisor's major field and my major field and the most interesting subject for me, the thing I've taken the most classes in. (English)

Almost anything that I would do in the area of [particular author] would be interesting to me. Even if I did something mechanical like compiling some big bibliography that might be useful to other scholars, even that would be interesting to me. (English)

Start looking early. Think about topics that you think would be interesting to yourself because if you don't think it's interesting, you'll never get it done. (Political Science)

I became interested in the [particular program]. I became aware of the program through coursework. It was an area I wanted to know more about. (Political Science)

You have to pick an area of interest. Start reading the literature and try to put holes in it. What seems important that hasn't been asked? Find the hole you want to fill, the hole that interests you most. (Political Science)

As I was going along in the program it became evident to me that there are some things I'm interested in. What can I do with them once I get out of here? That's when I started to get interested more specifically in this area. (Sociology)
The best advice I could give for finding a topic is to keep an eye on the journals. Don't read them necessarily, but keep an eye on what kinds of things are being published in them. That will give you an idea, by proxy, what people in your department think is important. Figure out areas you're interested in as soon as possible. Pick a committee as soon as possible and work out a reading list for your dissertation.

(Sociology)

I was reading a lot about [particular area of] theory and [particular area of] theory. The ideas were there and I encountered them. I found both sets of ideas interesting and I saw that there was some similarity between the two sets of ideas. I have a tendency to want to bring ideas together theoretically instead of just developing a lot of fragmented sets of ideas.

(Sociology)

In relation to the criterion of personal interest or liking, students in the departments of English, political science, and sociology also indicate that the dissertation topics they select stimulate an identification between the topics and themselves. The topics selected "touch" some personal element that triggers an internal identification. Although they do not indicate that this personal identification is a criterion they establish for their topics prior to their selection, in retrospect they recognize that the topics they choose hold this quality.

The [particular nationality of] people that I met and the poets and writers that I read all seem to have a strange affirmation of life - all the time recognizing that there are things that are just not possible. The hope, the affirmation, that I admire a great deal. There's an idealism in the literature. It's a hope and a vision and a certainty mixed with that hope, a romantic quality. That's why I was attracted to that literature. (English)
When I thought of this topic it was immediate excitement, intrinsic commitment. (Political Science)

The topic really grew out of my relationship with the literature and my personal interests. I feel committed to the area. (Sociology)

A fourth element, found to be common in research topic selection for students in the departments of English, political science, and sociology, involves the rejection of particular topics or topic areas. Students in these three departments indicate that, prior to choosing their present research topics, they had developed "potential" topics or explored "potential" research areas before grasping their chosen research topics. Their rationales for rejection are varied. They include scholarly identity, personal preference, the availability of faculty mentors, topic complexity, marketability, the length of time necessary for completion, and the quality of available data. However, it is important to note that students in these three departments do experience "false starts" in the dissertation topic selection process.

I didn't choose [particular area of] literature because I did not have a model in the field, an advisor or a guide in the field in this department. We're not particularly strong in [particular area of] literature. That has a lot to do with why I'm not in the area. (English)

If I did my dissertation on [author] I would have to forego my interest in [particular area of] literature unless I got a really general job somewhere where I could do a little bit of [author] here, a little bit of [particular area of] literature there. (English)
When I came to [this university] I came for [subject area]. It's easier to get a job in that area. It became a minor area but I didn't feel anything. It's the head, not the heart. The heart is literature. (English)

The fact that I had a topic so early provided guidance for my whole program. Also, I took [subject area] fall of my first year. I knew I didn't want to do that work. So I was able to rule out certain areas early in my program. (Political Science)

There just wasn't a lot of good data there and I thought, to get the kind of data that would be really good, it would take a lot of time, going down there, going to committee meetings. I just didn't want to spend the time on it. (Political Science)

I initially went in with the idea to do a comparison between the [subject area] and [subject area]. Two committee members thought it was too big. My advisor thought I could do it. They said, "We want to get you out of here. You don't want to spend ten years doing a dissertation." After I did some initial work, I decided they were right. I cut it back to just [subject area]. (Political Science)

[Subject area] is a very low demand area. That had a lot to do with my not continuing in that area. You're not likely to get a job with that being your main thing, if you don't have something else major to offer. (Sociology)

There was another topic, sort of a false start. I could see it would be such a complicated process that I didn't want to tackle it for a dissertation. (Sociology)

I developed an initial idea for a dissertation while taking [a particular] class. I abandoned the original idea because I started to have some methodological problems. If I was going to [use a particular method], it was going to take me multiple years and I started wondering about that. (Sociology)
The fifth and final element influencing the selection of research topics, found to be common for students in these three departments, involves their consideration of the relationship between the dissertation topics they choose and their future professional careers. Students' consideration of the job market influences the research topics they select in several ways. They may reject interest areas or hesitate continuing in particular areas because of poor employment outlooks within those areas of specialization.

Fear of this not yielding a job hindered my recognition and embracing of the area for awhile. (English)

My advisor thought it would be a good idea to re-interview these people [previous class project] to see how their objectives had changed. He told me a couple of times he thought that might be an interesting dissertation topic because it was something I'd already done and I could just spin off more. But I didn't think the topic was as interesting or as doable as the other one. It also would have narrowed the job market for me. (Political Science)

I was always interested in social phenomena. My undergraduate minor was sociology. I was originally interested in [subject area] when I came here but it's a bad job market. (Sociology)

Students also indicate that part of their consideration in choosing research topics involves becoming known as scholars of particular areas. The subject areas of their dissertations identify them as area specialists. They enter the job market with these identities.
I made the decision when [a faculty member] was tempting me to do my dissertation on [a particular author]. He told me that if I wanted to get it done quickly, I could do it with him. I mentioned that to a friend of mind on the faculty and he told me I couldn't do that because I would be known as that particular type of person - a [particular author] person. If I'm going to be known as a man of some sort, I guess it would have to be [another author] man. (English)

It would almost certainly have been a [subject area] or [subject area] dissertation. Because when you go out on the job market you'll be packaged in terms of what your dissertation is. (Political Science)

If I don't like academia, what's the alternative? The alternative is to get a job in either industry or government in either of which I'd be working in organizations. Therefore, it would do me well to study something that is of use to organizations, that everyone knows is important. And there it was. Everybody knows [subject area] is important. (Sociology)

Additional employment related concerns students reveal as part of their research topic selection include: the potential for publication, the versatility the topics will offer in different employment areas, the visibility of doing topics in particular areas, and their areas' ability to generate information for research beyond their dissertations.

What I want to do is dangerous to me. Another interpretation of [particular author]. Everyone has their point of view so this is his point of view. What I want to do is a solution to the whole problem, not just biting off a small chunk, but trying to get to the structure underneath that is operating. (English)
Another reason, a very practical one, that [area of] literature has just been run over and over. I'd just be lost in the crowd. (English)

The interest in [particular area of] literature is very strong and I think that's important to me. A lot of colleges are producing [area] studies programs. (English)

I chose the topic because of my interest in the area. The topic will also get me a job. This area is the hot area. It's the in thing to say you're an [area] person. It's the kind of interests people will be looking for. (Political Science)

I would like to teach but I know that teaching opportunities are not very great in political science. So, I wanted a dissertation that could be applied to the academic, government, and business worlds. (Political Science)

All of a sudden the journals were just full of this subject. They were devoting whole journals to it. Books were coming out where you'd never seen books before. All these other people were publishing articles on [subject area]. Why couldn't I? If I did something that was a unique contribution, an extended thing, that was really important. At the time I was thinking about a topic, I was thinking about the academic job market. I thought that if I did it, a book would come out of it. (Political Science)

I would tell people to think about what it is they're interested in. Think of which of those areas is more likely to get you a job. Which of those areas may be more relevant to the discipline itself. Try to come up with something that is not just going to give you a dissertation, data that will get you through to tenure stage. Get something that someone around here can work with you on. Something that's on the leading edge of things. (Sociology)
Once I met [faculty member], I saw that this would be an area that was relevant to do. There are employment opportunities. (Sociology)

It's popular in literature but it's not just that it's trendy. I thought it was an important topic and it's not likely to ever become less important. Also, it fits into the kind of work I want to do. (Sociology)

In sum, five common elements, other than structural, emerge as influential in the dissertation topic selection process for students in the departments of English, political science, and sociology. These elements may be viewed as factors along a continuum of time that frame the research topic selection experience. (See Chart 8.) The first two elements—experiences prior to the pursuit of doctoral education and experiences during the coursework phase of the students' programs—both occur prior to topic selection. These elements, which include previous education, association with groups outside of education, the stimulation of interest areas, and opportunities for skill development, serve as preparation for the topics selected. Although the preparation is not necessarily conscious, experiences prior to the topic selection phase of the students' doctoral programs influence the dissertation topics they choose.

A third element, interest or liking of their topics, occurs at the time the topics are selected. Students indicate a need for vested interest in their research subjects. They express the development of personal identity with their topics, and commitment to their topics. Fourth, students' concern with the relationship between the dissertation
Chart 8
Elements Considered in Dissertation Topic Selection and Rejection by Doctoral Students in the Departments of English, Political Science, and Sociology

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<th>PASTa</th>
<th>PRESENTb</th>
<th>FUTUREc</th>
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<td>Interest Areas</td>
<td>Interest Areas</td>
<td>Marketability</td>
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<td>Skill Development Opportunities</td>
<td>Doctoral Coursework</td>
<td>Publication</td>
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<tr>
<td>Coursework-undergraduate and graduate</td>
<td>Skill Developmentd</td>
<td>Scholarly Identity</td>
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<td>Literature</td>
<td>Identity with Topic</td>
<td>Versatility</td>
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<td>Interest Groups</td>
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<td>Visibility</td>
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<td>Available Faculty</td>
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<td>Topic Complexity</td>
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<td>Holes in Literaturee</td>
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a - elements described that related to experiences that occurred prior to entering the doctoral programs.
b - elements described that related to experiences during the course of the doctoral programs and the established criteria for the selection of dissertation topics.
c - elements described that related to the students' dissertation topic and their career goals.
d - described by students in the departments of English and political science only.
e - described by students in the departments of political science and sociology only.
topics they select and their career outlooks symbolize the future's influence upon the present task. Employment-related aspects such as: available market areas, identity as area specialists, publication, versatility, and visibility are considerations in research topic selection.

Finally, the rejection of particular topics or topic areas occurs during both the coursework phase and the topic selection phase of the students' programs. Rationales for rejecting certain research areas are varied. However, the rationales students identify include aspects of past, present and future. Students' previous experiences during coursework may help them to rule out certain research areas on the basis of interest or the availability of faculty members with whom they might pursue the areas. Students may rule out particular areas using present criteria such as topic complexity, quality of available data, or the length of time necessary for completion. And, criteria students use to reject topics that relate to future aspects include scholarly identity and marketability.

Thus, past, present and future elements influence the selection of dissertation topics in the departments of English, political science, and sociology. These elements emerge with the topic selection task and influence the products. Their nature—past, present and future—provides a frame of time prevailing upon the experience.
Additional Influential Elements

As mentioned earlier, several elements influencing research topic selection are found as factors in one or two of the departments studied. Many of these elements relate to the differences found between departments in the students' use of the literature for the selection of their research topics. Additional influential elements include the influence of coursework, and the combination of circumstances and experiences leading to topic recognition. This section describes these elements as they relate to the selection of dissertation topics in the various departments.

In the four departments studied, students utilize the research literature of their fields in the selection and development of their research topics. However, some distinct differences exist regarding how students use their fields' literature. As described earlier, students in the department of chemistry synthesize and integrate the articles they read to develop ideas that extend into unknown areas. In essence, they look into their interest areas asking the question - "What has not been done with this material?"

In the departments of political science and sociology, students emphasize the notion of looking for "gaps," "holes," or "voids" in the research literature of their fields. Once they identify areas that are missing in the literature, they are used as sources of focus for their dissertation topics.
I had a general interest in [subject area], but the data was there. There hadn't been a whole lot done and suddenly a great deal was being done and I think it was easier to see where the voids were in the literature. You could just look and see people had done certain things with the variables and not much else. The data was so recent and the studies that had been done were of the type where someone had gotten the data and done just basic frequencies, some easy cross tabs, very simple analysis. I could see there was a clear need to do more than what was there. (Political Science)

One of the sub-fields that I had on generals was [subject area], plus it's been one of the areas that I've always been interested in. I have a general interest in [subject area A] and a general interest in [subject area B] as well. They sort of merged together. (Political Science)

Here I am interested in [subject area] and I'm a social psychologist. Therefore, I'm interested in social psychological elements related to [subject area]. I go in and find out there have been tons and tons of personality studies done, tons and tons of therapeutic studies done, and there's this little gap in here. What about the [subject area]? (Sociology)

I'm trying to tie some of the areas of [subject area A] theory together with some of the ideas from [subject area B] theory. Sort of trying to borrow ideas from [subject area B] theory to formalize some parts of [subject area A] theory. (Sociology)

Students in the departments of political science and sociology also make use of the literature of their fields in determining the "popularity" of their subject areas. An area is considered "popular" if there is a considerable amount of publication in the field journals. This consideration relates to their determining the significance and importance of their research topics, as well as the availability of the
necessary data. In addition, the "popularity" of their research areas helps to determine the "timeliness" of their subjects. This element connects the selection of their topics to their pending marketability.

