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Pursuit of the Ph.D.: "Survival of the Fittest," Or Is It Time for a New Approach?

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Abstract:

The thesis is put forward that changes in public policy which originally promoted broad access to higher education are leading to the diminished likelihood that minorities, those from low-income backgrounds and females in underrepresented disciplines will pursue, or be able to complete, the doctorate. By reviewing a wide range of research literature and statistical reports on the status of doctoral education in the U.S. & Canada, a detailed sociological portrait of those who pursue the Ph.D. is presented. Recommendations are given for further research on doctoral education, particularly in areas of attrition, retention, student indebtedness, social stratification, and post-doctoral career plans.

Introduction

The purpose of this two-part study (the second part is published as Number 17 of Volume 3 of this journal) is to provide a contemporary overview of the status of doctoral education in the U.S. and Canada. In "Pursuit of the Ph.D.", a comprehensive review of published research studies on trends in doctoral education is provided. Then, "Surviving the Doctoral Years: Critical Perspectives", I present the results of my own survey research into conditions affecting the progress and career development objectives of today's doctoral students, as well as a critical analysis of social, economic, and political issues shaping the academic labor market for today's

doctoral recipients.

Why "Survival of the Fittest"?

Much of my research focuses on students' "survival" through the doctoral education process. This raises questions as to the functions of doctoral study in universities. Historically the doctorate has represented an elite award, reserved for students who were selected for further study by graduate faculty because they were thought to offer the greatest academic promise. Ph.D. study by its very nature is arduous and time-consuming because it reflects a student's acquisition of expertise in a significant body of research theory and practice.

To a considerable extent, the Ph.D. is an institution's "stamp of approval" of the student's ability to conduct original research in at least one academic discipline. It is recognized as the "union card" for obtaining an assistant professorship in most colleges and universities (Smith, 1990). But as Smith points out, the doctorate is not without its critics:

William James was dismayed at what he called 'the Mandarin disease' of the Ph.D., a 'Teutonic' invention, completely foreign to American ways... It seems to me hard to improve on James' jeremiad on the Ph.D. We have become so accustomed to it, it is so ingrained in our ways of thinking about higher education, that we consider it part of the natural order of the universe. It is difficult to perceive its absurdity or fully understand the damage it has done to the intellectual and moral basis of higher education. To take only the most obvious example, the Ph.D. has shifted the responsibility for making the decision about the appointment of a junior faculty member from the institution doing the hiring (where, of course, the responsibility should lie) to the institution doing the certifying. It is rather like USDA-certified Grade A beef. Beef is inspected and graded on the well-grounded assumption that the consumer is not qualified to make such a judgment himself/herself. But does any hiring institution wish to make such a claim in regard to a future colleague?

As between two Ph.D. holders of equal academic ability, is anyone prepared to argue that the one stamped and certified by Harvard University is not going to be preferred, except in rare instances, to one certified by Western Illinois University? Or poor Slippery Rock, if it now grants Ph.D.s? As the holder of a prized (and generally, I regret to say, overrated) Harvard Ph.D., I am acutely aware of the lead I had over equally qualified rivals for the better academic prizes; the more insecure an upscale university feels, the more disposed it is to opt for those prestigious degrees (Smith, P., 1990, pp. 108-09).

Because it validates a student's advanced research capabilities, the Ph.D. is a possession prized by most who hold it and a symbol of an as-yet unattained academic recognition by both those who are currently pursuing and those who have withdrawn from formal doctoral study. It is, at its best, both a personal reflection of an individual's intellectual development and growth and an external recognition of that same individual's research capabilities. The doctoral dissertation is viewed by faculty as serving two principal goals: (1) to demonstrate skills; and (2) to train in research skills (Isaac, Quinlan, & Walker, 1992). Nevertheless, faculty who teach in doctoral programs may also strive to impart other professional skills to their students, such as "human relations competency" and "reflective thinking competency" in addition to the traditional capacity for conducting quality doctoral research (Smart & Hagedorn, 1994).

But what does pursuit of the doctorate mean to today's students? What expectations and hopes do doctoral students carry into the educational process, and what personal feelings result

from having pursued the doctorate? Do most doctoral recipients emerge from their educational experiences with greater feelings of "worth", "intelligence," and "ability"?

And what about students who begin but do not complete the doctorate? Does non-completion have lasting negative consequences for students? Are some students more likely to withdraw before finishing, and why? This last question is particularly critical because, according to many sources, approximately half of the students in the U.S. and Canada who begin doctoral study will never receive the degree (Baird, 1993; Bowen & Rudenstine, 1992; Canadian Association of Graduate Studies, 1994; Tinto, 1993). It is also critical because of the high financial cost to society of doctoral education. Drop-out of 50 percent of doctoral candidates suggests substantial waste of precious institutional resources in an era of tremendous fiscal austerity for U.S. and Canadian universities.

It is the main thesis of my study that, in many ways, the learning experiences and educational environments for contemporary doctoral students in U.S. and Canadian universities reflect a "survival of the fittest" ethic (Hawley, 1993; Moore, 1985; Rudestam & Newton, 1992; Sternberg, 1981). The combined effects of shrinking institutional resources, rising tuition and student indebtedness, eroding public support for higher education, downward economic mobility in American society, deteriorating faculty morale and declining job opportunities for doctoral recipients--particularly those graduating from non- elite public universities--are the factors chiefly responsible for this outcome (Brodie, 1995; Burke, 1995; Ehrenreich, 1989; Horwitz, 1994; Kerlin & Dunlap, 1993; Lewis & Altbach, 1994; Magner, 1994; McCloskey, 1994; Newman, 1994; Slaughter, 1993).

Central to my thesis is the argument that individuals from groups which made the greatest social gains in the past fifty years (women, minorities, first-generation college graduates, and individuals from working-class and modest middle class backgrounds) are most vulnerable to these combined effects, and are the most "at risk" of not pursuing, or completing, the Ph.D. I contend that conservative social and fiscal policies, such as the U.S. Republican party's "Contract for America" and related policies of the Canadian Progressive Conservative Party, will likely intensify the reversal of the previous social gains for these groups, contributing to intensified competition for shrinking resources and, ultimately, a deteriorating climate of teaching and learning conditions for graduate students and faculty, particularly in the non-elite public universities.

While the issue of "who completes the Ph.D." is certainly a critical concern when studies of the academic profession are conducted, the follow-up question may be even more critical: from which institutions, and backgrounds, will the next generation of university professors evolve? And what are the implications--particularly for regional public universities--if the backgrounds of faculty are increasingly different (in terms of race, gender, class, institutional origin) than their students?

This report is part of a symposium session presented at the 1995 annual meeting of the American Educational Research Association in San Francisco, California. It arose out of my continuing interest in research on critical issues shaping the academic profession on the eve of the twenty-first century. In part, it stems from my professional work with graduate students which spans ten years, including management of an 1100-member graduate teaching assistants' union and consulting work for the Graduate Dean at the University of Oregon.

