A STUDY OF FACULTY RESEARCH PRODUCTIVITY

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by

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APPROVAL OF THE DISSERTATION

This dissertation, A STUDY OF FACULTY RESEARCH PRODUCTIVITY, has been approved by the Graduate Faculty of the Curry School of Education in partial fulfillment of the requirements for the degree of Doctor of Education.

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ABSTRACT

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The purpose of this study was to examine the relationship between and among factors that have been identified in the literature to explain the variance in faculty research performance--psychological-individual factors, cumulative advantage, reinforcement, and disciplinary norms. No study had previously incorporated the four explanations for variance in faculty research productivity in a single study.

In order to investigate this problem, the researcher utilized self-report data from the 1989 Carnegie Survey of faculty. Individual research performance of 4380 full-time, tenured and non-tenured faculty employed in Research Universities, Doctorate Granting Universities, Comprehensive Colleges and Universities, and Liberal Arts Colleges was studied by

eight correlates of faculty research productivity. These research correlates were institutional affiliation, academic rank, discipline, tenure status, gender, the number of hours per week spent on research and/or scholarly activities, current engagement in scholarly work, and receipt of internal research support in the past twelve months. Four types of publication counts and the receipt of external research support were used as measures of research performance. Data analysis relied on descriptive statistics and stepwise multiple regression techniques.

Results of this study indicated rank and institutional affiliation were significant predictors ($p \leq .1$) for each of the five measures of faculty research productivity. Current engagement in scholarly work, tenure status, and the hours per week spent on research and/or scholarly activities were significant predictors ($p \leq .1$) for four of the five measures of research productivity. Overall, levels of faculty scholarly productivity increased from Liberal Arts II Colleges through Research I Universities, the rank of

instructor through the rank of professor, non-tenured to tenured faculty, females to males, nonreceipt of internal research support to receipt of such support, no engagement in scholarly work to engagement in such activity, and spending ten or less hours per week on research/scholarly activities through spending forty hours per week on such activities. Engineering faculty were the most productive in four of the five measures of research performance. Faculty in the Biological Sciences ranked second on three of the five measures of scholarly performance and Fine Arts faculty ranked last on three of the five research measures.

To My Family

Terry

Scott

Terry Lynn

and my parents

Charles Scott ("Bus") and Eula Trent Frazier

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Chapter 1

Introduction to the Study

Why some faculty maintain a high level of research productivity year after year and others do not remains an enigma in higher education (Cole & Zuckerman, 1984; Long, 1978). Variation in faculty research performance tends to be very high and the average rate of individual faculty publication very low (Allison, 1980; Fox, 1983; Robbins, Corcoran, Hepler, & Magner, 1986). While one commonly finds four explanations in the literature for this variance in faculty research productivity--psychological-individual factors, cumulative advantage, reinforcement, and disciplinary norms--no single study analyzes all four explanations (Creswell, 1985a, p. 241; Wood, 1990, p. 83).

Psychological-individual factors include intelligence scores (Cole, J. & Cole, S. 1973; Cox, 1980), motivation to engage in research/scholarly activities (Cole, J. & Cole, S. 1973; Merton, 1973; Pelz & Andrews, 1966), personality characteristics (Fox, 1983; Roe, 1953), stress (Horowitz, Blackburn, & Edington, 1984), age (Reskin, 1980), and gender (Astin,

1984; Cole, J. 1979; Cole & Zuckerman, 1984). Cumulative advantage is based on Merton's (1973) "Matthew effect" in science (i.e., when scientists receive recognition or resources, they gain additional advantages). Cumulative advantage factors include prestige of the doctoral program, mentoring, prestige of the employing institution, academic resources (including internal research support), and assignment that allows time for research (Allison & Stewart, 1974; Cole, J. & Cole, S. 1973; Merton, 1973). Based on the Skinnerian principle that an activity which is rewarded is more likely to be continued than an activity which is not rewarded, reinforcement refers to recognition by colleagues (Gaston, 1978; Reskin, 1977), academic rank (Reskin, 1977), tenure (Reskin, 1977), early productivity (Blackburn, Behymer & Hall, 1978; Cole, J. & Cole, S. 1973; Lightfield, 1971, p. 133; Manis, 1951), and preference for research (Blackburn, Behymer & Hall, 1978; Cresswell, Barnes & Wendel, 1982). The norms of a discipline also explain part of the variance in the research performance of faculty (Astin, 1978; Blackburn, Behymer & Hall, 1978; Cole, S. 1979; Storer, 1973, p. xvii; Wanner, Lewis & Gregorio, 1981).

Some studies of faculty research performance (Allison & Stewart, 1974; Gaston, 1978) have discussed as many as three of the four explanations for the variance in faculty research productivity--psychological-individual, cumulative advantage, and reinforcement. A study of leading researchers in nursing conducted by Megel, Langston, and Creswell in 1988 examined these three explanations and provided a model for studying factors influencing scientific research productivity (p. 47).

The importance of high research performance is widely accepted and understood by those working on college and university campuses (Creswell, 1985, p. 1). However, specific factors identified as correlates of high research productivity are "fraught with measurement problems, unclear causality, and unspecified predictive power" (Creswell, iii).

In spite of more than ninety studies of faculty research productivity conducted since 1940 (Fox, 1983), measures of research performance remain unclear and problematic (Clemente, 1972; Creswell, 1985, iii). Any attempt to measure faculty research performance

disturbs some who consider it to be unmeasureable (Yuker, 1978).

For this study, self-report data from the 1989 Carnegie Survey of the professoriate were utilized to report faculty research productivity. The Carnegie Foundation for the Advancement of Teaching has conducted a series of four surveys in 1969, 1975, 1984, and 1989 to "clarify the status of the professoriate and . . . provide a portrait of American higher education" (Carnegie, 1989).

Many studies of faculty research productivity are limited by their failure to account adequately for factors such as institutional affiliation, academic rank, discipline, tenure status, and gender (Creswell, 1985, vii). Failure to control for such factors poses limits to college and university administrators for translating research findings into viable approaches to faculty evaluation. Moreover, data reported from national studies of faculty research productivity that do account for such factors are typically aggregated to such an extent that subsequent use of the results by college and university administrators is deemed impractical (Gill, 1991). In this study, the researcher

disaggregated the data by institutional affiliation, rank, discipline, tenure status, and gender in order to facilitate use of the data by faculty and administrators.

Purpose of the Study

The purpose of this study was to examine the relationship between and among psychological-individual factors, cumulative advantage, reinforcement, and disciplinary norms--factors that account for variance in research performance--and individual faculty research productivity as measured by self-report data on the 1989 Carnegie Survey of faculty. Studying faculty research productivity in this manner incorporated the four explanations for variance in faculty research performance in a single study. In order to investigate this problem, the individual research performance of full-time faculty was studied by institutional affiliation, academic rank, discipline, tenure status, gender, the hours spent per week on research and/or comparable scholarly activities, current engagement in scholarly work, and the receipt of internal research support in the past

twelve months. Self-report data relative to publication counts, which are commonly used as measures of individual research productivity (Creswell, 1985, p. 7), and external research support received by faculty within the last twelve months (Megel et al., 1988, p. 47) were used as measures of research performance.

It is anticipated that the results of this study will benefit scholars of higher education by increasing the understanding of individual faculty research productivity. Because of the high degree of variance in faculty research performance, it is anticipated that the results of this study will be an important information source for presidents, deans, chairs, and personnel committees who review faculty credentials from different departments and disciplines.

Rationale for the Study

From the early 1980s, an aggressive movement to "upgrade the importance of scholarly productivity as a criterion for academic personnel decisions" has been observed in diverse colleges and universities throughout the United States (Bowen & Schuster, 1985, p. 14). The "research surge" has not been limited to "universities" but has been prevalent at other institutions where research previously received lower priority status (Bowen & Schuster, 1986, p. 147; Seldin, 1984). Findings from a study of fifty-nine chairs of promotion and tenure committees in ninety-three universities with accredited master of social work programs indicated that research/scholarly productivity was the central criterion for making promotion and tenure decisions (Gibbs & Locke, 1989). Fifty-four percent of all faculty surveyed by the Carnegie Foundation in 1989 indicated that it was difficult for one to achieve tenure if he or she did not publish, and fifty-seven percent reported that the number of publications was important (Carnegie, 1989, pp. 48-49). However, sixty-eight percent of the faculty

surveyed agreed that better ways, besides publications, were needed to evaluate the scholarly performance of faculty (Carnegie, p. 52).

Research productivity of science and social science faculty, the disciplinary groups that have been studied most (Creswell, 1985, pp. 22-23), has traditionally been measured by publication counts (Caplow & McGee, 1958; Folger, Astin, & Bayer, 1970), citation counts (Bayer & Folger, 1966; Kroc, 1983; Lindsey, 1978; Smith & Fielder, 1971), and/or peer or colleague ratings (Centra, 1977; Cole, S. 1979; Folger, Astin, & Bayer, 1970; Pelz & Andrews, 1966; Seldin, 1984). While these three measures of faculty research performance are intercorrelated (Creswell, p. 7), few writers consider alternative measures of scholarly productivity (Finkelstein, 1984). Creswell suggests empirical studies of faculty research productivity should include such measures as "grants obtained, patents, and creative projects" (p. 7).

Self-report data from the 1989 Carnegie Faculty Survey were utilized in this study to examine faculty research productivity. As Creswell has recommended (1985, p. 5), criteria other than publications,

citations, and ratings were used to measure faculty research performance. Current engagement in any scholarly work that one expects to lead to a publication, an exhibit, or a musical recital was used as a correlate of research productivity measures. In this study, the criteria for measuring faculty research productivity are as follows: the number of articles published in academic or professional journals, the number of articles published in edited collections or volumes, the number of books or monographs published or edited alone or in collaboration, the number of professional writings published or accepted for publication in the past two years, and the receipt of external research support within the last twelve months.

Substantially modifying the model developed by Megel, Langston, and Creswell (1988) to include all four explanations for variations in research performance (Creswell, 1985; Finkelstein, 1985), the researcher studied research productivity of full-time faculty. For psychological-individual explanations, faculty research performance was examined by gender and current engagement in scholarly work. To include

cumulative advantage factors, faculty research productivity was studied by institutional type, hours spent per week on research and/or comparable scholarly activities, and internal research support received during the last twelve months. In order to examine reinforcement, faculty research performance was examined by academic rank and tenure status. Individual research productivity of faculty was also studied by discipline.

Acknowledging that faculty performance includes teaching and service as well as research (Kirschling, 1978; Yuker, 1978), the researcher chose to limit the proposed study to factors related to "research" productivity. Hoffman (1984) concluded that effective faculty performance in teaching, research, or service did not predict success in either of the other performance areas.

Further, this study focused only on individual faculty research. Institutional, departmental, or collegial analyses of research productivity are available in studies done by Kroc (1983) and Wallhaus (1975).

Research Questions

The study utilized quantitative methods through the employment of a self-reported questionnaire to study faculty research productivity.

The following research question prompted this study and was of primary importance in this research.

> How does the level of faculty research productivity vary by institutional type? by academic rank? by discipline? by tenure status? by gender? by the number of hours spent per week on research and/or scholarly activities? by current engagement in scholarly work? by internal research support?

In order to answer this primary research question, subsidiary questions were addressed.

1. How many hours per week do faculty spend on research and/or comparable scholarly activities?
2. What percentage of faculty is currently engaged in scholarly work that is expected to lead to a publication, an exhibit, or a musical recital?
3. What percentage of faculty has received internal research support during the past twelve months?
4. What is the level of faculty productivity as determined by (a) the number of articles published in academic or professional journals? (b) the number of articles published in edited collections or volumes? (c) the number of books or monographs published or edited alone, or in collaboration? (d) the number of professional writings published or

accepted for publication in the past two years? (e) the receipt of external research support within the last twelve months?

5. What percentage of variance in faculty research productivity can be explained by (a) institutional affiliation? (b) rank? (c) discipline? (d) tenure status? (e) gender? (f) hours spent per week on research and/or scholarly activities? (g) current engagement in scholarly work? (h) receipt of internal research support?

Chapter 2

Review of Related Literature

Research is one of the primary roles of faculty in American colleges and universities (Finkelstein, 1984). Furthermore, faculty are often recruited, hired, valued, and rewarded based on their research productivity. The following literature review establishes the framework for this study of faculty research productivity.

In order to understand the issues surrounding this study, it is necessary to synthesize the literature and research conducted previously in several topic areas. A brief summary of the history of the research role of faculty is provided to illustrate the emerging importance of this role for faculty. The philosophical context of research is examined to provide a contextual understanding of the faculty research role. Specific factors identified in the literature as correlates of faculty research productivity are presented in terms of previous studies. In particular, institutional affiliation, academic rank, discipline, tenure status, gender, and resources will be discussed as they relate to faculty research performance. Finally, a model

developed by Megel, Langston, and Creswell (1988) for studying factors influencing scientific research productivity is presented.

Historical Development of the Research Role for Faculty

Enthusiasm for research came from Germany to the United States during the post-Civil War period and was manifested in American universities by the 1870s (Veysey, 1965). Johns Hopkins University, opened as a graduate school for men in 1876, embodied the Germanic aim of research. However, Daniel Coit Gilman, the first president of Hopkins, was never entirely comfortable with the term "research" and "had no desire to replace the conventional American college with a Germanic university" (Veysey, p. 159). Gilman said that the American university should never become

> merely a place for the advancement of knowledge or for the acquisition of learning; it will always be a place for the development of character. A society made up of specialists, of men who have cultivated to the extreme a single power, without

> simultaneously developing the various faculties of the mind, would be a miserable society of impractical pessimists . . . (Gilman, 1886, p. 210).

Profound commitment to research during this time was usually limited to a particular segment of the faculty and graduate students. As individual departments of learning evolved in the 1880s and 1890s, they were often split internally between identification with academic ideologies and devotion to research (Veysey, 1965, pp. 59-60). While the distinction between pure and applied research was never exact, "pure" or non-utilitarian research was defined as "learning for its own sake" (Veysey, p. 122). Illustrative of this dichotomy in orientation of American institutions of higher learning during the latter part of the nineteenth century was the establishment of a School of Pure Science at Columbia, in 1890, with a separate Faculty of Applied Science (Veysey, p. 122).

Twenty-four American graduate schools evolved in the 1880s and 90s, with one-half of the students

enrolled in natural sciences and social sciences (history and psychology) and one-third engaged in the study of languages (Veysey, 1965, p. 173). Only one-tenth of the graduate students majored in philosophy or the fine arts, disciplines that had "resisted a scientific perspective" (Veysey, p. 173).

The impetus for research had become a primary concern of higher education by 1890. Colleges and universities encouraged their faculty to take leave to pursue advanced degrees. By 1893, graduate work was necessary in order to gain a permanent appointment at prominent colleges and universities, and, by 1900, the Ph.D. was usually mandatory (Veysey, 1965, p. 176). The Association of American Universities (AAU), founded in 1890, viewed research as "the intrinsic function of `the' university in the United States" (Veysey, p. 175). In 1901, Yale announced that promotion of faculty would be based on "productive work" that would give the faculty a "national reputation" (Veysey, p. 177). Requiring a minimum amount of teaching, the first "research chair" was established at Cornell in 1909 (Veysey, p. 176). While controversy was to be ongoing, by 1910 research had nearly gained the prominence in

academia that it was to maintain thereafter, counted among the other demands placed on institutions of higher learning (Veysey, pp. 177-78).

The growth of research influenced American higher education in two significant ways: by fostering increased specialization of knowledge and by accepting the "liberation of intellect for its own sake" (Veysey, 1965, p. 142). With the growing emphasis on research was a concomitant tendency to devalue the undergraduate college and the teaching role (Veysey, pp. 143-44).

Scholars began to study the research role of faculty in the 1940s and 50s. One of the first studies of faculty research productivity was Logan Wilson's (1942) The Academic Man. In this study, Wilson concluded that faculty who confined their activities to classroom teaching were promoted more rapidly than those persons who published research. Fifteen years later, Lazarsfeld and Thielens (1958) studied highly productive social scientists and found that, as a group, they tended to hold an office in one or more professional organizations, move from one institution to another, and come from a high socioeconomic level.

Interest in research productivity increased from a practical perspective during the post-sputnik era, as policymakers became concerned about maximizing research performance (Kaplan, 1964). Having received funding from the National Institutes of Health and the Carnegie Corporation, Pelz and associates at the University of Michigan conducted a six-year study to determine what factors create a stimulating environment for research and development (Pelz & Andrews, 1966, p. 1). This line of research as well as studies on the social structure of institutions and the individual characteristics of its participants (Merton & Gaston, 1977; Storer, 1973) has provided important baseline information for the study of research performance and has "added substance and depth to a field of study known today as the sociology of science" (Creswell, 1985, p. 3).

Philosophical Context of the Faculty Research Role

While the modern role of American faculty includes research, teaching, institutional service, and community service, faculty view themselves predominantly as teachers, spending most of their work hours teaching or in teaching-related activities (Bowen & Schuster, 1986; Fulton & Trow, 1974). Baldwin and Blackburn (1985) reported that a uniform high ranking of the importance of teaching remained stable over the career span of faculty. In spite of the fact that the majority of faculty has never published or has published very little, research appears to be valued as a very important activity for faculty in postsecondary education (Ladd, 1979). As Creswell (1985, p. xv) noted,

> Presidents and trustees value productivity for the visibility and reputation it indirectly earns for the institution. Administrators and deans admire productivity for the creative, stimulating forces it brings into the collegial atmosphere. The

academic community smiles upon scholarly work because it advances knowledge.

Research productivity is being stressed at institutions other than research, doctoral-granting, and major universities (Seldin, 1984). Having visited thirty-eight diverse American colleges and universities during the early 1980s, Howard Bowen and Jack Schuster observed an aggressive movement to "upgrade the importance of scholarly productivity as a criterion for academic personnel decisions" (Bowen & Schuster, 1985, p. 14). Bowen and Schuster noted that the "research surge" was not limited to "universities" but was prevalent at other institutions where research had previously received lower priority status (Bowen & Schuster, 1986, p. 147).

Faculty research productivity becomes an avenue to establish an institution's reputation (Bowen & Schuster, 1986, p. 150; Meisinger, Purves, & Schmidtlein, 1975) and a quantitative element in the promotion and tenure process (Ladd, 1979). In addition, faculty research contributes to the public domain of knowledge (Carnegie, 1980; Ziman, 1968). Penicillin,

the computer, and the polio vaccine were developed through research conducted in universities (Bowen & Schuster, 1986, p. 17).

Research performance, like teaching, is more intrinsically than extrinsically motivated (Finkelstein, 1985; Hunter & Kuh, 1984; Kearney, 1987; McKeachie, 1969; O'Connell, 1983). Finkelstein (1980) found that faculty research productivity patterns apparently do not reflect the "performance demands . . . in institutional incentive structures" (p. 23) but rather faculty's "individual predilections" (p. 24). In a study of highly successful researchers in mass communications research departments (Schweitzer 1989), ninety-seven percent of the respondents cited personal motivation as their strongest single productivity factor.

Research performance, unlike teaching, is supported by institutions in terms of providing tangible rewards, stimulating colleagues, and providing opportunities for growth (Finkelstein, 1985, p. 5; Schuster & Wheeler, 1990, pp. 94-95; Tuckman, 1985). Research is also supported "by the norms and

expectations of the academic disciplines and professional fields" (Finkelstein, p. 5).

In American colleges and universities, research productivity is playing an increasingly important role in academic decision-making. (Creswell, 1985, p. xv).

Correlates of Faculty Research Productivity

The variation in faculty research productivity can be explained, in part, by institutional affiliation, academic rank/age, gender, discipline, tenure status, and resources.

Institutional Affiliation

A recent study of the effects of organizational context characteristics and individual characteristics on the research performance of chemistry faculty indicated that organizational context advantages, such as the research orientedness of the affiliated institution, were related to high faculty research productivity (Kim, 1990). No individual characteristics in this study were found to be significantly related to faculty publication productivity.

Prestigious institutions attract talented graduate students to faculty positions (Crane, 1965), and, in turn, the employing institution molds individual research performance (Creswell in Finkelstein, 1985, p. 256). The correlation between the prestige of the employing institution and individual research productivity increases over time (Long & McGinnis, 1981). Long and McGinnis (1981) found that faculty research productivity was largely determined by the context of a new employing institution within six years of obtaining a position.

Why prestigious institutions enhance faculty research productivity is unclear, however (Fox, 1983). Long (1978) proposed that prestigious institutions have the resolve and ability to select those individuals who will become high research producers, while Crane (1965) reasoned that prestigious institutions are able to recruit highly talented faculty and offer faculty high visibility and contacts. Creswell (in Finkelstein, 1985, p. 257) made the following observation:

> Papers submitted by faculty in prestigious departments may appear superior and be more

readily accepted for publication. Prestigious departments and institutions tend to be larger and to possess resources and colleagues that facilitate research.

Academic Rank/Age

Academic rank is highly correlated to faculty research productivity (Creswell, 1985, p. 40). Overall, faculty in the higher academic ranks have larger numbers of publications to their credit than do faculty in the lower academic ranks (Blackburn, Behymer & Hall, 1978; Fulton & Trow, 1974). While this relationship is to be expected, the causal direction between academic rank and faculty research performance remains unclear. Finkelstein (1984, p. 101) believes selection factors account for the association between rank and publication rate. He thinks that

> . . . promotion to a higher rank may be a function of an already demonstrated publication rate, which persists in the new status (Finkelstein, 1984, p. 101).

In a study of performance levels and promotion experiences of 371 university faculty members under three different market conditions, Perrucci, O'Flaherty, and Marshall (1983) found that faculty promoted during a buyer's market remain in rank longer before being promoted and exhibit a higher level of productivity than faculty promoted during other market conditions. In this study, the impact of "tight" market conditions on faculty research performance was found to be greater for faculty below the rank of full professor (Perucci et al.).

Complex measurement and other methodological problems make the relationship between faculty research productivity and age difficult to determine. Some studies use chronological age (Cole, S. 1979; Pelz & Andrews, 1966), while other studies use years of professional experience (Creswell, Patterson & Barnes, 1984), number of years since the doctorate was received (Allison & Stewart, 1974; Bayer & Dutton, 1977), or a combination of academic rank and career age (Baldwin & Blackburn, 1981).

Pelz and Andrews (1966) have identified a saddle-shaped or dual curve of scholarly productivity

with respect to age, i.e., an early rise, a subsequent fall, and then another rise during the fifties. This study was corroborated by Blackburn, Behymer, and Hall (1978), who reported a decrease in faculty research productivity at the associate professor stage and a subsequent increase at the full professor stage.