After years of nothing, suddenly there were new measures of what people know about [subject area]. There were never any variables available like that before. The good thing was there are no literature that are contradicting me to a great extent. There's literature using the variables but not using them the way I was using them. As I started the paper I thought it would be nice and easy to do because there wasn't anything out there to say it would be different from me. (Political Science)

In the summer I took a course in [subject area] sociology. It explored the relationship between my two areas of interest. They used [subject area] as the example. I also attended a conference that focused in on [subject area]. That really spurred my interests. Then I went into the literature. The data shaped the way I'd go about doing things. My subject area is a hot issue in the area of the sociology of [subject area] and [subject area]. (Sociology)

In addition to finding gaps in the literature and determining the popularity of their research areas, students in the departments of political science and sociology consider data availability as part of the dissertation topic selection process. The obvious presence of data can spur interest in particular topics or curtail the scope of the students' research areas.
I'd been thinking about doing something on [subject area] anyway because that's what I was interested in. These data sets were there after years of no data, two data sets with just an enormous amount of data, hundreds of variables that had never been tested before. There were a lot of opportunities to do something with it. Nothing could compare with this because all the data was there. I didn't have to do anything. Not just that all the data was there, there was data that I knew hadn't been mined very well. There were still things to be done with it. That was part of it, too. (Political Science)

After six weeks [a political group] finally responded. They wouldn't give me access to the data I needed. It was a real let-down. Then I got more pressure from my advisor to come up with a new topic. This new topic is not as refined as the first one. I'm searching to see if I can get the data. It may have to be narrowed down. (Political Science)

My advisor would like it to be a comparative study. So would I. There's just no other organization of the same type to compare it to. (Sociology)

I want to do it cross-nationally using as many different countries as I can get data for. (Sociology)

Students in the department of English, in contrast to the students in political science and sociology, indicate that a particular piece of literature stimulates their interest in their research topics. Like students in the department of chemistry, English students describe being "struck" by a piece of literature that they find interesting.

I read the poem and it struck me as an interesting piece that I wanted to know more about. Historically, a lot of people were reading it and I wanted to know why. (English)
Then I started researching people who I hadn't really read, all of those who there had been a number of anthologies on. I came across a book called [specific title]. I think it's one of those skeletal keys that every scholar has when he starts off. It opens the door to a lot of other things. It's bibliography. It's notes. It was very valuable. I think what happens is if you do people who are well-known, you really have to find a needle in a haystack. You really have to find specific aspects of them or of certain issues. I liked the book because that's what I wanted to do. I wanted the scope. (English)

In addition to being "struck" by a piece of literature, students in the department of English indicate that, as they approach the selection of their topics, they develop goals for its outcome. They approach research topic selection with the knowledge that they want to address certain issues, and, therefore, they want to include certain subjects.

It was an area that built up gradually. At [another university] I took a survey course in [particular area of] literature and I wrote my paper on [particular author]. Even then I suppose I had an inkling. I'm interested in all [particular area of] literature, theories of [particular area of] literature, that sort of thing. And [particular author] is so central to the whole thing. (English)

I'm interested in how to get literature out of its current pathetic state. By investigating [subject area], I hope to help answer questions bothering me now about contemporary literature. (English)

Students in the department of English do not describe their use of the research literature of their field as searching for "gaps," "voids," or "holes" as do students in the departments of political science and
sociology. However, they do indicate that their topics have to be different than anything done previously. The distinction here is the novelty of the issues they utilize in addressing their subjects, rather than searching the literature to combine areas that will fill gaps or holes in the existing literature.

The first criticism I found I did not like at all. So the thing that gave me the original impetus to do this topic was, "What's been said is rotten, so there's plenty of room for me to say good things." And, apparently, there was not a lot also. So it looked to me that it was a field that had not had a lot of attention and what attention it had was not particularly worthwhile. That had quite a bit to do with deciding to write my dissertation. (English)

I've selected a particular author I want to do my dissertation on. I have written several seminar papers on this one novel. I have plenty of ideas. Some of them seem to me to be original. On the other hand, they may not be because I haven't really focused closely enough on secondary sources to tell whether or not I have anything new to say about the author. (English)

In sum, differences exist in the manner in which students in the departments of chemistry, English, political science, and sociology make use of the research literature of their fields in the topic selection process. In the department of chemistry, students indicate that the major journals of the field and the journals in their areas of specialization are used to integrate and synthesize ideas in the development of research topics that extend along a research path. Students in the departments of political science and sociology describe
using books and journals within their fields, and major journals outside of their fields to identify gaps, holes, or voids in the literature. These gaps are used as the substance of focus for their research ideas. In addition, students in the departments of political science and sociology express consideration of the "popularity" of their research ideas, and the availability of data as factors influencing their choice of dissertation topics. In contrast to the use of literature described by students in the departments of chemistry, political science and sociology, students in the department of English indicate that their primary sources, i.e., the actual literature, and their secondary sources, i.e., criticism of the literature, are most often found in books. Students in this department indicate that the literature of the field is used to stimulate questions that can be addressed in their research, to identify areas that have not been addressed previously, and as the substance for the presentation of opposing perspectives.

Two additional elements relating to the selection of research topics remain for discussion. First, students in the departments of English and political science indicate that requirements for their coursework, during the first phase of their programs, expose them to tasks that necessitate the development of skills that are later used in the selection of their research topics. Students in these two departments specify that coursework tasks help them to develop writing abilities and expose them to literature in ways that influence the development of their own analytical and critical skills. Students in the department of chemistry
and sociology do not draw a relationship between their doctoral coursework and skill development, although sociology students do relate previous educational experience and skill development.

What we do in writing is what people in science do by experiments. We test an hypothesis in sentences where they test in test tubes. That's how we know if it's good. Sometimes it's not, so we try another sentence. For me it comes down to sentences. How I want the vision sharpened. That's why the courses do stress the papers. It is necessary torment. (English)

I had a very vague concept of what constituted a useful piece of writing about a book. I certainly would not have known how to judge a bunch of papers on a book. What did he say about the book? Why write about it? Why bother? Then I started reading people writing about what are the bases for criticism. What is it based on? What should it be based on? What are valid and useful things to ask? I just read people arguing about these things, which is what I did in that class. We read these critical arguments carried out in the journals. That's one thing we did and that was an eye-opener. (English)

The classes I've had have given me a really good idea of the literature. It's nauseating detail when it comes to the study of the literature. It really helped that I could see a really clear gap in the literature and I really thought that if I could get something there it would be possible to get it published. (Political Science)

The political science department at [this university] is really good at teaching you how to tear things apart. Find the holes, find out what's wrong. Unfortunately, they're not very good at telling you how to do original research. (Political Science)
Finally, students in the department of political science describe an experience in which they become "suddenly aware" of their research topics. Although, prior to this experience, to some extent they are thinking about the need to select their topics, and they are considering their interest areas and the literature within those areas, they indicate that their topics "hit" them with sudden awareness, identity and intrinsic commitment. Students in the other three departments do not describe an experience of this kind.

There was a lot of encouragement to build your own program. You don't get much pressure early on to develop a topic. I just molded things as I went along. Common sense let me know I'd be better served if I had a topic in mind early on and it just came to me. (Political Science)

It was serendipity. A couple of drinks and this idea popped into my head. Bang! It was just there. I'm sure I was thinking about it but not to any great degree. (Political Science)

The topic found me as much as I found the topic. I was taking the class and I needed a paper topic but I also needed a dissertation topic. At the same time this data was coming out. A lot of stuff was being published. I could see that no one was doing the kinds of things that I thought could be done with the data. There were a lot of things converging together at the same time. I could see the other project wouldn't be really interesting to me as a dissertation. All these things coming together led me to do the paper and really as quickly as I could try to do more with it than just the paper. But, if there had not been the data available or if I was just coming along now, a lot more has been published in the literature, I'm not sure that I would even pick the same topic. (Political Science)
In summary, elements influencing the selection of research topics for students in the departments of chemistry, English, political science, and sociology emerge as a result of both experience and circumstance. In all four departments, the topics must be original, and they must hold some significance or importance for the fields of study. In addition, research literature is used by students in the four departments to stimulate and refine their topics. However, differences do exist between departments as to how students make use of the literature.

In the department of chemistry, students must select original research topics for defense at their oral examinations. They learn certain "rules" regarding the selection of their topics, and certain "criteria" for the topics selected from other students who have been through the process and act as consultants to the students. The research topics selected by chemistry students are not to be subjected to experimental proof, i.e., students are not required to complete the proposed research. As such, students indicate that the scope of significance of their research ideas is not as critical as their ability to defend those ideas before their examining committees. The research topics selected by chemistry students must be unrelated to the laboratory research they are conducting for their dissertations, and their advisors are not to be consulted in the selection process.

Although students in the department of chemistry do not select original research topics for their dissertations, they do draw a relationship between their experiences for their oral examinations and their dissertation research. They find that their abilities to generate
research directions, and defend their rationales for those directions, are increased following their oral examinations. As a result of this learning, students assume greater independence in their laboratory research and require less supervision.

Five common elements relating to research topic selection are described by students in the departments of English, political science, and sociology. Students in these departments indicate that their original research topics are to be selected for their dissertations. The research topics they propose are studies that are to be completed as their dissertation research. The elements they describe as influencing their choice of topics include:

1) **Experiences prior to the beginning of doctoral education.** This includes the development of "seeds of interest," previous education, and former associations with political factions, interest groups, a particular book, and personal interest areas.

2) **Experiences during the coursework phase of the their doctoral programs.** This includes the stimulation of interest areas as a result of particular classes.

3) **The Importance of interest or liking their topics, especially as this relates to the development of personal identification and commitment to their research topics.**
4) Their rejection of "potential" research areas and "potential" research topics. The rationales used for rejecting topics and topic areas include marketability, the availability of mentors, scholarly identity, topic complexity, the quality of available data, and the time necessary for completing the research.

5) The relationship between the research topics selected and the students' employment outlook. This includes wanting to be known as scholars of particular areas, position availability, flexibility, visibility, and the longevity of their research areas.

The five elements influencing dissertation topic selection described by students in the departments of English, political science, and sociology, may be viewed along a time continuum that frames the topic selection experience. Elements relating to the students' past, present and future combine and influence their selection of research topics.

Several additional elements influencing research topic selection are described by students. In the departments of political science and sociology, students indicate that their ability to identify "gaps" or "holes" in the research literature of their fields is an important aspect of topic selection. Students also indicate that they consider their subjects areas' popularity in the literature as part of their selection process. For students in the department of English, a particular piece of literature stimulates their interests in a dissertation topic. Their
use of literature does not indicate the discovery of "gaps." Instead, they approach topic selection with concern for particular issues and goals they establish for its outcome.

Students in the departments of English and political science indicate that class requirements, during the first phase of their programs, encourage the development of writing and analytical skills that they later use during research topic selection. Finally, students in the department of political science describe an experience in which they become "suddenly aware" of their research topics. They indicate that, at a particular moment, they recognize and embrace their topics.

It is obvious from the experiences and circumstances described by students in the departments of chemistry, English, political science, and sociology, that research topic selection is a complex process involving the combination of a wide variety of influential elements. The elements described involve the nature of the fields, the influence of the departments, the influence of faculty and other students, the abilities of the students, previous experience, and future goals and expectations. Each of these areas provide factors for consideration during the research topic selection process. The research topic selection process is complex because of the wide range of elements involved and their interrelatedness.
Student Growth and Development

As a result of their experiences during doctoral education, students in the departments of chemistry, English, political science, and sociology undergo both a personal and professional shift. This shift may be classified as personal and professional growth and development. That is, the changes that occur are critical to the successful completion of doctoral education. Without them it is unlikely that doctoral students would be capable of completing the required tasks, especially during the advanced stages of their programs. In fact, the structure of doctoral education tends to establish the various stages of professional and personal growth. Topic selection is one stage in the structure that requires and stimulates a particular level of professional and personal development.

The professional change that occurs includes a visible increase in skill level and discipline knowledge. Coupled with this professional change is a personal development that includes increased confidence in abilities and the development of commitment/identification with a chosen field. These developmental experiences are influenced by the requirements placed upon students as they attempt to successfully complete the stages of their programs. As such, the requirements and expectations that are communicated serve to socialize students as members of their chosen fields.
Professional Development

The first step towards professional development for students in all four departments studied involves learning the content of the discipline itself. Students must first master a substantive knowledge of their chosen fields. This learning forms the foundation for further developmental growth and occurs, primarily, during the coursework phase of doctoral education. Students sometimes highlight that this knowledge acquisition is a basic requirement necessary for the topic selection task, as they compare their graduate learning experiences to their undergraduate learning experiences.