From 1989 to 1992 I conducted doctoral research assessing the impact of severe financial retrenchment in public higher education on the recruitment, retention, and job satisfaction of contemporary American professors (Kerlin, 1992; Kerlin & Dunlap, 1993). Fundamental to my dissertation research was the finding that retrenchment is having negative effects on faculty morale, job satisfaction, academic salaries, and commitment to the university, and that declines in the quality of the academic profession are severely affecting the learning climate for doctoral students and the academic labor market for recruiting new tenure-track professors.

My post-doctoral research (Kerlin & Smith, 1994) extends this inquiry about the status of the academic profession into the realm of doctoral education. It questions both the validity of recent predictions of faculty shortages (Bowen & Rudenstine, 1992; Bowen & Sosa, 1989) and the adequacy of conditions under which current Ph.D. candidates are obtaining their education. It also addresses many of the critical issues that contribute to completion and non-completion of the doctorate. Finally, my current research seeks to draw implications about the impact of growing social inequality upon the potential demographic differences (in terms of race, gender, and class background) between faculty newly-hired during the next decade and those professors first hired in the 1960s and 1970s.

TRENDS IN GRADUATE AND DOCTORAL EDUCATION

With their publication of *In Pursuit of the Ph.D.*, William Bowen and Neil Rudenstine (1992) filled a major gap in the research literature on doctoral education in the United States. Studies of the doctorate have not been unavailable, as Baird (1990, 1993) and Malaney (1988) have acknowledged, but few have as broad a scope as Bowen & Rudenstine's examination of doctoral education at ten of America's leading doctoral-granting institutions. Critics have suggested that Bowen & Rudenstine's text suffers from over-dependence upon data from a few, highly-selective institutions that do not represent the vast majority of graduate programs or students (McCloskey, 1994), while supporters have hailed the authors' calls for improvements in the quality of academic departments and the levels of faculty support for graduate students. D'Arms (1994) argues in his defense of Bowen & Rudenstine that doctoral faculty need to see themselves less as gatekeepers to the profession and more as educational "partners" with their doctoral students.

Literature and Statistics on Students in Doctoral Programs

In his broad review of the research literature published on graduate education, Malaney (1988) found that the majority of research studies about doctoral education have focused exclusively upon students, especially statistical measures of enrollment and matriculation trends and predictions of student performance in graduate school. The journal with the greatest number of research articles about graduate education is *Research in Higher Education*, the official journal of AIR--the Association for Institutional Research (Gillingham, Seneca, & Taussig, 1991; Kallio, 1995; Ott, Markewich, & Ochsner, 1984). But in spite of these many studies, Malaney notes that little systematic research has been conducted on student retention and attrition at the graduate level, largely due to problems with developing appropriate research designs.

Much of the available research on nationwide trends of doctoral candidates is limited to statistical portraits of graduate enrollments and degree recipients. The standard report on doctoral recipients in the U.S., *Summary Report, Doctorate Recipients from United States Universities* is produced annually by the National Research Council (NRC) based upon a survey of doctoral recipients during each academic year (see National Research Council, 1989, 1991, 1993, 1995). Based on annual surveys conducted with all recipients of research doctorates from U.S. institutions, this report presents an exhaustive statistical overview of demographic trends among doctoral graduates and includes data on discipline of study, gender, age, nationality, race, and institutions. In the NRC reports, statistics describe length of enrollment, post-doctoral plans, level of indebtedness, and changing trends in doctoral recipients during the past 30 years. Occasional issues of the report contain additional data, such as the 1991 study (NRC, 1993) which has a special section on female doctoral recipients.

U.S. Doctorates Awarded Since 1963 by Field and Citizenship

According to the latest (1993 doctoral recipients) report from the NRC (published in 1995), the total number of annual research doctorates granted by U.S. universities grew from 12,278 in 1963 to 39,754 in 1993, an increase of 224 percent in 30 years. The graph on the following page depicts broad changes in doctorates received in U.S. institutions since 1963, including statistics on citizenship and gender. The period of greatest increase in doctorates received was clearly between 1963 and 1973, when the annual numbers of doctorates grew by 165 percent for all doctorates and 156 percent for doctorates awarded to U.S. citizens. Interestingly, the rate of growth of faculty positions in U.S. colleges and universities during this same ten-year period was only 88 percent (Ryan & Sackrey, 1984).

Since 1973, there has been minimal growth in annual numbers of doctorates received by U.S. citizens in most disciplines, and some fields such as humanities, education, and the physical sciences have shown declines (NRC, 1995, p. 21). Between 1978 and 1993, the annual number of U.S. citizens earning doctorates averaged less than 25,000. Among 1993 doctoral recipients, approximately 26,400 U.S. citizens were included (NRC, 1995). Among non-citizens, 12,173 (32 percent of the total) doctorates were awarded in 1993. The nations of China (People's Republic and Taiwan), Korea, and India accounted for 52 percent of non-U.S. citizens receiving doctorates, and Canadian citizens represented an additional 4 percent. Smith & Tang (1995) note that the total number of science and engineering doctorates granted to U.S. citizens between 1975 and 1990 has grown by only one percent, but the number of U.S. minorities earning science/engineering doctorates during this same period grew by 104 percent.

Among broad fields, the 30 year changes in doctorates received were as follows:

DOCTORATES GRANTED BY UNITED STATES UNIVERSITIES, 1963 TO 1993

Field of Study	1963	1973	1983	1993
All Fields	12,728	33,755	31,282	39,754
Physical Sciences	2,910	5,311	4,426	6,496
Engineering	1,357	3,364	2,781	5,696
Life Sciences	2,083	5,168	5,554	7,397
Social Sciences	2,027	5,757	6,095	6,545
Humanities	1,842	5,414	3,500	4,481
Education	2,137	7,238	7,174	6,647
Professional/Other	372	1,503	1,752	2,492
U.S. Citizens	10,925	27,914	24,359	26,386

Source: National Research Council, Summary Report 1993: Doctorate Recipients from United States Universities, 1995.

Among all fields examined, life sciences and social sciences are the only ones which showed continued growth in doctorates earned between 1963 and 1993. The period of 1973 to 1983 showed a relative decline in doctorates received among many fields as well as significant declines in total doctorates awarded to U.S. citizens. However, since 1983, these trends reversed for most fields, and by 1993 fields such as physical sciences, engineering, and life sciences exceeded total doctorates received in these fields in 1973.

Another recent statistical portrait of graduate students in U.S. institutions is available from the Council of Graduate Schools (CGS): Graduate Enrollment and Degrees, 1986 to 1992 (1994). The data in this publication presents a comparative look at master's and doctoral recipients in terms of gender, ethnicity, type of institution, discipline, and geographic region of the U.S. The CGS report includes figures organized by Carnegie institutional classification as

well as average annual changes in enrollment and graduation by degree type from 1986 to 1992.