Research conducted by Bayer and Dutton (1977) revealed a direct decline of faculty research productivity according to career stage, with article publication peaking at approximately five to ten years of career age. While this study reported only a slight decrease in research productivity among faculty with twenty-five years of career age, it found a notable increase in the number of faculty who were not producing any scholarly work.

In a national study of faculty, Fulton and Trow found that faculty, with increasing age, focused their time and energies on teaching at the expense of research (1974, p. 54). This study reported that faculty described themselves as "exclusive teachers" with twice the frequency and as "strong researchers" with half the frequency between the ages of thirty-one to thirty-five and fifty-six to sixty.

Using a twenty-two field sample, Tuckman (1985) studied four faculty activities--teaching, public service, publishing books, and publishing articles. He concluded that publishing articles had the greatest impact on a faculty member's chances for promotion (p. 127), with the contribution being stronger at the rank of associate professor than at the full professor level.

Literature relevant to faculty research productivity and age supports conflicting assumptions: while faculty research performance improves with experience, aging impairs research productivity (Creswell in Finkelstein, 1985, p. 242). Reskin (1980) postulated that the positive and negative effects of aging could negate one another or operate independently at different career stages.

Several factors can affect the relationship between faculty research productivity and age. These include motivation, risk-taking, stamina, socialization to research norms, the institutional reward system, competing demands on time, extraprofessional roles, and the effect of scientific specialties (Reskin, 1980).

Age has been found to be an insignificant correlate of faculty research productivity when research performance was regressed against gender, academic rank, and the research standing of the employing institution (Over, 1982). Because age correlates highly with academic rank, Blackburn, Behymer, and Hall (1978) eliminated age entirely in their final statistical analysis. Based on the correlation between research performance and academic rank, the researcher has chosen to report faculty research productivity in this study by academic rank.

Discipline

The norms of a discipline and the knowledge in the field of study explain, in part, variations in faculty research productivity (Blackburn, Behymer, & Hall, 1978; Blau, 1973; Finkelstein, 1985; Wanner, Lewis, & Gregorio, 1981; Wilson, 1942; Wood, 1990, p. 85).

> Natural scientists, as a group, emerge as the most productive; faculty in the humanities, education, and the fine arts, as the least productive; and social scientists fall

somewhere in between (Finkelstein, 1984, p. 100).

This rank order when comparing productivity variables for three disciplinary categories--natural sciences, social sciences, and the humanities--was found in earlier studies conducted by Wanner, Lewis, and Gregorio (1981) and Biglan (1973).

The norms of a discipline have a twofold effect on faculty research productivity. First, disciplines differ in the stage of paradigmatic development, in the understanding of the accepted theory, in the preferred methodologies, and in the understanding of important areas to study (Kuhn, 1970). Social sciences, for example, are immature fields considered to be in a pre-paradigmatic stage, while the physical sciences are mature fields in a paradigmatic stage. Lodahl and Gordon suggest the paradigm "provides structure by suggesting which problems require investigation next, what methods are appropriate to their study, and even which findings are indeed `proven'" (1972, p. 58). Second, fields of study differ in their research

activities (Zuckerman & Merton, 1973), called the social activities of disciplines by Gaston (1978).

The paradigmatic stage of a discipline affects scholarly research (Lodahl & Gordon, 1972) in terms of acceptance rates in journals (Gaston, 1978) and the form of communication (Biglan, 1973). In disciplines in which the knowledge is codified to a high degree (e.g., physics), the acceptance rates are high. Further, in disciplines in a paradigmatic stage, abbreviated forms of scholarly publications--journal articles--are accepted. In pre-paradigmatic disciplines, such as education, lengthened communication forms--books and monographs--are required (Biglan).

Disciplines also vary in terms of the research activities. These differences in research activities include the amount of concern scientists express relative to the priority to be placed on their current research, the average number of papers produced annually, the age of the literature included in scholarly papers, the validity of published answers to research questions, the extent to which mathematics is utilized in research, the coauthorship patterns, the reliance on research assistants, and the division of

labor on scholarly works that require various collaborators (Gaston, 1978).

Tenure Status

Tenure is an integral issue in faculty research productivity (Chait & Ford, 1985; Wood, 1990). Alstyne (1985, p. 167) made the following observation:

> The function of tenure is not only to encourage the development of specialized learning and professional expertise by providing a reasonable assurance against the dispiriting risk of summary termination; it is to maximize the freedom of the professional scholar and teacher to benefit society through the innovation and dissemination of perspectives and discoveries aided by his investigations, without fear that he must accommodate his honest perspectives to the conventional wisdom.

While tenure is an issue in faculty research performance (Chait & Ford, 1985), the granting of tenure may not be an incentive to increase the level of

research performance (Creswell, 1985, p. 40). Holley (1977) found a posttenure decrease in the level of faculty research performance across institutional types. Conducting a study of faculty research productivity in four departments-- physics, chemistry, sociology, and political science--Neumann (1979) reported insignificant differences in publication rates between tenured and non-tenured faculty. Because of this defacto relationship between granting tenure and the level of faculty research performance, Blackburn, Behymer, and Hall (1978) concluded that few mistakes will be made by granting tenure to faculty who are productive.

Gender

While there is compelling evidence that males publish more than females (Astin, 1984, 1969; Babchuk & Bates, 1962; Cole, J. 1979; Cole & Zuckerman, 1984; Hargens, McCann, & Reskin, 1978) and are consequently more frequently cited (Persell, 1983), the literature is less conclusive relative to the reasons for the differences in output (Cole & Zuckerman).

Several possible explanations for the variation in faculty research productivity by gender have been suggested. One such explanation proposed that women do not have access to the "old boy" network and are not privy to the scientific information being exchanged (Creswell in Finkelstein, 1985, p. 242). Another explanation that has been offered is that women's work is not taken seriously by the academic community; that is, their work is often dismissed by those in powerful positions (Creswell in Finkelstein, 1985, p. 242). Cole and Zuckerman (1984) found that female scientists seemed to be discouraged more readily than male scientists and were less readily encouraged by having their work cited to varying degrees. Another possible explanation for females publishing less than males has to do with traditional family responsibilities that would prevent women from spending as much time on research activity as men (Creswell in Finkelstein, 1985, p. 242). However, in a study of faculty research performance conducted by Ferber and Loeb (1973), married females with or without children were found to be no less productive than single women. Stephen Cole (1979) found that the stability and routine often

associated with marriage and family are positively related to high faculty research productivity.

While gender helps to explain variations in the quantity of faculty research publications (Rosenfeld, 1987), it is, comparatively, an insignificant correlate of faculty research performance because of its high correlation with other variables (Bernard, 1964; Blackburn, Behymer, & Hall, 1978; Cameron & Blackburn, 1981; Cole & Zuckerman, 1984).

Resources

In order to be highly productive researchers, faculty need resources that support their research agendas (Cole, S. 1979; Creswell, 1985, p. 50; Fox, 1983, p. 297; Ingalls, 1982; Wood, 1990, p. 87). One of these resources is time. Faculty and administrators often overlook the need to assign research time to the faculty load (Creswell, p. 50). While the amount of time faculty spend on research has been found to be an important predictor of high research productivity (Allison & Stewart, 1974; Harrington, 1985), the amount of time assigned as part of the workload for faculty for research "need not be excessive" (Creswell, p. 50). Spending too much or too little time on research activities can hamper research productivity (Pelz & Andrews, 1966). Spending less than ten percent or more than eighty percent of one's work time on research activities has been associated with low research performance (Knorr, Mittermeir, Aichholzer & Waller, 1979). Research productivity peaked among scientists when about one-third of their work time was spent on research (Knorr et al.).

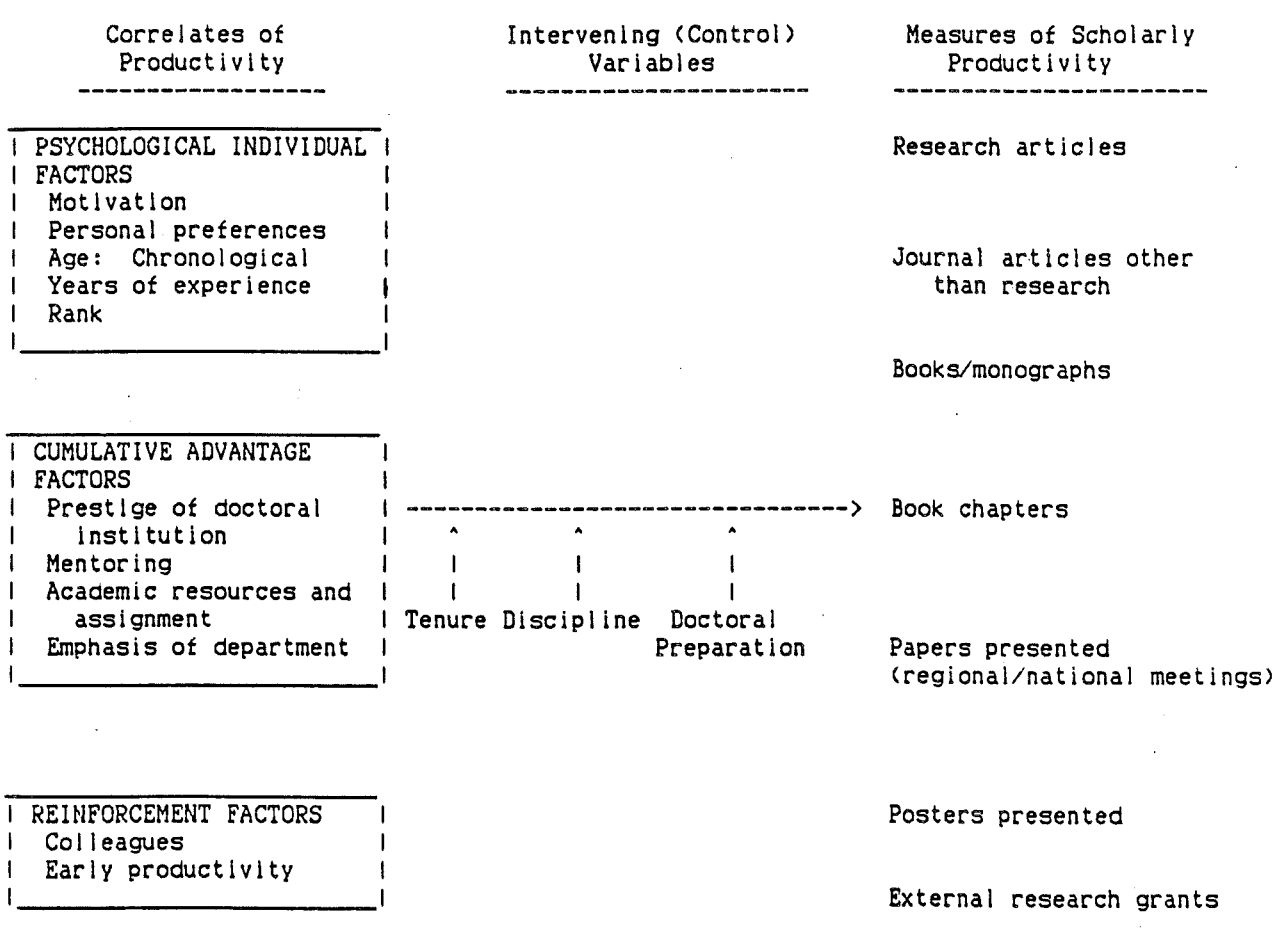
Research grants are another source of research support for faculty. Use of monies for research varies by departments (Wood, 1990). For example, equipment is more essential in the sciences than in the social sciences, where research funds for travel and personnel to transcribe interviews are considered very important. In music and drama, funds are needed to offset the costs associated with performances and productions (Wood, p. 88). Liebert (1976) found that grant receipt depends primarily on faculty research productivity, secondarily on the inequalities in favor shown to specific fields, and very little on particular situational and personal status factors.

Faculty need internal research support to have productive research careers (Creswell, 1985, p. 50; Ingalls, 1982; Wood, 1990). Among the resources that faculty need are sufficient computer time, research assistants, secretarial support, internally funded research grants, sabbatical leave grants, equipment, and faculty travel funds.

Scholarly Productivity Model

A study of leading nurse-faculty researchers conducted by Megel, Langston, and Creswell in 1988 examined psychological-individual, cumulative advantage, and reinforcement explanations for the variance in faculty research performance, and provided a model for studying factors influencing scientific research productivity (p. 47). In the study conducted by Megel et al., tenure, discipline, and doctoral preparation were control variables. Measures of scholarly productivity included research articles, journal articles other than research, books/ monographs, book chapters, papers presented at regional/national meetings, posters presented, and external research grants. Five time periods were used to measure research productivity: before doctorate, after doctorate before tenure, tenure through present, last three years, and career.

MEGEL/LANGSTON/CRESWELL MODEL



The purpose of the study conducted by Megel et al. (1988) was to identify the factors that explain the differences among nursing researchers in terms of faculty research productivity. From this study, the profile of a productive nurse-faculty researcher emerges as an individual who has

> published slightly less than one research article per year for the last three years, has a record of increasing productivity during his or her career and published before obtaining the doctorate, is motivated to conduct research by peers outside the institution and fellow research team members inside the institution, likes conducting and writing research and writing research grant proposals, tends to have coauthored research papers with mentors in graduate school, spends less time teaching than the combined time given to conducting and writing research, and spends a substantial amount of time on administrative duties (Megel et al., 1988, p. 53).

Chapter 3

Design and Methods

This research was a descriptive study that used quantitative methods to describe the relationship between levels of faculty research productivity and institutional affiliation, academic rank, discipline, tenure status, gender, the hours per week that faculty spend on research and related scholarly activities, the current engagement of faculty in scholarly work, and the receipt of internal research support within the last twelve months. Levels of faculty research productivity were based on the number of articles published in academic or professional journals, the number of articles published in edited collections or volumes, the number of books or monographs published or edited alone or in collaboration, the number of professional writings published or accepted for publication in the past two years, and the receipt of external research support within the last twelve months. These measures of faculty research productivity are reported by the following factors.

1. Institutional type: Research I, Research II, Doctorate I, Doctorate II, Comprehensive I, Comprehensive II, Liberal Arts I, Liberal Arts II

2. Academic rank: Professor, Associate Professor, Assistant Professor, Instructor

3. Discipline: Biological Sciences, Business, Education, Engineering, Fine Arts, Health Sciences, Humanities, Physical Sciences, Social Sciences, Other

4. Tenure status: Tenured, Non-tenured

5. Gender

6. Number of hours per week spent on research and comparable scholarly activities

7. Current engagement of faculty in scholarly work

8. Internal research support received by faculty within the last twelve months

The researcher used multiple regression to determine the percentage of variance attributed to the eight faculty research productivity correlates (predictors) for each of the five measures of faculty research performance.

Self-report data for the study were generated by the 1989 survey of the professoriate conducted by the Carnegie Foundation for the Advancement of Teaching.

Allison and Stewart (1974) estimated the reliability of self-reported information relative to faculty research productivity by comparing responses from chemists to publication counts from Chemical Abstracts and found the correlation was r=.94. For this study, the unit of analysis was individual responses of faculty members who returned the 1989 Carnegie Survey. The researcher answered the research questions through subsequent data analysis.

Research Questions

Primary Research Question:

> How does the level of faculty research productivity vary by institutional type? by academic rank? by discipline? by tenure status? by gender? by the number of hours spent per week on research and/or scholarly activities? by current engagement in scholarly work? by internal research support?

Subsidiary Research Questions:

1. How many hours per week do faculty spend on research and/or comparable scholarly activities?
2. What percentage of faculty is currently engaged in scholarly work that is expected to lead to a publication, an exhibit, or a musical recital?
3. What percentage of faculty has received internal research support during the past twelve months?

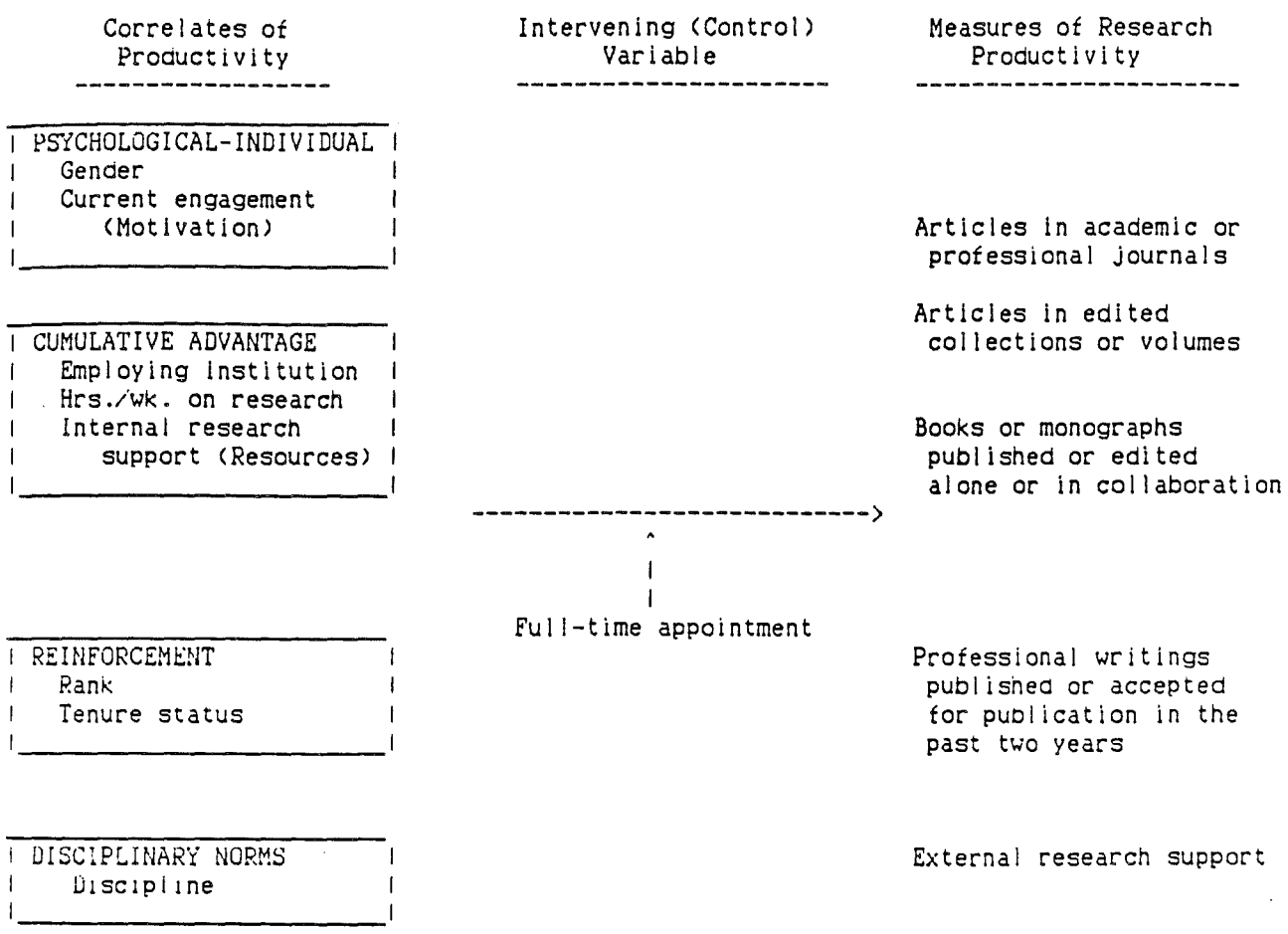
4. What is the level of faculty productivity as determined by (a) the number of articles published in academic or professional journals? (b) the number of articles published in edited collections or volumes? (c) the number of books or monographs published or edited alone, or in collaboration? (d) the number of professional writings published or accepted for publication in the past two years? (e) the receipt of external research support during the past twelve months?

5. What percentage of variance in faculty research productivity can be explained by (a) institutional affiliation? (b) rank? (c) discipline? (d) tenure status? (e) gender? (f) hours per week spent in research and/or scholarly activities? (g) current engagement in scholarly work? (h) receipt of internal research support?

Research Model

Substantially modifying the research model developed by Megel, Langston, and Creswell (1988, p. 47) to include all four explanations for the variance in faculty research productivity found in the literature and the correlates of faculty research performance germane to this study, the researcher utilized the following research model to examine faculty research productivity.

RESEARCH MODEL



The Research Model substantially differs from the Megel-Langston-Creswell Model (MLC Model). While the MLC Model used tenure and discipline as control variables, the Research Model used these variables as correlates of faculty research productivity. By using tenure and discipline as research correlates, the researcher was able to examine the relationship between these variables and specific measures of research performance. The MLC Model also used doctoral preparation as a control variable. The sole control variable for the Research Model was full-time employment in the affiliated institution for at least nine months of the academic year.

Correlates of faculty research productivity in the MLC Model address factors related to only three of the four explanations found in the literature for the variance in faculty research performance--psychological-individual, cumulative advantage, and reinforcement. By adding the fourth explanation for the variance in faculty research productivity--discipline--to the Research Model, the researcher was able to address all four explanations. For psychological-individual factors the MLC Model used motivation, personal preferences, chronological age, years of

experience, and rank. The Research Model used gender and current engagement for psychological-individual factors. Current engagement was used as a motivational factor. For cumulative advantage factors, the MLC Model used prestige of the doctoral institution, mentoring, academic resources and assignment, and emphasis of the department. The Research Model used the type of employing institution, number of hours per week spent on research or comparable scholarly activities, and receipt of internal research support for cumulative advantage factors. In the Research Model, the receipt of internal research support was substituted for academic resources used in the MLC Model. For reinforcement factors, the MLC Model used colleagues and early productivity. The Research Model used rank and tenure status for reinforcement correlates. Rank and tenure are considered to be a part of the reward structure in postsecondary institutions. While the MLC Model did not include disciplinary norms as correlates of faculty research productivity, the Research Model used discipline to complete a model which utilizes all four of the explanations found in the literature for the variance in faculty research performance.

There are similarities and differences relative to the productivity measures used in the two research models. Publications dominate the measures of research performance for both models. The MLC Model and the Research Model include four types of publications as measures of faculty research productivity. The MLC Model used research articles, journal articles other than research, books/monographs, and book chapters as scholarly productivity measures. The measures of faculty research productivity in the Research Model are articles in academic or professional journals, articles in edited collections or volumes, books or monographs published or edited alone or in collaboration, and professional writings published or accepted for publication in the past two years. The MLC Model also used papers presented at regional/national meetings and posters presented as research productivity measures. Both models include the receipt of external research support as a measure of faculty research productivity.

Definition of Terms

The following terms vital to this study were included throughout the narrative.