The coursework gave me the tools I need to do chemistry. They gave me a basic understanding of chemistry itself—basic tools for understanding and looking at chemistry. (Chemistry)

The process of becoming a critic in literature is a process of learning which questions are the most fruitful, most applicable. That's a huge gestalt thing that you either pick up or you don't. It's the major skill in the field and it's the same skill you need to be a good teacher in order to ask the right questions in class. It's very definitely something I learned as a result of my graduate courses. A lot of reading; a lot of writing about that reading; a lot of reading fellow critics like models and class discussion. (English)

There's no point in thinking you know everything there is to know about a subject area. Unless you came from a super undergraduate department, you probably don't. Most departments don't teach undergraduates enough depth to really give them the knowledge to develop a topic. (Political Science)
When I entered I was still trying to figure out what sociology should be doing, although I didn't recognize that as something I was doing. I don't think I had any notion at the time that I should be trying to integrate various perspectives towards some common whole that would be more relevant to the discipline. I learned that through classes and seminars. You learn all these theories and they have to be put together some way. (Sociology)

In addition to learning the substantive areas of their chosen fields, students must also learn to understand and use research skills. Knowledge of both field content and method are vital to their professional growth.

You learn about a reaction in class. But, when you have to do research, you find out that there's a step you have to make from reading about a reaction, and actually doing a reaction. There's sort of a transition. You start reading journals; reading books. (Chemistry)

The first quarter I was here in one of my classes, we did this treasure hunt thing. "Here are the resources we're talking about this week. Go find these facts." It was like a treasure hunt. Learning some basic tools like the MLA bibliography. That was just the beginning of learning to do research. You actually have to do research for every paper you write. As time goes on you get more and more skilled. (English)

I don't think an undergraduate coming in would be well prepared enough early on to frame the idea, collect the data, know the variables, know what the literature is like. I'm not sure they could do it. There's so much you have to learn about doing research. (Political Science)
What happens is you start acting like a sociologist without even thinking about it. It is partly knowing the language, the implicit familiarity with certain sociology theories, the research. Also, some understanding of the more organizational aspects of the field. Who is in control? You learn methods. You learn how to understand research. You learn what techniques are thought of most highly. (Sociology)

In addition to knowledge acquisition, a variety of skills are learned as part of the professional development process. Skills such as the ability to integrate material, and the ability to critically analyze literature are important aspects of the doctoral students' development. These skills begin to be learned during coursework, are vital to the successful completion of the General Examination, and continue to be applied through both topic selection and the dissertation completion phases of doctoral education. (In the department of chemistry, the structure of the academic program is different from the other three departments. See Program Structure, pages 97-149. However, the skills that must be learned are the same for students in all four departments.)

You develop an ability to be critical about what you read and you also develop a commitment— intrinsically; you now see the value of what you're doing. Before I met my advisor I thought everything that was published was gold. He'd be very critical about it. And, I'd turn around and say, "Yeah. That's a good point." That's what I had to learn to do. (Chemistry)

Coursework was hard. By the end of the first year, you should be able to integrate material. Doing research reinforces integration. The oral exam is the first place to apply those skills. (Chemistry)
You get on the treadmill. You turn the crank. You get the seminar papers out. You get your grades. You read. If you're a TA, you teach your class. You grade your papers. And, you go out at the end of finals week and celebrate. You don't think much about generals until the courses are over. You couldn't look back or ahead. You just had to get what you needed to do done. Then, after coursework, you start thinking about generals, about putting this information you cranked out and your own intuitions and understandings about the literature together. (English)

For quite a while the problem was that I was responding to other critics too much. I'm trying to correct them rather than simply saying what needs to be said about the relevant material. Structuring an argument around something intrinsic to the subject rather than structuring it as a response to the things other people have said. (English)

A lot of the socialization occurs through the nature of seminars. When you get into a seminar situation, the professor throws something out on the table and everyone has to discuss it. You can't just say, "I like this article. It told me that the president does this." You have to delve into some of the methods used. You have to integrate this with the other things you've read. What about this article you read that said the exact opposite? How do you reconcile the two? And you can't just get away with a superficial reading to get a few facts down to throw into an essay or a multiple choice question. Here you have to be challenged to think and in some cases it is intimidating. The professor sits down on your level and asks you a question. You have to be prepared. You can't think, "Here's this guy who's published a hundred articles. He must be right. What can I say as a graduate student that would criticize him?" And, we're taught right away to be analytical, critical. Those words are thrown out the first day of class. "This is not a class in which you are going to memorize what the president does. You are going to analyze. You are going to criticize the evaluation of others of the way the president works. It is not now that you criticize the president anymore. Now you criticize the people writing about the president." So we shift focus from the institution to the researchers and how they
have done their job. I think a lot of it just comes out of seminars and the fact that people tell you the first day you're going to have a lot of reading and that reading has to be done critically. You're not given a textbook anymore. (Political Science)

You're taught to look for weaknesses in research. Where the research is slim, loopholes; what has and hasn't been done. (Sociology)

... If you're going to successfully get through graduate school and do something with all that once you get out, you have to get socialized into that profession. You learn what it is to be a sociologist by being around people who are doing that sort of work. You learn to be critical. You learn to integrate different theories, put together different ideas. (Sociology)

As part of the development of both integrative and analytical skills, students learn to approach their disciplines as researchers. This involves developing the abilities to both recognize the important questions within their fields and learning to formulate those questions for themselves. They must learn to approach field content and method as their chosen disciplines define them. This also involves a perspective on their specific disciplines that includes knowledge of details as well as a broader, more integrated view.

Have you come to a point where you can think and apply what it is you have learned from all these courses to solve a problem? Do you have a basic overview of the field as a whole? Can you apply it under pressure? I got confidence from getting to be right more and more often. As time went on, I began to understand how chemistry all tied together. I could look at it differently than the way I could look at it before. It wasn't just fragmented pieces. They were all bonded
together in some way. Just by being more and more familiar with it and getting things right more and more often. Like, everytime I'd pass a curve, I'd get a little more confident. (Chemistry)

You learn to poke your nose in certain directions which you have a feeling are going to be rewarding. The feeling is something you develop but I can't get a clear picture how it's developed. . . . You discover things. At the same time you have a fair idea of where you're going. The best analogy I can think of is to a scientist. It begins by observing: "This is a very interesting event on the atomic level or the molecular level. I have some idea of how to produce that event." So he starts about trying to produce it. That's like asking questions. "What happens if I push this atom into this atom?" He doesn't know exactly what is going to happen or how it's happening. He's pleasantly surprised to discover something along the way. But if he didn't have some idea, some framework, some idea that this was going to be a rewarding experiment, how would he know which experiment to try? Which atom to push into which atom? (English)

It's something you develop through experience. You look through things like the methods. Then you see if everything is developed properly. What did he say versus what you know is the conventional wisdom? Why did he say that? Why has this person been published? There's no map to follow to tell you how to critically evaluate things. You have to develop your own style. I think some of it is just confidence. You just have to say, "He's not necessarily right just because he's published a lot." He looks at it one way and I look at it a little differently. (Political Science)

The ways in which I ask questions are different now. They reflect the specific interests of the discipline. Every discipline has specific interests and questions are asked in that context. They provide guidance. (Sociology)
The professional development of doctoral students, in addition to learning analytical and integration skills as well as discipline content and method, also involves learning the behaviors and requirements of field professionals. For doctoral students in chemistry, English, political science, and sociology, one of the most significant professional behaviors learned is the importance of publication. The need for publication and the professional rewards that are received from publishing are stressed from the beginning of doctoral education. In the department of chemistry, students learn that they must publish articles during their doctoral experience. This is not required in the other three departments, although it is encouraged.

When you go for a post doc or a faculty position, the most important thing they look at is publication. They don't care how well you can teach or how well you do in courses. They want to know how imaginative you are, how productive you are. So, if you come out of graduate school with a good publishing record, they look favorably on that. (Chemistry)

At this point in my career, there aren't any particular journals I want to be published in. Anything would be fine. But there are some that, if I got a publication, it would definitely help my career. (English)

People were telling you that if you are going to be a professional political scientist, a professor of political science, then you are going to have to publish to stay alive. Your publishing is going to take you a lot further than your teaching. You can be a great publisher and a bad teacher and go on. If you're a great teacher and a bad publisher, you will probably not go on. I was told that directly and through the various role models that were around whom I chose either to identify with or not identify with. (Political Science)
You learn to speak the language. You learn what things seemed to be considered important as far as being a member of the discipline. Publication, presenting papers; those are just two examples. It's very difficult to put my finger on. In a very amorphous way you learn to speak the language. You pick up on what criteria people use to evaluate other people here. (Sociology)

Another aspect of professional development for students in all four departments involves understanding and adopting a particular learning/working style. Students must learn to "learn on their own." There is a required "independence" that is communicated to students as the acceptable learning/working behavior in all four departments.

After you've been a graduate student for six years you just sort of pick up the way you're supposed to be. You're supposed to be independent. You cannot run in to your advisor every ten minutes and say, "Now, what do I do?" You have to do a lot of learning on your own, which is very slow but it's the only way you're going to learn. It's a very frustrating experience, but when things work out it's very rewarding. To think that you actually thought of this idea, you did it and you've convinced somebody. (Chemistry)

Developing a topic takes practice, experience, trial and error. There aren't any books to learn from. You do one paper and it doesn't work out, so you do something else next time. It's a process you have to learn on your own. (English)

Graduate school is a learning process in itself. You have to learn self-discipline, especially with the dissertation. You have to learn to be independent. (Political Science)
You do reach a point where you're very much on your own. You're not terribly influenced by what people think, at least in the immediate sense. You sort of come up with some conclusions on your own about what sorts of theories are doing a better job. What you think they should be trying to do more deeply. You come to a better idea of what you think the discipline should be trying to do and the values that guide you, independent of other people. (Sociology)

Finally, students indicate that they find it necessary to learn the implicit rules of their fields. These include knowledge of such things as who the significant scholars are and what words or language are found to be appropriate for use. These types of knowledge, though not specifically taught, help students to feel more a part of the community of scholars within their chosen fields.

It's understood in the research group. You never use the word "I," even if you're the one that did all the work. It's the scientific "we" and it's not as offensive as "I did this," or "I thought of this." It's more objective. (Chemistry)

You have to keep up with the recent literature. You have to know what the most recent ideas are. You have to know who's who in your scientific field. You have to be informed to be any kind of professional. (Chemistry)

It's important to develop a knowledge of basic things like vocabulary. A lot is also experience, experience with similar kinds of arguments. (English)

You can kind of set your own standards for exams. You make up your own reading lists. They have to be approved but they're based on the authors that you've read from your four different areas. (English)
One of the first things that happens in political science is that we get socialized through these scope and methods courses. Right away, through scope and methods courses, they taught you that certain departments were better than others; that certain people were better than others; certain names that we saw come up over and over again. (Political Science)

You learn to be a professional by watching those who are professionals. You're expected to do a certain amount of community work. The publish or perish syndrome that goes on here is hectic. You pick up those sorts of things by watching the people who are doing it. You learn to speak the language. You learn the important names to know. They're all things you pick up as part of the experience. (Political Science)

It's real obvious to me that they're making a real push toward putting out mainstream, get published in the big journals, sociologists. Keep an eye on the journals. That will give you an idea, by proxy, what people in the department think is important. It's sort of anticipatory socialization. If you want to get published, you want to give them what they want. (Sociology)

You're socialized your first year. Interaction with other graduate students; working with my thesis advisor. Some people who have been around a little longer have a better idea how to get through those courses. You seek them for advice. You start out not knowing the rules, not knowing the language. You're not being told rules. You're usually looking for some specific application. You develop a feel for what the rules are in finding out a specific instance of the rule. (Sociology)

In sum, doctoral students in the departments of chemistry, English, political science, and sociology experience professional growth as a result of their educational programs. Students in all four departments learn both discipline content and method, and develop their own research
understanding and perspective. They become familiar with the details of their chosen fields, as well as develop the necessary analytical and critical skills needed for an overall understanding of their chosen discipline and profession. With this, students in all four departments learn the important names in their fields, the language used by the members of their disciplines, rules regarding appropriate professional behavior, and the criteria upon which professionals in their areas are evaluated. Finally, the various aspects of discipline knowledge that are learned appear to be related to the structure of the doctoral programs. The students’ professional development is intimately tied to the various requirements of each phase of doctoral education.

**Personal Development**

As a result of their experiences during doctoral education, the students in the four departments studied also undergo a personal/psychological change. One aspect of this personal development concerns an evolving "self-perspective." As they reflect upon their success in learning about their chosen fields, and as they manifest the independent working/learning styles that are required, they develop a "self-perspective" that includes a visible increase in self-confidence. They come to believe in their own abilities as researchers in their chosen fields.