The National Research Council has also completed a detailed study of doctoral programs in U.S. universities (see Magner, 1995) entitled *Research-Doctorate Programs in the United States: Continuity and Change*. Four years in the making, this report analyzes peer-reviewed doctoral programs in 274 U.S. universities representing 41 distinct fields of study. Ratings of each program in terms of "quality" and "effectiveness in educating research scholars" are included. The published study based its findings on surveys that were administered to approximately 8000 graduate faculty across the U.S., and reportedly contains "objective" statistics on 19 different characteristics for each program, as well as an overall ranking for each institution offering the course of study. Comparisons between the current study (conducted in 1992-93) and an earlier NRC survey of doctoral programs (1982) are included in the final report.

The Aging of Doctoral Students

Although not as much information is available on the age of doctoral recipients, there is evidence that the median age of recipients has increased in the past 20 years. In 1993, the median age of all doctoral recipients was 34.1 years. The field with highest median age was Education, at 43.0 years, while Chemistry recipients were the youngest with a median age of 29.7 years. For all men, the median age at graduation in 1993 was 33.2 years while for women it was 36.1 years. By comparison, in 1987, the median age of all doctoral recipients was 33.6 years, and 32.8 years for men and 35.4 years for women (NRC, 1989, 1995).

Equally important as the changing ages of doctoral recipients is the fact that increasing numbers of older (i.e. beyond age 25) individuals are entering and completing doctoral study in U.S. universities (Brazziel, 1992). Pauley (1994) utilized the NRC study of 1992 doctoral recipients (NRC, 1993) to focus his dissertation research on doctoral recipients with "non-traditional baccalaureate origins" (i.e. age 25 or older when receiving the bachelor's degree). His research compared the characteristics and educational experiences of 4,296 non-traditional bachelor's recipients from the U.S. with those of the remaining 23,226 U.S. citizens who received their doctorates in 1992 but who obtained their baccalaureate before age 25. Pauley found that the "non-traditional" class was an average of 42.5 years old (versus 35.5 years for traditionals), more ethnically diverse, and less likely to receive assistantships and fellowships than their traditional doctoral colleagues.

Family Backgrounds of Doctoral Recipients

The doctorate symbolizes for many students a kind of "rite of passage". It is instructive to inquire what proportion of doctoral recipients are the first in their families to graduate from college. While not an adequate indicator of true "social class" (about which more will be discussed later in this paper) by itself, completion of a college education has been recognized historically as a form of acceptance into the professional world (Ryan & Sackrey, 1984), and completion of the Ph.D. represents a kind of "vocational license" to practice in the middle class academic profession (Bledstein, 1978). In this section I will briefly examine the educational backgrounds of doctoral recipients.

Among 1993 graduates who are U.S. citizens, fully half could be classified as "first-generation college graduates." When parents' educational backgrounds for 1993 doctoral recipients were examined by the NRC, 49 percent of fathers and 62 percent of mothers had not graduated from colleges, while 19 percent of fathers and 21 percent of mothers held bachelor's degrees as their highest level of educational attainment. Nearly 20 percent of 1993 recipients' fathers and 6 percent of mothers held doctoral or professional degrees. In comparison, over 80 percent of fathers and mothers of 1968 doctoral recipients held no college degree (1).

Doctoral Attrition and Degree Progress

While statistical portraits are readily available on doctoral recipients, less information exists on students who have not yet completed their doctoral programs of study. We have no central database indicating what portion of total doctoral students across the U.S. have dropped out of graduate school prior to completing their work (see Baird, 1993). However, a number of published sources have noted that attrition rates of 50 percent or higher are common among doctoral candidates across the U.S., and reportedly have been on the increase during the past three decades (Baird, 1993; Bowen & Rudenstine, 1992; Tinto, 1993). Retention and attrition data disaggregated in terms of gender, ethnicity, or class backgrounds are usually unavailable for doctoral students.

During the doctoral years, numerous issues may surface in a student's own life as well as the educational process which can lead to withdrawal from a doctoral program. These issues need to be researched and discussed more broadly at the departmental, institutional, and regional policy-making levels. Tinto (1993) has called for more comprehensive theories and research on the factors which contribute to completion of and attrition from doctoral programs. I would add that due to the tremendous costs of graduate education--to the students, their institutions, and the society--institutions and researchers have a profound obligation to improve understanding of the causes and consequences of high rates of doctoral student attrition and to pursue policy changes aimed at increasing student success and reducing doctoral student dropout.

Perhaps no other issue is as critical in a doctoral student's professional development as the question of whether to withdraw from a program prior to completion (Golde, 1994). The "ABD phenomenon" typically describes students who have passed their qualifying examinations and formally "advanced to doctoral candidacy" but who have not yet completed their doctoral dissertation requirements (Hanson, 1982; Jacks, Chubin, Porter, & Connolly, 1983). Some of these students will eventually complete their studies; others will formally withdraw; still others will simply "disappear" from academic institutions, leaving no clear indication to faculty or administrators of their decisions. Among the chief causes of dropout are inadequate financial resources, poor relations between students and faculty, and dissatisfaction with the doctoral program (Jacks et al., 1983). For a variety of reasons, research on ABDs is still quite limited.

Recent studies that focus on identifying factors most often cited by students who withdraw from formal doctoral studies include two dissertations completed during 1994 that studied ABD students. Ramos (1994) examined 12 ABD doctoral candidates in the School of Education at the University of Kansas in order to understand factors that influenced their degree progress. He found that structure, or lack of it, was especially critical during the "post-comprehensive" period of doctoral study, when many students were basically "on their own" in making progress toward degree completion. Ramos recommends that institutions provide some form of support structure and ongoing contact with doctoral advisers during the post-comprehensive phase as a method of sustaining students' momentum to the point of degree completion. His second recommendation is that doctoral programs should operate "within a firm developmental context" (p. 84) in that programs should sufficiently match the developmental stages of their students based on the ages of most program enrollees. Ramos argues adult learning theories should be studied in all doctoral programs to recognize the interrelations between personal and professional life among adult doctoral students.

In her dissertation on doctoral students enrolled in the Instructional Technology program at Wayne State University, Tluczek (1994) identified "obstacles, factors, and circumstances associated with the ABD phenomenon that may hinder doctoral students from completing their dissertations" (p. 19) and offered suggestions for reducing barriers to successful completion of the dissertation. She found that the single most common obstacle reported by the ABDs, doctoral recipients, and committee members she interviewed was "the need to be self-disciplined and

motivated to work independently" (p. 86). Many respondents indicated a need for greater structure in their programs during the dissertation-writing phase, as well as additional incentives and support to keep them motivated. They also noted that the pressures of balancing among multiple roles, including family, job, and other academic responsibilities were often so demanding that it was easy to put the dissertation (if not a daily requirement for making progress) aside. Tluczek concludes that departments would benefit from conducting periodic needs analyses of their students in order to (1) better understand the unique needs and requirements of each student; and (2) improve the student's overall research skills. Additionally, she notes that all respondents recognized poor advisor and committee relationships as major obstacles to the progress toward completing the dissertation. She also observed that the factor most indicative of a student's likelihood of completion was the answer to her question, "how badly do you want this degree?" (2).