Career Age: The number of years one practices a profession.

Data: "Numbers that are collected as a result of observations" (Runyon & Haber, 1988, p. 7).

Descriptive Statistics: "Statistical procedures used in describing the properties of samples, or of populations where complete population data are available" (Ferguson & Takane, 1989, p. 9).

Faculty Evaluation: The process for determining the value of faculty for the purpose of decision-making (Worthen & Sanders, 1987, p. 22).

Mean: "The sum of a set of measurements divided by the number of measurements in the set" (Ferguson & Takane, 1989, p. 53).

Multiple Regression: A statistical technique used to predict one variable from a knowledge of other variables (Ferguson & Takane, 1989, p. 115).

Population: "A complete set of individuals, objects, or measurements having some common observable characteristic" (Runyon & Haber, 1988, p. 7).

Random Sampling: A process by which "each element has an equal chance of selection that is independent of any other events in the selection process" (Babbie, 1973, p. 83).

Research: All of the "activities of faculties that advance knowledge and the arts" (Bowen & Schuster, 1986, p. 16).

Research Performance: Engagement in research or scholarly activities.

Research Productivity: Research and/or scholarly activity that is measurable. In this study the terms "research productivity" and "scholarly productivity" are used synonymously.

Sample: "A subset of a population selected in accordance with the research design" (Runyon & Haber 1988, p. 8).

Scholarly Productivity: Research and/or scholarly activity that is measurable. In this study the terms "scholarly productivity" and "research productivity" are used interchangeably.

Scholarly Work: Application or use of knowledge and skills acquired through and certified by doctoral research training (Braxton & Toombs, 1982).

Stratified Sampling: Drawing elements from homogeneous subsets of a population (Babbie, 1973, p. 94).

Variable: "A property whereby the members of a group or set differ one from another" (Ferguson & Takane, 1989, p. 10).

The Study Group

A two-stage, stratified, random sample design was used to select college and university faculty for inclusion in the 1989 Carnegie survey. In the first stage, 306 four-year and two-year institutions were selected from the Carnegie Foundation data bank of U.S. colleges and universities. The institutions selected for the survey were equally divided among the nine Carnegie Classifications, with thirty-four colleges/universities per classification.

The number of institutions in each of the Carnegie Classifications based on 1986 statistics is as follows:

Carnegie Classification	# Colleges/Universities
Research Universities I	70
Research Universities II	34
Doctoral Granting U. I	51
Doctoral Granting U. II	58
Comprehensive U./C. I	424
Comprehensive U./C. II	171
Liberal Arts Colleges I	142
Liberal Arts Colleges II	430
Two Year Coll/Inst.	1,367
	2,747

Within each Classification, an institution was selected with a likelihood proportionate to the size of its faculty when compared to other colleges/universities within the same Classification. When the sample was drawn, a few institutions were selected more than once. In these cases, the following school on the list was also selected.

For the purpose of this study, the researcher restricted data analysis to the first eight of the nine Carnegie Classifications. The categories have been described by the Carnegie Foundation based on the

"level of degree offered and the comprehensiveness of their missions" (1989, pp. 147-48).

> Research I institutions offer a full range of baccalaureate programs, are committed to graduate education through the doctorate degree, and give high priority to research. They receive annually at least $33.4 million in federal support, and award at least 50 Ph.D. degrees each year.
>
> Research II institutions offer a full range of baccalaureate programs, are committed to graduate education through the doctorate degree, and give high priority to research. They receive annually between $12.5 million and $33.5 million in federal support and award at least 50 Ph.D. degrees each year.
>
> Doctorate-granting I institutions offer a full range of baccalaureate programs, and their mission includes a commitment to graduate education through the doctorate degree. They award at least 40 Ph.D. degrees annually in five or more academic disciplines.
>
> Doctorate-granting II institutions offer a full range of baccalaureate programs, and their mission includes a commitment to graduate education through the doctorate degree. They award annually 20 or more Ph.D. degrees in at least one discipline or 10 or more Ph.D. degrees in three or more disciplines.
>
> Comprehensive I institutions offer baccalaureate programs and, with few exceptions, graduate education through the masters degree. More than half of their baccalaureate degrees are awarded in two or more occupational or professional disciplines such as engineering or business administration. All of the

institutions in this group enroll at least 2,500 students.

Comprehensive II institutions award more than half of their baccalaureate degrees in two or more occupational or professional disciplines, such as engineering or business administration, and many also offer graduate education through the masters degree. All of the colleges and universities in this group enroll between 1,500 and 2,500 students.

Liberal Arts I institutions are highly selective and are primarily undergraduate colleges that award more than half of their baccalaureate degrees in arts and science fields.

Liberal Arts II institutions are primarily undergraduate colleges that are less selective and award more than half of their degrees in liberal arts fields. This category also includes a group of colleges that award less than half of their degrees in liberal arts fields but, with fewer than 1,500 students, are too small to be considered comprehensive.

In the second stage of the sample design for the Carnegie Survey, faculty were designated at the selected institutions. From a data bank of American college and university faculty, 9,996 faculty members were randomly selected for the Carnegie study. The sample was equally distributed among the nine Carnegie Classifications. As part of the plan for analysis, data for each of the responses were weighted according to the Carnegie Classification and proportionate to the total number of faculty in all institutional types.

Before the actual survey, a pre-test was conducted in the fall of 1988 in which a draft of the questionnaire was mailed to seven college faculty and to several scholars. Based upon the results of the pre-test, the questionnaire was modified during December of 1988 and January of 1989 for the full-scale study.

The main Carnegie Survey consists of four mailings. On February 10, 1989, a preliminary letter describing the study and soliciting cooperation was mailed to the 9,996 faculty selected for the study. The survey questionnaire was mailed February 17. On February 24, a post card was mailed to all potential respondents as a reminder to complete the questionnaire. A second copy of the questionnaire was mailed on March 3, with a request to complete the questionnaire if this had not been done. The completed questionnaires were accepted for data processing through April 17. Data were entered and processed from March through May of 1989.

Of the 9,996 faculty selected for the survey, 5,450 returned their questionnaires, for a response rate of 54.5 percent. The completion rate for each of

the eight Carnegie Classifications used in this study is as follows:

Research University I	618	56%
Research University II	649	58%
Doctoral Granting University I	668	60%
Doctoral Granting University II	647	58%
Comprehensive University/College I	623	56%
Comprehensive University/College II	589	53%
Liberal Arts I	691	62%
Liberal Arts II	455	41%

A separate mailing, a postage-paid post card, was used to ask the respondents to identify themselves by name, employing institution, zip code, and faculty rank, and to ask whether the respondents did or did not hold tenure. The Carnegie Foundation received approximately 5,150 post cards from the 5,450 respondents.

The Instrument

The 1989 Carnegie Faculty Survey Questionnaire (see Appendix A) included fifty-nine questions. These questions addressed the goals of collegiate education, academic standards, attitudes about student life, teaching, research, service, status of the profession, views of the employing institution, participation in decision-making, and general observations.

Data Analysis

This study utilized data from selected questions related to faculty research productivity included in the 1989 Carnegie Foundation Faculty Survey. The Curry School of Education at the University of Virginia purchased a copy of the data tape from the Carnegie Foundation.

For the purpose of this study, the researcher applied the statistical software package SPSS (Statistical Package for the Social Sciences) to the 1989 Carnegie Survey data for computer-based analysis. This study of faculty research productivity was restricted to include only the responses of faculty

who indicated they had a full-time appointment for at least nine months of the academic year at the designated institution.

The twenty-nine disciplines included on the Carnegie Survey were collapsed into ten categories for this study as follows:

Biological Sciences
- Agriculture/Forestry/Natural Resources
- Biological/Life Sciences

Business
- Business/Management

Education
- Education (including Administration and Counseling)
- Physical and Health Education

Engineering
- Engineering

Fine Arts
- Fine Arts (Art, Drama, Music)

Health Sciences
- Health Professions (Dentistry, Medicine, Nursing, Veterinary)

Humanities
- Foreign Languages
- Humanities (Literature, History, Philosophy, Religion, Theology, Rhetoric)

Physical Sciences
- Mathematics/Statistics
- Physical Sciences

Social Sciences
- Area/Ethnic Studies
- Economics
- Geography
- Psychology
- Social Sciences (Anthropology, Political Science, Sociology, Social Work)

Other
- Allied Health (Medical Technologies)
- Architecture/Environmental Design
- Communications/Journalism
- Computer/Information Science
- Home Economics
- Industrial Arts
- Law
- Library Science
- Military Science/Technologies
- Public Affairs
- Vocational/Technical Training
- Other Discipline

A general demographics summary of the respondents within the study group by institutional type and discipline is provided in Appendix B. This summary includes the total number of respondents, the number of males and females, and the number of respondents by academic rank and tenure status.

In order to answer the research questions, means or percentages were calculated for each category of comparison and are reported in the study. Levels of research productivity for full-time faculty by institutional type (institutional code was printed on the top of the back page of the survey), academic rank

(survey question #3, 2-5), discipline (survey question #11, 1-29), tenure status (survey question #2, 1 or 2), gender (survey question #53, 1 or 2), hours spent per week on research and/or scholarly activities (survey question #9, d), current engagement (survey question #13), and receipt of internal research support (survey question #14, a) were measured by the number of articles published in academic or professional journals (survey question #15), the number of articles published in edited collections or volumes (survey question #16), the number of books or monographs published or edited alone or in collaboration (survey question #17), the number of professional writings published or accepted for publication in the past two years (survey question #18), and the receipt of external research support within the last twelve months (survey question #14, b-e).

Stepwise multiple regression techniques were utilized to determine the amount of variance that could be attributed to the eight faculty research productivity correlates for each of the five measures of faculty research performance. Multiple regression

assumes the respondents were randomly chosen and data were weighted to reflect the population from which the sample was drawn and assumes equal variability or homogeneous variance. A decision was made to set the probability of entry in a stepwise regression procedure at .1 with a tolerance level of .0001. Statistical tables are presented and descriptive summaries are provided for each of the research questions addressed in this study.

Limitations

Correlates and measures of faculty research productivity for this study are limited to related items on the 1989 Carnegie Foundation Survey of faculty. For example, intelligence scores, stress, prestige of doctoral program, mentoring, and early productivity are not used as correlates of faculty research performance, and presentations of papers at regional or national conferences cannot be used as a measure of faculty research productivity in this study, because no item on the survey instrument addresses these factors.

By analyzing the selected measures of research productivity as determined by the questions on the survey, one can conclude that the quantity of publication counts dominates the methods of measurement. In reporting the number of publications, the Carnegie survey may give equal credit to poorly written papers in badly edited journals and to well-written papers in high-quality journals (Bayer & Folger, 1966; Smith & Fieldler, 1971) and give equal credit to shorter and longer works. The researcher has attempted to balance the four survey questions related to the number of publications with a question that relates to external research support received during the past twelve months.

Another limitation of this study is the reliance on self-report data of faculty related to research productivity. In one study, Allison and Stewart (1974) estimated the reliability of self-reported information relative to faculty research productivity by comparing responses from chemists with publication counts from Chemical Abstracts and found the correlation was r=.94.

Further, no single study has been conducted using all four explanations for the variation of faculty research performance found in the literature. Therefore, existing published research provides a limited base for projecting outcomes of this study or for corroborating the results.

Finally, interpreting the results of the study is limited to reporting the levels of faculty research productivity across selected research correlates and to providing explanations from the literature for the variance in individual faculty research performance based on the selected research correlates across specific research measures. From the selected research correlates, profiles of faculty with high levels of research performance can be determined for each measure of scholarly research.

Chapter 4

Results

The purpose of this study was to use quantitative methods to describe the relationship between levels of faculty research productivity and institutional affiliation, academic rank, discipline, tenure status, gender, the hours per week that faculty spend on research and related scholarly activities, the current engagement of faculty in scholarly work, and receipt of internal research support within the last twelve months. Levels of faculty research productivity as reported in the 1989 Carnegie Survey of faculty were based on the number of articles published in academic or professional journals, the number of articles published in edited collections or volumes, the number of books or monographs published or edited alone or in collaboration, the number of professional writings accepted for publication in the past two years, and the receipt of external research support within the last twelve months.

From the Carnegie data set, the researcher analyzed the responses of 4380 faculty. The faculty included in this analysis were all full-time, tenured

or non-tenured employees on at least nine-month contracts at four-year colleges and universities. Responses of these faculty were analyzed to address the following research question:

> How does the level of faculty research productivity vary by institutional type? by academic rank? by discipline? by tenure status? by gender? by the number of hours spent per week on research and/or scholarly activities? by current engagement in scholarly work? by internal research support?

In order to answer this primary research question, data from the 1989 Carnegie Survey of faculty were also used to address subsidiary questions as follows:

1. How many hours per week do faculty spend on research and/or comparable scholarly activities?
2. What percentage of faculty is currently engaged in scholarly work that is expected to lead to a publication, an exhibit, or a musical recital?
3. What percentage of faculty has received internal research support during the past twelve months?
4. What is the level of faculty productivity as determined by (a) the number of articles published in academic or professional journals? (b) the number of articles published in edited collections or volumes? (c) the number of books or monographs published or edited alone, or in collaboration? (d) the number of professional writings published or accepted for publication in the past two years?

(e) the receipt of external research support within the last twelve months?

5. What percentage of variance in faculty research productivity can be explained by (a) institutional affiliation? (b) rank? (c) discipline? (d) tenure status? (e) gender? (f) hours spent per week on research and/or scholarly activities? (g) current engagement in scholarly work? (h) receipt of internal research support?

Research Measures by Institutional Type

In response to the primary research question concerning the level of faculty research productivity by institutional type, the mean number of publications and the percentage of faculty who received external research support within the last twelve months were calculated for each of the eight institutional types included in this study. The following five tables (Table 1-Table 5) report these data.

Table 1

Mean No. of Articles in Academic or Professional Journals by Institutional Type

	Mean	Std Dev	Minimum	Maximum	n
RI	29.99	37.07	0	325	549
RII	25.22	34.13	0	380	586
DI	17.48	26.20	0	320	592
DII	14.58	24.28	0	300	569
CI	9.28	18.03	0	300	532
CII	3.78	5.83	0	63	495
LAI	9.75	14.66	0	125	573
LAII	2.65	4.83	0	50	352

RI=Research I RII=Research II DI=Doctoral I DII=Doctoral II CI=Comprehensive I CII=Comprehensive II LA I=Liberal Arts I LA II=Liberal Arts II

The mean number of articles published per faculty member in academic or professional journals declined, with one exception, from Research I Universities through Liberal Arts II Colleges. The publication mean for faculty in Liberal Arts I Colleges, the one anomaly in this publication trend, was slightly greater than the means for faculty in Comprehensive I and Comprehensive II institutions. Faculty in Research Universities, as might be expected, published at a much higher rate than faculty in other types of

institutions. This publication pattern can be understood if one considers factors such as the respective institutional missions and reward systems. The statistics indicate a high degree of variance in the scholarly productivity of faculty based on institutional affiliation.

Table 2

Mean No. of Articles in Edited Collections or Volumes by Institutional Type

	Mean	Std Dev	Minimum	Maximum	n
RI	7.02	11.52	0	110	528
RII	5.90	10.71	0	100	550
DI	4.41	14.03	0	208	557
DII	3.66	6.63	0	60	535
CI	1.83	3.51	0	35	501
CII	1.17	3.48	0	50	462
LAI	2.44	4.70	0	50	540
LAII	1.61	11.69	0	200	326

RI=Research I RII=Research II DI=Doctoral I
DII=Doctoral II CI=Comprehensive I CII=Comprehensive II
LA I=Liberal Arts I LA II=Liberal Arts II

The means in Table 2 follow the same publication pattern by institutional type as the means in Table 1. That is, the mean number of articles published per

faculty member in edited collections or volumes declined, with one exception, from Research I Universities through Liberal Arts II Colleges. Faculty in traditionally teaching-oriented institutions reported lower numbers of publications, on average, than faculty in research-oriented institutions reported. As in Table 1, the mean for faculty in Liberal Arts I Colleges was higher than the means for faculty in Comprehensive I and Comprehensive II institutions. As might be expected, the mean number of articles published in edited collections or volumes (Table 2) were lower by institutional type than the means for articles published in academic or professional journals (Table 1).

Table 3

Mean No. of Books or Monographs Published or Edited Alone or in Collaboration by Institutional Type

	Mean	Std Dev	Minimum	Maximum	n
RI	2.55	4.62	0	45	519
RII	2.11	3.72	0	35	556
DI	2.15	5.97	0	114	561
DII	1.74	9.03	0	200	526
CI	1.41	3.10	0	32	509
CII	.88	2.84	0	30	462
LAI	1.24	2.61	0	40	537
LAII	.60	2.16	0	25	324

RI=Research I RII=Research II DI=Doctoral I
DII=Doctoral II CI=Comprehensive I CII=Comprehensive II
LA I=Liberal Arts I LA II=Liberal Arts II

The mean number of books or monographs published per faculty member declined from Research I Universities through Liberal Arts II Colleges, with one exception. This publication pattern can be explained by such factors as differential faculty selection and work load assignment. The mean number of publications for faculty in Liberal Arts I Colleges is greater than the mean for faculty in the Comprehensive II institutions. Unlike Tables 1 and 2, Table 3 indicates that the mean number of publications for

faculty in Liberal Arts I Colleges did not surpass the mean for faculty in Comprehensive I Colleges and Universities.

Table 4

Mean No. of Professional Writings Published or Accepted for Publication in the Past Two Years by Institutional Type

	Mean	Std Dev	Minimum	Maximum	n
RI	5.29	5.20	0	45	549
RII	4.52	5.30	0	70	573
DI	3.61	4.25	0	35	582
DII	2.91	3.52	0	30	564
CI	2.08	3.80	0	50	521
CII	1.11	1.96	0	15	473
LAI	2.23	2.88	0	25	566
LAII	1.06	3.41	0	40	346

RI=Research I RII=Research II DI=Doctoral I DII=Doctoral II CI=Comprehensive I CII=Comprehensive II LA I=Liberal Arts I LA II=Liberal Arts II

The mean number of professional writings per faculty member published or accepted for publication in the past two years declined, with one exception, from Research I Universities through Liberal Arts II Colleges. The mean for faculty in Liberal Arts I Colleges was higher than the means for faculty in the

Comprehensive I and II institutions. This publication pattern was noted for Tables 1 and 2 as well. Descriptive statistics indicate, as they did in Tables 1-3, a high degree of variance in the scholarly productivity of faculty by institutional affiliation.

Table 5

Percentage of Faculty Who Received External Research Support in the Past Twelve Months by Institutional Type

RI	RII	DI	DII	CI	CII	LAI	LAII
19.1% (519)	19.5% (544)	13.0% (532)	11.8% (507)	7.5% (479)	8.4% (439)	10.6% (509)	6.4% (299)

RI=Research I RII=Research II DI=Doctoral I DII=Doctoral II CI=Comprehensive I CII=Comprehensive II LA I=Liberal Arts I LA II=Liberal Arts II

*The total number of respondents is given in parentheses.

The percentage of faculty who received external research support declined, overall, from those faculty employed in Research Universities through those faculty affiliated with Liberal Arts Colleges. The percentage of Liberal Arts I faculty who received external research support was greater, however, than

the percentages of Comprehensive I and Comprehensive II faculty who received such support. Within the Research Universities, the percentage of faculty who received external research support in Research II Universities was slightly higher than the percentage of faculty who received external research support in Research I institutions. A similar relationship can be observed in the percentages for faculty who reported the receipt of external research support in Comprehensive I and II institutions. That is, the percentage of faculty who reported the receipt of external research support was greater in Comprehensive II Colleges and Universities than in Comprehensive I institutions. The percentages of faculty who received external research support by institutional type followed the overall pattern of scholarly productivity of faculty by institutional type, reported in Tables 1-4.

For all five of the measures of faculty research productivity utilized in this study, levels of scholarly productivity declined, overall, from Research I Universities through Liberal Arts II Colleges. This pattern is not unexpected in terms of

the respective institutional missions and reward structures (Creswell in Finkelstein, 1985, p. 256).

Research Measures by Rank

In response to the primary research question concerning the level of faculty research productivity by academic rank, the mean number of publications per faculty member and the percentage of faculty who received external research support within the last twelve months were calculated for each of the four academic ranks included in this study. The following five tables (Table 6-Table 10) report these data.

Table 6

Mean No. of Articles in Academic or Professional Journals by Academic Rank

	Mean	Std Dev	Minimum	Maximum	n
Professor	25.35	34.48	0	380	1769
AssoProf	9.82	13.35	0	220	1310
AssiProf	4.57	5.73	0	44	939
Instructor	1.26	3.15	0	30	137

AssoProf=Associate Professor AssiProf=Assistant Professor

The mean number of articles published per faculty member in academic or professional journals increased from the rank of instructor through the rank of professor. Because this measure relates to cumulative research productivity, it is not surprising that faculty in the higher ranks reported, on average, higher numbers of publications. Cumulative research productivity is generally related to longevity, and longevity to higher rank. Professors published, on average, two and one-half times the number of articles that associate professors published.

Table 7

Mean No. of Articles in Edited Collections or Volumes by Academic Rank

	Mean	Std Dev	Minimum	Maximum	n
Prof	5.80	12.15	0	208	1665
AssoProf	2.78	7.77	0	200	1226
AssiProf	1.54	3.65	0	40	886
Instruc	.37	1.18	0	10	135

Prof=Professor AssoProf=Associate Professor
AssiProf=Assistant Professor Instruc=Instructor

The mean number of articles published per faculty member in edited collections or volumes increased from the rank of instructor through the rank of professor. This publication pattern was evident in Table 6 as well. Assistant professors published, on average, slightly more than four times the number of articles that instructors published, and professors, on average, published twice the number of articles that associate professors published. Faculty in the higher ranks typically have more colleagues to serve as potential collaborators for edited publications.

Table 8

Mean No. of Books or Monographs Published or Edited Alone or in Collaboration by Academic Rank

	Mean	Std Dev	Minimum	Maximum	n
Prof	2.61	6.80	0	200	1681
AssoProf	1.21	2.98	0	32	1232
AssiProf	.59	1.84	0	25	860
Instruc	.47	1.66	0	12	133

Prof=Professor AssoProf-Associate Professor
AssiProf=Assistant Professor Instruc=Instructor

The means for the number of books or monographs published per faculty member increased from the rank of instructor through the rank of professor, a publication trend noted for Tables 6 and 7 as well. The effect of rank may be related to differential work load assignment (Fulton & Trow, 1974). At higher ranks, the teaching load is typically not as great as it is in the lower ranks. As might be expected, the mean number of publications per faculty member was less in each rank, overall, for books or monographs than for articles in academic or professional journals (Table 6) and articles in edited collections or volumes (Table 7). The mean number of books or monographs published per instructor, the only exception, was higher than the mean number of articles published in edited collections or volumes (Table 7).