The whole purpose of graduate education is for you to learn to learn by yourself. You learn how to teach yourself and you get more confident in your abilities as a chemist. (Chemistry)
He would say to me, "You have to think about the literature and think about your own understandings of it." He stressed that. I think that's what made the generals process kind of fun. I was putting down on paper what I thought about this literature. It was old ground I was going over, but I was going over it with a new freshness and a wonderful sense of confidence. I also had many talks with friends and colleagues who had taken them. I learned that it didn't have to be this bookwormish recall. You wrote with a feeling and confidence about literature that you didn't read yesterday. You've read and thought about this literature most of your academic life. I went in to generals with that sense. (English)

When you pass generals, you measure up to the standards expected of a graduate student at [this university]. You should know that by your course grade, but it's reinforced by generals. I was more confident after I passed generals. It indicates to yourself that you can handle that large amount of information and do something worthwhile in your own mind with it. (Political Science)

Part of what you have to learn is how to focus a topic the way the discipline wants you to focus. After a while you know you can do it. You know you're capable. You develop a sense of confidence. You're a sociologist. (Sociology)

A second aspect of personal development concerns the student's sense of identification with and commitment to their chosen fields. In all four departments, as students assume their independence and grow confident in their own abilities, they begin to identify themselves as researchers in their fields. They identify with and are committed to their respective disciplines. This sense of identity and commitment can be seen most clearly as students discuss their relationship to their research.
He [advisor] cut me loose. I reached the next rung. I can make decisions on my own; I don't have to go to him to get the next idea. I know what should be done. As a matter of fact, I know more about this problem than he does. He has no business telling me anything about it. I'm the expert now. I know more about it than anyone else. I make the decisions. (Chemistry)

There's the feeling that you have reached a certain level. You are doing scholarship for a paper in your profession. Your first paper, your dissertation. It's the sense that you're involved now. You're no longer a student. Generals have proven that you are invested of knowledge and that puts you, not departmentally, not administratively, but idealistically you are one of them. You are part of the community of scholars. (English)

You're taught that to be good is to be a good researcher and that that's the way you advance professionally. If you want the respect of your peers within political science because you are a professional political scientist, if you want that respect, then you have to do papers at conventions. You have to publish. You have to be one that others will cite. They are not going to cite your classroom teaching. I want to be able to teach graduate students. That's important to me. And I take my turn sneering at those other professors who aren't allowed to teach graduate students because they're not keeping up on the literature, they're not producing research, feeling that they are somehow less important than the other people who are producing. Although they're doing a different job and doing their job well, this professional socialization means that they don't go to conventions. They don't publish. And, in some senses I felt that they were cheating me, cheating themselves, cheating students in general out of something. As long as I feel that way, hopefully I won't be that way. I'll continue to do some research. I'll continue to improve as a teacher. (Political Science)

As an undergraduate I found sociology interesting but I certainly couldn't have spoken for the discipline. I have something at stake in the discipline that I didn't have before. (Sociology)
Doctoral students in the departments of chemistry, English, political science, and sociology describe two types of developmental growth - personal and professional. These growth experiences are directly related to the requirements placed upon students during the various phases of doctoral education. Professional development begins with coursework where students learn the substantive knowledge - content and method - of their fields. As they progress they develop the analytical and critical skills necessary for professionals. In addition, they develop a perspective of their fields that is integrative. That is, they develop an overall understanding of their professions. This includes both an integrated understanding of its content, as well as the rules and requirements with regard to professional behavior and advancement.

Finally, as the students develop professionally, they experience personal growth. They become confident in their abilities as scholars/researchers within their fields, and they develop an identification and commitment to their disciplines.

Summary of Descriptions

The elements influencing the selection of research topics for doctoral students in the departments of chemistry, English, political science, and sociology are complex and interrelated. In all four departments students indicate that the requirements of the earlier phases of their programs contribute to their abilities to identify and develop original research topics. They describe elements such as familiarity
with the literature of their fields, their abilities to develop questions about the literature they read, and their abilities to identify their interest areas within the literature.

In addition to the development of both skills and interests, students also describe program structures that require increasing levels of skill development. Although the structural phases of the doctoral programs are not identical, the requirements of the various phases are similar. The earlier phases require the development of broad-based field knowledge. Following this, students are required to learn and apply their knowledge within ever-increasing specialized areas. The structural phases continue to narrow to a point of expertise on the part of the students on particular research projects.

The structural phases of the doctoral programs in the four departments studied also function as a stimulus for the students' personal and professional development. As the students travel through the phases of their programs, they describe developing self-confidence in their abilities as field scholars, and a growing sense of identity and commitment to their chosen fields. In relation to this, students in all four departments describe being treated more as equals by their faculty advisors following the completion of their oral examinations. As professionals, the students experience increased skill levels and knowledge levels. Thus, the students' experiences in their doctoral programs may be described as a "process of becoming" scholars of their fields.
The structural, learning and developmental elements discussed influence the selection of research topics for the students in the departments of chemistry, English, political science, and sociology. Two additional elements are also found to influence topic selection in these four departments, although they are defined differently. These elements are: 1) the topics selected must be original, and 2) the topics selected must have some significance or importance for the fields of study. These two elements relate more to the educational system rather than the students' experiences. That is, they are requirements "placed upon" the process of topic selection.

The elements summarized thus far are those that are found to be common to the four departments studied. However, many additional elements that contribute to research topic selection are found to be influential in particular departments. The majority of differing elements are described by students in the department of chemistry.

In the department of chemistry, students select advisors on the basis of their interests in one or more of the advisors' research projects. Their laboratory research on their advisors' projects eventually becomes the substance of their dissertations. There is a formal system for advisor selection in this department. The criteria students use to select their advisors includes: research interests, national reputation, group size, personality, and various quality ratings of faculty members. In addition, these criteria are used as a basis for
comparison between faculty members. The timing of advisor selection, and the requirements particular advisors have for their advisees may influence the students' progress through the phases of their programs.

There are a variety of additional elements that influence research topic selection that are only described by students in the department of chemistry. First, chemistry students are required to develop original research topics for defense before their examining committees as their oral examination experience. They indicate that, because their dissertation research is always related to their advisors' original research projects, and because it is important for them to develop the skills necessary for developing original research ideas, they are required to do so for their oral examinations. However, the ideas they develop for their oral examinations will not be completed as part of their programs. Because of the structural difference in research topic selection for students in the department of chemistry, the elements influencing topic selection include literature, input from peers, the relationship to laboratory research, and the potential success of their ideas.

Second, students in the department of chemistry gradually assume increasing levels of responsibility for the research they conduct as part of the advisors' projects. In relation to this, their advisors gradually decrease their role as research supervisor, allowing their students to assume greater responsibility for the research endeavor. However, the advisor-advisee relationships in the department of chemistry are that of employer-employee. Regardless of the levels of "ownership" the students
assume in their research activities, they remain aware of their advisors' ultimate authority. Students in the department of chemistry attribute their learning experiences for their oral examinations to their abilities to assume greater levels of responsibility for their laboratory research.

Finally, in the department of chemistry, the research group structure and interaction with other students is an important aspect of the students' programs. Students in this department learn from and teach one another, both in relation to laboratory research and in the development of original research ideas.

In the departments of English, political science, and sociology, students describe five elements that relate directly to research topic selection. These elements include: 1) experiences prior to the pursuit of doctoral education, 2) experiences during the coursework phase of their programs, 3) the importance of interest in their topics - especially as this relates to internal identification with the topics, 4) the rejection of particular topics or topic areas and the rationales used for rejection, and 5) concern with the relationship between the topics selected and career futures. Each of these elements includes specific descriptive components that influence the research topics selected by students in these three departments.

In addition to the differences found in the elements involved in topic selection between students in the department of chemistry and students in the other three departments, some important structural differences are described. First, there are three structural phases to the doctoral programs in the departments of English, political science,
and sociology. Although the overall developmental sequence is similar for students in all four departments, students in the departments of English, political science, and sociology view the final phase of their programs as a distinct and separate part. They do draw on their previous educational experiences in the selection of research topics, but they consider this task a separate phase of the experience.

The research topics selected by students in the departments of English, political science, and sociology are to be completed as the students' dissertations. Students indicate that their faculty advisors act as consultants during the process of topic selection, offering guidance and making suggestions. However, they stress independence in the topic selection process.

The primary criterion used in the advisor selection process for students in the departments of English, political science, and sociology is a mesh between the interest areas of the students and the faculty members. In the departments of political science and sociology, preferred methodological orientation is also considered in the advisor selection process. Like students in the department of chemistry, students in the other three departments indicate that more experienced students are sources of information on departmental regulations and how to progress through the phases of their programs. In addition, they also describe becoming sources of information for the students following them in their programs.
The descriptions of the elements influencing research topic selection found in this chapter portray the complex set of circumstances and experiences involved in the process. The four area divisions—Program Structure, Advisor, Research Topic Selection, and Student Growth and Development, are four broad frames that include detailed descriptive elements influencing the process of research topic selection. These areas identify—1) the system in which the process occurs, 2) the significant individuals involved in the process, 3) aspects related to both the product and the process, and 4) aspects related to change in students both as a stimulus for and a result of this educational experience. Although presented separately, the elements influencing the research topic selection process and the research topics selected for study, are best viewed as intimately tied to one another. Just as elements have an impact within a particular area, each area has the potential to impact another area. Thus, the selection of original research topics, for doctoral students in the departments of chemistry, English, political science, and sociology, is influenced by a complicated set of elements and the complexity through which the interaction of these elements bears upon the topic selection process.
CHAPTER V

Results and Implications for Future Research and Student Personnel Work

As the skill of violin makers, wine tasters, and good diagnosticians, so the skill of researchers is complex beyond the specificity that can be achieved in verbal description. (Engel, 1966, p. 786)

Introduction

As Engel (1966) indicates in the quotation above, the skill of researchers is a complex combination of technical and creative abilities. Doctoral education focuses upon both the development of technical expertise and the development of the novice researchers' abilities to recognize their own creative talents. The following discussion will highlight the elements of doctoral education, as discovered in this study, that relate to students' technical and creative abilities to select research topics.

The methodology employed in this study was used to discover the elements influencing dissertation topic selection from the students' perspectives. These results, formulated as theoretical propositions,
reflect the use of methodological procedures such as category saturation, response consistency, validation through follow-up and advisor interviews, probing for explication of meaning, and reflection of understandings for clarification. Specific models of question types, as described by Spradley (1979), were employed to elicit responses that reveal both depth and scope of the students' experiences in the dissertation topic selection process. The simultaneous collection, coding and analysis of data is a system that further enhances the development of thorough and meaningful results. Further, the procedures of category development on the basis of the emerging data, saturation of the categories through additional interviews, and integration of the categories developed exhibit the rigor through which both data collection and analysis were conducted. Finally, the method of "reduction," to "discover underlying uniformities in the original set of categories or their properties" (Glaser and Strauss, 1967, p. 110), was used to formulate the propositions presented in this chapter.

The research method, applied with rigor and consistency throughout the study, provides the basis through which confidence in the validity of the results is established. The data presented in the previous chapter also support the results to follow. These results are "transferable" to the dissertation topic selection experience for doctoral students in similar contexts. In addition, future studies may be conducted to further substantiate the validity of the propositions developed. Thus, the results that follow are drawn on the basis of the investigator's
understanding, established through rigorous application of methodological procedures, of the process of research topic selection from the students' descriptions.

The Interviews and the Use of Language

A primary goal of this study was to understand, from the respondents' perspectives, the elements influencing the process of research topic selection. The method employed to achieve this understanding, in-depth interviewing, necessarily required language as the primary mode of communication. In an effort to understand the language used by respondents, the researcher posed probing questions requesting deeper meaning and elaboration upon the words and phrases used. In many instances these probing questions highlight important distinctions between the students in different departments, e.g., the uses of "originality" and "significant contribution to knowledge," which contribute to a deeper understanding on the part of the researcher.

Occasionally, questions requesting deeper meaning were informative in other ways. For example, in an effort to better understand the research area of a chemistry student, the Investigator asked the student to explain the difference between the word "molecule," used by this student, and the word "compound," used by another student. The student responded that, as far as he was able to discern, there is no difference. A second example concerns the Investigator's language use in questioning the respondent. In a follow-up interview, a student from the department of English was asked to explain his use of the word "generate" in
relation to the development of a research topic. He responded by indicating that the word "generate" was not his word, but instead, was included in the investigator's original question. Discovering this led the researcher to question the student regarding the terms he would use, and to a more thorough understanding. In addition, the investigator reviewed the transcripts to determine the relationship between the phrasing in questions and the terminology of responses. This review revealed that the questions that emerged during the interviews were phrased using the respondents' terminology, and thus, the incident described above is an isolated case.

Occasionally, the language used by respondents is indicative of individual personalities, relationships with others, or the requirements of fields. For example, in describing the criteria students used in selecting their advisors, words and phrases such as, "nice," "screwing up," "simple," "trustworthy," "respect," "nice relationship," "takes care," "admire him," and "knows his stuff," may be indicative of individual communicative style, the relationship that has developed with advisors, or the amount of information they have about advisors prior to advisor selection. Thus, although an attempt has been made to understand students' use of language as fully as possible, language use may be indicative of a variety of elements and is suggestive of an area for further exploration.
Results and Related Literature

The selection of a research topic for doctoral students in the departments of chemistry, English, political science, and sociology involves a complex and intricate set of sociological, intrapersonal, and interpersonal elements. These elements cannot be explicated in any linear fashion. To do so obscures the inherent complexity and interrelatedness of the elements involved. Thus, the following discussion may appear repetitive as an attempt is made both to formulate propositions and to present the topic selection process in its complexity.