An issue in doctoral education that has received greater attention by researchers is the "time-to-degree" (the length of time from receipt of the bachelor's degree to receipt of the doctorate). In recent years, the time-to-degree (both registered and total time) has become longer for doctoral students in most disciplines (Bowen & Rudenstine, 1992; NRC, 1995; Tuckman, Coyle, & Bae, 1989). The data provided by the NRC for 1993 doctoral recipients show that time-to-degree (TTD) varies widely by discipline of study. For all disciplines, the median total TTD was 10.5 years among 1993 graduates compared with 8.6 years in 1963; the field with shortest TTD (physical sciences) rose from a median of 6.3 years in 1963 to 8.3 years in 1993, while the field with longest TTD (education) rose from 13.2 years in 1963 to 19.2 years in 1993 (NRC, 1995).

Other researchers have sought to identify predictors of TTD based on statistical analyses of economic factors (Gillingham, Seneca, & Taussig, 1991), departmental and institutional characteristics (Baird, 1990; Stricker, 1994), and the interrelationship among student characteristics, departmental characteristics, and financial circumstances (Sheridan & Pyke, 1994). In turn, they have made efforts to develop statistical models of graduate degree progress (Girves & Wemmerus, 1988; Ott, Markewich, & Ochsner, 1984; Pyke & Sheridan, 1993). Tinto's research (1993) posits a "longitudinal model of graduate persistence", suggesting that doctoral students go through various "stages" of persistence, some more defined by the student's own characteristics and others by more external factors (such as financial assistance). But Tinto also points out that much more research is needed on issues affecting doctoral students' progress at various stages of their educational paths, particularly for women and minority students (3).

One particular area of research urged by Tinto (1993) and Lipschutz (1993) is to examine the quality of the graduate experience from the perspective of the students themselves, using a wide range of qualitative and quantitative methods. Toward the goal of obtaining greater feedback from students, McKeown, McDonell, & Bowman (1993) have developed attrition research for college students that focuses upon the centrality of the student experience as a means for better explaining the causes of student attrition in higher education. Similar studies need to be conducted with doctoral students at specific stages, such as the end of first year course work, following comprehensive examinations, and during the dissertation proposal and later stages. Further, department faculty who work with doctoral students, with the assistance of central offices of Institutional Research and Graduate Studies, need to maintain up-to-date information on the progress of each doctoral student and on rates and causes of attrition from their programs. Faculty also need to periodically assess the quality of their own work with doctoral candidates in order to determine new and improved methods of assisting the progress and ultimate success of their students.

The Status of Women in Doctoral Education

In 1963, women were scarce among graduate students, receiving only 11 percent of doctorates. However, by 1993 women received 38 percent of total doctorates granted by U.S. universities, and among U.S. citizens receiving doctorates women accounted for 45 percent of the 1993 graduating class (NRC, 1995). The percentage of doctorates awarded to women by discipline since 1963 is displayed below.

PERCENTAGES OF DOCTORATES GRANTED BY UNITED STATES
UNIVERSITIES TO FEMALES, BY DISCIPLINE, 1963 TO 1993

Field of Study	1963	1973	1983	1993
All Fields	10.9	18.0	33.7	38.0
Physical Sciences	4.3	7.2	13.9	20.7
Engineering	0.7	1.4	4.5	9.1
Life Sciences	9.9	17.8	31.0	41.7
Social Sciences	13.0	21.0	39.5	49.3
Humanities	16.5	28.6	43.7	47.5
Education	19.5	24.6	50.4	58.7
Professional/Other	17.7	12.7	29.4	35.9

Source: National Research Council, *Summary Report 1993: Doctorate Recipients from United States Universities*, 1995

These statistics suggest that women, though still a minority of doctoral recipients in most disciplines, have made significant progress since 1963. Further data available from the National Center for Education Statistics projects that by the year 2005, women will be earning more than 20,000 doctorates annually while men's rates are projected to decline to equivalent or even lower numbers (NCES Report, "Projections of Education Statistics to 2005," 1995, p. 63 Table 30).

A wide range of research on the status of women in doctoral education has sought to identify the variety of factors shaping women's educational experiences in pursuit of the doctorate (for examples, see Acker, 1977; Holmstrom & Holmstrom, 1974; Solmon, 1976; Vartuli, 1982; Wong & Sanders, 1983). One of the first significant studies of female doctorates was Helen S. Astin's *The Woman Doctorate in America: Origins, Career, and Family* (1969). Astin's research found evidence that female attrition from doctoral studies was substantially higher than that of males but recognized the inadequacy of nationwide statistical data on women's progress and attrition in doctoral programs.

In the early 1980s, the Project on the Status and Education of Women for the Association of American Colleges published "The Classroom Climate: A Chilly One for Women?" (see Hall & Sandler, 1982). This report focused on the ways academic institutions may construct barriers to female students' and faculty members' success and on strategies for removing the barriers and improving the teaching and learning climate for women. Among graduate students, the report noted that even though graduate women are highly self-selected and often have higher grades than their male classmates, many women in graduate studies encountered faculty who seriously doubted their commitments to completing the requirements for their degrees (p. 10). Faculty--particularly males--were often known to give preferential treatment to the male graduate students, especially when determining the recipients of research assistantships or fellowship awards. Female students reportedly often felt "left out" of informal communication networks within their departments and were denied acceptance as "professional colleagues" by faculty in the same manner as male students. This study subsequently spawned research on the status of women in universities of Canada (Dagg & Thompson, 1988; Chilly Editorial Collective, 1995).

On the heels of the chilly climate study in the U.S., a number of other studies of female graduate students were published in the 1980s and beyond. Berg & Ferber (1983) suggested that females in graduate school tend to be more timid, set lower goals for themselves, and are likely to be given less encouragement than males. In their examination of graduate students enrolled at a single midwestern university between 1968 and 1975, they found that only 11 percent of females had earned doctorates by 1979 while 26 percent of men had done so. Hite (1985) examined female doctoral students' likelihood of success based on three criteria: role congruence (level of integration of the various roles within one's life), perceived faculty support, and perceived peer support. She found that men perceived more role congruity and faculty support than women, while peer support did not differ on the basis of sex.

Academic departments in which women are subjected to sexual harassment or other forms of unsupportive behaviors by faculty or graduate students introduce an especially negative impact on the progress of female doctoral students (Morris, 1989; Schneider, 1987). Heinrich (1991) found that relatively few women doctoral students in her study experienced advising relationships with male faculty that qualified as "mentoring relationships". She noted that male faculty who adopted "androgynous" approaches to advisement were the most beneficial in helping female doctoral students to be successful and to emerge from their experiences with high levels of self-confidence.