Table 9

Mean No. of Professional Writings Published or Accepted for Publication in the Past Two Years by Academic Rank

	Mean	Std Dev	Minimum	Maximum	n
Prof	3.80	5.00	0	70	1738
AssoProf	2.60	3.78	0	45	1294
AssiProf	2.45	3.13	0	50	918
Instruc	.61	1.35	0	8	135

Prof=Professor AssoProf=Associate Professor
AssiProf=Assistant Professor Instruc=Instructor

The means for the number of professional writings per faculty member published or accepted for publication in the past two years increased from the rank of instructor through the rank of professor. This publication pattern was also noted for Tables 6-8. The difference between the mean number of writings for assistant professors and associate professors and the difference between the maximum number of writings for these two groups was smaller than for previous types of publications (Tables 6-8). Unlike the previous publications, this category of comparison is not cumulative over the faculty member's career.

Table 10

Percentage of Faculty Who Received External Research Support in the Past Twelve Months by Academic Rank

Prof	AssoProf	AssiProf	Instruc
15.5% (1591)	10.9% (1168)	10.4% (863)	2.6% (116)

Prof=Professor AssoProf=Associate Professor
AssiProf=Assistant Professor Instruc=Instructor

*The total number of respondents is given in parentheses.

The percentage of faculty who received external research support increased from the rank of instructor through the rank of professor. This trend is consistent with the pattern for the mean number of publications per faculty member as reported in Tables 6-9. The percentages of assistant and associate professors who reported the receipt of external research support are four times greater than the percentage of instructors who reported the receipt of such support. The difference in the percentages of assistant professors and associate professors who reported receipt of external research support is

small. However, the percentage of professors who reported the receipt of external research support is approximately one-half greater than the percentages of associate and assistant professors who reported such support. Faculty in the upper ranks may benefit from a higher degree of visibility than faculty in the lower ranks in securing external research support.

For all five of the measures of faculty research productivity used in this study, levels of scholarly productivity increased from the rank of instructor through the rank of professor. This trend may be explained, in part, by the reinforcement role that rank plays in the reward system for faculty in higher education (Finkelstein, 1984, p. 101).

Research Measures by Discipline

In response to the primary research question concerning the level of faculty research productivity by discipline, the mean number of publications and the percentage of faculty who received external research support within the last twelve months were calculated for each of the disciplinary categories in this study.

The following five tables (Table 11-Table 15) report these data.

Table 11

Mean No. of Articles in Academic or Professional Journals by Discipline

	Mean	Std Dev	Minimum	Maximum	n
BS	25.94	27.67	0	200	306
BU	12.58	24.73	0	250	274
ED	14.60	24.74	0	325	319
EN	26.69	34.83	0	205	215
FA	4.21	7.22	0	50	339
HS	11.54	30.20	0	300	157
HU	10.17	18.62	0	300	809
PS	26.64	42.06	0	380	528
SS	14.10	18.11	0	150	697
OT	10.96	17.46	0	140	479

BS=Biological Sciences BU=Business/Management ED=Education EN=Engineering FA=Fine Arts HS=Health Sciences HU=Humanities PS=Physical Sciences SS=Social Sciences OT=Other

For faculty who reported the number of articles published in academic or professional journals, the faculty by disciplines rank as follows: (1) Engineering, (2) Physical Sciences, (3) Biological Sciences, (4) Education, (5) Social Sciences, (6) Business/Management, (7) Health Sciences, (8)

Humanities, (9) Other, and (10) Fine Arts. On average, faculty in the natural sciences (including Engineering) emerged as most productive; faculty in the Humanities and Fine Arts were the least productive; and Education faculty and Social Science faculty fell in between. The data indicate that scholarly productivity varies across disciplines in terms of articles published in academic or professional journals.

Table 12

Mean No. of Articles in Edited Collections or Volumes by Discipline

	Mean	Std Dev	Minimum	Maximum	n
BS	5.67	11.59	0	100	286
BU	3.56	7.32	0	60	266
ED	2.90	4.94	0	40	295
EN	8.59	19.80	0	200	200
FA	1.80	12.20	0	208	308
HS	1.95	5.28	0	52	146
HU	3.49	9.61	0	200	768
PS	3.19	7.40	0	100	499
SS	4.31	7.52	0	80	665
OT	3.07	6.10	0	45	449

BS=Biological Sciences BU=Business/Management ED=Education
EN=Engineering FA=Fine Arts HS=Health Sciences
HU=Humanities PS=Physical Sciences SS=Social Sciences
OT=Other

In terms of the mean number of articles published per faculty member in edited collections or volumes, the faculty by disciplines rank as follows: (1) Engineering, (2) Biological Sciences, (3) Social Sciences, (4) Business/Management, (5) Humanities, (6) Physical Sciences, (7) Other, (8) Education, (9) Health Sciences, and (10) Fine Arts. As in Table 11, Engineering faculty ranked first in the mean number of publications and Fine Arts faculty ranked last. Otherwise, the rank order for faculty in Table 2 was different from that in Table 1. Disciplines differ in their coauthorship patterns (Gaston, 1978) and in the division of labor on scholarly works that require various collaborators (Gaston, 1978). Faculty in some disciplines, such as the natural sciences, tend to co-author publications at a higher rate than faculty in other disciplines, such as Education and the Fine Arts.

Table 13

Mean No. of Books or Monographs Published or Edited Alone or in Collaboration by Discipline

	Mean	Std Dev	Minimum	Maximum	n
BS	.80	1.66	0	18	283
BU	1.86	4.10	0	30	261
ED	2.94	8.07	0	114	301
EN	1.15	3.59	0	45	195
FA	1.35	4.31	0	40	309
HS	.71	1.29	0	8	146
HU	2.01	3.21	0	35	767
PS	.89	2.29	0	25	491
SS	2.21	8.35	0	200	669
OT	1.59	3.18	0	31	449

BS=Biological Sciences BU=Business/Management ED=Education
EN=Engineering FA=Fine Arts HS=Health Sciences
HU=Humanities PS=Physical Sciences SS=Social Sciences
OT=Other

Concerning the mean number of books or monographs published per faculty member, the faculty by disciplines rank as follows: (1) Education, (2) Social Sciences, (3) Humanities, (4) Business/Management, (5) Other, (6) Fine Arts, (7) Engineering, (8) Physical Sciences, (9) Biological Sciences, and (10) Health Sciences. Engineering faculty, who reported the highest publication levels in Table 11 and Table 12,

rank seventh in the mean number of books or monographs published per faculty member. Fine Arts faculty, who reported the lowest publication levels in the previous two tables, rank sixth in terms of the mean number of books or monographs published. Disciplines vary according to their paradigmatic stage in terms of the form of publications required (Biglan, 1973). For paradigmatic disciplines, such as the natural sciences, shorter forms of publications--journal articles--are accepted (Table 11). In pre-paradigmatic disciplines, such as Education, lengthened communication forms--books and monographs--are required (Biglan).

Table 14

Mean No. of Professional Writings Published or Accepted for Publication in the Past Two Years by Discipline

	Mean	Std Dev	Minimum	Maximum	n
BS	4.33	6.35	0	70	301
BU	2.69	3.31	0	25	271
ED	3.05	3.95	0	28	312
EN	4.64	5.20	0	28	211
FA	1.37	3.11	0	40	325
HS	2.16	3.14	0	20	153
HU	2.86	3.94	0	50	802
PS	3.53	4.96	0	40	519
SS	3.23	3.88	0	45	691
OT	2.66	3.47	0	35	468

BS=Biological Sciences BU=Business/Management ED=Education EN=Engineering FA=Fine Arts HS=Health Sciences HU=Humanities PS=Physical Sciences SS=Social Sciences OT=Other

In terms of the number of professional writings published or accepted for publication per faculty member in the past two years, the faculty by disciplines rank as follows: (1) Engineering; (2) Biological Sciences; (3) Physical Sciences; (4) Social Sciences; (5) Education; (6) Humanities; (7) Business/ Management; (8) Other; (9) Health Sciences; and (10) Fine Arts. As in Table 11, on average, faculty in the

natural sciences emerged as most productive; faculty in the Humanities and Fine Arts were the least productive; and Education faculty and Social Science faculty fell in between. The paradigmatic stage of a discipline affects scholarly research in terms of acceptance rates in journals (Gaston, 1978). In disciplines such as the natural sciences in which the knowledge is codified to a high degree, the acceptance rates are high. Further, in paradigmatic disciplines, abbreviated forms of scholarly publications are accepted.

Table 15

Percentage of Faculty Who Received External Research Support by Discipline

BS	BU	ED	EN	FA	HS	HU	PS	SS	OT
21.3% (296)	9.5% (242)	12.6% (269)	22.2% (198)	11.9% (302)	15.8% (139)	8.9% (710)	12.8% (501)	11.1% (633)	13.1% (434)

BS=Biological Sciences BU=Business/Management ED=Education EN=Engineering FA=Fine Arts HS=Health Sciences HU=Humanities PS=Physical Sciences SS=Social Sciences OT=Other

*The total number of respondents is given in parentheses.

The rank order of disciplines in which faculty reported the receipt of external research support is as follows: (1) Engineering; (2) Biological Sciences; (3) Health Sciences; (4) Other; (5) Physical Sciences; (6) Education; (7) Fine Arts; (8) Social Sciences; (9) Business/Management; and (10) Humanities. Approximately 22 percent of Engineering faculty received external research support, while almost 9 percent of faculty in the Humanities received such support. Grant receipt depends primarily on faculty research productivity (Liebert, 1976), which may help to explain why faculty in the natural sciences emerged as most productive, overall, in terms of the receipt of external research support.

Engineering faculty ranked first in four out of the five measures of scholarly productivity (Tables 11, 12, 14, and 15). The mean number of books or monographs published (Table 13) was the only measure for which Engineering faculty failed to rank first. Faculty in the Biological Sciences ranked second in three of the five measures of research productivity--number of articles in edited collections or volumes (Table 12), number of articles published or accepted

for publication in the past two years (Table 14), and the receipt of external research support (Table 15). Business/Management faculty ranked fourth in the mean number of articles published in edited collections or volumes (Table 12) and in the mean number of books or monographs published (Table 13). Fine Arts faculty had the lowest productivity levels of any disciplinary group in terms of articles published in academic or professional journals (Table 11), articles published in edited collections or volumes (Table 12), and professional writings published or accepted for publication in the past two years (Table 14). Faculty in the Biological Sciences ranked second in the mean number of articles published in edited collections or volumes (Table 12) and in the mean number of professional writings published or accepted for publication in the past two years (Table 14).

Variance in research performance among the ten disciplinary categories is evident for each of the five measures of faculty research productivity. Furthermore, variation in the level of faculty scholarly productivity may be noted in terms of the rank of a disciplinary category across the five

measures of research performance. However, on the whole, faculty in the natural sciences emerged as most productive and faculty in the Humanities and Fine Arts were the least productive.

Research Measures by Tenure Status

In response to the primary research question concerning the level of faculty research productivity by tenure status, the mean number of publications and the percentage of faculty who received external research support within the last twelve months were calculated for tenured and non-tenured faculty in this study. The following five tables (Table 16-Table 20) report these data.

Table 16

Mean No. of Articles in Academic or Professional Journals by Tenure Status

	Mean	Std Dev	Minimum	Maximum	n
Tenured	18.57	28.74	0	380	3041
Non-tenured	5.59	12.09	0	300	1207

The mean number of articles published per faculty member in academic or professional journals was three times higher for tenured faculty than for non-tenured faculty. Tenured faculty typically have been in the profession longer than have non-tenured faculty. Because this measure of faculty research productivity is a cumulative measure, it is not surprising that the number of publications reported by tenured faculty was much higher, on average, than the number of publications reported by non-tenured faculty.

Table 17

Mean No. of Articles in Edited Collections or Volumes by Tenure Status

	Mean	Std Dev	Minimum	Maximum	n
Tenured	4.36	10.00	0	208	2857
Non-tenured	1.93	7.21	0	200	1142

The mean number of articles published per faculty member in edited collections or volumes was more than twice as large for tenured faculty than for non-tenured faculty. This overall publication trend

was noted for Table 16 as well. Edited collections very often include revisions of manuscripts that were previously published in academic or professional journals. Therefore, tenured faculty who published, on average, three times as many articles in academic or professional journals as non-tenured faculty published (Table 16) would have an advantage in this measure of scholarly productivity (Table 17).

Table 18

Mean No. of Books or Monographs Published or Edited Alone or in Collaboration by Tenure Status

	Mean	Std Dev	Minimum	Maximum	n
Tenured	2.01	5.61	0	200	2875
Non-tenured	.73	2.08	0	25	1119

Consistent with the publication pattern indicated in Tables 16 and 17, the mean number of books or monographs published or edited per faculty member is higher for faculty with tenure than for faculty without tenure. Tenured faculty, on average, reported more than twice the number of publications that

non-tenured faculty reported. However, considering the length of books and monographs and the professional status and orientation of non-tenured faculty (Chronister, Baldwin, & Bailey, 1991), non-tenured faculty, on average, indicated a respectable number of publications.

Table 19

Mean No. of Professional Writings Published or Accepted for Publication in the Past Two Years by Tenure Status

	Mean	Std Dev	Minimum	Maximum	n
Tenured	3.24	4.56	0	70	2987
Non-tenured	2.35	3.17	0	40	1187

Table 19 reports that the mean number of professional writings published or accepted per faculty member for publication in the past two years is higher for tenured faculty than for non-tenured faculty. This trend was inherent in Tables 16-18 as well. While the descriptive statistics in Tables 16-19 indicate a high degree of variation in the level of faculty scholarly productivity by tenure status, the

gap between the means for the two cohorts is narrower for this category of comparison.

Table 20

Percentage of Faculty Who Received External Research Support by Tenure Status

Tenured	Non-tenured
13.2% (2719)	10.8% (1109)

*The total number of respondents is given in parentheses.

Consistent with the pattern of faculty scholarly productivity indicated in Tables 16-19, the percentage of faculty who received external research support was higher for tenured faculty than for non-tenured faculty. The non-tenured faculty, however, have done well on this variable. Tenured faculty reported higher levels of scholarly productivity than non-tenured faculty indicated for the five measures of faculty research productivity reported in this study (Tables 16-20).

Research Measures by Gender

In response to the primary research question concerning the level of faculty research productivity by gender, the mean number of publications and the percentage of faculty who received external research support within the last twelve months were calculated for males and females in this study. The following five tables (Table 21-Table 25) report these data.

Table 21

Mean No. of Articles in Academic or Professional Journals by Gender

	Mean	Std Dev	Minimum	Maximum	n
Males	17.93	28.41	0	380	3130
Females	6.31	13.33	0	300	1104

The mean number of articles published per faculty member in academic or professional journals was almost three times greater for males than for females. Some of this variance can be explained by the distribution of faculty across institutional types. Females are employed disproportionately in traditionally

teaching-oriented institutions (See Appendix B). Respective missions and reward systems of institutions lead to differential work load assignment.

Table 22

Mean No. of Articles in Edited Collections or Volumes by Gender

	Mean	Std Dev	Minimum	Maximum	n
Males	4.27	10.44	0	208	2952
Females	1.93	4.72	0	70	1035

In terms of the mean number of articles published per faculty member in edited collection or volumes, the level of publication was over twice as high for males as for females. One explanation for the variation in faculty research productivity by gender is that women do not have access to the "old boy" network and are not privy to information being exchanged (Creswell in Finkelstein, 1985, p. 242). Males may have a larger network of different collaborators, interacting on specific tasks.

Table 23

Mean No. of Books or Monographs Published or Edited Alone or in Collaboration by Gender

	Mean	Std Dev	Minimum	Maximum	n
Males	1.81	4.10	0	114	2960
Females	1.00	2.63	0	40	1021

The mean number of books or monographs published per faculty member was higher for males than for females. This publication pattern had been noted previously for Tables 1 and 2. However, for the mean number of books or monographs published, the difference between males and females was not as large as the difference in means for the previous two measures of faculty research productivity (Tables 1 and 2). Females, on average, had one book or monograph published, while males had less than two books or monographs published.

Table 24

Mean No. of Professional Writings Published or Accepted for Publication in the Past Two Years by Gender

	Mean	Std Dev	Minimum	Maximum	n
Males	3.31	4.58	0	70	3093
Females	2.07	2.82	0	30	1068

The publication pattern indicated in Table 24 was consistent with the trend found in Tables 21-23. That is, the mean number of articles published or accepted for publication in the past two years per faculty member was greater for males than for females. The measures of faculty research productivity in Tables 21-23 were cumulative over a faculty member's career, while the data in Table 24 reflect a publication trend over the past two years. In terms of the data reported in Tables 21-24, females may be more recently narrowing the gap with males in terms of publication differences.

Table 25

Percentage of Faculty Who Received External Research Support by Gender

Males	Females
12.9% (2856)	11.2% (961)

*The total number of respondents is given in parentheses.

A slightly higher percentage of males received external research support during the past twelve months than females did. Because grant receipt--a salient source of external research support--depends primarily on faculty research productivity (Liebert, 1976) and there is compelling evidence that males publish more than females (Astin, 1984, 1969), it is not surprising that a greater percentage of males receive external research support than do females. However, the difference in the percentages between males and females in Table 25 is not large. While females may be closing the gap with males in terms of some publication measures, males rated higher than

females on all of the five measures of research performance utilized in this study.

Research Measures by Hours per Week Spent on Research/Scholarly Activities

In response to the primary research question concerning the level of faculty research productivity by hours spent per week on research and/or scholarly activities, the mean number of publications and the percentage of faculty who received external research support within the last twelve months were calculated for the hours per week spent on research and/or scholarly activities (scaled) in this study. The following five tables (Table 26-Table 30) report these data.

Table 26

Mean No. of Articles in Academic or Professional Journals by Hours Spent Per Week on Research and/or Scholarly Activities

Hrs./Wk.	Mean	Std Dev	Minimum	Maximum	n
10 or less	9.31	16.93	0	300	2053
11-20	18.39	22.55	0	205	984
21-30	27.79	37.93	0	380	429
31-40	37.36	45.57	0	320	190
41 or more	36.36	53.30	0	310	98

The mean number of articles published per faculty member in academic or professional journals increased, overall, as the number of hours spent per week on research and/or scholarly activities increased. Faculty who spent more than 40 hours per week, the only exception, had a slightly lower level of publication than faculty who spent 31 to 40 hours per week had.

Table 27

Mean No. of Articles in Edited Collections or Volumes by Hours Spent Per Week on Research and/or Scholarly Activities

Hrs./Wk.	Mean	Std Dev	Minimum	Maximum	n
10 or less	2.42	7.43	0	208	1922
11-20	4.64	9.85	0	200	936
21-30	5.98	9.85	0	70	406
31-40	8.56	18.39	0	200	189
41 or more	7.85	13.67	0	100	94

The mean number of articles published per faculty member in edited collections increased, with one exception, as the number of hours spent per week on research and/or scholarly activities increased. Faculty who spent more than 40 hours per week had a

lower level of publication than faculty who spent 31 to 40 hours per week did. This publication trend was indicated in Table 26 as well. Spending too little or too much time on research activities may impair faculty scholarly productivity (Pelz & Andrews, 1966).

Table 28

Mean No. of Books or Monographs Published or Edited Alone or in Collaboration by Hours Spent Per Week on Research and/or Scholarly Activities

Hrs./Wk.	Mean	Std Dev	Minimum	Maximum	n
10 or less	1.31	3.82	0	114	1935
11-20	2.08	3.84	0	40	932
21-30	2.11	3.99	0	32	398
31-40	2.26	4.38	0	45	178
41 or more	2.46	4.55	0	35	92

The mean number of books or monographs published or edited alone or in collaboration per faculty member increased as the number of hours spent per week on research and/or scholarly activities increased. The amount of time faculty spend on research has been found to be a important predictor of high research productivity (Allison & Stewart, 1974).

Table 29

Mean No. of Professional Writings Published or Accepted for Publication in the Past Two Years by Hours Spent Per Week on Research and/or Scholarly Activities

Hrs./Wk.	Mean	Std Dev	Minimum	Maximum	n
10 or less	1.87	2.78	0	40	2019
11-20	4.17	4.54	0	50	970
21-30	5.56	5.26	0	45	427
31-40	5.92	5.34	0	30	187
41 or more	6.46	8.68	0	70	97

The mean number of professional writings published or accepted for publication in the past two years per faculty member increased as the number of hours spent on research and/or scholarly activities increased. This research pattern is consistent with the publication trend indicated in Table 28, even though the previous productivity measure was cumulative over a faculty member's career. As indicated by the data, the amount of time spent on research/scholarly activities appears to be directly related to the level of faculty research productivity for both measures of research performance (Tables 28 and 29).

Table 30

Percentage of Faculty Who Received External Research Support by Hours Spent Per Week on Research and/or Scholarly Activities

Hrs./Wk. 10 or less	11-20	21-30	31-40	41 or more
8.7% (1829)	15.9% (900)	20.0% (409)	23.9% (176)	21.5% (93)

*The total number of respondents is given in parentheses.

The percentage of faculty who received external support increased as the number of hours spent per week on research and/or scholarly activities increased, up to 40 hours per week. The percentage of faculty who received external research support was lower for faculty who spent more than 40 hours per week on research/scholarly activities than for faculty who spent 31-40 hours per week.

The levels of faculty research productivity for the five measures of research performance increased, overall, as the number of hours spent per week on research and/or scholarly activities increased. Faculty who spent more than 40 hours per week on research/scholarly activities had lower levels of

scholarly productivity than faculty who spent 31 to 40 hours per week for three of the measures of research performance (Tables 26, 27, and 30).

Research Measures by Current Engagement in Scholarly Work

In response to the primary research question concerning the level of faculty research productivity by current engagement in scholarly work, the mean number of publications and the percentage of faculty who received external research support within the last twelve months were calculated for the faculty who were currently engaged in scholarly work and for the faculty who were not currently engaged in such activity. The following five tables (Table 31-Table 35) report these data.

Table 31

Mean No. of Articles in Academic or Professional Journals by Current Engagement in Scholarly Work

Currently Engaged	Mean	Std Dev	Minimum	Maximum	n
Yes	17.20	27.56	0	380	3518
No	3.72	8.42	0	90	730

The mean number of articles published per faculty member in academic or professional journals was over four times higher for faculty who were currently engaged in scholarly work than for faculty who were not currently engaged in such activity. Because this is a cumulative measure of publication, it is possible for faculty not to be engaged in scholarly work and still have publications to their credit. However, the time spent on research and/or scholarly activities has been found to be an important predictor of high research productivity (Allison & Stewart, 1974; Tables 26-30). It is not surprising, therefore, that faculty who are currently engaged in scholarly work have reported, on average, substantially higher numbers of publications.