Sociological Elements Related to Research Topic Selection

The paradigmatic development of the field influences research topic selection. This influence is made evident through the criteria students use in advisor selection, the students' use of literature, the roles of the faculty advisor, and the framework for defining the criteria of "originality" and "significant contribution to knowledge."

Advisor Selection - Although some of the criteria students use in the selection of faculty advisors are similar for students in different departments, some important differences have an impact upon research topic selection that are indicative of the paradigmatic development of the fields. In the department of chemistry, advisor selection directly influences the dissertation topics for doctoral students as students' research is directly related to one or more of their advisors' funded projects. As representative of a highly paradigmatic
subject area, the faculty in the department of chemistry clearly identify student research areas and the methodological orientations for studying those areas. Students became part of the "social connectedness" (Biglan, 1973b) through association with their advisors.

In contrast, students in the department of English experience a great deal of freedom and independence in the selection of their research topics. Although they select advisors on the basis of their research interest areas, this selection does not indicate a particular dissertation topic. The dissertation topic is determined by the individual student, with the advisor's cooperation and support. Methodological orientation is not a significant consideration; although the approach to literary analysis may be considered in the advisor selection decision. Thus, as an example of a nonparadigmatic subject area, the topic selection process for students in the department of English "is more independent and idiosyncratic" (Biglan, 1973b, p. 211).

The two important differentiating criteria in advisor selection for students in political science and sociology are research interest area and methodological orientation. Like students in the department of English, students in political science and sociology experience freedom and independence in the selection of their dissertation topics. However, unlike students in English, students in these departments must consider their methodological orientation in relation to advisor selection.
Since the existence of a paradigm indicates specification of both research content and method, the criteria used in advisor selection for students in political science and sociology may be indicative of Biglan's (1973a) contention that "the social sciences . . . are fields that strive for a paradigm; but have yet to achieve one" (p. 202).

Another possible explanation for independence with regard to research content, and social connectedness with regard to methodological orientation, as students in the departments of political science and sociology describe, may be Masterman's (1970) discussion regarding "multiple-paradigm sciences." Including the social sciences in her discussion, Masterman (1970) indicates that a multiple-paradigm science is one in which there are "too many" paradigms. Like Biglan (1973a), Masterman (1970) also suggests that multiple-paradigm fields, characterized by areas of specialization that function on the basis of separate individual paradigms, strive for a single unifying paradigm. By citing excerpts from Kuhn (1962), Masterman (1970) indirectly indicates that a single paradigm, in multiple-paradigm fields, will eventually absorb competing paradigms and cause others to collapse.

Use of Literature - As described in Chapter IV, the use of literature and the literature used have an influence upon the students' selection of research topics in the four departments studied. However, there are some important distinctions regarding how the literature is used and which literature is used by students in different departments.
Students in the department of chemistry indicate that journal articles are used as sources of information in the selection of research topics for their oral examinations and are a primary source of information in relation to their laboratory research. Both the major journals in the field of chemistry and the journals related to areas of specialization are considered important. The journal articles are used by doctoral students in this department to integrate ideas and generate the next phase along a research path. In addition, chemistry students make use of the literature to defend the research ideas they propose.

In contrast to the literature used by chemistry students, students in the department of English report that their primary sources, i.e., the actual piece of literature, and their secondary sources, i.e., discussion or criticism regarding the literature, are most often found in books. English students utilize the critical literature to determine areas that have been discussed previously in an effort to identify areas for their own discussion regarding literary works. In addition, the literature provides substance for the presentation of opposing viewpoints and perspectives.

Students in the departments of political science and sociology indicate that journal articles and books are used as sources of information in the process of research topic selection. However, differing from the experience students in both chemistry and English describe, students in these two departments indicate that the major journals within their own fields, the journals in specialized areas
within their fields, and major journals in other fields, e.g., psychology, history, business and law, are sources of information in the development of their research ideas.

Like students in the department of chemistry, students in political science and sociology integrate ideas presented in literature in the development of their topics. However, the integration does not appear to meet the purpose of extension along a research path. Rather, students in these two departments approach the literature to identify "gaps," "holes," and "voids" that they can fill.

Thus, chemistry students make use of the literature of their own field to "build upon" in the selection of their ideas. English students make use of the literature of their own field in the presentation of different perspectives. And, political science and sociology students make use of the literature of their own field and others to identify holes to be filled. Several studies indicate differences in style of publication in relation to the paradigmatic development of the field (Biglan, 1973b; Creswell & Bean, 1981; Neumann, 1977a). The students' use of various literature appears to support the findings that journal publication is more prevalent in the hard sciences while publication in the form of books occurs more often in the humanities. Again, political science and sociology appear to fall between the two extremes.

Differences in the use of literature as described above have not been addressed in research. However, these differences clearly relate to the paradigmatic development of the fields. In the highly paradigmatic field, where research content and method are specified, the intent is to
integrate and extend. In a nonparadigmatic field, where both content and method are open, integration is unnecessary. What becomes important in this area is a new way of "looking at" the same piece of literature or literary area. Finally, in the social sciences, where the development of a single, unifying paradigm is pending, filling in gaps or holes may help lead to its development. In addition, the use of multiple literature from a variety of fields, and its horizontal integration, may be suggestive of the multiple-paradigmatic nature of these fields.

Advisor Roles - Many roles attributed to the academic advisor are described similarly by students in all four departments studied. However, some important differences in the faculty advisors' roles described by students in the department of chemistry are indicative of the paradigmatic development of that field.

Students in the department of chemistry emphasize their advisors' roles as direct research supervisor, employer, group leader and research project director. These roles, not described by students in other departments, all relate to the students' research activities. Such additional roles support the findings of Biglan (1973b) and Smart and Elton (1975) that faculty in "hard" subject areas place a greater emphasis on research-related activities than do faculty in "soft" subject areas. The advisor roles described by students in the departments of English, political science, and sociology are similar to one another. In addition to the paradigmatic development of the field, both the program
structure and the context in which research is conducted may be influential with regard to the faculty advisors' roles. These aspects will be discussed later in this chapter (pages 283-291).

**Originality and Significant Contribution to Knowledge** - As revealed by the students' descriptions in the previous chapter, "originality" and "significant contribution to knowledge" are two criteria required in their selection of research topics. (This discussion relies upon the criteria for research topic selection for the oral examination in the department of chemistry, and for the dissertation in the other three departments.) However, differences exist regarding how the concepts of "originality" and "significant contribution to knowledge" are defined between the four departments studied. These differences relate to both the students' use of literature and to the paradigmatic development of the fields.

In the department of chemistry, originality relates to the integration of ideas that have not been integrated in prior research. Students indicate that originality relates to a new or novel extension along a research path. For students in this department a significant contribution to knowledge centers upon how their ideas can be seen as contributing to what is already known by the scientific field. Thus, originality is seen as a clear extension along a research path, and a contribution is determined by its scientific importance as determined by field scholars.
In contrast, students in the department of English describe originality in relation to identifying a new perspective or framework for approaching their chosen piece of literature or literary area. Is their research addressing a new question in relation to the literature? In addition, two criteria are used to determine whether an idea is a contribution to knowledge. First, in declaring its contributory nature students indicate that whatever has been said before about their literary areas isn't "good," "worthwhile," or contributory. Second, an idea is a significant contribution if it addresses a question that is considered important by the field of English scholars, as determined by the immediate faculty.

Students in the departments of political science and sociology describe a different concept for determining originality. Within these fields originality is determined by either 1) a new theoretical perspective or combination of theoretical perspectives used to observe a phenomenon, or 2) use of a methodological orientation upon a set of data that has not been used previously with the data. Determination of significant contribution relates to both the development of the field, i.e., information that can be used by field scholars in a better understanding of the field itself, and the practical significance of the research idea, i.e., how will the findings help the particular groups or organizations studied?

Thus, differences in the determination of "originality" and "significant contribution to knowledge" fall along the lines of paradigmatic development of the field. In all four areas one of the
elements used to determine a "significant contribution" involves its contributing to what the scholarly field needs to know. Thus, Crane's (1972) notion of "invisible colleges" has an influence upon the research topics selected by doctoral students. It is clear that students' use of the literature of their fields relates to the determination of "originality" and "significant contribution to knowledge."

In addition, the use of the characteristics of practicality or usefulness in the determination of the significance or importance of an idea, as described by students in the departments of sociology and political science, relates to Biglan's (1973a) differentiation of subject areas on the basis of their concern with life systems. Thus, while chemistry and English fall on the negative end of this dimension (i.e., concern with nonlife systems), political science and sociology fall along the positive end of this dimension (i.e., concern with life systems). The determination of "significant contribution" appears to relate to this life-system connection.

Paradigmatic development influences research topic selection through its influence upon criteria students use in advisor selection, advisor roles, use of literature, and the determination of "originality" and "significant contribution to knowledge." Two additional sociological elements that influence research topic selection, program structure and the context of research, remain for discussion.
The program structure of doctoral education influences the selection of research topics. This influence is made evident through the students' personal and professional development, advisor selection, advisor roles, and component parts of the structure.

**Personal and Professional Development** - The program structures in the four departments studied are designed to stimulate students' personal and professional development. When viewed as a process or sequence, the coursework and examination phases of the programs may be viewed as preparatory. Within these phases students learn the technical knowledge of both content and methods within their fields that are necessary for research topic selection. This knowledge, an aspect of students' professional development, also contributes to their professional socialization. As described by Taylor (1976) students learn the language, appropriate methods, and important problems in their fields. The earlier structural elements can be viewed as preparation for the research tasks in the later phase of the students' programs.

In addition to stimulating professional development, the structural phases in doctoral programs also stimulate personal development. Students report greater self-confidence and an increase in identity and commitment to their chosen fields as they successfully complete the earlier phases of their programs. These elements of personal growth are critical to the research topic selection process because of the inherent independence required of students for this task. Of course, both personal and professional development continue to be enhanced during the
topic selection and research phases of the doctoral programs. However, the field knowledge and personal growth resulting from earlier phases contributes to students' abilities in research topic selection.

The structural phases of the four doctoral programs studied can be related to Wallas' (1926) stages of creative thought. The first stage of creative thought described by Wallas is "preparation." This stage can be related to the coursework and examination phases of the doctoral programs. The second stage, "Incubation," can be related to that period of time, for doctoral students in the departments of English, political science and sociology, between their General Examinations and the selection of their dissertation topics. As described in Chapter IV, students in these three programs describe a "lag" time between examinations and the selection of their topics in which they explore ideas and review literature, but are not necessarily making a conscious effort to formulate their dissertation topics. For students in the department of chemistry, the period of incubation can be related to the time between their oral examinations and their recognition that they are assuming greater levels of independence and self-confidence regarding their laboratory research efforts.

The third stage in the creative thought process described by Wallas (1926) is "Illumination." For students in the three "soft" subject areas, Illumination occurs when they recognize and grasp their research topics, and develop their ideas by writing research proposals. For chemistry students, Illumination is more clearly related to their independent identification of an idea for their laboratory research. The
fourth stage, "verification," relates to approval of the research ideas and, where appropriate, the research proposals, for the continuation of the research work. It should be noted that students in the department of chemistry may experience similar phases on a briefer scale as they prepare research ideas for defense at their oral examinations.

In sum, the program structures in the four doctoral programs studied may be viewed as a stimulus for the creative, personal, and professional development necessary for the selection of research topics. Students' development of technical, substantive, and creative abilities influences their research topic selection process. In addition, the development of self-confidence and commitment to their fields influences their selection of research topics.

Advisor Selection - As a structural component of the doctoral programs, the timing of the selection of the faculty advisor influences research topic selection. Doctoral students in the department of chemistry may select an advisor at any time during their first year of study. As the students describe, their faculty advisors have the potential to influence their progress through the program phases. In addition, the requirements regarding laboratory research differ among faculty members. Thus, students who enter the laboratory earlier in their programs may become involved in a developmental experience earlier than other students. Since the structural phases and the developmental experiences are associated with research topic selection, the faculty advisors' influence upon program structure also relates to research topic selection.
The omission of the faculty advisor in the department of chemistry from the process of research topic selection for the oral examinations also influences the students' experiences. Until this time, academic advisors are in a relatively direct supervisory role in relation to the students' laboratory research. Since students cannot consult their advisors regarding their research ideas for their oral examinations, the students approach the task and consider their ideas in relation to projected reactions from their advisors. Thus, the task becomes a learning experience in which the projected advisor reaction helps the students to determine appropriate and acceptable research ideas.

In the departments of English, political science, and sociology, students are not required to select advisors within any specified period of time. This allows students greater amounts of time to explore their interest areas through coursework. Unlike the curriculum in the department of chemistry, students in these three departments report greater flexibility in their coursework. The curriculum freedom in the "soft" subject areas relates to Thompson and Brewster's (1978) findings that faculty in "low-paradigm" fields are more likely to give students input regarding degree requirements than faculty in "high-paradigm" fields. However, once the advisor is selected students begin to focus upon major and minor areas of study. Thus, advisor selection is a stimulus for determining and narrowing interest areas for students in these three departments.
One of the roles assumed by the faculty advisors in the departments of English, political science and sociology is to provide structure during the dissertation phase of the doctoral program. When students enter the dissertation phase of their programs, their faculty advisors function to keep them moving along the research path. By providing structure, the faculty advisors in these three departments are influencing the research topic selection process.