Mentoring has often been related to students' success in graduate studies (Osborne, 1995), but mentoring can also have negative consequences for both female and male proteges if the mentor (regardless of gender) (1) betrays the trust of the student; (2) loses power, resulting in diminished career possibilities for the protege; (3) has a destructive personality; (4) guides the protege toward the mentor's own ends, and uses the relationship for fame and fortune; (5) experiences conflict or sexual exploitation with an opposite sex protege (Braun, 1990). High levels of faculty support for women's (and, in fact, for all students') development in graduate studies are indeed necessary for them to be successful. Shroeder & Mynatt (1993) found that female graduate students reported higher levels of concern for their welfare and higher quality interactions from female faculty who were their major advisors than from male major advisers, but that levels of difference with male faculty were relatively small. Nevertheless, increasing numbers of female faculty in graduate programs will likely improve the quality of all women's educational experiences.

Research on females in graduate education has also focused on the overall patterns of career development and working conditions for women faculty in higher education (Clark & Corcoran, 1986; Reynolds, 1992; Tack & Patitu, 1992) and sought to identify factors that may cause what Clark & Corcoran call "a case of accumulative disadvantage." These authors point out that women in doctoral programs are inevitably affected by women's patterns of stratification in the academic hierarchy. Dunlap (1995), in examining the transition from Ph.D. recipient to new professor for women, found that nearly all of the women in her study expressed the feeling that in order to be successful at both graduate studies and faculty work, they had to work harder and be more assertive than would have been necessary if they were males.

Although women's numbers in doctoral studies reflect in 1995 an overall improvement in their status within the academic profession, research on the issues affecting females' enrollment trends, degree progress and degree completion in doctoral programs is still needed, in order to identify the principal factors influencing women's retention and attrition. Research such as that by Bobbi Smith (1995) that examines critical turning points in female doctoral students' educational experiences enables a better understanding of the needs and concerns expressed by the students themselves. Further research is needed in which doctoral women's voices play an integral part.

Minority Doctoral Students

The National Research Council's latest annual report (1995) on 1993 doctoral recipients points out that reliable data on minority doctoral students has only been maintained since 1975, so analysis of long-term trends is more limited than what is available based on gender. The NRC and the American Council on Education (ACE) are the two agencies which maintain the most substantial data on minority doctoral students across the U.S. According to the ACE analysis of 10-year trends from 1982 to 1992 (Ottinger, Sikula, & Washington, 1993), the number of minority doctorates granted by U.S. universities grew by 27 percent between 1982 and 1992 while the overall number of U.S. doctorates grew by only 6 percent during the same period. However, these total increases mask declines among certain groups, such as African-American females, whose completion of doctorates declined by 20 percent by 1992. Overall, African-Americans' receipt of doctorates declined by 9 percent between 1982 and 1992, while Native Americans and Asian-Americans each doubled their numbers of doctorates earned during this period and Hispanics' rates increased by approximately 50 percent.

In 1992, minority students had significantly diversified in terms of the fields from which they received doctorates. Ottinger et al. show that in 1992, education accounted for only 29 percent of minority doctorates while physical sciences and life sciences represented an additional 26 percent, natural sciences and engineering represented 38 percent, and social sciences represented 17 percent of minority doctorates. Smith & Tang (1995) studied trends for science/engineering doctorates, noting that Native Americans had the largest increase between 1975 and 1990 among minority recipients, followed by Hispanics and Asians. African-Americans' share of doctorates in science/engineering grew only slightly, from 1.9 to 2.1 percent.

The 1995 NRC report contrasts ethnicity of doctoral recipients during the years of 1978 to 1993. The table below lists relative changes in total doctorates received by minority students during these years.

PERCENT OF DOCTORATES EARNED BY U.S. MINORITIES, 1978 AND 1993		
	1978	1993
Native Americans	0.3	0.5
Asians	1.6	3.4
Hispanics	2.0	3.2
African-Americans	4.3	4.2
TOTAL MINORITIES	8.2	11.3

Source: National Research Council, *Summary Report 1993: Doctorate Recipients from United States Universities*, 1995.

Research on the progress of minority students in doctoral programs is not as extensive as for women, but there are reports published regularly by the American Council on Education (1995) that include doctoral students in their assessment of minority student issues in higher education. Additionally, the Minority Graduate Education Project of the Educational Testing Service has released an update of its research agenda (Brown et al., 1994), and urges further research on these issues: (1) factors limiting the supply of minority students who have completed college and are potential clients for graduate education; (2) the ways in which minority students develop aspirations for graduate education and their perceptions of the obstacles that may keep them from applying or enrolling in graduate education; (3) the impact of indebtedness and costs of graduate education on minority students' enrollment and persistence rates; (4) the impact of departmental and institutional climate on minority students; and (5) factors shaping minority

graduate students' persistence, attrition, and degree completion rates.

Many researchers of minority issues have addressed the impersonal and sometimes hostile climate experienced by Hispanic, African-American, and Native American students on predominantly white college and university campuses (Kerlin, 1993). This is particularly true at the doctoral level because the pool of qualified minority students who complete their baccalaureates and wish to advance to graduate study is typically small (Vaughn, 1985). Nettles (1990) found that among the minority doctoral students in his study of four university campuses, both Hispanic and black students reported feelings of racial discrimination on their campuses. Black students came from the lowest economic strata of all doctoral students in Nettles' study, yet they also received the fewest teaching and research assistantships. Turner & Thompson (1993) contributed to the research on women doctoral students by contrasting the socialization experiences of minority and white females at a midwestern university. Minority women were again less likely to hold research or teaching assistantships and also reported less help from faculty with publishing and few opportunities to receive mentoring and career guidance.

More research is needed on the factors which shape minority students' decisions and opportunities for pursuing graduate study. In order to understand the factors influencing the "minority pipeline" and to forward improved policies for assisting the success of African-American, Native American, and Hispanic graduate students (Smith, E., 1995), it is also essential to examine the adequacy of existing institutional efforts to attract and retain talented minority graduate students. Efforts at improving the racial climate for minority students on predominantly white university campuses should include substantial commitment from graduate deans and graduate faculty campus-wide.

Class and Social Stratification in Higher Education

Though much research exists on women and minority group members in academe, there is a dearth of studies focusing on the impact of social class background and upward mobility on individuals' academic careers. However, research on social stratification and class inequality (Grusky, 1994; Szymanski, 1983) has many applications in the world of higher education because ultimately this is one of the announced missions of American higher education: to provide access to individuals from all class backgrounds. However, evidence has long suggested that individuals from lower-income backgrounds tend to fare less well in higher education, often for reasons of ability to pay the rates of tuition charged. We know far less about the impact of class than of race or gender in higher education because American society and higher education tend to perpetuate the myths of a "classless society." Evidence suggests that higher education institutions have done surprisingly little in recent years to fulfill the needs of working-class and lower middle-class individuals (Karen, 1991).