Table 32

Mean No. of Articles in Edited Collections or Volumes by Engagement in Scholarly Work

Currently Engaged	Mean	Std Dev	Minimum	Maximum	n
Yes	4.29	10.13	0	208	3306
No	.71	2.13	0	25	693

Table 32 indicates a publication level six times greater for faculty who are currently engaged in research and/or scholarly activities than for faculty who are not engaged in scholarly work. This publication trend was noted for articles published in academic or professional journals as well (Table 31). Faculty who are currently engaged in research activity and published, on average, four times as many articles in academic or professional journals as faculty who were not engaged in scholarly activity had published (Table 31) would have a big advantage in this measure of scholarly productivity (Table 32).

Table 33

Mean No. of Books or Monographs Published or Edited Alone or in Collaboration by Engagement in Scholarly Work

Currently Engaged	Mean	Std Dev	Minimum	Maximum	n
Yes	1.89	5.33	0	200	3295
No	.54	1.67	0	20	699

The mean number of books or monographs published per faculty member was more than three times greater

for faculty who were engaged in scholarly work than for faculty who were not engaged in such activity. Not surprisingly, faculty published fewer books or monographs than articles in academic or professional journals (Table 31) or articles in edited collections or volumes (Table 32). Because books and monographs are lengthier forms of communication, they require more time. Therefore, it is not surprising that the difference in mean number of publications is substantial between faculty who are currently engaged in scholarly work and faculty who are not currently engaged in such activity.

Table 34

Mean No. of Professional Writings Published or Accepted for Publication in the Past Two Years by Engagement in Scholarly Work

Currently Engaged	Mean	Std Dev	Minimum	Maximum	n
Yes	3.52	4.43	0	70	3467
No	.37	1.08	0	10	707

years was almost ten times higher for faculty who were currently engaged in scholarly work than for faculty who were not currently engaged in such activity. Because this measure of research performance is a recent measure, as opposed to a cumulative measure, it is not surprising that faculty who are not currently engaged in scholarly work have such few publications to their credit in the past two years. However, a mean publication rate of 3.52 for the past two years for faculty who are currently engaged in scholarly work is very impressive. This mean for the 3467 faculty who indicated current engagement in scholarly work approaches the mean number of professional writings published or accepted for publication in the past two years of Doctorate I University faculty (Table 4).

Table 35

Percentage of Faculty Who Received External Research Support by Engagement in Scholarly Work

Current Engagement	Yes	No
	14.3% (3204)	3.5% (624)

*The total number of respondents is given in parentheses.

For faculty who reported the receipt of external research support, the percentage of faculty currently engaged in scholarly work was four times greater than the percentage of faculty not currently engaged in such activity. This pattern of scholarly productivity by current engagement in scholarly work has been noted for the five measures of research performance (Tables 31-35). Engagement or non-engagement in scholarly work is an important determinant of the level of faculty research productivity.

Research Measures by Internal Research Support

In response to the primary research question concerning the level of faculty research productivity by internal research support received during the past twelve months, the mean number of publications and the percentage of faculty who received external research support within the last twelve months were calculated for faculty who had received internal research support and for faculty who had not received such support. The following five tables (Table 36-Table 40) report these data.

Table 36

Mean No. of Articles in Academic or Professional Journals by Receipt of Internal Research Support

Internal Research Support	Mean	Std Dev	Minimum	Maximum	n
Yes	17.16	24.80	0	310	2010
No	11.61	23.31	0	325	1835

The mean number of articles published per faculty member in academic or professional journals was 47 percent higher for faculty who received internal research support than for faculty who did not receive such research support. The data indicate a positive relationship between internal research support and the level of faculty research productivity.

Table 37

Mean No. of Articles in Edited Collections or Volumes by Receipt of Internal Research Support

Internal Research Support	Mean	Std Dev	Minimum	Maximum	n
Yes	4.28	9.70	0	208	1892
No	2.58	6.78	0	110	1739

The mean number of articles published per faculty member in edited collections of volumes was 65 percent greater for faculty who received internal research support than for faculty who did not receive such support. While the faculty were almost evenly divided (Tables 36 and 37) between those who had received internal research support and those who had not received such support, the majority of faculty reported the receipt of internal research support.

Table 38

Mean No. of Books or Monographs Published or Edited Alone or in Collaboration by Receipt of Internal Research Support

Internal Research Support	Mean	Std Dev	Minimum	Maximum	n
Yes	1.77	3.46	0	40	1883
No	1.48	6.27	0	200	1756

The mean number of books or monographs published or edited per faculty member was higher for faculty who received internal research support than for faculty who did not receive such assistance. The difference between the mean number of publications

for both cohorts was much smaller than the difference between the publications means for the previous two measures of scholarly productivity (Tables 36 and 37). The data suggest that the receipt of internal research support may not be as directly related to the mean number of books or monographs published as it is to the mean number of journal articles published (Table 36) or the mean number of articles published in edited collections (Table 37).

Table 39

Mean No. of Professional Writings Published or Accepted for Publication in the Past Two Years by Receipt of Internal Research Support

Internal Research Support	Mean	Std Dev	Minimum	Maximum	n
Yes	3.83	4.35	0	50	1990
No	2.12	3.92	0	70	1798

The mean number of professional writings per faculty member published or accepted for publication in the past two years was higher for faculty who received internal research support than for faculty who did not receive such support. While this measure

of faculty research productivity is not cumulative, the data indicate a publication trend that is consistent with the pattern noted for the three previous measures of faculty research performance (Tables 36-38).

Table 40

Percentage of Faculty Who Received External Research Support by Receipt of Internal Research Support

Internal Research Support	Yes	No
	16.8% (1758)	.3% (1882)

*The total number of respondents is given in parentheses.

Faculty who received external research support also received internal research support in a higher proportion than faculty who did not receive external research support did. This pattern of research productivity by receipt of internal research support has been noted for the five measures of research performance (Tables 36-40) used in this study. The receipt of internal research support has been related

to higher levels of faculty research productivity in the five categories of comparison.

Hours Spent per Week on Research/Scholarly Activities by Research Correlates

In response to the first subsidiary research question concerning the number of hours faculty spend per week on research and/or comparable scholarly activities, the mean number of hours was calculated by institutional affiliation, gender, tenure status, discipline, rank, current engagement, and the receipt of internal research support. The following seven tables (Table 41-47) report these data. Hours spent per week are scaled as indicated in the tables.

Table 41

Mean Hours/Week Spent on Research/Scholarly Activity by Institutional Type

	Mean	Std Dev	*Minimum	+Maximum	n
RI	21.49	14.20	1	5	538
RII	18.21	11.21	1	5	553
DI	15.71	11.85	1	5	554
DII	14.17	11.20	1	5	519
CI	10.36	9.18	1	5	478
CII	7.57	7.25	1	5	423
LAI	12.05	11.02	1	5	517
LAII	6.53	7.79	1	5	266

RI=Research I RII=Research II DI=Doctoral I
DII=Doctoral II CI=Comprehensive I CII=Comprehensive II
LA I=Liberal Arts I LA II=Liberal Arts II

* 1=10 or less hours per week + 5=41 or more hours per week

The mean number of hours per week spent per faculty member on research and/or scholarly activities declined, overall, from Research I Universities through Liberal Arts II Colleges. The mean for faculty in Liberal Arts I Colleges, the one exception, was greater than the means for faculty in Comprehensive institutions.

Table 42

Mean Hours/Week Spent on Research/Scholarly Activity by Gender

	Mean	Std Dev	*Minimum	+Maximum	n
Males	14.91	11.89	1	5	2868
Females	11.29	11.49	1	5	969

* 1=10 or less hours per week + 5=41 or more hours per week

The mean number of hours per week spent per faculty member on research and/or scholarly activities was 32 percent greater for males than for females. The relationship between the mean and standard deviation for each of the two groups indicates a higher degree of variation for females than for males in the number of hours spent per week on research activities.

Table 43

Mean Hours/Week Spent on Research/Scholarly Activity by Tenure Status

	Mean	Std Dev	*Minimum	+Maximum	n
Tenured	14.20	11.80	1	5	2773
Non-tenured	13.43	12.09	1	5	1075

* 1=10 or less hours per week + 5=41 or more hours per week

The mean number of hours per week spent per faculty member on research and/or scholarly activities was slightly higher for faculty who were tenured than for faculty who were non-tenured. The means were surprisingly close in relation to the means for productivity measures reported earlier in this study (Tables 16-20).

Table 44

Mean Hours/Week Spent on Research/Scholarly Activity by Discipline

	Mean	Std Dev	*Minimum	+Maximum	n
BS	19.28	14.62	1	5	290
BU	13.69	10.27	1	5	243
ED	10.25	9.74	1	5	278
EN	16.92	11.10	1	5	200
FA	12.15	10.50	1	5	313
HS	9.88	11.95	1	5	142
HU	12.73	10.88	1	5	748
PS	16.74	13.21	1	5	483
SS	15.84	12.63	1	5	645
OT	11.78	9.87	1	5	425

BS=Biological Sciences BU=Business/Management ED=Education EN=Engineering FA=Fine Arts HS=Health Sciences HU=Humanities PS=Physical Sciences SS=Social Sciences OT=Other

* 1=10 or less hours per week + 5=41 or more hours per week

In terms of the mean number of hours per week spent per faculty member on research and/or scholarly activities, the faculty by disciplines rank as follows: (1) Biological Sciences; (2) Engineering; (3) Physical Sciences; (4) Social Sciences; (5) Business/ Management; (6) Humanities; (7) Fine Arts; (8) Other; (9) Education; and (10) Health Sciences.

Faculty in the natural sciences rank highest, as they did in the measures of research performance (Tables 11-15), in terms of the time spent per week on research. Health Science faculty, who ranked last in this category, ranked last or next to last in three of the five performance measures (Tables 12-14). Education faculty, who ranked ninth in this category of comparison, were in the top one-half of the ten disciplinary classifications of faculty in three of the five performance measures (Tables 11-15).

Table 45

Mean Hours/Week Spent on Research/Scholarly Activity by Rank

	Mean	Std Dev	*Minimum	+Maximum	n
Prof	15.12	12.08	1	5	1622
AssoProf	12.83	11.20	1	5	1204
AssiProf	14.35	12.36	1	5	850
Instruc	7.90	8.86	1	5	100

Prof=Professor AssoProf=Associate Professor
AssiProf=Assistant Professor Instruc=Instructor

* 1=10 or less hours per week + 5=41 or more hours per week

The mean number of hours per week spent per faculty member on research and/or scholarly activities varied by rank. Assistant professors spent more hours per week per faculty member than did associate professors but less than professors.

Table 46

Mean Hours/Week Spent on Research/Scholarly Activity by Current Engagement

Current Engagement	Mean	Std Dev	*Minimum	+Maximum	n
Yes	15.39	11.99	1	5	3354
No	4.46	4.59	1	4	494

* 1=10 or less hours per week + 4=31-40 hours per week
+ 5=41 or more hours per week

The mean number of hours per week spent per faculty member on research and/or scholarly activities was almost three and one-half times greater for faculty currently engaged in scholarly work that was expected to lead to a publication, an exhibit, or a musical recital than for faculty not currently engaged in research/ scholarly activities with such expectations. This is the only measure for

which a cohort of faculty reported spending a maximum of no more than 40 hours per week on research/ scholarly activities.

Table 47

Mean Hours/Week Spent on Research/Scholarly Activity by Receipt of Internal Research Support

Internal Support	Mean	Std Dev	*Minimum	+Maximum	n
Yes	16.44	12.36	1	5	1941
No	10.98	10.53	1	5	1574

* 1=10 or less hours per week + 5=41 or more hours per week

The mean number of hours per week spent per faculty member on research and/or scholarly activities was 49.7 percent greater for faculty who had received internal research support than for faculty who had not received such support. Because the receipt of internal research support (Tables 36-40) and the increased number of hours spent per week on scholarly activities (Tables 26-30) were indicative of higher levels of faculty research productivity, these data are not surprising.

Percentage of Faculty Engaged in Scholarly Work by Research Correlates

In response to the second subsidiary research question concerning the percentage of faculty currently engaged in scholarly work that is expected to lead to a publication, an exhibit, or a musical recital, percentages of faculty engaged and percentages of faculty not engaged were calculated by institutional affiliation, gender, tenure status, discipline, rank, hours per week spent on research/scholarly activities (scaled), and the receipt of internal research support. The following seven tables (Table 48-Table 54) report these data.

Table 48

Percentage of Faculty Currently Engaged in Scholarly Activities by Institutional Type

Research I	95.9%	(562)
Research II	93.3%	(598)
Doctoral I	90.6%	(607)
Doctoral II	86.8%	(583)
Comprehensive I	75.8%	(554)
Comprehensive II	65.3%	(516)
Liberal Arts I	82.1%	(592)
Liberal Arts II	58.4%	(368)

*The total number of respondents is given in parentheses.

The percentage of faculty members currently engaged in scholarly work that is expected to lead to a publication, an exhibit, or a musical recital declined, with one exception, from Research I Universities through Liberal Arts II Colleges. A greater percentage of faculty in Liberal Arts I institutions were currently engaged in scholarly work than were faculty in Comprehensive institutions. The trend indicated in Table 48 for current faculty engagement in scholarly activity by institutional type follows the pattern reported in Tables 1-5 and Table 41 for six categories of comparison by institutional type.

Table 49

Percentage of Faculty Currently Engaged in Scholarly Activities by Gender

Male	84.4%	(3212)
Female	77.3%	(1151)

*The total number of respondents is given in parentheses.

The percentage of faculty members currently engaged in scholarly work that is expected to lead to

a publication, an exhibit, or a musical recital is greater for males than for females. The trend indicated in Table 49 for current engagement in scholarly activity by gender follows the pattern reported in Tables 21-25 and Table 42 for the categories of comparison by gender. In this study, males have had higher means or percentages than females in every category of comparison.

Table 50

Percentage of Faculty Currently Engaged in Scholarly Activities by Tenure Status

Tenured	83.0%	(3134)
Non-tenured	81.0%	(1246)

*The total number of respondents is given in parentheses.

The percentage of faculty members currently engaged in scholarly work that is expected to lead to a publication, an exhibit, or a musical recital is slightly greater for faculty who are tenured than for faculty who are not tenured. The trend indicated in Table 50 for current engagement in scholarly activity by tenure status follows the pattern reported in

Tables 16-20 and Table 43 for the categories of comparison by tenure status. That is, tenured faculty have consistently ranked above non-tenured faculty in all measures of comparison. However, in Tables 19, 43, and 50, the difference between the means or percentages for the two cohorts is relatively small compared to the difference between the means or percentages for the two groups in other categories of comparison (Tables 16, 17, 18, 20). In terms of the mean number of professional writings published or accepted for publication in the past two years, the mean number of hours spent per faculty member each week on research/scholarly activities, and the percentage of faculty currently engaged in scholarly work, data for non-tenured faculty were very close to the statistics for tenured faculty.

Table 51

Percentage of Faculty Currently Engaged in Scholarly Activities by Discipline

Biological Sciences	86.8%	(311)
Business/Management	77.4%	(283)
Education	76.6%	(325)
Engineering	88.9%	(216)
Fine Arts	89.4%	(378)
Health Sciences	84.6%	(162)
Humanities	83.5%	(838)
Physical Sciences	79.5%	(533)
Social Sciences	90.1%	(707)
Other	76.3%	(497)

*The total number of respondents is given in parentheses.

In terms of the percentage of faculty members currently engaged in scholarly work that is expected to lead to a publication, an exhibit, or a musical recital, the faculty by disciplines rank as follows: (1) Social Sciences; (2) Fine Arts; (3) Engineering; (4) Biological Sciences; (5) Health Sciences; (6) Humanities; (7) Physical Sciences; (8) Business/ Management; (9) Education; and (10) Other. The Social Sciences faculty, who ranked first in Table 51, have held rankings more in the middle of the faculty by discipline in previous tables. The Fine Arts faculty,

who ranked second in Table 51, have consistently ranked in the lower half of the faculty by discipline in previous tables. Engineering faculty, who have consistently ranked near the top among faculty in the ten disciplines--first in Tables 11, 12, 14, and 15, and second in Table 44--ranked third in Table 51.

Table 52

Percentage of Faculty Currently Engaged in Scholarly Activities by Rank

Professor	84.8%	(1818)
Associate Professor	82.7%	(1355)
Assistant Professor	83.2%	(968)
Instructor	58.5%	(142)

*The total number of respondents is given in parentheses.

The percentage of faculty currently engaged in scholarly work that is expected to lead to a publication, an exhibit, or a musical recital increased, overall, from the rank of instructor through professor. The percentage of assistant professors was higher relative to engagement than the percentage of associate professors was. The pattern indicated for current engagement in Table 52

follows the pattern reported in Table 45. In terms of the mean hours per week spent per faculty member on research/scholarly activities (Table 45) and the percentage of faculty currently engaged in scholarly work (Table 52), the means or percentages increase, except for assistant professors, from instructor through professor. In Table 52, the percentage of instructors engaged in scholarly work is far behind the percentages of faculty in the three higher ranks engaged in such activity. The percentages of faculty engaged in scholarly work in the three highest ranks are clustered very closely.

Table 53

Percentage of Faculty Currently Engaged in Scholarly Activities by Hours per Week Spent on Research/Scholarly Activities

10 or Less Hours per Week	78.0%	(2109)
11-20 Hours per Week	97.3%	(1010)
21-30 Hours per Week	99.3%	(437)
31-40 Hours per Week	99.5%	(194)
41 or More Hours per Week	100.0%	(98)

*Total number of respondents is given in parentheses.

The percentage of faculty currently engaged in scholarly work that is expected to lead to a publication, an exhibit, or a musical recital increased as the number of hours per week spent on research and/or scholarly activities increased. At least 97 percent of faculty who spent more than ten hours per week on research/scholarly activities expected their efforts to lead to publications, exhibits, or recitals. All of the faculty who spent more than forty hours per week on research and/or scholarly activities had these expectations. The majority of faculty (54.8%) reported spending ten or less hours per week on research/scholarly activities.

In terms of time spent on research and/or scholarly activities and productivity measures, Tables 28 and 29 indicate the same pattern as Table 53. That is, as the number of hours per week spent per faculty member on research/scholarly activities increased, the levels of research productivity for faculty increased. Tables 26, 27, and 30 also indicate increased levels of faculty scholarly productivity as the number of hours per week spent per faculty member increased, up to a point. For

faculty who spent more than 40 hours per week on research/scholarly activities, the means or percentages of research productivity decreased.

Table 54

Percentage of Faculty Currently Engaged in Scholarly Activities by Receipt of Internal Research Support

Internal Research Support	95.2%	(2052)
No Internal Research Support	71.6%	(1895)

*The total number of respondents is given in parentheses.

The percentage of faculty who were currently engaged in research and/or scholarly work was over 13 percent higher for faculty who received internal research support than for faculty who had not received such support. The trend indicated in Table 54 in terms of the receipt of internal research support is reported in Tables 31-35 and Table 47. For every category of comparison related to internal research support, levels of research productivity were higher for faculty who received internal research support than for faculty who had not received such support.

Internal Research Support by Research Correlates

In response to the third subsidiary research question concerning the percentage of faculty receiving internal research support during the past twelve months, percentages were calculated by institutional affiliation, gender, tenure status, discipline, rank, current engagement, and hours per week spent on research/scholarly activities (scaled). The following seven tables (Table 55-Table 61) report these data.

Table 55

Percentage of Faculty Who Received Internal Research Support by Institutional Type

Research I	58.6%	(502)
Research II	61.3%	(530)
Doctoral I	57.1%	(559)
Doctoral II	52.8%	(527)
Comprehensive I	43.6%	(505)
Comprehensive II	38.5%	(460)
Liberal Arts I	60.4%	(545)
Liberal Arts II	34.5%	(319)

*The total number of respondents is given in parentheses.

The percentage of faculty who received internal research support was greatest for faculty employed in Research II Universities (61.3%). Liberal Arts I Colleges ranked second in the percentage of faculty who reported the receipt of internal research support (60.4%). Otherwise, the percentage of faculty who received internal research support declined from Research Universities through Liberal Arts Colleges. Tables 1-5, 41, and 48 indicated faculty in Liberal Arts I Colleges exceeded faculty in Comprehensive institutions in categories of comparison by institutional type. However, Table 55 is the first table to report Liberal Arts I faculty exceeding Doctorate Granting University faculty in a category of comparison.

Table 56

Percentage of Faculty Who Received Internal Research Support by Gender

Male	53.5%	(2899)
Female	48.1%	(1035)

*The total number of respondents is given in parentheses.

A greater percentage of male faculty received internal research support than did female faculty. This trend is consistent with the research performance pattern indicated in Tables 21-25, 42, and 49. Males have indicated higher levels of faculty research productivity across all categories of comparison.

Table 57

Percentage of Faculty Who Received Internal Research Support by Tenure Status

Tenured	51.2%	(2800)
Non-tenured	53.8%	(1147)

*The total number of respondents is given in parentheses.

The percentage of faculty who received internal research support was greater for tenured faculty than for non-tenured faculty. This trend is consistent with the pattern indicated in Tables 16-20, 43, and 50. Tenured faculty have reported higher levels of research productivity than non-tenured faculty in every category of comparison.

Table 58

Percentage of Faculty by Discipline Who Received Internal Research Support

Biological Science	70.5%	(285)
Business/Management	46.9%	(254)
Education	40.3%	(283)
Engineering	53.6%	(183)
Fine Arts	55.2%	(335)
Health Sciences	49.7%	(145)
Humanities	49.7%	(767)
Physical Sciences	50.2%	(490)
Social Sciences	59.9%	(654)
Other	48.0%	(442)

*The total number of respondents is given in parentheses.

In terms of the percentage of faculty who received internal research support, the faculty by disciplines rank as follows: (1) Biological Sciences; (2) Social Sciences; (3) Fine Arts; (4) Engineering; (5) Physical Sciences; (6) Humanities and Health Sciences; (7) Other; (8) Business/Management; and (9) Education. Faculty in the Biological Sciences (ranked first in Tables 58 and 44) are 10 percentage points ahead of faculty in Social Sciences (ranked second) and 30 percentage points above Education faculty (ranked last) relative to the receipt of internal

research support. Faculty in Humanities and Health Sciences tied for sixth place among faculty by discipline who received internal research support. While this is the first category of comparison in which Education faculty ranked last, they did rank ninth in two categories (Table 44 and 51) Physical Scientists and Business/Management faculty held the same rankings--fifth and next to last, respectively--for the receipt of external research support (Table 15) and for the receipt of internal research support (Table 58).