Component Parts of Program Structure - Certain aspects of the structure of the doctoral programs have an influence upon research topic selection. In the department of chemistry the program is divided into six structural phases. In the first phase, coursework, students take courses in a well specified core curriculum. Thus, the initial learning experience is well defined. They are exposed to the most recent literature in the field and therefore, the most current research ideas.

Since students in the department of chemistry do not select original research ideas for their dissertations, they are required to develop and defend an original idea for their oral examinations. The limited period of time in which they have to select and develop their ideas has an influence upon the topics they choose. Their concern during this experience does not relate to the quality of the topic as much as it relates to passing the examination by defending their ideas.

In contrast, students in the departments of English, political science, and sociology are exposed to a relatively flexible curriculum in which they are able to explore their own interests. They are exposed, with this flexibility, to a wide variety of stimuli for their research
Ideas. In addition, the General Examination phase of their programs offers them the opportunity to review course material and integrate ideas. This structural component again offers the opportunity for research ideas to be stimulated.

The context in which research is conducted influences research topic selection. This influence is made evident through student-student and faculty-student interaction.

Student-Student Interaction - In the department of chemistry the primary environment for conducting research is the research laboratory. As chemistry students describe, the laboratory context offers students significant opportunities for peer interaction regarding research. Students utilize these opportunities to learn from one another and to explore their research ideas. Thus, the context in which research is conducted enhances chemistry students' abilities to generate and select research ideas as it increases opportunities for peer interaction.

Students in the department of chemistry also indicate that two additional contextual elements related to student-student interaction influence their selection of research topics and the development of their ideas for their laboratory research. Older, more experienced students in the department of chemistry function as research consultants for students during the topic selection process for their oral examinations. In addition, the more experienced students also provide "pre-oral"
opportunities for students to practice the defense of their ideas. Thus, peer interaction has a direct influence upon research topic selection for this task.

Further, the group structure in the department of chemistry allows students the opportunity to present their research ideas, findings, and problems, and the opportunity to learn about the research being conducted by other group members. Because of the context of the group meeting, opportunities for the stimulation of ideas are increased.

In contrast, students in the departments of English, political science and sociology indicate that once they complete their coursework contact and interaction with other students decreases significantly. They describe the context in which research is conducted as isolating. In addition, students in these three departments indicate that, by the time they reach the dissertation phase of their programs, they are so specialized that it is difficult to discuss their research ideas with other students. Thus, in comparison, the laboratory and group structure in the department of chemistry enhance the students' opportunities for peer interaction and exploration of their research ideas; while in the departments of English, political science and sociology, isolation and specialization in the research task inhibit interaction and the opportunities for the stimulus of ideas.

Faculty-Student Interaction - As in the case with student-student interaction, the laboratory environment and group structure in the department of chemistry offer students greater opportunities for interacting with their faculty advisors. Because of
these contextual elements students have opportunities to learn from their faculty advisors, to stimulate research ideas, and to check on the direction they are taking with their research activities.

In contrast, students in the other three departments interact with their faculty advisors on a more formal basis through scheduled appointments. Although these appointments also serve to stimulate research ideas, to learn from faculty advisors, and to check on the direction of their research activities, the interactions are time bound and more formally structured. Thus, the context of research activity and the opportunities this context provides for faculty-student interaction has an influence upon the students' selection of research topics.

Both Berelson (1960) and Heiss (1970) indicate that the context in which research is conducted in the physical sciences has an influence upon students. Berelson (1960) suggests that lack of advisor supervision and direction is more of a problem outside of the laboratory sciences because "the laboratory makes for a regular and intimate contact between student and professor that is lacking on the other side of campus" (p. 162). Although Heiss (1970) does not allude to opportunities for interaction in the laboratory sciences, she does state that "the physical activity required in laboratory research acts as a unifying principle on the intellectual and spiritual satisfaction the researcher derives from his effort" (Heiss, 1970, p. 215). As both of these researchers suggest, and as the students in this study describe, the context in which research
is conducted does influence the students' experiences. And, taken one step further, the context of research influences research topic selection through its impact upon interaction with others.

**Intrapersonal Elements Related to Research Topic Selection**

The students' abilities to identify substantive interest areas influences research topic selection. The identification of interest areas includes experiences prior to doctoral education, experiences during doctoral education, and rejecting substantive areas.

**Experiences Prior to Doctoral Education** - Educational experiences prior to beginning doctoral education influence students in all four departments studied. For students in the department of chemistry, undergraduate coursework influences their choice of areas of specialization, e.g., organic chemistry or inorganic chemistry. Similarly, students in the department of English indicate that their undergraduate and graduate coursework stimulates interest in their areas of specialization, e.g., American literature or Irish literature. In addition, students in the departments of English, political science, and sociology indicate that experiences in undergraduate and graduate coursework tend to plant "seeds of interest" that re-surface during doctoral coursework and stimulate their interest areas. Further, students in the departments of English and sociology assert that previous educational experiences offer them the opportunity to develop skills that
are later used in the selection of their research topics. Thus, previous educational experiences have the potential to influence the research topic selection process.

In addition to previous educational experiences, students in the departments of English, political science, and sociology also identify non-educational experiences in relation to their selection of research interest areas. Experiences such as association with interest groups or the stimulus of a particular book are described as spurring their interest areas. As such, both prior educational and personal experiences have the potential to influence research interests.

Experiences During Doctoral Education - Students in the department of chemistry indicate that their coursework and oral examination experiences during their doctoral programs expose them to literature and mandate the development of skills that serve to enhance the development of research interest areas. Tools such as familiarity with literature and pre-orals; and skills such as connecting and integrating research ideas help chemistry students to develop and identify their research interests.

Doctoral coursework also stimulates research interest areas for students in the departments of English, political science, and sociology. They indicate that ideas presented during coursework spur both "liking" of a particular area and "internal identification" with a particular area. This Internal Identification is suggestive of Dunham and Lumsden's (1981) description of topic selection as a process of introspection. Further, students in English and political science indicate that
coursework aids the development of skills in analyzing and criticizing literature that help them to identify research areas; and students in English, political science and sociology all identify skills developed during their General Examinations as contributing to their abilities in the recognition and development of interest areas. Thus, for students in all four departments, experiences during coursework and examinations stimulate and enhance their research interests and their skills in approaching those interest areas toward the selection of research topics. In addition, for students in English, political science and sociology, the intrapersonal elements of personal liking and identification with an interest area contribute to their recognition and identification of research interests.

Rejecting Substantive Areas - Students in the departments of English, political science, and sociology describe individual considerations that contribute to their rejection of substantive research areas. Elements such as scholarly identity, time necessary for completion, and topic complexity are all considered in the rejection of research areas and particular research topics. In addition, students consider their career goals in relation to their interest areas, and the rejection of research areas. The elements related to career goals will be discussed in further detail in the next section.
The students' consideration of their careers influences research topic selection. The consideration of career is made evident through elements students consider in the selection and rejection of research topics, and the consideration of national reputation in the advisor selection decision.

**Elements Students Consider in the Selection and Rejection of Research Topics** - Students in the departments of English, political science and sociology consider elements such as time necessary for completion, marketability, publication potential, versatility in the job market, visibility, and scholarly identity in relation to their selection of research topics. Topics are explored and are either accepted or rejected on the basis of their potential for increasing employment opportunities for students in these three departments. Thus, students' individual career goals in these three departments influences their selection of research topics.

**National Reputation as a Criterion for Advisor Selection** - In the departments of chemistry, political science and sociology, students consider the national reputation of faculty members as a criterion in their advisor selection decision. As the students describe, being linked with faculty members who have positive reputations within their chosen fields increases the students' prospects of locating a position in the overcrowded job market. Students occasionally indicate that they consider the publications, referee status, and prior research of faculty members as evidence of their national reputations and esteem. Faculty members with positive national reputations are assumed to have the
respect of their peers, and by association with these faculty members, students are considered in a more favorable light for employment opportunities. In addition, faculty advisors with national esteem are assumed to have greater numbers of contacts and linkages in the employment market, and are therefore more likely to be able to aid students in their search for employment. Although the implication has been made that academic sponsorship is influential in students' future career productivity (Crane, 1965; Reskin, 1979), there is little empirical evidence relating sponsorship to placement in students' first position.

The criteria students consider in advisor selection have both a direct and indirect influence upon students' selection of research topics. This is evident through the link between the students' interest areas and the advisors' interest areas, and the relationship potential between advisors and their students.

Link Between Interest Areas - As described in Chapter IV, the mesh between the advisors' and students' research interest areas is a primary consideration in the students' advisor selection decision for students in all four departments in this study. In the department of chemistry students are involved in research related to one or more of their advisors' funded projects. Thus, in this department there is a direct link between advisor selection and the selection of a research area. In addition, as discussed earlier, students consider their advisors' interests and may even model their advisors' behavior in the
selection of research topics for their oral examinations. Although the influence is not direct in this case, students are again influenced by their advisors in the selection of research topics.

In the departments of English, political science and sociology, the selection of advisors on the basis of mesh between interest areas is an unwritten "rule" students learn during the course of their programs. However, it is obvious that, because of this "rule," advisor choice narrows the options for research topic selection to, at least, a specific area of specialization. Although the faculty advisors act as consultants to students in these three departments during the research topic selection process, they are consultants within particular areas of expertise, and thus, the potential topic areas are more narrowly defined.

Advisor-Student Relationship Potential - Many of the criteria students consider in the advisor selection decision have the potential to enhance the advisor-student relationship. Students in all departments indicate that criteria such as teaching styles, personality, and interest in the student are all considered in their advisor selection decision. Two additional criteria, supervision needs of the student and previous contact with their advisors, are identified by students in English, political science and sociology. It appears that student satisfaction with these characteristics in their advisors may contribute to a more positive advisor-student relationship. Since many studies indicate that advisor-student interaction is often a cause for both dissatisfaction - with doctoral study and prolonged duration of doctoral study (Berelson,
considering these criteria in the selection of advisors may enhance the potential successful completion of the students' doctoral programs.

The professional and personal development of students influences the selection of research topics. This is evident through the students' attitudes towards their own abilities and their identities as scholars and researchers of their fields.

Student Attitudes - As described earlier in this chapter, doctoral students experience a process of both personal and professional development as they proceed through the structural phases of their programs. As part of this developmental process they become more independent and self-confident. Students describe an attitude change in which they come to believe in their own abilities as researchers. Thus, the findings by Kuh and Thomas (1983), concerning students' redefinition of self and the development of purposeful independence; and the findings of Lozoff (1976) and Taylor (1976), indicating that graduate students become more autonomous, self-motivated and self-confident, are corroborated by the students' descriptions of their own developmental experiences in this study. In addition, the doctoral students interviewed in this study relate their personal and professional development to their ability to do the kind of independent work necessary for the selection of their research topics.
Scholarly Identity - Part of the personal and professional development described by doctoral students in the four departments studied involves their self-identification as scholars and researchers of their chosen fields. Students indicate that they learn the necessary language, the independent learning/working style, the recognition and ability to formulate important questions, and the reward system for professional behavior as part of their developmental process. As Becker and Carper (1956) and Rosen and Bates (1967), as well as others, suggest, the students interviewed in this study describe a process of socialization in which they internalize the norms and ideals of the fields and professions in the development of their scholarly identities.

Interpersonal Elements Influencing Research Topic Selection

The faculty advisors for doctoral students influence the selection of research topics. This is evident through the advisors' roles and changes in the student-advisor relationship.

Advisor Roles - As has already been noted, faculty advisors in the department of chemistry provide doctoral students with research projects for their dissertation research. However, doctoral students in the department of chemistry, English, political science and sociology indicate that their advisors assume many roles that influence the selection of research topics. Advisor roles and responsibilities such as establishing performance expectations, setting quality standards, role modeling appropriate professional behavior, teaching, assessing student
performance, and acting as field experts in the research endeavor all contribute to the students' selection of research topics directly, through direct communication regarding substantive content and research activity, and indirectly, by influencing professional and personal development and the structure of the doctoral programs. Thus, faculty advisors, as research supervisors, have a variety of roles and responsibilities in relation to their students that are both directly and indirectly influential in research topic selection.

Change in Student-Advisor Relationship - Students in all four departments in this study indicate that their relationships with their advisors change as a result of their successful completion of their General Examinations. In describing these changes students note that their relationship with their advisors are more collegial, and that their advisors expect the students to assume increasing levels of independence in their research work. Thus, changes in the advisee-advisor relationship reflect the independent learning/working style expected in the research effort, and further enhances the students' internalization of their scholarly identities.

Peer relationships have an indirect influence upon research topic selection. This is evident through the influence peers have upon students' advisor selection, and departmental accommodation.