For a variety of reasons, individuals from lower-income backgrounds are often limited to attending graduate school in a regional state university, being unable to afford the higher cost tuition of out-of-state universities or private institutions as well as the costs of relocating one's family to another region where such a university might be located. Hence, America's public universities have often been the only reasonable option available for large numbers of individuals who wish to pursue the Ph.D.

There is evidence that one's social class has a great bearing on the institution in which one can pursue a doctoral education. Lang's studies (1984, 1987) point out that the academy sustains a meritocratic system with persistent status divisions which often make it difficult for individuals from modest backgrounds to enter the top private universities. Lang states,

The distribution of students to different-ranked institutions is linked to their social class and sex background, regardless of undergraduate achievement and rank of

undergraduate institution attended. This inequality confers on certain groups and classes clear advantages in participation within the academic hierarchy.

Working-class students, from highly-ranked undergraduate institutions and with high achievement levels, cannot expect to attend the same-ranked graduate school as students with similar merit backgrounds from the middle and upper middle classes.

Meritorious middle class students can also expect to attend lower-ranked schools than upper-middle-class students with similar merit backgrounds, while the upper-middle-class students with high levels of merit can look forward to attending the highest-ranked graduate schools. This structure appears to allocate individuals to various levels of the academic hierarchy on the basis of social class distinctions and backgrounds (Lang, 1987, pp. 456-7).

Some researchers have examined the impact of class backgrounds on career development paths of university faculty. The best-known book on working-class academics' career paths is published by Ryan & Sackrey (1984). Their analysis of the influence of class inequality and stratification as well as patterns of social mobility through higher education is groundbreaking, in that it seeks to debunk many myths about higher education's capacity to facilitate genuine "upward mobility" among the members of the lower classes in society. More recent studies by Tokarczyk & Fay (1993) and Dews & Law (1995) offer essays by working class women and men who have pursued academic careers, a number of them conveying stories of their graduate years and the impact of their working-class circumstances on socialization into the academic profession. Abel (1986) demonstrates, however, that access and mobility for previously underrepresented groups are inadequate when institutions in effect create oversupplies of Ph.D.s who are unable to obtain quality academic positions. She argues that the Ph.D. recipients most likely to obtain low-pay and part-time positions in higher education have tended to be individuals from underrepresented groups within the university, such as women, minorities, and working-class graduates.

Class backgrounds undeniably play a major role in the progress of students through the "academic hierarchy", yet we have only limited research on class issues in higher education. To a large extent, it is likely that class backgrounds will play an increasingly substantial role in the years ahead in determining who will be able to attend and complete doctoral studies and, ultimately, who will enter the academic labor market for the college and university faculty of the 21st century. For this reason, research on class issues in higher education needs to be significantly expanded.

Doctoral Education: Financial Considerations

During the 1980s, there were numerous investigations into the rising cost of graduate education in the U.S. that called for a greater federal government role in financially assisting graduate students and institutions (Brademas, 1984; National Commission on Student Financial Assistance, 1983; Rosenzweig, 1984). Hauptman (1986) published a report under the auspices of the Association of American Universities (AAU) warning that graduate students were incurring levels of indebtedness from their graduate studies that not only would be increasingly difficult to repay, but also threatened the ability of many prospective graduate and professional students to pursue and complete their studies. Further, Hauptman pointed out there is no level of national commitment toward providing sufficient aid to meet the real needs of all qualified applicants (p. 57).

Other researchers have noted that total supplies of financial aid for graduate students have

been difficult to measure because of the sheer variety of sources available to students. In his proposed model for tracking the progress of doctoral students, Tinto (1993) acknowledges that the cost issue often becomes most critical for doctoral students in the later years of their studies, after institutional aid such as fellowships and assistantships have ended. Many students take more than five years to complete their doctoral dissertations, and often in the last years of study it is necessary to devote all of one's time to completing the dissertation. Yet this is often when the financial strains become the worst for doctoral students.

A key source of information on graduate students' financial aid in the U.S. is the National Postsecondary Student Aid Study (NPSAS), published periodically by the National Center for Education Statistics. In a summary of the graduate and professional student data from the 1989-90 NPSAS report, the NCES examined a host of factors including types of aid, levels of indebtedness by program of study, and changing trends in student indebtedness since 1981. For doctoral candidates, 57 percent were enrolled on a full-time basis and 59.9 percent received some form of financial aid for the 1990-91 academic year. Annual distribution of income was reported for all financially independent doctoral students, and annual expenses related to pursuit of doctoral education was reported for all students enrolled in the 1989-90 academic year. These figures appear in the next table.

DISTRIBUTION OF ANNUAL INCOME* AND AVERAGE ANNUAL EXPENSES
FOR DOCTORAL STUDENTS IN U.S. UNIVERSITIES, 1989-90

	----- Percent Distribution by Annual Income -----					
Income:	5000-	10,000-	20,000-	30,000-	50,000	
	<\$5000	9999	19,999	29,999	49,999	or more
Total Students	12.5	17.1	24.0	15.6	17.9	12.8
Public Univ	11.3	18.0	21.9	16.9	18.5	13.3
Private Univ	15.0	15.4	28.4	12.9	16.5	11.8

Expenses:	TOTAL	TUITION & FEES	FOOD & HOUSING	BOOKS & SUPPLIES	OTHER
	EXPENSES				
All Students	\$15,580	5,191	6,006	834	3,549
Public Univ	13,468	3,079	6,049	805	3,536
Private Univ	19,244	8,858	5,931	885	3,570

* Listed only for students who are independent of their parents.

Source: National Center for Education Statistics, "Student Financing of Graduate and First-Professional Education", Report No. NCES 93-076, 1993.

According to the NCES, among doctoral students, the chief source of financial aid in 1989-90 was grants, which were awarded to nearly 40 percent of doctoral students. Nearly 20 percent of doctoral students also received loans and 18.3 percent received some form of tuition waivers. The average annual aid received by part-time students was \$8,961 and among full-time doctoral students was \$13,395 for the 1990-91 year across all disciplines, with amounts awarded to students in private institutions being somewhat higher.

Preliminary results have been presented from the follow-up NPSAS study, conducted with students enrolled during the 1992-93 academic year (NPSAS: 93). They show the following: Approximately 55% of all doctoral students (150,000 net students) were receiving financial aid, with an average annual award (among both private and public university students) of \$10,800

(combining part-time and full-time students). Nearly 35 percent of all doctoral students received some sort of grant aid, while 16 percent received loans and 21 percent received assistantships. A summary report entitled "Financing of Graduate and Professional Education, 1992-93" is forthcoming from the National Center for Education Statistics, as well as a longitudinal study entitled "Trends in Postsecondary Student Financial Aid, 1987-93".