Table 59

Percentage of Faculty Who Received Internal Research Support by Rank

Professor	53.7%	(1619)
Associate Professor	49.7%	(1220)
Assistant Professor	56.5%	(894)
Instructor	35.2%	(125)

*The total number of respondents is given in parentheses.

The percentage of faculty that received internal research support is higher for assistant professors than for professors and is greater for associate

professors than for instructors. This pattern indicated in Table 59 for the receipt of internal research support differs from the trend in all other categories of comparison by rank. Levels of faculty research productivity increased from the rank of instructor through the rank of professor (Tables 6-10). The mean number of hours spent each week per faculty member on research/scholarly activities (Table 45) and the percentage of faculty engaged in scholarly work (Table 52) increased, overall, from the rank of instructor through professor. Assistant professors had a higher mean (Table 45) and percentage (Table 52) than associate professors.

Table 60

Percentage of Faculty Who Received Internal Research Support by Current Engagement

Currently Engaged	59.0%	(3310)
Not Currently Engaged	15.4%	(637)

*The total number of respondents is given in parentheses.

The percentage of faculty who received internal research support was almost four times greater for

faculty who were currently engaged in scholarly work than for faculty who were not currently engaged in such activity. In all categories of comparison, the means or percentages for faculty currently engaged in scholarly work were greater than those for faculty not engaged in such activity (Tables 31-35, 46, and 54).

Table 61

Percentage of Faculty Who Received Internal Research Support by Hours per Week Spent on Research/Scholarly Activities

10 or Less Hours per Week	45.6%	(1923)
11-20 Hours per Week	64.7%	(930)
21-30 Hours per Week	67.0%	(397)
31-40 Hours per Week	72.8%	(173)
41 or More Hours per Week	77.2%	(92)

*The total number of respondents is given in parentheses.

The percentage of faculty that received internal research support increased as the number of hours per week spent per faculty member on research/scholarly activities increased. This trend was indicated in Table 53. The same pattern could be observed in Tables 26-30, up to a point. Faculty who spent more

than 40 hours per week on research and/or scholarly activities had lower levels of research productivity than faculty who spent 31-40 hours per week had. Less than one-half of the faculty who indicated they spent ten or less hours per week on scholarly activities received internal research support, while more than one-half of the faculty who spent more than ten hours per week on research and/or scholarly activities received such support.

Levels of Faculty Research Productivity

What is the level of faculty productivity as determined by (a) the number of articles published in academic or professional journals? (b) the number of articles published in edited collections or volumes? (c) the number of books or monographs published or edited alone, or in collaboration? (d) the number of professional writings published or accepted for publication in the past two years? (e) the receipt of external research support within the last twelve months? To answer subsidiary research question four, levels of faculty research productivity were calculated by institutional affiliation, gender,

tenure status, discipline, rank, current engagement, hours per week spent on research/scholarly activities (scaled), and the receipt of internal research support. The data for these levels of faculty research productivity have been reported previously in this study as follows:

(a) articles published in academic or professional journals--Tables 1, 6, 11, 16, 21, 26, 31, 36, 41, 46;
(b) articles published in edited collections or volumes--Tables 2, 7, 12, 17, 22, 27, 32, 37, 42, 47;
(c) books or monographs published or edited alone, or in collaboration--Tables 3, 8, 13, 18, 23, 28, 33, 38;
(d) professional writings published or accepted for publication in the past two years--Tables 4, 9, 14, 19, 24, 29, 34, 39, 44, 49; and
(e) receipt of external research support within the last twelve months--Tables 5, 10, 15, 20, 25, 30, 35, 40.

Multiple Regression

What percentage of variance in faculty research productivity can be explained by institutional affiliation, rank, discipline, tenure status, gender, hours spent per week on research and/or scholarly activities, current engagement in scholarly work, and the receipt of internal research support? In order to

answer this final subsidiary research question, stepwise multiple regression techniques were employed for each of five measures of faculty research performance used in this study. A decision was made to set the probability of entry in a stepwise regression procedure at .1 with a tolerance level of .0001. The following five tables (Table 62-Table 66) report these data.

Table 62

Multiple Regression Summary Table: Articles Published in Academic or Professional Journals

Predictors	Multiple R	Rsq	F(Eqn)	SigF
Rank	.3588	.1288	486.948	.000
Hrs./Wk.	.4631	.2145	449.768	.000
Carnegie	.5018	.2518	369.323	.000
Engagement	.5047	.2547	281.252	.000
Gender	.5070	.2570	227.680	.000
Discipline	.5084	.2584	191.091	.000
Tenure Status	.5090	.2591	164.275	.000

A multiple correlation of .51 was obtained between the criterion measure, number of articles published in academic or professional journals, and

seven of the eight predictors. Approximately 26 percent of the variance in the number of journal publications was explained by the predictors. Rank was found to be the highest correlate, accounting for approximately 13 percent of the variation. Receipt of internal research was the only variable that failed to enter the regression equation ($p \geq .1$).

Table 63

Multiple Regression Summary Table: Articles in Edited Collections or Volumes

Predictors	Multiple R	Rsq	F(Eqn)	SigF
Rank	.1914	.0366	118.670	.000
Hrs./Wk.	.2543	.0647	107.858	.000
Carnegie	.2746	.0754	84.776	.000
Engagement	.2818	.0794	67.215	.000
Tenure Status	.2847	.0811	54.993	.000

A multiple correlation of .28 was obtained between the criterion measure, number of articles published in edited collections or volumes, and five of the eight predictors, indicating that approximately 8 percent of the variance in the number

of edited publications was explained by the predictors. Rank, as in Table 62, accounted for the greatest amount of variance (approximately 4 percent). Discipline, gender, and receipt of internal research support failed to enter the regression equation ($p \geq .1$).

Table 64

Multiple Regression Summary Table: Books or Monographs Published or Edited Alone or in Collaboration

Predictors	Multiple R	Rsq	F(Eqn)	SigF
Rank	.2085	.0435	141.667	.000
Carnegie	.2331	.0543	89.487	.000
Engagement	.2443	.0597	65.920	.000

A multiple correlation of .24 was obtained between the criterion measure, number of books or monographs published or edited alone or in collaboration, and three of the eight predictors, indicating that approximately 6 percent of the variance in the number of publications was explained by the predictors. As in Tables 62 and 63, rank was the highest correlate. This variable accounted for

approximately 4 percent of the variance. Discipline, tenure status, receipt of internal research support, gender, and hours spent per week on research/ scholarly activities were variables which failed to enter the regression equation ($p \geq .1$).

Table 65

Multiple Regression Summary Table: Professional Writings Published or Accepted for Publication in the Past Two Years

Predictors	Multiple R	Rsq	F(Eqn)	SigF
Hrs./Wk.	.3366	.1133	415.953	.000
Carnegie	.3842	.1476	281.882	.000
Engagement	.4059	.1647	213.893	.000
Rank	.4229	.1789	177.169	.000
Internal Support	.4277	.1830	145.651	.000
Tenure Status	.4287	.1838	122.034	.000

A multiple correlation of .43 was obtained between the criterion measure, number of professional writings published or accepted for publication in the past two years, and six of the eight predictors, indicating that approximately 18 percent of the variance in the number of publications or acceptances was explained by the predictors. The number of hours

spent per week on research and/or scholarly activities was the highest correlate. Approximately 11 percent of the variance for this category was explained by the time spent on research/scholarly activities. Discipline and gender failed to enter the regression equation ($p \geq .1$).

Table 66

Multiple Regression Summary Table: Receipt of External Research Support

Predictors	Multiple R	Rsq	F(Eqn)	SigF
Internal Support	.2847	.0810	273.415	.000
Hrs./Wk.	.2952	.0871	147.914	.000
Rank	.2990	.0894	101.400	.000
Discipline	.3019	.0911	77.652	.000
Carnegie	.3036	.0921	62.869	.000
Tenure Status	.3051	.0931	52.950	.000

A multiple correlation of .31 was obtained between the criterion measure, the receipt of external research support, and six of the eight predictors. Approximately 9 percent of the variance in the receipt of external research support was explained by the predictors. Receipt of internal

research support was the highest correlate for the receipt of external research support. The receipt of internal research support accounted for approximately 8 percent of the variance. Gender and current engagement were the variables which failed to enter the regression equation ($p \geq .1$).

Rank was the highest correlate for three of the research measures (Tables 62-64), the fourth highest correlate for the measure in Table 65, and the third highest correlate for the measure in Table 66. The number of hours per week spent per faculty member on scholarly work was the highest correlate for the research measure in Table 65 and the second highest correlate for the measures in Tables 62, 63, and 66. Type of institution was a significant predictor ($p \leq .1$) for all five of the research measures (Tables 62-66). Current engagement in research/ scholarly activities was a significant predictor ($p \leq .1$) for all of the research measures except the receipt of external research support (Table 66). The number of articles published in academic or professional journals (Table 62) was the only research measure for which gender was a significant predictor ($p \leq .1$). The

number of books or monographs published (Table 64) was the only research measure for which tenure status was not a significant predictor ($p \geq .1$). Discipline was a significant predictor ($p \leq .1$) for two of the five research measures, articles published in academic or professional journals (Table 62) and receipt of external research support (Table 66). The receipt of internal research support was the highest correlate for the receipt of external research support (Table 66) and a significant predictor ($p \leq .1$) for the number of professional writings published or accepted for publication within the past two years (Table 65).

In terms of the percentage of variance for which the eight predictors accounted, the measures of research performance rank as follows: (1) articles published in academic or professional journals (26%); (2) professional writings published or accepted for publication within the past two years (18%); (3) receipt of external research support (9%); (4) articles published in edited collections or volumes (8%); and (5) books or monographs published (6%).

Chapter 5

Summary and Discussion

While faculty research productivity has been the topic of more than one hundred studies conducted since 1940, no single study has included correlates from all four of the explanations found in the literature for the variation in faculty research performance (Creswell, 1985a, p. 241; Wood, 1990, p. 83). Further, numerous studies of faculty research productivity have failed to account adequately for factors such as institutional affiliation, academic rank, discipline, tenure status, and gender (Creswell, 1985, vii). Failure to account for such factors has posed limitations to faculty and academic administrators who need to translate research findings into practice. The purpose of this study was twofold: to examine individual faculty research productivity in terms of the relationship between and among factors selected from all four of the explanations found in the literature for the variance in faculty research productivity; and to control for factors such as institutional affiliation in order to facilitate the

utilization of results of this study by faculty and academic administrators.

In this study, the researcher utilized self-report data from the 1989 Carnegie Survey of the professoriate of full-time, tenured and non-tenured faculty employed in Research Universities, Doctoral Granting Universities, Comprehensive Colleges and Universities, and Liberal Arts Colleges. Individual faculty research performance was studied by institutional affiliation, academic rank, discipline, tenure status, gender, the number of hours per week spent on research and/or scholarly activities, current engagement in scholarly work, and the receipt of internal research support in the past twelve months. Studying faculty research performance in this manner incorporated the four explanations found in the literature for the variation in research productivity--psychological-individual factors, cumulative advantage, reinforcement, and disciplinary norms. Self-report data relative to the number of articles published in academic or professional journals, number of articles published in edited collections or volumes, number of books or monographs published or edited alone or in

collaboration, number of professional writings published or accepted for publication in the past two years, and receipt of external research support were used as measures of research performance.

Because of the high degree of variance in faculty research productivity (Allison, 1980; Fox, 1983; Robbins et al., 1986) and an aggressive movement observed from the early 1980s to increase the importance of faculty research performance as a criterion for academic personnel decision-making (Bowen & Schuster, 1985, p. 14; Seldin, 1984), the researcher controlled for such factors as institutional affiliation, rank, discipline, and gender. The researcher also disaggregated the data reported in this study in a manner that would facilitate its use by faculty and academic administrators--presidents, deans, chairs--and personnel committees who review faculty credentials from different departments and disciplines.

A comparison between the levels of individual faculty research productivity across institutional types in this study indicates, on the whole, a predictable decrease in performance levels as one moves from Carnegie Classifications one through eight (i.e.,

from Research I to Research II to Doctorate I to Doctorate II to Comprehensive I to Comprehensive II to Liberal Arts I to Liberal Arts II). Notable exceptions include faculty in the Liberal Arts I institutions. For each category of comparison, faculty in Liberal Arts I institutions ranked higher, with one exception, than faculty in Comprehensive I and II institutions. Liberal Arts I faculty did not report higher publication levels than Comprehensive I faculty for books or monographs. Other exceptions are the Doctoral I faculty, who ranked higher than Research II faculty on the mean number of books or monographs published or edited by faculty. Finally, faculty in Research I institutions did not rank the highest in all categories of comparison. In terms of the percentage of faculty who received external research support and the percentage of faculty who had received internal research support within the last twelve months, Research I institutions ranked second and third, respectively. This overall pattern of variation in faculty research productivity by institutional type is not unexpected in terms of the respective institutional missions and reward structures (Creswell in Finkelstein, 1985, p. 256). When regressed

with the other seven correlates of faculty research productivity, institutional affiliation was found to be a significant predictor ($p \leq .1$) for all five measures of research performance.

In terms of institutional affiliation, the results of this study corroborate Kim's (1990) findings in a recent study of the effects of organizational context characteristics on the research performance of chemistry faculty. Kim found that organizational context advantages, such as the research orientedness of the affiliated institution, were related to high faculty research productivity.

The levels of individual faculty research productivity across four ranks--professor, associate professor, assistant professor, and instructor--varied as expected (Blackburn, Behymer & Hall, 1978; Creswell, 1985, p. 40; Fulton & Trow, 1974). Overall, the levels of research productivity increased with higher ranks. Assistant professors did rank higher than associate professors in terms of hours per week spent per faculty member on research/scholarly activities, current engagement in scholarly work, and receipt of internal research support. A high percentage of assistant

professors seeking promotion and/or tenure may help explain why they may be engaged in scholarly work and spending more time than associate professors on research. When regressed with the other seven correlates of faculty research productivity used in this study, rank was found to be a significant predictor ($p \leq .1$) for each of the five measures of research performance. Rank was the highest correlate for three research measures (Tables 62-64). This trend may be explained, in part, by the reinforcement role that rank plays in the reward system for faculty in higher education (Finkelstein, 1984, p. 101).

For each of the five measures of scholarly productivity used in this study, levels of research productivity increased from the rank of instructor through the rank of professor. It is not surprising that faculty in the higher ranks reported, on average, higher numbers of publications. Three of the four publication measures were cumulative. Cumulative research productivity is generally related to longevity, and longevity to higher rank.

Results of this study corroborate the findings of earlier studies relative to the rank order of faculty

research productivity for three disciplinary categories--natural sciences, social sciences, and the humanities (Biglan, 1973; Finkelstein, 1984, p. 100; Wanner, Lewis, & Gregorio, 1981). One exception can be noted. In terms of the mean number of books or monographs published or edited, Education faculty in this study ranked first and were followed by faculty in Social Sciences, Humanities, Business/Management, and Fine Arts. In pre-paradigmatic disciplines, such as education, books and monographs are required (Biglan, 1973).

The results of this study indicate that faculty in the Biological Sciences and the Social Sciences received internal research support in greater percentages than in any other disciplinary group, while faculty in Engineering and the Biological Sciences reported the receipt of external research support in greater percentages. Biological Sciences, Engineering, Physical Sciences, and Social Sciences were the disciplines which had the highest mean numbers of hours per week spent per faculty member on research/scholarly activities. Faculty in Social Sciences, Fine Arts, and

Engineering reported the highest level of current engagement in research and/or scholarly activities.

While earlier studies found that the paradigmatic stage of a discipline affects scholarly research (Lodahl & Gordon, 1972) in terms of acceptance rates in journals (Gaston, 1978) and the form of communication (Biglan, 1973), in this study discipline was found to be a significant predictor ($p \leq .1$) for only two of the five measures of research performance--the number of articles published in academic or professional journals and the receipt of external research support. Discipline was found to be an insignificant predictor ($p \geq .1$) for the number of articles published in edited collections or volumes, the number of books or monographs published or edited alone or in collaboration, and the number of professional writings published or accepted for publication in the past two years.

The levels of research productivity for tenured faculty in this study were higher than those for non-tenured faculty in every category of comparison. These findings would seem to substantiate Alstyne's (1985, p. 167) observation that the function of tenure

is to encourage and maximize scholarly activity. When regressed with the other seven research correlates utilized in this study, tenure status was found to be a significant predictor ($p \leq .1$) for four of the five measures of faculty research productivity--number of articles published in academic or professional journals, number of articles published in edited collections or volumes, number of professional writings published or accepted for publication in the past two years, and receipt of external research support. Tenure status was not found to be a significant predictor ($p \geq .1$) for the number of books or monographs published or edited.

The results of this research add to the compelling evidence presented in previous studies that males publish more than females (Astin, 1984, 1969; Babchuk & Bates, 1962; Cole, J. 1979; Cole & Zuckerman, 1984; Hargens, McCann, & Reskin, 1978). Male faculty reported higher levels of research productivity than female faculty reported in every category of comparison. However, when regressed with the other seven correlates of faculty research performance used in this study, gender was found to be an insignificant

predictor ($p \geq .1$) for four of the five measures of research performance. Gender was found to be a significant predictor ($p \leq .1$) for the number of articles published in academic or professional journals. Findings from this study corroborate results from previous studies pertaining to the relationship between gender and research performance: while gender helps to explain variations in the quantity of faculty research publications (Rosenfeld, 1987), it is, comparatively, an insignificant correlate of faculty research performance (Bernard, 1964; Blackburn, Behymer, & Hall, 1978; Cameron & Blackburn, 1981; Cole & Zuckerman, 1984).

The levels of faculty research productivity increased, overall, as the mean number of hours per week spent per faculty member on research and/or scholarly activities increased. As faculty reported spending more time on research activities, the mean number of books or monographs published or edited and the number of professional writings published or accepted for publication within the last two years increased. The mean number of articles published in academic or professional journals, the mean number of

articles published in edited collections or volumes, and the percentage of faculty who received external research support increased as the number of hours spent per week on research/scholarly activities increased, up to forty hours per week. These means or percentages declined for faculty who indicated they spent forty-one hours or more per week on research. This finding corroborates an earlier study conducted by Pelz & Andrews (1966), which reported that spending too much time on research activities can hamper research productivity. As the number of hours faculty reported spending per week on research/scholarly activities increased, the percentages of faculty who reported the receipt of internal research support within the past twelve months and current engagement in research/scholarly activities also increased.

The number of hours per week spent per faculty member on research/scholarly activities was found to be a significant predictor ($p \leq .1$) for four of the five measures of faculty research productivity used in this study--number of articles published in academic or professional journals, number of articles published in edited collections or volumes, number of articles

published or accepted for publication within the last two years, and receipt of external research support. The number of hours per week spent on research/ scholarly activities was found to be an insignificant predictor ($p \geq .1$) for the number of books or monographs published or edited alone or in collaboration. These findings corroborate results of previous studies that found the amount of time faculty spend on research to be an important predictor of high research productivity (Allison & Stewart, 1974; Harrington, 1985).

Levels of research productivity for faculty who reported current engagement in research were higher in all categories of comparison than research levels for faculty who indicated no current engagement in research. Current engagement in research/scholarly activities was found to be a significant predictor ($p \leq .1$) for four of the five measures of research productivity utilized in this study--number of articles published in academic or professional journals, number of articles published in edited collections or volumes, number of books or monographs published or edited alone or in collaboration, and number of professional writings published or accepted for publication in the

past two years. Current engagement in research was not found to be a significant predictor ($p \geq .1$) for the receipt of external research support.

Faculty who indicated the receipt of internal research support in the past twelve months reported higher levels of research performance across all categories of comparison than faculty who indicated no receipt of internal research support reported. The need for internal research support in order to be a productive researcher has been documented in previous studies by Creswell (1985, p. 50), Ingalls (1982), and Wood (1990). When regressed with the other seven correlates of faculty research productivity used in this study, internal research support was found to be a significant predictor ($p \leq .1$) for two of the five measures of faculty research performance--the number of articles published or accepted for publication in the last two years and the receipt of external research support. Receipt of internal research support was the highest correlate for receipt of external research support. The receipt of internal research support was not found to be a significant predictor ($p \geq .1$) for the number of articles published in academic journals, the

number of articles published in edited collections or volumes, and the number of books or monographs published or edited.

The rank order found between the correlates of faculty research productivity used in this study and the measures of faculty research performance is as follows: 1-the number of articles published in academic or professional journals (R=.26); 2-the number of professional writings published or accepted for publication in the past two years (R=.18); 3-the receipt of external research support (R=.09); 4-the number of articles published in edited collections or volumes (R=.08); and 5-the number of books or monographs published or edited alone or in collaboration (R=.06).

The descriptive data presented in this study can inform faculty and academic administrators as they develop strategies for faculty research development. For example, referring to the research model, this study underscores the importance of rank (reinforcement) and institutional affiliation (cumulative advantage) on each of the five measures of individual faculty research productivity. Engagement in

scholarly work (psychological-individual) and the hours spent per week on research and/or scholarly activities (cumulative advantage) were shown to be significantly related ($p \leq .1$) to four of the five measures of research performance.

The results of this study could prove useful to presidents, deans, chairs, and personnel committees who review faculty credentials from different departments and disciplines. The descriptive data provided in this study might serve as one source of information for assessing the level of individual faculty research productivity.

Findings from this study can also be used to inform faculty and academic administrators as they develop guidelines to evaluate faculty research performance. How the individual research productivity of faculty varies by institutional affiliation, rank, discipline, tenure status, gender, the number of hours spent per week on research and/or scholarly activities, current engagement in scholarly work, and the receipt of internal research support, is indicated by the interpretation of data presented in this study. The practical implications of these findings indicate the

need to move away from institution-wide evaluation of faculty research performance and to move toward the establishment of ongoing departmental and/or disciplinary evaluation procedures.

A synthesis of the literature relevant to faculty research productivity and the limitations of this study raise questions and indicate possible avenues for further scholarly investigation.

1. How do specific correlates of the work environment such as colleagues, socialization processes, participation in campus governance, and reward systems affect faculty research productivity? Researchers might consider holding variables such as institutional affiliation, discipline, and rank constant in order to examine significant correlates of the work environment that would have a positive predictive influence on individual faculty research performance.
2. What is the relationship between faculty career stages and the level of research performance? Researchers could attempt to relate the levels

of individual faculty research productivity to career or developmental stages.