Advisor Selection - Since one of the criteria used in the selection of advisors by students in all four departments involves the
departmental reputation of faculty members, peers have the potential to influence the advisor selection decision. Much of what is learned about faculty members is learned as a result of peer interaction. Thus, since the faculty advisor is an influential element in the selection of research topics, peers become influential as they influence the advisor selection decision. It should be noted that, in addition to peer influence upon advisor selection, students in the department of chemistry describe a more direct peer influence in research topic selection through laboratory and group contact, and the pre-oral experience. These influential elements were addressed in a previous section of this chapter.

Departmental Accommodation - Students in all four departments in this study indicate that peers are a primary source of information regarding departmental rules and procedures, and professional behavior standards. As both of these elements relate to successful progress through the program phases, and the internalization and identification of professional identities, peers are again indirectly influential in the process of research topic selection.

Summary

The selection of a research topic involves a complex web of sociological, intrapersonal, and interpersonal elements. It is evident from the students' descriptions of their experiences, and the results presented, that doctoral students in the four departments studied become embedded in a system including the nature of the field, the program
structure, and the context in which research is conducted, that have an impact upon their selection of research topics. The individuals, however, do not enter as blank slates. They bring with them both skills and interests. As they proceed through their programs, their interests and skills develop and they experience both personal and professional growth. Further, their future career goals become part of their present activities as they seek to identify their research topics. Finally, their experiences are influenced by association with others. Both their advisors and peers influence the process of doctoral education and research topic selection.

Although there is some linearity in the nature of doctoral education, the elements influencing research topic selection and the temporal location of research topic selection cannot be viewed as finite. The doctoral "experience," in its contextual fullness, exhibits a multitude of interactive elements influencing the process of research topic selection.

**Implications for Future Research**

The results of this investigation suggest many areas for additional study regarding elements influencing the process of research topic selection. First, this study focuses upon four departments in one university. Future studies are needed to investigate different subject areas and different universities. Utilizing Biglan's (1973a) categorization of subject areas, additional research focusing upon departments within the applied dimension in both hard and soft, and life
and nonlife subject areas may expand upon influential elements in research topic selection, and the differences among departments. Comparative research between universities may highlight differences in research topic selection on the basis of program structure, research context, advisor selection, and any other degree requirement differences that may influence the selection of research topics.

The respondents for this study were white, male, non-foreign doctoral students who were actively working on their dissertation research. Thus, their responses are limited to their retrospective accounts of the topic selection process. Longitudinal research, tracing students' progress from program entrance, may reveal additional influential elements in research topic selection not captured in retrospect. Further, previous research indicates that women students (Adler, 1976; Berg & Ferber, 1983; Holmstrom & Holmstrom, 1974) and minority students (Duncan, 1976) may have different experiences in doctoral programs, and therefore, these populations may experience different influential elements in the selection of their research topics. This may also be true of the foreign student population.

The students in this study may be referred to as having a "success experience." Although they are classified as ABD (All But Dissertation), they are well on their way to completing their programs. Additional research with students who are experiencing extended duration of doctoral study may help to identify influential elements in research topic selection not described by respondents for this investigation.
Two additional areas for further study are suggested as a result of the researcher's impressions during the interviews. First, there is some indication that individual personalities or psychological types have an influence upon the manner in which students make decisions regarding both advisor selection and research topic selection. Additional research is needed to determine the impact of psychological orientation on the decision-making process in relation to these elements. Finally, there is some indication that the career age of the faculty advisors influences the roles they assume in relation to students and the relationships that are established with students. As Bargar and Mayo-Chamberlain (1983) and Baldwin and Blackburn (1981) indicate, faculty members experience both personal and professional development. Additional research is needed to explore this developmental process in relation to its impact upon doctoral student supervision and the relationships established with students.

Implications for Student Personnel Work

The results of this study suggest several areas in which student personnel professionals may influence the doctoral student experience. First, student personnel workers and graduate school administrators must recognize that students' experiences differ in relation to their academic fields. This may have implications for differentiating admissions standards, completion requirements, and time limitations in relation to fields of study.
Second, orientation programs for students highlighting administrative requirements and program phases may remove some of the mystery associated with doctoral education, and curtail the myths that are passed from student to student. Additional interventions that relate to stress management, goal-setting, proposal writing, advisor selection, advisor roles, and advisee-advisor relationships may help students' progress, and limit the ABD phenomenon.

Third, providing arenas for student interaction, especially necessary outside of the laboratory sciences, through which students may identify support groups, will help decrease the isolation experienced during the dissertation phase of their programs. In addition, student interaction and student-faculty interaction may be enhanced in the form of "research forums" where participants are given the opportunity to present and discuss research ideas. Further, weekly group meetings for students working on both proposals and dissertations may provide necessary structure and help them to establish reasonable goals. Two students in the department of political science describe a group such as this and call it "Dissertations Anonymous." For these students it is a somewhat helpful experience for their dissertation work.

Fourth, both the personal and professional development inherent as a result of doctoral education cannot be ignored by student personnel workers. Providing workshops that address developmental issues, and counseling facilities to help students work through their growth experiences, stress and frustrations, may help to alleviate some of the emotional trauma associated with the developmental process.
Fifth, graduate faculty members are an important part of the doctoral students' experiences. Providing professional development experiences for faculty members, especially in relation to their work with doctoral students and their own career development, may help to enhance the experiences of both students and faculty. Further, providing opportunities for student-faculty interaction that is less formally structured, such as the "research forums" mentioned earlier, may help to enhance student-faculty relationships.

As the descriptions of the research topic selection process suggest, it is unlikely that student personnel workers can provide any experience in the form of an intervention or series of interventions that will teach students how to identify research topics. The process of topic selection is too complex and intricate for "how to" interventions. However, there are many elements associated with the research topic selection process, and with doctoral education in general, that can be addressed by student personnel professionals.

The results of this study suggest several areas in which student personnel workers may be influential in the experience of doctoral education, especially the research related aspects of that experience. Further research, as suggested earlier, will contribute additional information that will aid in understanding the process of research topic selection for doctoral students, and more generally, the experience of doctoral education.
BIBLIOGRAPHY


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Wilson, K. M. (1965). Of time and the doctorate. (Monograph No. 9), Atlanta, GA: Southern Regional Education Board.


APPENDIXES
APPENDIX A

Examples of the Use of Descriptive, Structural and Contrast Questions*

Descriptive Questions - The purpose of descriptive questions is to elicit information regarding the participant's experiences in the participant's language.

Examples

1) You said that literature was helpful to you when you were trying to identify a research topic. Would you describe in what ways you found it helpful?

2) You said that your advisor hassles you. What do you mean by that?

Structural Questions - The purpose of structural questions is to elicit information regarding the membership of experiences to categories already identified by the interviewer.

Examples

1) You mentioned that there's a group meeting every week where you talk about research. What other kinds of things are discussed during the group meetings?

2) You've told me that you found out things like what classes to take, who the best professors were and what exams were like from other students. What other information did you learn from students?

Contrast Questions - The purpose of contrast questions is to determine how experiences and elements from within the same category differ from one another.
1) You said that your advisor treated you differently after you finished your exams. Would you explain how his behavior changed towards you?

2) You told me that you considered things like how famous your advisor was, how much money he had, the kinds of projects he had for you to work on, and the kinds of contact he had in Industry before you chose him. What are the relationships between these reasons for choosing him?

APPENDIX B

Interview Guidelines for Students

1. What is your research area?

2. Can you tell me about the time when you first began thinking about this idea? Where did it come from?

3. What makes you interested in this research topic? What makes it meaningful to you?

4. Can you explain to me what your experience has been in terms of developing a dissertation topic?

5. How has your advisor influenced the dissertation topic you talk about?

6. What are the main factors over the course of your program that you feel have really hindered your progress? In what ways?

7. What are the main factors over the course of your program that you feel have really helped you to progress? In what ways?

8. In comparison to other students who entered your program with you, how have you progressed?

9. If there is one thing you could change about being a doctoral student, what would that one thing be? Why?

10. Imagine that a friend of yours comes to visit you from out of state. He tells you that he is interested in entering the same program you are in and that he already has an idea for a dissertation. What would you tell him about being a doctoral student in that program? What would you tell him about developing a dissertation topic?

11. What patterns can you identify in your attitudes, since you entered your program, towards doing a dissertation?

12. If another student in your program were to ask you how to develop a dissertation topic, what would you tell the student?

13. What influence did factors such as the content or timing of your General Examinations, the style of your prospectus, or your curriculum requirements, have upon your dissertation topic or the development of that topic?

14. In what ways did peer relationships influence the development of your dissertation topic?
APPENDIX C

Interview Guidelines for Students Developed

As a Result of Emerging Data

1. How have you changed as a result of your doctoral education?

2. How did you learn to be independent in your work as a doctoral student?

3. How has your relationship with your advisor or other faculty members changed as a result of changes in you?

4. How have faculty members and your advisor influenced changes in you?

5. How have faculty expectations for your performance influenced you?

6. What does it mean to be a professional in your field?

7. How do you become a professional in your field?

8. What are the processes that influence your becoming a professional?

9. In what sense are you accepted as a professional? How do you know?

10. How does your methodological orientation influence your choice of advisor?

11. How does literature influence your becoming professional? What literature? How do you use literature?

12. How does publication influence your becoming professional?

13. What role(s) did your advisor have in relation to your becoming professional? In relation to your research? How did other faculty members influence you? Your research?
APPENDIX D

Interview Guidelines for Advisors

1. What is your experience like as an advisor of doctoral students?

2. What stages can you identify in the development of a research area for students you work with?

3. What similarities do you find in your work with different students?

4. What differences do you find in your work with different students?

5. In what ways do you describe the development of dissertation research areas?

6. What do you identify as important variables to consider in the development of a research topic for dissertation research?
APPENDIX E

Letter to Doctoral Students

Office Address

Date

Dear:

The purpose of this letter is to request your participation in a study concerning the process of selecting a dissertation topic. It is my expectation that this study will begin to address some of the issues involved in doctoral education and will be a step towards further understanding the process of knowledge creation. Some of the questions that this study will address are:

1. What is the process of development of dissertation topics in four academic fields; chemistry, sociology, political science, and English? What is the difference in the development of dissertation topics across these four fields? What contributes to these differences?

2. What influence does the academic field (i.e., type of knowledge created, age, paradigmatic development) have upon the dissertation topics developed?

3. What role does the advisor play in the development of dissertation topics?

4. What influence does the program structure (i.e., timing of examinations, content of examinations, style of prospectus, curriculum requirements) have upon the development of a dissertation topic?

5. What role do peer relationships have on the development of dissertation topics?

I need your help in order to answer these questions. Please understand, however, that your participation is strictly voluntary and will not affect your academic program in any way. In an attempt to describe this study to you in more detail, I have tried to anticipate some of your questions about the project and your involvement with it.
WHO IS CONDUCTING THIS STUDY?

This study is being conducted by Marla Barr, a doctoral candidate in the Student Personnel Work Program here at [name of] University. The project director, Robert J. Silverman, is my academic advisor and coordinator of the Student Personnel Work Program in the College of Education.

WHO ARE THE STUDENTS INVOLVED?

White male doctoral students in the departments of chemistry, English, political science, and sociology will be interviewed for this study. Students must have completed general examinations and must be actively working on their dissertation research. Students will be determined to be actively working on their dissertation research by their self reports. As many of you realize, some departments have only a small number of doctoral students. Because of the small number of available students, I need your cooperation and participation.

WHO ELSE IS INVOLVED IN THIS STUDY?

Because part of the process of development of your dissertation topic may involve your advisor's role, the academic advisor for each student will be asked to participate. The advisors will be interviewed regarding their methods of working with each student during the question formation phase of the research process.

WHAT ABOUT CONFIDENTIALITY?

Any information you share with me will be held in strictest confidence. Neither your advisor nor other students will have access to or be told anything about our interview session or your experiences in developing a dissertation topic.

I am interested in identifying general categories and concepts. Thus, information from our interview will be broken down into small pieces of data. After I have determined that it will not be necessary to contact you again, all identifying comments will be removed from my field notes. Consequently, your name will not appear in conjunction with the information you share with me.

WHAT IS THE TIME COMMITMENT FOR PARTICIPATION IN THIS STUDY?

I am asking you for an initial time commitment of two hours for an interview with me. It is possible, however, that I may need to follow-up on some information after our initial interview. As I gather more data, I may ask you to elaborate or to clarify some information. However, any additional time beyond the initial interview should be minimal if it is at all necessary.
Your willingness to participate in this study will be greatly appreciated. Please contact me at either the location on the first page of this letter, (office phone), or at my home, listed below, if you have any additional questions and to inform me regarding your participation.

Sincerely,

Home Address and Phone

Marla A. Barr

Robert J. Silverman
Academic Advisor
APPENDIX F

Telephone Screener to Check Study Eligibility

Name: Date:

1. In which department are you a doctoral student?
2. Are you a white male?
3. Are you a foreign student?
4. Have you completed and passed your General Examinations?
5. Are you actively working on your dissertation?
6. What are your future occupational goals?
7. Who is your advisor?
8. Do you have any questions you'd like to ask me?
APPENDIX G

Letter to the Advisors

Office Address

Date

Dear:

The purpose of this letter is to request your participation in a study entitled *The Selection of a Dissertation Topic: Factors Influencing Student Choice*, which I am undertaking as a doctoral candidate in the Student Personnel Work Program under the guidance of Robert J. Silverman.