One measure of students' accumulated debt burdens resulting from doctoral study is available in the annual NRC reports and displayed in the table below. Each year, the survey of doctoral recipients asks graduates to indicate (1) their principal sources of funding for their doctorates; and (2) the amounts of indebtedness they have incurred directly from their doctoral studies. The next table shows that nearly 78 percent of 1993 physical sciences doctoral recipients were funded primarily by university forms of aid, including federally-funded research assistantships, while only 12 percent of physical science graduates paid for their education principally out of personal resources. For education doctorates, these figures were essentially inverted, with most students paying principally with their own resources. Furthermore, the table shows that levels of indebtedness varied widely among different fields of study. In total, 26 percent of doctoral recipients from all fields who had debts related to their doctorates held debt loads of \$20,000 or greater, and these percentages were much higher for graduates in the social sciences. It is notable that among women across disciplines, personal funding was the most common source of financial support, while among men, university funding was the largest source.

Much evidence shows that rising levels of indebtedness are characteristic of today's doctoral students and may be preventing some students from completing their studies due to the simple fact that, upon graduation, they are required to begin repaying their loans and educational debts (Boyd, 1993; Galloway & Hartle, 1995; Hartle, 1994). As plans for eliminating the "grace period" after graduation for loan repayment are considered in the U.S. Congress, graduate students are bracing themselves for tuition increases of 5-20 percent per year or more during the coming years.

SOURCES OF PRIMARY FINANCIAL SUPPORT AND LEVELS OF
DOCTORAL-RELATED INDEBTEDNESS OF 1993 DOCTORAL RECIPIENTS

Field of Study:	Sci.	Phys. Engin.	Sci.	Life Sci.	Soc. Human.	Educ.
	Primary Support(%)					
University *	77.9	69.3	56.8	41.6	50.5	13.9
Personal	12.1	14.7	21.4	47.8	43.3	79.8
Federal	4.5	4.9	14.4	5.0	2.2	1.1
Other	5.4	11.1	7.4	5.6	3.9	5.2
	Median Level of **					
Post-Doctoral Debt	\$8,500	9,300	9,800	14,500	10,000	10,100
Percent with Debt:	42.6	38.5	50.0	61.9	55.2	38.1
	Doctoral Debt Load(%)					
\$1 to \$10,000	57.5	52.9	50.9	36.5	49.8	49.6
> \$10K to \$20K	26.3	23.8	27.4	27.5	28.0	25.3
> \$20K to \$30K	9.0	10.8	11.1	27.5	28.0	13.5
> \$30 K	7.1	12.4	10.4	19.9	9.1	11.5

* Includes federal aid administered through university sources

** Based only on students who reported levels of doctoral debt

Source: National Research Council, *Summary Report 1993: Doctorate Recipients from United States Universities*, 1995.

Galloway and Hartle (1995) note that between 1988-89 and 1993-94, graduate tuition rose 55 percent across the U.S., but much more dramatically in states such as Massachusetts (110 percent) and California (75 percent between 1990-91 and 1992-93). In the 1993-94 academic year, nationwide tuition in the U.S. averaged \$5766 for all institutions, \$2916 for public universities, and \$10,578 for private universities (National Center for Education Statistics, *Digest of Education Statistics 1994*, Table 306).

There is reason to believe that in light of massive increases in student borrowing during the 1990s, these debt loads will dramatically increase for future doctoral recipients. While real salaries of U.S. college graduates actually fell by 2.6 percent between 1987 and 1991, the volume of student borrowing among both undergraduates and graduate/professional students jumped dramatically between 1985 and 1991. Additionally, between the fiscal years of 1992 and 1994 alone, the total amount borrowed by students jumped from \$14.7 billion nationwide to \$23.1 billion--a 57 percent increase. What is also troubling is that under current financial aid policies, graduate and professional students are able to borrow as much as \$138,000 toward their graduate studies, yet most post-graduation positions for Ph.D. recipients will offer insufficient salaries to repay large loans.

Among graduate and professional students in the U.S., the number of loans grew by 47 percent and the amount borrowed grew by 31 percent between 1985 and 1991. Galloway & Hartle note that students enrolled in public universities are almost totally bearing the burden of debt from their education, with little assistance from parents. They express concerns that borrowing levels are growing out of proportion with students' long-term abilities to repay their loans, noting that increasing numbers of students are incurring major debt burdens from their undergraduate years that make it harder than ever to pursue graduate studies. Boyd (1993) reported a 197 percent increase in the mean level of total educational loans among samples of borrowers who were doctoral students in 1985 and 1991. For the 1991 doctoral recipients in his study, the mean level of loan repayment represented 17.59 percent of their net income levels, a dramatic increase from the 8.51 percent of net income paid by 1985 doctoral recipients toward student loans. Evidence suggests that the growth of loan debt for many doctoral recipients is rapidly outpacing ability to repay, causing serious potential for increasing numbers of students to face loan defaults.

As serious as the cost of doctoral studies is for students, the larger society must also pay a significant price to support graduate education. The result has been increasing concern in recent years about the cost of doctoral study for taxpayers. An example comes from the state of Ohio, where the State Board of Regents moved recently to recommend placing a cap on doctoral enrollments in the state's public universities during the next two years (*Chronicle of Higher Education*, January 27, 1995). Citing evidence that the enrollments of doctoral students had climbed by 40 percent since 1990 in the state's public universities while overall college student enrollment growth in that state during the same period was just three percent, the Board's recommendation was reportedly in response to calls for reducing the costs to taxpayers. In Ohio, the annual cost of educating a single doctoral student in a public university is reportedly \$13,000, though estimates in some states have run much higher.

While the Ohio policy raises questions about factors influencing supply and demand for doctoral education and doctoral recipients, the broader implication is clear: there are limits to the numbers of doctoral students a state is willing to support. And it suggests that institutions may well have become caught in a "numbers game" where doctoral students are being admitted to provide sources of ready cash for institutions which, in turn, may be less committed to sustaining the quality of doctoral studies and student outcomes than in maintaining a steady flow of tuition revenues. This raises serious questions about the adequacy of many universities' efforts to match

the supply of doctoral program spaces to some type of realistic labor market demand (both inside and outside of academic institutions) for Ph.D. recipients.

Post-Doctoral Education and Career Plans of Doctoral Recipients

In addition to rises in levels of indebtedness, the professional job market is also having a serious impact on graduate students' post-education plans (Magner, 1994). Since 1973, the NRC has collected data on doctoral recipients' post- doctoral plans. The highlights of its findings on students' plans are listed in the next table.

POSTDOCTORAL PLANS FOR U.S. CITIZEN DOCTORAL RECIPIENTS,
1973 TO 1993

	Percent of Respondents				
	1973	1978	1983	1988	1993
	Pursue Employment *				
All Fields	83.8	80.3	79.3	73.6	71.1
Physical Sciences	60.9	60.5	62.0	51.4	50.3
Engineering	87.1	84.8	87.5	80.2	74.8
Life Sciences	58.1	47.4	44.8	39.4	35.9
Social Sciences	91.9	87.0	86.3	84.2	80.0
Humanities	96.2	95.2	95.4	93.1	93.1
Education	98.0	97.7	97.4	95.6	97.1
Prof/Other	98.6	98.4	97.2	97.5	97.2
	Employment Sector **				
Academe	64.3	56.4	50.2	49.7	52.5
	Industry/Self				
Employed	11.5	15.3	19.8	20.4	18.7
Government	11.6	12.5	11.1	10.8	10.0
	Other (Schools/ Non-Profits)				
	12.5	15.9	18.9	19.1	18.8

* Lists proportions who chose "employment" over "study" for post-doctoral plans.