3. What measures of faculty research performance in addition to publication counts, citation counts, and peer or colleague ratings can be used to measure individual faculty research productivity? Researchers should endeavor to expand commonly used measures of faculty research productivity to include alternative measures of research performance such as production of computer software, receipt of patents, and participation in art exhibits, musical recitals, and competitions.
4. What practical application does research on individual faculty research productivity have for academic administrators and faculty? Efforts should continue to translate research findings into viable approaches to faculty development and evaluation.

These research questions represent potential areas of future inquiry relative to individual faculty research productivity. It is evident from these

questions that the relationship between research correlates and measures of research performance must be included in further study to facilitate a better understanding of individual faculty research performance. Because of the importance placed on individual faculty research productivity on college and university campuses, continued efforts to understand correlates that have a positive influence on research performance, to expand commonly used measures of research productivity, to relate the levels of individual faculty research productivity to career or developmental stages, and to translate research findings into practical approaches to faculty development and evaluation are imperative.

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APPENDIX A

Cover Letter and Survey

THE CARNEGIE FOUNDATION
FOR THE ADVANCEMENT OF TEACHING

February 17, 1989

Dear Professor:

Last week I wrote to you asking for your assistance in our nationwide survey of college and university faculty. Your cooperation will be enormously helpful to us and will contribute to our longitudinal study of the American professoriate. As you may recall, our study goal is twofold: to learn more about this nation's system of higher education in general as well as the opinions of faculty members from coast to coast.

When completing the questionnaire, please be candid. I can assure you that your responses will be held in complete confidence. You need not sign your name and we do not intend to report responses to or by individual colleges or universities. The bibliographic questions located at the end of the questionnaire will serve only to improve our analysis of the survey data.

Please take a few minutes and complete the survey and return it in the enclosed prepaid envelope addressed to The Wirthlin Group. They are assisting us with the administration of this survey. If you wish, also include a self-addressed and stamped envelope for a free summary report of our more interesting findings.

We look forward to receiving your completed questionnaire, and we would appreciate receiving it on or before the end of March in order for your opinions to be included in our national study. Thank you very much for your help.

Best wishes,

Ernest L. Boyer
President

INSTRUCTIONS FOR COMPLETING THE QUESTIONNAIRE

Please read each question carefully. Most questions require only one response, others request that you circle all that apply, while on some you write in a number. A "no opinion" or "neutral" response category is usually provided.

Several questions use a five-point rating scale. You may circle any single number on the scale.

If you teach at more than one institution, please answer the questions in relation to the college or university where you spend most of your time.

The following questions refer to your current academic position.

1. Do you have a full-time appointment at this institution for at least nine months of the current academic year?

   1 Yes
   2 No, full-time but for less than nine months
   3 No, part-time

2. What kind of appointment do you have? (If you have a joint appointment, answer for your primary department)

   1 Campus faculty member, with tenure
   2 Campus faculty member, without tenure
   3 Adjunct
   4 Visiting
   5 Other: _____

3. What is your current academic rank?

   1 Lecturer
   2 Instructor
   3 Assistant Professor
   4 Associate Professor
   5 Professor
   6 No rank designated
   7 Other: _____

4. If you have tenure, please skip to Question 5.

   Is your appointment...

   1 Untenured, but on a tenure-track
   2 Untenured, with a continuous contract or its equivalent
   3 Untenured, not on a tenure track and without the guarantee of a continuous contract
   4 Untenured, but none of the above

5. At how many colleges or universities have you been employed full-time as a faculty member beyond the level of a teaching assistant? (Include your current position)

   _____

6. For how many academic years have you been employed on a full-time basis: (Include current year)

   (a) in higher education _____
   (b) at your institution _____
   (c) in your present academic rank _____

7. Are your teaching responsibilities this spring term... (Please circle one response)

   1 Entirely undergraduate
   2 Some undergraduate, some graduate or professional
   3 Entirely graduate or professional
   4 Not teaching this spring term–SKIP TO QUESTION 9

8. On average, about how many students enroll in the typical class you are teaching at each level this spring term?

   1 Typical introductory undergraduate class _____
   2 Typical advanced undergraduate class _____
   3 Typical graduate or professional class _____

9. During this Spring term, approximately how many hours per week are you spending on each of the following activities?

   a. Formal classroom instruction in undergraduate courses (give actual, not credit hours) _____
   b. Formal classroom instruction in graduate or professional courses (give actual, not credit hours) _____
   c. Preparation for teaching _____
   d. Research and/or comparable scholarly activities _____
   e. Scheduled office hours _____
   f. Administrative service (departmental or institutional) _____
   g. Consulting (with or without pay) _____
   h. Academic advising _____
   i. Service with cocurricular student activities _____
   j. Supervising graduate teaching assistants _____

10. Please contrast your teaching load this year with your teaching load five years ago.

    1 Much lighter
    2 Lighter
    3 About the same
    4 Heavier
    5 Much heavier
    6 I was not teaching five years ago

11. From the following list, circle the department of your teaching appointment. Where your discipline does not appear, circle the most similar discipline.

    1 Agriculture/Forestry/Natural Resources
    2 Allied Health (Medical Technologies)
    3 Architecture/Environmental Design
    4 Area/Ethnic Studies
    5 Biological/Life Sciences
    6 Business/Management
    7 Communications/Journalism
    8 Computer/Information Science
    9 Economics
    10 Education (Including Administration and Counseling)
    11 Engineering
    12 Fine Arts (Art, Drama, Music)
    13 Foreign Languages
    14 Geography
    15 Health Professions (Dentistry, Medicine, Nursing, Veterinary)

(continued

11. Continued...

16 Home Economics
17 Humanities (Literature, History, Philosophy, Religion, Theology, Rhetoric)
18 Industrial Arts
19 Law
20 Library Science
21 Mathematics/Statistics
22 Military Science/Technologies
23 Physical and Health Education
24 Physical Sciences
25 Psychology
26 Public Affairs
27 Social Sciences (Anthropology, Political Science, Sociology, Social Work)
28 Vocational/Technical Training
29 Other Discipline

We would like to learn about your scholarly activities. Please answer each of the following.

12. Do your interests lie primarily in research or in teaching?

1 Primarily in research
2 In both, but leaning toward research
3 In both, but leaning toward teaching
4 Primarily in teaching

13. Are you currently engaged in any scholarly work that you expect to lead to a publication, an exhibit, or a musical recital?

1 Yes
2 No

14. During the past 12 months, did you (or your project) receive research support from: (Please circle one number for each response)

	Yes	No
a. Institutional or departmental funds	1	2
b. Federal agencies	1	2
c. State or local government agencies	1	2
d. Private foundations	1	2
e. Private industry	1	2
f. Other: _____	1	2

15. Approximately how many articles have you ever published in academic or professional journals?

_____

16. Approximately how many articles have you ever published in edited collections or volumes?

_____

17. Approximately how many books or monographs have you ever published or edited, alone or in collaboration?

_____

18. Approximately how many of your professional writings have been published or accepted for publication in the PAST TWO YEARS?

_____

19. During the past two years, have you served as a paid or unpaid consultant to...(Please circle one number for each response)

1 Yes, paid
2 Yes, unpaid
3 No

1	2	3	A non-profit agency
1	2	3	A university-based research project
1	2	3	Federal government
1	2	3	A foreign government
1	2	3	A private business or industry
1	2	3	Schools (elementary or secondary)
1	2	3	State or local government agencies
1	2	3	Other: _____

20. During the past year, how many of the following professional meetings did you attend?

	Attended Meetings		Number Attended
	Yes	No	
National	1	2	_____
Regional	1	2	_____
State	1	2	_____
Local	1	2	_____

21. During the past year, have you had any professional contact with teachers in elementary or secondary schools?

1 Yes
2 No

22. Please indicate the extent of your agreement or disagreement with each of the following statements. A "neutral" response is provided.

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1	2	3	4	5	The goal of an academic scholar is to advance knowledge without regard for the possible implications for society
1	2	3	4	5	Performing sponsored research for a private company is not a proper university activity
1	2	3	4	5	Scientific progress these days is more of a threat than a positive contribution to human welfare

(continued)

22. Continued...
Please indicate the extent of your agreement or disagreement with each of the following statements. A "neutral" response is provided.

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1 2 3 4 5 Faculty members should be free to present in class any idea that they consider relevant, however much I may disagree with their views

1 2 3 4 5 I am apprehensive about the future of this country

1 2 3 4 5 My discipline is too research oriented

1 2 3 4 5 Exciting developments are now taking place in my discipline

1 2 3 4 5 The new developments in my discipline are not interesting to me

1 2 3 4 5 In my discipline, most faculty agree on the standards of good scholarship

1 2 3 4 5 During the past two or three years financial support for work in my discipline has become harder to obtain

1 2 3 4 5 Faculty members in high schools and colleges should work together to improve education in my discipline

Tenure is one of many concerns voiced by faculty members. Your response to this set of questions will help us to better understand this important issue.

23. Please indicate the extent of your agreement or disagreement with each of the following statements. A "neutral" response is provided.

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1 2 3 4 5 In my department tenure is now more difficult to achieve than it was five years ago

1 2 3 4 5 Many young faculty members at this institution will leave because it is "tenured in"

1 2 3 4 5 The abolition of faculty tenure would, on the whole, improve the quality of American higher education

(continued)

23. Continued...

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1 2 3 4 5 In my department it is difficult for a person to achieve tenure if he or she does not publish

1 2 3 4 5 At my institution publications used for tenure and promotion are just "counted", not qualitatively measured

1 2 3 4 5 At my institution we need better ways, besides publications, to evaluate the scholarly performance of the faculty

1 2 3 4 5 The pressure to publish reduces the quality of teaching at my university

1 2 3 4 5 Teaching effectiveness should be the primary criterion for promotion of faculty

1 2 3 4 5 At my campus, academic freedom would be protected whether faculty members could get tenure or not

1 2 3 4 5 Multidisciplinary work is "soft" and should not be considered scholarship

24. How important are the following for granting tenure in your department?

1 Very important
2 Fairly important
3 Fairly unimportant
4 Very unimportant
5 No opinion

1 2 3 4 5 The number of publications

1 2 3 4 5 The type of publications (books, edited volumes, articles)

1 2 3 4 5 The reputations of the presses or journals publishing the books or articles

1 2 3 4 5 Published reviews of the scholar's books

1 2 3 4 5 Research grants received by the scholar

1 2 3 4 5 Syllabi for courses taught

1 2 3 4 5 Recommendations from current or former students

1 2 3 4 5 Observations of teaching by colleagues and/or administrators

1 2 3 4 5 Lectures or papers delivered at professional meetings or at other colleges and universities

(continued)

24. Continued...

1 Very important
2 Fairly important
3 Fairly unimportant
4 Very unimportant
5 No opinion

1 2 3 4 5	Recommendations from other faculty within my institution
1 2 3 4 5	Recommendations from outside scholars
1 2 3 4 5	Student evaluations of courses taught
1 2 3 4 5	Service within the university community
1 2 3 4 5	Service within the scholar's discipline (editing a journal, serving as an officer or on a committee of a professional organization, etc.)
1 2 3 4 5	Academic advisement

The following questions refer to the institution at which you are currently employed. Please tell us your candid opinions.

25. In general, how do you feel about your institution? It is...

1 A very good place for me
2 A fairly good place for me
3 Not the place for me

26. Please rate the performance of your institution for each of the following activities. (Please circle the number that best describes your assessment)

1 Excellent
2 Somewhat better than adequate
3 Adequate
4 Somewhat less than adequate
5 Poor

1 2 3 4 5	Providing undergraduates with a general education
1 2 3 4 5	Preparing undergraduates for a vocation or career
1 2 3 4 5	Providing undergraduates the opportunity to explore personal interests through electives
1 2 3 4 5	Providing opportunities for an undergraduate to explore a subject in depth, through the major
1 2 3 4 5	Strengthening the values of undergraduates
1 2 3 4 5	Creating opportunities for undergraduates to engage in public service
1 2 3 4 5	Offering undergraduates an opportunity to experience and understand leadership

27. Who has primary responsibility for the academic advising at your institution?

1 Faculty
2 Full-time advisors
3 Student affairs professionals
4 Others: _____
5 No formal provision

28. In general, for each of these areas, the academic standards at my institution should be...(Please circle one number for each response)

1 Much higher
2 Somewhat higher
3 Left as they are
4 Somewhat lower
5 Much lower
6 Not applicable

1 2 3 4 5 6	Undergraduate admissions
1 2 3 4 5 6	Bachelor's degrees
1 2 3 4 5 6	Graduate admissions
1 2 3 4 5 6	Advanced degrees

29. In general, for each of these areas, the academic standards in my department should be...(Please circle one number for each response)

1 Much higher
2 Somewhat higher
3 Left as they are
4 Somewhat lower
5 Much lower
6 Not applicable

1 2 3 4 5 6	Undergraduate admissions
1 2 3 4 5 6	Bachelor's degrees
1 2 3 4 5 6	Graduate admissions
1 2 3 4 5 6	Advanced degrees

30. Please indicate the extent of your agreement or disagreement with each of the following statements. A "neutral" response is provided.

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1 2 3 4 5	My institution is managed effectively
1 2 3 4 5	The administration here supports academic freedom
1 2 3 4 5	Faculty members who become administrators soon lose sight of what it means to be a teacher or to do research
1 2 3 4 5	A small group of senior professors has disproportionate power in the decision-making at my institution

(continued)

30. Continued...
Please indicate the extent of your agreement or disagreement with each of the following statements. A "neutral" response is provided.

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1 2 3 4 5	This institution spends too much time and money teaching students what they should have learned in high school
1 2 3 4 5	This institution has serious financial problems
1 2 3 4 5	In the next five years, I expect that some of the tenured faculty here will lose their jobs due to lack of funds
1 2 3 4 5	There are more part-time and adjunct faculty members at this institution today than there were five years ago
1 2 3 4 5	My institution is as interested now in increasing the numbers of women and minority members on our faculty as it was five years ago
1 2 3 4 5	I am satisfied with the results of affirmative action at this institution
1 2 3 4 5	Issues raised by affirmative action are causing serious strains among the faculty in my department
1 2 3 4 5	The normal academic requirements should be relaxed in appointing members of minority groups to the faculty at this institution
1 2 3 4 5	Junior faculty members have too little say in the running of my department
1 2 3 4 5	Faculty in my department have fundamental differences about the nature of the discipline
1 2 3 4 5	Faculty meetings in my department generally are a waste of my time
1 2 3 4 5	My department has had to live with more than its fair share of budget restraints over the past several years
1 2 3 4 5	There is more alcohol abuse among my colleagues than there was five years ago

The following questions concern college curriculum in general and the curriculum at your institution. Please tell us your opinions by answering each question.

31. Apart from major field requirements, should undergraduates at your institution be required to take...(Circle one)

1 A required common core curriculum
2 Breadth requirements in general education
3 No required courses, only elective courses
4 A public service internship
5 I have no opinion

32. Many goals have been proposed for undergraduate education. Please indicate the importance of each of the following goals. To...

1 Very important
2 Fairly important
3 Fairly unimportant
4 Very unimportant
5 No opinion

1 2 3 4 5	Provide an appreciation of literature and the arts
1 2 3 4 5	Shape students' values
1 2 3 4 5	Enhance creative thinking
1 2 3 4 5	Provide a basic understanding in mathematics and science
1 2 3 4 5	Provide knowledge of history and the social sciences
1 2 3 4 5	Prepare students for a career
1 2 3 4 5	Provide knowledge of one subject in depth

33. How would you evaluate the undergraduate curriculum at your institution? (Please circle the number that best describes your assessment of each)

1 Too little
2 About right
3 Too many
4 No opinion

1 2 3 4 5	General education requirements
1 2 3 4 5	Requirements for the major
1 2 3 4 5	Requirements for a pre-professional program
1 2 3 4 5	Electives in the major
1 2 3 4 5	Electives outside the major

34. Please indicate the extent of your agreement or disagreement with each of the following statements. A "neutral" response is provided.

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1 2 3 4 5	I prefer teaching undergraduate courses that focus on limited specialties to those that cover wide varieties of material

(continued)

34. Continued...

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1 2 3 4 5 In my undergraduate courses, I prefer teaching students who have a clear idea of the career they will be following

1 2 3 4 5 Undergraduate education in America would be improved if there were less emphasis on specialized training and more on broad liberal education

1 2 3 4 5 The typical undergraduate curriculum has suffered from the specialization of faculty members

1 2 3 4 5 Undergraduates at my institution are not getting as good an education today as they did five years ago

1 2 3 4 5 Outcome assessment of undergraduates using multiple-choice instruments will increase the quality of undergraduate education

1 2 3 4 5 State mandated assessment requirements threaten the quality of undergraduate education and intrude on institutional autonomy

The following questions solicit your assessment of undergraduate students attending your institution. Please answer each item.

35. There has been considerable discussion about the change in student orientations from the late 1960s or early 1970s to the present. How do you assess each of the following? A "neutral" response is provided.

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1 2 3 4 5 Undergraduates have become more conservative politically

1 2 3 4 5 Undergraduates have become more conservative in lifestyles

1 2 3 4 5 On the whole, undergraduates are now more willing to work hard in their studies

1 2 3 4 5 Undergraduates have become more grade conscious

1 2 3 4 5 Undergraduates have become more careerist in their concerns

(continued)

35. Continued...

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1 2 3 4 5 Overall, the mood of today's undergraduates is better suited to a successful educational experience than was the mood of their counterparts in the late 1960s or early 1970s

1 2 3 4 5 Undergraduates today are more competitive academically

1 2 3 4 5 Today's undergraduates are more willing to cheat in order to get good grades

1 2 3 4 5 There is more racism among today's undergraduates than in the late 1960s and early 1970s

1 2 3 4 5 There is a growing trend among undergraduates to isolate themselves in small groups

1 2 3 4 5 Fraternities and sororities are a more negative force on my campus than they used to be

1 2 3 4 5 There is more violence and crime perpetrated by off-campus criminals now

1 2 3 4 5 There is more alcohol abuse among today's undergraduates than five years ago

1 2 3 4 5 There is more drug abuse among today's undergraduates than five years ago

36. Please indicate the extent of your agreement or disagreement with each of the following statements. A "neutral" response is provided.

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1 2 3 4 5 The number of general education (core) courses required of all undergraduates should be increased

1 2 3 4 5 I enjoy interacting informally with undergraduates outside the classroom

1 2 3 4 5 Most undergraduates expect too much attention

1 2 3 4 5 Undergraduates should seek out faculty only during posted office hours

(continued

36. Continued...
Please indicate the extent of your agreement or disagreement with each of the following statements. A "neutral" response is provided.

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1 2 3 4 5	Most undergraduates at my institution only do enough to just "get by"
1 2 3 4 5	Grade inflation is a problem at my institution
1 2 3 4 5	A "tough" grading system contributes positively to student motivation
1 2 3 4 5	Undergraduate education in America would be improved if grades were abolished
1 2 3 4 5	I find myself not grading as "hard" as I should
1 2 3 4 5	The undergraduates with whom I have close contact are seriously underprepared in basic skills–such as those required for written and oral communication
1 2 3 4 5	There has been an overall decline in the quality of graduate students in my discipline over the past decade

Few topics involving higher education in the United States are receiving more attention than the matter of faculty morale and commitment. Please consider each of the following questions and give us your opinion.

37. Please indicate the degree to which each of the following is important to you.

1 Very important to me
2 Fairly important to me
3 Fairly unimportant to me
4 Not at all important

1 2 3 4	My academic discipline
1 2 3 4	My department
1 2 3 4	My college or university
1 2 3 4	My relationship with undergraduates
1 2 3 4	National or international societies in my discipline

38. How much opportunity do you have to influence the policies of: (a) your department; (b) your institution?

1 A great deal
2 Quite a bit
3 Some
4 None

1 2 3 4	Department
1 2 3 4	Institution

39. Please indicate the extent to which you participate in meetings of each of the following types of organizations at your institution. (Please circle one number for each response)

1 Never
2 Rarely
3 Sometimes
4 Often

1 2 3 4	Departmental faculty
1 2 3 4	Faculty senate or comparable campus-wide faculty unit
1 2 3 4	Campus-wide faculty committee
1 2 3 4	Administrative advisory committee
1 2 3 4	Academic budget committees

40. How would you rate each of the following?

1 Excellent
2 Good
3 Fair
4 Poor
5 Not applicable

1 2 3 4 5	Your own salary
1 2 3 4 5	Your own teaching load
1 2 3 4 5	The academic reputation of your department outside your institution
1 2 3 4 5	The academic reputation of your institution within your discipline
1 2 3 4 5	The intellectual environment at your institution
1 2 3 4 5	Faculty salary levels at your institution
1 2 3 4 5	The administration at your institution
1 2 3 4 5	The quality of life at your institution
1 2 3 4 5	The sense of community at your institution

41. Do you feel that the administration of (a) your institution, (b) your department is...

1 Very autocratic
2 Somewhat autocratic
3 Somewhat democratic
4 Very democratic

1 2 3 4	Institution
1 2 3 4	Department

42. How have the following changed over the past five years?

1 Was not teaching five years ago
2 Much better
3 Somewhat better
4 About the same
5 Somewhat worse
6 Much worse

1 2 3 4 5 6	Departmental morale

(continue

42. Continued...

1 Was not teaching five years ago
2 Much better
3 Somewhat better
4 About the same
5 Somewhat worse
6 Much worse

1 2 3 4 5 6 Job prospects for undergraduates in my field

1 2 3 4 5 6 Job prospects for graduate students in my field

43. During the past two years, have you ever considered a permanent departure from academia?

1 Yes, I have given it serious consideration
2 Yes, I have considered it, but not seriously
3 No

44. How likely are the following changes in your career?

1 Very likely
2 Somewhat likely
3 Somewhat unlikely
4 Very unlikely
5 Don't know

1 2 3 4 5 That you will seek a research position outside academia during the next five years?

1 2 3 4 5 That you will seek an administrative position outside academia during the next five years?

1 2 3 4 5 That your academic position would be in jeopardy if there were faculty cutbacks during the next five years?