It is my expectation that this study will begin to address some of the issues involved in doctoral education and will be a step towards further understanding the process through which knowledge is developed. Some of the questions that this study will address are:

1. What is the process of development of dissertation topics in four academic fields; chemistry, sociology, political science, and English? What is the difference in the development of dissertation topics across these four fields? What contributes to these differences?

2. What influence does the academic field (i.e., type of knowledge created, age, paradigmatic development) have upon the dissertation topics developed?

3. What role does the advisor play in the development of dissertation topics?

4. What influence does the program structure (i.e., timing of examinations, content of examinations, style of prospectus, curriculum requirements) have upon the development of a dissertation topic?

5. What role do peer relationships have on the development of dissertation topics?

This dissertation will focus upon white, male doctoral students in the departments of chemistry, sociology, political science, and English.
Because the process of dissertation topic development is likely to involve the advisor, each student's advisor is being asked to participate. I would like to interview you regarding your methods of working with students during the question formation phase of the research process.

Any information you share with me will be held in the strictest confidence. Neither other advisors nor students will have access to or be told anything about our interview session or your experiences in working with students during the phase of dissertation topic development.

I am interested in identifying general categories and concepts. Thus, information from our interview will be used in the generation of propositions. After I have determined that it will not be necessary to contact you again, all identifying comments will be removed from my field notes. Consequently, your name will not appear in conjunction with the information you share with me.

I am asking you for an initial time commitment of two hours for an interview. It is possible, however, that I may need to follow-up on some information after our initial interview. As I gather more data, I may ask you to elaborate or to clarify some information. However, any additional time beyond the initial interview should be minimal if it is at all necessary.

Your willingness to participate in this study will be greatly appreciated. Please contact me at either the location on the first page of this letter, (office phone), or at my home, listed below. If you have any additional questions and to inform me regarding your participation.

Sincerely,

Home Address and Phone

Marla A. Barr

Robert J. Silverman
Academic Advisor
Examples of Personal, Methodological, and Theoretical Notes
Made During the Interview Process

The notes maintained by the investigator in the process of collecting data for this study serve several purposes. First, they serve as a reminder of the experiences and reactions during the interview phase. Second, they provide information regarding areas to be explored during future interviews, follow-up interviews, or in the final analysis. Lastly, they are used to remind the investigator regarding exactly what was done in preparation for and during the interview sequence. The following are some examples of the kinds of notes that were made by this investigator.

Example 1 - Many students thought they had to get their advisors' participation. For some, that is why they hadn't responded to me. I informed them that I would be contacting the advisors and that I was most interested in the information the students had to share. Some were very protective of the advisor . . . "He's very busy," or "He doesn't have much time." Are students concerned about my talking to their advisors? I better reassure them about confidentiality during the interviews.
Comment - This entry began to clue the researcher in on the relationships between students and advisors and the significance of those relationships. The researcher also determined to re-emphasize the guarantee of confidentiality because there was a feeling of hesitancy about advisor interviews that was sensed from the students' expressions. Finally, in the light of future research projects, the researcher determined that the letter sent to the students requesting their participation may not have been explicit enough regarding contacting the advisors. This kind of problem would have to be resolved in further studies.

Example 2 - Political Science students seemed most eager to participate in the study.

The first student to respond to the letter - the day after it was mailed - said he "would like to participate since I didn't get any help at all with my dissertation."

Comment - This entry indicated to the researcher a need to check with students regarding their reasons for agreeing to participate in the study. In order to insure that the data sources were reliable and that the students were offering accurate information, it was important to determine that their motives for participating were not skewed by some personal experience. For the most part, their eagerness was a result of genuine interest in the research topic and the feeling that there really isn't enough research being conducted in the area of doctoral education. Finally, this entry also led to a specific discussion with the student
who indicated he "didn't get any help at all," regarding why he made the statement. As it turned out, he had just been denied access to the data he needed for his original topic, and the statement was made from a feeling of anger on his part.

**Example 3** - Called [name] - third interviewee, to set up appointment. The phone was answered [advisor name] group. Another student referred to his advisor as "Boss." He said that he was part of a research group and they all called him "Boss." Does complete identity revolve around the advisor in chemistry?

**Comment** - This entry led the investigator to explore the relationship between advisor and student in the department of chemistry. This was also the first indication that the research group was a significant part of the structure and the students' experiences, and that it had to be explored further.

**Example 4** - Three advisors in the English department phoned today and agreed to participate. The letters were just mailed yesterday! Why so fast?

**Comment** - The investigator was confused by the fast response of three advisors from the same department. It took three to four days for advisors from other departments to respond. After several weeks the researcher realized that the letters were mailed in the same building that housed the English department faculty. Thus, these faculty members
received their letters long before faculty members in other departments. Sometimes a practical explanation reaches further than a theoretical explanation.

Example 5 - Political science student ready to defend. Difficult to take him back to topic development. Really involved in dissertation. Understandable since he's ready to defend. Chemistry student rather bland. Excited by research but not animated like political science student. Could be a function of different points in program? Two interviews done today. I can only handle one. So much data. How can this all be organized?

Comment - This entry alerted the researcher to watch for differences in the students' descriptions of their experiences selecting research topics because of differences in their program stage. Two students had not identified topics, two students were ready to defend their dissertations, the rest of the students were either collecting data, between proposal and data collection or writing their dissertations. In the department of chemistry, distance was a factor of time from the oral examination. Thus, the researcher had to be cautious regarding retrospective accounts of the topic selection process on the basis of the students' distance from that experience.

This entry also reminded the researcher of the overwhelming feeling of immersion during the data collection process. There seemed to be so much information that organization and processing appeared impossible.
Example 6 - Most students seem not to have given much thought to the process of their research. Some of the questions I'm asking are things they say they're thinking about for the first time. Better watch for this and go back and re-check with them. Initial reactions may not be the most accurate. A lot of students have told me that their interviews were really helpful to them. They expressed appreciation because they were becoming more aware of their own experiences.

Comment - This entry alerted the researcher to be cautious regarding answers to questions that seemed to be not well thought out, i.e., that were presented as "on the one side... but on the other side." In addition, this reminded the investigator that some information that did not "fit" the rest of the data may have resulted from responses to questions that students had not previously considered in relation to their experiences. This entry also reminded the investigator about the willingness and appreciation received from the students interviewed. It is possible that participation in this study may have helped some students to reframe their doctoral experience.

Example 7 - I seem to want to generate some new areas for questions. I'm rehashing. I'm close to a different level but I can't get there yet. I need to know more about the program as a beginning point. Do I need to see the lab?

Comment - This entry alludes to the struggle inherent in the continuous collection and coding of data. There was a point where the
researcher knew that some categories were saturated but had not yet clearly identified new categories for exploration. Time had to be spent reflecting on this feeling, discussing it with the investigator's advisor, and then formulating new question areas. Also, a decision was made at this point not to do laboratory observation. It was felt that the students' descriptions were sufficient, and since no such physical space was available to observe students in departments other than chemistry, laboratory observation might have skewed the data results.

**Example 8a** - The "process of becoming" in relation to any field has emerged as an important concept. An important marriage of advisor, literature and the students' intrinsic interest in the content area. In chemistry - advisor tries to model way of approaching problem. Need to do more here - trace this out - "process of becoming."

**8b** - I wonder if I'm getting too far off the track with the concept "process of becoming." Somehow this is related to the doing of a dissertation, but how is it related to the development of the topic?

**8c - Process of Becoming** - A major factor influencing the selection of a dissertation topic relates to a critical perspective the student must develop as he travels through the doctoral program. This perspective, developmental by nature, involves the ability to look at a particular field, focus upon its particular problems, and identify gaps
or missing links in previous research endeavors. As of this date, no
individual has been able to enumerate the specific activities or factors
that aid in a student's ability to develop this perspective.

Comment - As is obvious from the substance of these entries, they
were written over a period of time. They display the emergence of a
particular category or group of categories, confusion about the
appropriateness of the category, and the identification of particular
elements within the category. These entries helped the investigator to
develop question areas that would elicit more information about the
elements related to the "process of becoming."

Example 9 - In the middle of today's interview, the student
responded to one of my questions by saying, "Nice probe." Another
student laughed when I was writing down a quote -- verbatim. He said, "I
do the same thing in interviews when I think that the statement being
made may be gold."

Comment - This entry served to remind the investigator that the
students being interviewed were not only responding as doctoral students.
They were also responding to the interviewer as researchers. It's
important to recognize the various perspectives of participants in
relation to the investigator.
Example 10 - Possible Breakdowns

1) Socialization
   Advisor Role
   Peers
   Change in Relationship with Advisor
   Relationship with Advisor
   Socialization
   Independence

2) Structure
   Program Structure
   Timing
   Exams
   Topic Selection
   Advisor Choice
   Coursework

3) Field
   Field
   Nature of Field
   Career
   Methodology
   Topic Selection
   Coursework

Comment - This entry exhibits one of the earlier attempts to combine the categories that had been developed into broader areas of identification. The researcher spent many hours "playing" with the categories to identify a framework for presenting the data.

It is hoped that the examples offered here will serve to highlight some of the experiences of data collection and coding on personal, methodological, and theoretical levels. In addition to making notes of the types identified above, the researcher also spent much time writing formal descriptions of the results of the data and the methodology employed. Some of those descriptions were used in the contents of Chapters III and IV. Others were premature analyses that serve to emphasize the need for complete "saturation."
APPENDIX I

Coding the Data

During the data collection phase of this study, data were coded on the basis of the researcher's field notes and notes made following the interviews. This consisted of writing pieces of information found in the notes onto small strips of index cards, and then grouping the strips on the basis of the emergent categories. The same piece of information was often placed on several strips and coded into several different categories.

Following the first round of interviews, the transcripts were made. The investigator then used the transcripts to create more strips and a few more categories. All of the "strips" of data were placed out, within their categories, on the living room floor. (At last count, that included approximately eight hundred pieces of information.) Some changes were made, on the basis of the floor analysis, that included additions to categories, deletions from categories, and the development of one new category. From this analysis, and on the basis of the first interview with a student, questions were formulated for the follow-up interviews.

During the follow-up interviews, field notes were used to code additional pieces of information into the existing categories. No new categories were created during this phase, although several categories
were expanded significantly. Transcripts were then made of the second set of interviews. The categories were grouped according to the area divisions found in Chapter IV - Program Structure, Advisor, Research Topic Selection, and Student Growth and Development.

These area divisions became the areas for coding the data directly from the first and second set of transcripts. An example is provided on the following pages. (See Diagram 7.) Coding the data in this way created further category divisions. For example, the information that was originally coded into the category - Literature - is broken down into the categories - Gaps in Literature, Topic Comparison to Available Literature, Popularity in Literature, and Amount of Previous Research in Literature. Not all categories were broken down in this way. For example, the category - Publishability - remained intact.

The numbers on the coding sheet correspond to numbers on Index cards on which the researcher recorded, verbatim, the quotations belonging to that category. An example of the Index cards used is also provided on the following pages. (See Diagram 8.) As we learn from our experiences, it is suggested to those who choose to employ this coding method, that only one quotation be placed on each card, and that the reverse side of cards should not be used.

Before writing the ethnography, the coding sheets were reviewed for similarities and differences between departments. In addition, the data cards in each category were reviewed to determine their inclusion in all related categories. Finally, the researcher determined which categories were revealed by a sufficient number of students to be used as part of
the descriptions. For example, the category - Ability to Work out Method - on the next page was not used. However, the category - Skill Development - was used as it related to the category - Coursework. In the body of the first draft of the report, number codes were used to identify the quotation cards rather than re-writing the quotation. For example, the report read: Card 25 - Area Division - Student Name #14. This saved a lot of time and energy for the investigator. Unfortunately, the typist found this method time consuming. Thus, what was saved in time was later spent on typing expenses.

Finally, it should be noted that each transcript was reviewed only in relation to one area division at a time. Since some of the categories emerged in different areas, some of the data was coded in more than one area. This resulted in some duplication of quotations in the original ethnography. The ethnography was reviewed after completion and new quotations were substituted for the duplicates.

Once the ethnography was written the descriptions were reviewed to identify qualities or properties of the elements influencing topic selection. Three qualities were identified -- sociological, interpersonal, and intrapersonal. Propositions that relate to each of these qualities were then developed. The specific categories that support each proposition were highlighted and discussed as they relate to the propositions and the broader descriptive qualities. Thus, the detailed qualities of the data suggest the overall frame for the presentation of the results. Once these qualities were identified the propositions and supporting categories that were descriptive of the qualities were delineated.
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Area Division - Research Topic Selection

Student Name - A

18. The classes I've taken have given me a really good idea of the literature. It's nauseating detail when it comes to the study of the literature. It really helped that I could see a really clear gap in the literature, and I really thought if I could get something there it would be possible to get it published.