** Limited to respondents who chose "employment" in previous question; listed in terms of all fields of doctoral recipients.

Source: National Research Council, *Summary Report 1993: Doctorate Recipients from United States Universities*, 1995.

What we can see from this table is that over the past 20 years, the proportions of doctoral recipients who have post- doctoral intentions of immediate employment have significantly declined in most fields of study, and the overall proportion has declined from 84 percent to just 71 percent of graduates who answered this question. The NRC reports that this question, regarding post-doctoral plans, has the highest non-response rate among its survey completers, and the proportion who did not respond in 1993 was nearly one-third, an increase over previous years (see NRC, 1995, p. 91). This increase undoubtedly reflects the uncertainty felt by many of today's doctoral recipients about their future career options.

Among respondents who did indicate plans of employment after completing the doctorate, the proportion who have chosen academe as their employment sector declined from 1973 to 1988, rising only slightly (but among a smaller response sample) in 1993. One way of interpreting these statistics is that contemporary doctoral recipients are experiencing greater uncertainty and ambivalence about their future careers. These findings suggest that academia may no longer be seen even by the students who have been successful at doctoral completion as a

dependable employment choice upon graduation. As I suggest later in this paper, this finding may be related to the increasingly competitive environment inside many doctoral programs and academic departments.

Comparative Trends of Doctoral Students in Canadian Universities

In Canada, statistical reports on graduate studies in 55 Canadian universities are produced by the Canadian Association for Graduate Studies (CAGS-1994). Some advantages exist in the Canadian data report in that it displays enrollment trend information disaggregated by type of program (master's or doctorate). Because of the overly high levels of dropout prior to degree completion, enrollment data for graduate students provides a more representative look at the true number of individuals pursuing graduate degrees in Canada. By comparison, the NRC reports are limited to doctoral recipients and the Council of Graduate Schools report (1993) does not disaggregate enrollment data on the basis of Master's versus doctorate- seeking students.

Examining the detailed data sets presented in the 1994 CAGS report, one sees that enrollment growth in Canadian doctoral programs essentially doubled between 1973 and 1993. The figures, based on gender, were as follows:

CHANGES IN DOCTORAL ENROLLMENTS IN CANADIAN UNIVERSITIES,
1973 TO 1993

Year:	1973	1978	1983	1988	1993
Males	10,469	9,396	10,295	12,783	16,239
% of Total	77.6	72.5	67.3	64.7	62.3
Females	2,895	3,559	5,000	6,976	9,842
% of Total	22.4	27.5	32.7	35.3	37.7
Students	13,364	Total 12,955	15,295	19,759	26,081

Source: Canadian Association for Graduate Studies, _Statistical Report 1994_.

This table demonstrates that, as in U.S. universities, women's enrollments at the doctoral level have grown in the past twenty years, reaching nearly 38 percent of all doctoral enrollments (regardless of field) by 1993-94.

Exploring the actual awarding of doctorates in Canadian universities during 1993-94 turns up the following information based on broad fields of study:

TOTAL DOCTORATES AWARDED BY CANADIAN UNIVERSITIES, 1993-94
BY BROAD FIELD OF STUDY

Field:	Doctorates
Humanities	403
Social Sciences (including Education)	967

Natural and Applied Sciences	1,148
Life Sciences	816
TOTAL DOCTORATES AWARDED	3,334

Source: Canadian Association for Graduate Studies, _Statistical Report 1994_.

One particularly valuable data source in the CAGS report for 1994 is a tracking study of the cohort of graduate students who entered Canadian universities in 1986. Although only 30 of the 55 member institutions supplied data for this portion of the study, the information is highly beneficial to policy researchers interested in measuring the rates of retention, degree completion, time to degree, and rates of withdrawal of doctoral students. The table below displays selected data on degree progress among the 1986 entering class of doctoral students:

PROGRESS OF ENTERING COHORT OF DOCTORAL STUDENTS IN CANADIAN
UNIVERSITIES, 1986 TO 1994 *

Field:	Human	Soc Sci	Nat Sci	Life Sci
Students Entering '86				
Males (Full-time)	170	229	449	313
Females (Full-time)	167	319	68	143
Total (Full-time)	337	548	517	456
% Completed by '94				
Males (Full-time)	47.6	33.6	73.7	73.5
Females (Full-time)	44.9	50.8	67.6	70.6
Total (Full-time)	46.3	43.6	72.9	72.6
% Withdrawn by '94				
Males (Full-time)	41.2	52.8	22.9	8.9
Females (Full-time)	41.3	35.7	32.4	21.7
Total (Full-time)	41.2	42.9	24.2	12.9
Mean Time to Degree (Months)				
Males (Full-time)	59.5	57.6	53.0	52.9
Females (Full-time)	64.9	61.2	56.1	57.7
Total (Full-time)	63.0	60.1	54.2	55.9

* Note: Data are based on responses from only 30 of the 55 institution members of the CAGS

Source: Canadian Association for Graduate Studies, _Statistical Report 1994_.

The data in the table above demonstrate significant differences in doctoral degree completion rates and dropout rates on the basis of broad field of study. Students in the natural

and life sciences--both men and women--have higher rates of completion and lower rates of withdrawal (non-completion) within the span of 8 years during which this tracking study was conducted. Overall, females' rates of withdrawal are somewhat higher (except in the field of social sciences) than are males', and women typically require 3 to 5 more months than males (on average) to complete their doctoral program requirements.

Holdaway (1994) points out that no publication with a national focus exists in Canada that synthesizes graduate student statistics along with policies, opinions, and discussions of critical issues facing graduate studies. Cude (1991) notes a serious lack of solid, dependable statistics on doctoral education across the nation, and urges institutions to make more efforts at gathering and maintaining data on the progress and dropout of graduate students. Currently, the most beneficial report currently available is published by the Ontario Council on Graduate Studies (1991): *Doctoral Graduation Rates in Ontario Universities: A Discussion Paper*.

This paper has presented a wide range of research studies on the status of doctoral education and student trends in U.S. and Canadian universities. However, statistics are less effective in describing the experiences of individual students who pursue the doctorate. In "Surviving the Doctoral Years: Critical Perspectives", I provide preliminary results from my own survey of doctoral students and draw some important implications for the future.

Notes

1. I wish to thank Lori Thurgood, Doctorate Records Project at the National Research Council, Washington, D.C. for her assistance in collecting the data for this section.
2. Telephone conversation with Judy Tluczek, April 3, 1995.
3. Author's interview with Vincent Tinto, May, 1994.
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