45. Please indicate your agreement or disagreement with each of these statements. A "neutral" response is provided.

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1 2 3 4 5 I am less confident today than I used to be about the capacities of higher education to help make a better society

1 2 3 4 5 Too many students ill-suited to academic life are now enrolling in colleges and universities

1 2 3 4 5 The United States is creating an over-trained work force in terms of available jobs

1 2 3 4 5 There has been a widespread lowering of standards in American higher education

(continued)

45. Continued...

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1 2 3 4 5 My job is the source of considerable personal strain

1 2 3 4 5 I tend to subordinate all aspects of my life to my work

1 2 3 4 5 I hardly ever get time to give a piece of work the attention it deserves

1 2 3 4 5 Members of the academic profession have a responsibility to set a good ethical example for their students

1 2 3 4 5 Fewer faculty members provide positive role models to our undergraduates than in the past

1 2 3 4 5 This is a poor time for any young person to begin an academic career

1 2 3 4 5 On the whole, faculty salaries here have kept up with the rate of inflation

1 2 3 4 5 If I had it to do over again, I would not become a college teacher

1 2 3 4 5 I am considering entering another line of work because prospects for academic advancement seem limited now

1 2 3 4 5 I may leave this profession within the next five years

1 2 3 4 5 I often wish I had entered another profession

1 2 3 4 5 I feel trapped in a profession with limited opportunities for advancement

1 2 3 4 5 I am more enthusiastic about my work now than I was when I began my academic career

Please answer the following questions to give us your candid assessment of your retirement plans.

46. At what age is it most likely that you will retire from full-time academic employment.

_____

47. What sources of retirement income are you currently planning on? (Please circle all that apply)

1 State or institutional pension
2 TIAA, CREF pension
3 Military or federal pension
4 Supplementary annuity
5 Savings and investments
6 Social Security
7 Royalties
8 Spouse's income or pension
9 Part-time employment

48. Please indicate your agreement or disagreement with the following statements about retirement. A "neutral" response is provided.

1 Strongly agree
2 Agree with reservations
3 Neutral
4 Disagree with reservations
5 Strongly disagree

1	2	3	4	5	I would exercise an early retirement option if it were offered to me
1	2	3	4	5	I look forward to retirement as an enjoyable period of my life
1	2	3	4	5	I believe that boredom will be a problem for me in my retirement
1	2	3	4	5	I intend to engage in research and professional writing during my retirement
1	2	3	4	5	At my institution, the major purpose of early retirement programs is to force out less productive faculty
1	2	3	4	5	My institution provides the conditions and support for faculty to retire with dignity

This last section includes questions that will be used for classification purposes of the survey data. Your response to each item is very important and will in no way be identified with you, your department, or your school.

49. Are you a U.S. citizen?

1 Yes
2 No

50. What is your year of birth? 19__ __

51. How would you characterize yourself politically at the present time?

1 Liberal
2 Moderately liberal
3 Middle-of-the-road
4 Moderately conservative
5 Conservative

52. On the following list, please indicate the degrees which you currently hold. (Circle all that apply)

1 Less than Bachelor's (A.A., etc.)
2 Bachelor's
3 Master's
4 Ph.D.
5 Ed.D.
6 J.D.
7 Other first professional
8 Medical degree (M.D., D.D.S., etc.)

53. Your gender:

1 Male
2 Female

54. Your race or ethnic group:

1 Asian
2 Black/Negro/Afro-American
3 Hispanic (non-Black)
4 Native American/American Indian
5 White/Caucasian
6 Other

55. From which of the following sources do you receive income to supplement your institutional salary? (Circle all that apply)

1 I have no supplemental source of income
2 Non-academic job in the summer
3 Non-academic job evenings or weekends
4 Part-time teaching or research at one or more institutions other than this one
5 Consulting
6 Other professional activity: _____

56. In 1988, roughly how much did you earn over and above your institutional salary?
(Please estimate as a percentage of your basic salary)

1 0%
2 Under 10%
3 10%–19%
4 20%–29%
5 30%–39%
6 40%–49%
7 50% and over

57. What is your institutional salary on a full-time basis before tax and deductions for the current academic year?

1 Below $16,000
2 $16,000–$17,999
3 $18,000–$19,999
4 $20,000–$21,999
5 $22,000–$24,999
6 $25,000–$27,999
7 $28,000–$30,999
8 $31,000–$33,999
9 $34,000–$36,999
10 $37,000–$39,999
11 $40,000–$44,999
12 $45,000–$49,999
13 $50,000–$54,999
14 $55,000–$59,999
15 $60,000–$64,999
16 $65,000–$69,999
17 $70,000 or more

58. Is this based on...

1 9–10 months
2 11–12 months

59. What was your spouse's total earned income in 1988?

1 No spouse
2 $0
3 Below $ 2,000
4 $ 2,000–$ 3,999
5 $ 4,000–$ 5,999
6 $ 6,000–$ 7,999
7 $ 8,000–$ 9,999
8 $10,000–$14,999
9 $15,000–$19,999
10 $20,000–$24,999
11 $25,000–$29,999
12 $30,000–$34,999
13 $35,000–$39,999
14 $40,000–$44,999
15 $45,000–$49,999
16 $50,000–$54,999
17 $55,000–$59,999
18 $60,000–$64,999
19 $65,000–$69,999
20 $70,000 or more

EXPLANATION OF THE CARNEGIE CLASSIFICATION CODE

Shown below is the manner by which the Carnegie Foundation groups American colleges and universities on the basis of their missions and educational functions. The aim is to group institutions according to their shared characteristics, rather than to make qualitative distinctions.

The code for your school is printed on the top of the back page.

Faculty and institutions were randomly selected within each Carnegie classification category.

Research Universities .....1 or 2
Doctorate-Granting Universities .....3 or 4
Comprehensive Universities and Colleges .....5 or 6
Liberal Arts Colleges .....7 or 8
Two-Year Institutions 9

Is there anything else you would like to tell us? Please add any thoughts you feel would be helpful.

APPENDIX B

Demographic Summary Tables

General Demographic Summary of Study Group

Research I Institutions

Variable	Number	Males	Females	Pr	AoP	AsP	I	T	NT
Totals	562	440	119	270	166	112	6	428	134
Agricul/Forest/Nat Res	24	22	2	15	5	4	0	20	4
Allied Health	3	1	2	1	2	0	0	3	0
Archit/Environ Design	13	12	1	2	9	1	0	11	2
Area/Ethnic Studies	3	3	0	1	0	1	1	1	2
Biological/Life Sci	36	29	7	18	12	5	0	29	7
Business/Management	25	22	3	10	8	6	0	17	8
Communications/Jour	16	10	6	6	4	6	0	9	7
Computer/Infor Sci	13	10	3	3	3	7	0	6	7
Economics	11	10	1	6	2	3	0	9	2
Education	31	24	7	17	10	3	0	25	6
Engineering	51	47	3	27	11	12	0	38	13
Fine Arts	31	17	14	13	11	7	0	24	7
Foreign Languages	31	22	8	19	9	3	0	28	3
Geography	7	5	2	4	1	2	0	5	2
Health Professions	23	6	17	4	10	8	0	13	10
Home Economics	6	2	4	0	5	1	0	5	1
Humanities	73	59	14	36	17	16	3	55	18
Industrial Arts	0	0	0	0	0	0	0	0	0
Law	1	0	1	0	1	0	0	0	1
Library Science	2	2	0	1	0	1	0	1	1
Math/Statistics	26	24	2	13	9	4	0	21	5
Military Sci/Tech	0	0	0	0	0	0	0	0	0
Physical/Health Ed	5	3	2	3	0	1	1	5	0
Physical Sciences	49	48	1	35	11	3	0	45	4
Psychology	25	17	8	9	9	5	1	17	8
Public Affairs	5	4	1	3	2	0	0	4	1
Social Sciences	44	36	7	21	13	10	0	33	11
Voc/Tech Training	0	0	0	0	0	0	0	0	0
Other Discipline	8	5	3	3	2	3	0	4	4

Pr=Professor AoP=Associate Professor AsP=Assistant Professor I=Instructor
T=Tenured NT=Non-tenured

Number of missing observations for Gender: 3 for Rank: 8

General Demographic Summary of Study Group

Research II Institutions

Variable	Number	Males	Females	Pr	AoP	AsP	I	T	NT
Totals	598	493	104	304	174	94	13	472	126
Agricul/Forest/Nat Res	25	24	1	20	3	2	0	23	2
Allied Health	6	2	4	2	1	3	0	4	2
Archit/Environ Design	19	17	2	6	9	4	0	14	5
Area/Ethnic Studies	2	2	0	1	1	0	0	2	0
Biological/Life Sci	36	33	3	30	4	2	0	34	2
Business/Management	37	32	5	17	9	11	0	25	12
Communications/Jour	17	11	6	3	7	5	1	10	7
Computer/Infor Sci	11	10	1	6	2	3	0	8	3
Economics	18	14	4	7	6	5	0	13	5
Education	56	45	11	35	9	9	2	44	12
Engineering	46	45	1	25	10	9	1	31	15
Fine Arts	51	36	15	24	17	7	2	41	10
Foreign Languages	16	10	5	5	6	2	1	12	4
Geography	5	5	0	1	4	0	0	5	0
Health Professions	12	6	6	5	4	1	1	8	4
Home Economics	8	3	5	4	3	0	1	6	2
Humanities	53	41	12	21	24	5	0	45	8
Industrial Arts	1	1	0	0	1	0	0	1	0
Law	3	1	2	0	0	2	1	1	2
Library Science	1	1	0	0	1	0	0	1	0
Math/Statistics	23	21	2	14	5	4	0	19	4
Military Sci/Tech	0	0	0	0	0	0	0	0	0
Physical/Health Ed	17	14	3	6	5	4	2	10	7
Physical Sciences	51	51	0	33	10	6	0	44	7
Psychology	18	15	3	10	6	2	0	15	3
Public Affairs	3	3	0	1	2	0	0	3	0
Social Sciences	48	38	10	21	19	7	1	41	7
Voc/Tech Training	0	0	0	0	0	0	0	0	0
Other Discipline	15	12	3	7	6	1	0	12	3

Pr=Professor AoP=Associate Professor AsP=Assistant Professor I=Instructor
T=Tenured NT=Non-tenured

Number of missing observations for Gender: 1 for Rank: 13

General Demographic Summary of Study Group

Doctorate I Institutions

Variable	Number	Males	Females	Pr	AoP	AsP	I	T	NT
Totals	607	481	121	250	199	135	15	465	141
Agricul/Forest/Nat Res	6	6	0	1	4	1	0	5	1
Allied Health	5	3	2	2	3	0	0	4	1
Archit/Environ Design	7	5	2	4	2	1	0	5	2
Area/Ethnic Studies	0	0	0	0	0	0	0	0	0
Biological/Life Sci	30	25	5	16	9	4	0	25	5
Business/Management	47	41	6	21	12	11	0	31	16
Communications/Jour	19	15	4	11	3	3	1	15	4
Computer/Infor Sci	21	20	1	8	5	8	0	14	7
Economics	19	17	2	4	9	6	0	13	6
Education	54	43	11	29	15	8	1	43	11
Engineering	39	39	0	18	10	10	1	27	12
Fine Arts	44	30	14	18	20	5	2	37	8
Foreign Languages	18	13	5	5	3	10	0	13	5
Geography	10	10	0	3	5	2	0	8	2
Health Professions	25	6	19	4	8	9	4	13	12
Home Economics	6	1	5	2	1	3	0	4	2
Humanities	67	53	14	27	25	14	2	56	12
Industrial Arts	1	1	0	1	0	0	0	1	0
Law	1	1	0	0	0	1	0	0	1
Library Science	4	2	2	1	2	1	0	3	1
Math/Statistics	38	36	2	13	11	12	2	24	14
Military Sci/Tech	2	2	0	0	2	0	0	2	0
Physical/Health Ed	9	6	3	2	3	2	1	8	1
Physical Sciences	39	39	0	21	11	7	0	32	7
Psychology	23	19	4	14	7	2	0	23	0
Public Affairs	6	5	1	3	3	0	0	6	0
Social Sciences	49	37	12	16	20	13	0	39	10
Voc/Tech Training	1	1	0	1	0	0	0	1	0
Other Discipline	12	5	7	5	6	2	1	13	1

Pr=Professor AoP=Associate Professor AsP=Assistant Professor I=Instructor
T=Tenured NT=Non-tenured

Number of missing observations for Gender: 5 for Tenure Status: 1
for Rank: 8

General Demographic Summary of Study Group

Doctorate II Institutions

Variable	Number	Males	Females	Pr	AoP	AsP	I	T	NT
Totals	583	429	154	227	197	121	18	429	154
Agricul/Forest/Nat Res	12	11	1	7	5	0	0	10	2
Allied Health	5	4	1	2	1	2	0	3	2
Archit/Environ Design	2	2	0	0	1	1	0	0	2
Area/Ethnic Studies	1	1	0	0	1	0	0	0	1
Biological/Life Sci	23	20	3	12	9	1	1	17	6
Business/Management	43	35	8	16	8	14	2	27	16
Communications/Jour	18	12	6	4	7	7	0	10	8
Computer/Infor Sci	17	15	2	4	7	4	0	10	7
Economics	6	5	1	1	2	2	0	4	2
Education	35	24	11	11	17	6	0	29	6
Engineering	45	45	0	17	16	11	0	29	16
Fine Arts	40	30	10	15	18	4	0	35	5
Foreign Languages	24	17	7	7	8	7	1	18	6
Geography	6	6	0	0	5	1	0	5	1
Health Professions	28	8	20	7	10	9	1	16	12
Home Economics	9	2	7	4	2	1	1	6	3
Humanities	74	57	17	29	27	15	1	56	18
Industrial Arts	2	2	0	0	1	1	0	1	1
Law	1	1	0	0	0	0	0	0	1
Library Science	0	0	0	0	0	0	0	0	0
Math/Statistics	28	25	3	10	10	8	0	25	3
Military Sci/Tech	0	0	0	0	0	0	0	0	0
Physical/Health Ed	18	13	5	4	4	4	5	10	8
Physical Sciences	49	48	1	28	12	9	0	40	9
Psychology	29	21	8	15	8	6	0	23	6
Public Affairs	3	3	0	2	0	1	0	3	0
Social Sciences	45	37	8	26	13	5	1	38	8
Voc/Tech Training	7	6	1	1	0	1	5	4	3
Other Discipline	12	7	5	5	5	1	0	10	2

Pr=Professor AoP=Associate Professor AsP=Assistant Professor I=Instructor
T=Tenured NT=Non-tenured

Number of missing observations for Gender: 1 for Rank: 20

General Demographic Summary of Study Group

Comprehensive I Institutions

Variable	Number	Males	Females	Pr	AoP	AsP	I	T	NT
Totals	554	395	158	244	161	118	13	395	158
Agricul/Forest/Nat Res	7	3	4	6	0	1	0	5	2
Allied Health	2	0	2	0	1	1	0	2	0
Archit/Environ Design	0	0	0	0	0	0	0	0	0
Area/Ethnic Studies	1	1	0	1	0	0	0	1	0
Biological/Life Sci	22	16	6	15	3	4	0	15	7
Business/Management	58	46	12	17	21	18	1	32	26
Communications/Jour	23	17	6	10	2	7	3	14	9
Computer/Infor Sci	9	7	2	3	3	2	0	6	3
Economics	9	8	1	5	2	2	0	8	1
Education	51	30	21	23	18	9	0	34	17
Engineering	24	23	1	8	8	7	0	13	11
Fine Arts	47	31	16	18	17	9	0	35	12
Foreign Languages	19	11	8	9	2	7	0	14	5
Geography	6	6	0	3	2	1	0	6	0
Health Professions	20	0	20	4	6	7	1	9	11
Home Economics	6	1	5	0	4	2	0	4	2
Humanities	77	59	18	47	18	9	3	61	16
Industrial Arts	3	2	1	3	0	0	0	3	0
Law	0	0	0	0	0	0	0	0	0
Library Science	1	1	0	0	0	1	0	1	0
Math/Statistics	22	17	5	8	8	4	0	19	3
Military Sci/Tech	0	0	0	0	0	0	0	0	0
Physical/Health Ed	25	18	7	6	7	7	3	14	11
Physical Sciences	43	35	8	23	12	5	0	33	10
Psychology	26	22	3	12	9	5	0	22	4
Public Affairs	2	2	0	1	1	0	0	1	1
Social Sciences	43	34	9	21	15	6	1	38	5
Voc/Tech Training	4	2	2	0	1	3	0	2	2
Other Discipline	4	3	1	1	1	1	1	3	1

Pr=Professor AoP=Associate Professor AsP=Assistant Professor I=Instructor
T=Tenured NT=Non-tenured

Number of missing observations for Gender: 1 for Rank: 18

General Demographic Summary of Study Group

Comprehensive II Institutions

Variable	Number	Males	Females	Pr	AoP	AsP	I	T	NT
Totals	516	329	185	186	157	140	30	347	169
Agricul/Forest/Nat Res	2	2	0	1	1	0	0	2	0
Allied Health	4	1	3	1	1	2	0	3	1
Archit/Environ Design	0	0	0	0	0	0	0	0	0
Area/Ethnic Studies	0	0	0	0	0	0	0	0	0
Biological/Life Sci	34	27	7	16	14	4	0	24	10
Business/Management	42	37	5	9	15	17	1	19	23
Communications/Jour	16	9	7	6	5	4	1	10	6
Computer/Infor Sci	11	8	3	1	3	6	1	4	7
Economics	10	7	3	3	6	1	0	8	2
Education	37	15	22	12	9	11	5	24	13
Engineering	1	1	0	0	1	0	0	1	0
Fine Arts	61	44	17	18	20	16	6	40	21
Foreign Languages	22	12	10	10	6	5	1	15	7
Geography	2	1	1	1	0	1	0	1	1
Health Professions	29	1	27	4	4	17	4	17	12
Home Economics	3	1	2	0	1	1	1	1	2
Humanities	98	66	32	44	29	19	5	74	24
Industrial Arts	2	2	0	1	1	0	0	2	0
Law	1	1	0	1	0	0	0	0	1
Library Science	1	0	1	0	1	0	0	0	1
Math/Statistics	20	14	6	10	6	3	1	16	4
Military Sci/Tech	0	0	0	0	0	0	0	0	0
Physical/Health Ed	21	14	7	5	9	5	2	16	5
Physical Sciences	23	19	4	11	5	7	0	17	6
Psychology	24	15	8	12	7	4	1	17	7
Public Affairs	0	0	0	0	0	0	0	0	0
Social Sciences	39	26	13	16	11	12	0	29	10
Voc/Tech Training	1	1	0	0	0	1	0	0	1
Other Discipline	12	5	7	4	2	4	1	7	5

Pr=Professor AoP=Associate Professor AsP=Assistant Professor I=Instructor
T=Tenured NT=Non-tenured

Number of missing observations for Gender: 2 for Rank: 3

General Demographic Summary of Study Group

Liberal Arts I Institutions

Variable	Number	Males	Females	Pr	AoP	AsP	I	T	NT
Totals	592	407	183	248	166	142	20	411	181
Agricul/Forest/Nat Res	0	0	0	0	0	0	0	0	0
Allied Health	0	0	0	0	0	0	0	0	0
Archit/Environ Design	1	1	0	0	1	0	0	1	1
Area/Ethnic Studies	1	1	0	1	0	0	0	1	0
Biological/Life Sci	31	22	9	9	13	9	0	21	10
Business/Management	6	5	1	2	3	1	0	2	4
Communications/Jour	6	4	2	0	1	5	0	3	3
Computer/Infor Sci	8	6	1	2	2	4	0	6	2
Economics	37	32	5	18	9	9	1	26	11
Education	18	11	7	7	6	5	0	11	7
Engineering	13	12	1	8	4	1	0	8	5
Fine Arts	56	35	21	17	22	9	3	38	18
Foreign Languages	60	27	33	25	16	15	4	43	17
Geography	2	1	1	1	0	1	0	1	1
Health Professions	10	0	10	1	2	7	0	4	6
Home Economics	1	0	1	0	0	0	1	0	1
Humanities	127	87	40	65	28	27	3	96	31
Industrial Arts	0	0	0	0	0	0	0	0	0
Law	0	0	0	0	0	0	0	0	0
Library Science	0	0	0	0	0	0	0	0	0
Math/Statistics	33	25	8	18	7	7	0	24	9
Military Sci/Tech	0	0	0	0	0	0	0	0	0
Physical/Health Ed	28	18	10	5	6	8	6	14	14
Physical Sciences	57	52	5	26	12	17	1	37	20
Psychology	42	30	12	18	14	8	1	31	11
Public Affairs	0	0	0	0	0	0	0	0	0
Social Sciences	51	35	16	21	20	9	0	40	11
Voc/Tech Training	0	0	0	0	0	0	0	0	0
Other Discipline	4	3	0	4	0	0	0	4	0

Pr=Professor AoP=Associate Professor AsP=Assistant Professor I=Instructor
T=Tenured NT=Non-tenured

Number of missing observations for Gender: 2 for Rank: 16

General Demographic Summary of Study Group

Liberal Arts II Institutions

Variable	Number	Males	Females	Pr	AoP	AsP	I	T	NT
Totals	368	210	156	88	135	106	27	186	182
Agricul/Forest/Nat Res	1	0	1	0	0	0	1	0	1
Allied Health	1	1	0	0	0	0	1	0	1
Archit/Environ Design	1	0	1	0	0	1	0	0	1
Area/Ethnic Studies	0	0	0	0	0	0	0	0	0
Biological/Life Sci	22	19	3	8	10	4	0	16	6
Business/Management	24	18	6	4	12	5	2	7	17
Communications/Jour	9	6	3	4	1	3	1	3	6
Computer/Infor Sci	5	4	1	0	1	3	1	1	4
Economics	3	2	1	0	1	2	0	2	1
Education	36	11	24	7	16	12	1	18	18
Engineering	0	0	0	0	0	0	0	0	0
Fine Arts	54	31	23	7	19	17	5	27	27
Foreign Languages	16	5	11	3	7	4	2	7	9
Geography	2	2	0	0	1	1	0	1	1
Health Professions	16	0	16	0	7	6	3	4	12
Home Economics	7	0	7	2	2	3	0	2	5
Humanities	69	50	19	25	28	12	1	46	23
Industrial Arts	0	0	0	0	0	0	0	0	0
Law	0	0	0	0	0	0	0	0	0
Library Science	2	0	2	1	0	1	0	1	1
Math/Statistics	20	13	7	4	6	8	2	6	14
Military Sci/Tech	0	0	0	0	0	0	0	0	0
Physical/Health Ed	15	11	4	1	3	9	1	9	6
Physical Sciences	23	14	9	7	9	5	2	12	11
Psychology	20	12	7	8	6	6	0	13	7
Public Affairs	0	0	0	0	0	0	0	0	0
Social Sciences	18	10	8	7	6	4	1	11	7
Voc/Tech Training	0	0	0	0	0	0	0	0	0
Other Discipline	4	1	3	0	0	0	3	0	4

Pr=Professor AoP=Associate Professor AsP=Assistant Professor I=Instructor
T=Tenured NT=Non-tenured

Number of missing observations for Gender: 2 for Rank: 12