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AN INVESTIGATION OF SELECTED FACTORS WHICH CONTRIBUTE TO THE PROLONGATION OF DOCTORAL PROGRAMS AT MICHIGAN STATE UNIVERSITY

By

Laurence Vincent Lauth

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ABSTRACT

AN INVESTIGATION OF SELECTED FACTORS WHICH CONTRIBUTE TO THE PROLONGATION OF DOCTORAL PROGRAMS AT MICHIGAN STATE UNIVERSITY

By

Laurence Vincent Lauth

Statement of the Problem

The crucial importance to any modern society of the professional training and development of as many of its members as possible has led to an increased national awareness of the continuing imbalance existing between doctorate supply and demand. As a result, the length of time required to earn the doctorate has emerged as one of the major issues in graduate education.

The time issue is viewed not so much as one involving the expected or actually enrolled period of time required for completion of the doctorate. Rather, the issue is seen as one concerned with the actual amount and manner of distribution of the lapsed time doctoral recipients take to earn the degree. With the accelerating expansion of man's knowledge and the increased need to gain control over it, less actual time spent on the doctorate is not seen to be as societally expedient as is the

searching out, and alleviation of, those factors which contribute to its unnecessary prolongation.

Historically, those variables which have been most strongly associated with prolongation of the doctorate fell readily into 6 general groupings--discontinuities of attendance, patterns of financial assistance and support, dissertation requirements, personal, and departmental variables.

Organization of the Study

The primary focus, then, of the present study was an investigation of the significance of those independent variables which a review of the literature had revealed as most influential in accounting for prolonged lapsed time periods in the pursuit of the doctoral degree.

To this end, a doctoral recipient sample of 320 was drawn randomly from Michigan State University's degree granting departments for the academic years 1966-67 and 1967-68. The testing by an intercorrelation matrix of 34 research hypotheses formulated from 53 of the 90 original independent variables and the 3 dependent time lapse variables followed.

A second intercorrelation matrix based on the total sample divided into 6 basic fields of study was then employed to test 4 research hypotheses. Finally, a Least Squares Stepwise Deletion procedure was undertaken

resulting in the formulation of 3 multiple regression equations, one for each of the 3 dependent time variables.

Major Findings of the Study

Of the 34 research hypotheses based on the total sample, 27 were found to be supported by the data with 8 of these correlating with one of the 3 dependent time variables at significantly greater than .50 revealing that those doctoral recipients with a greater lapsed time between B.A. and Ph.D. reception were found to have more total years of post-B.A. interruptions and greater lapsed time off-campus after the end of course work. Recipients who evidenced a greater lapsed time between entry to doctoral study and reception of the Ph.D. degree were shown to have greater lapsed time in interruptions during the Ph.D. program, greater lapsed time off-campus after the end of course work, fewer full-time terms, no prior doctoral language proficiency, a greater number of credits below the 800 level, and a lower Ph.D. Grade Point Average. Doctoral recipients exhibiting a lower Ph.D. grade point average also showed greater registered time from Ph.D. entry to reception.

Two of the research hypotheses based on the 6 fields of study data were also found to be significant at the .05 alpha level revealing that doctoral students in the humanities, the social sciences, the professions, and education show greater lapsed time between B.A. and

Ph.D. reception than do those in the biological and physical sciences, with those in education having the greatest lapsed time of the entire group.

Finally, the 3 multiple regression equations revealed that registered terms and lapsed time until the passage of the second language; part- and full-time terms; lapsed time of interruptions during the Ph.D.; number of institutions since the B.A.; age at entry to Ph.D.; number and total years of interruptions since the B.A.; citizenship; registered terms and lapsed time until course completion; lapsed time in residence and off-campus after the end of course work; career plans at the entrance to graduate school; student's evaluation of the importance of financial need for assistantships; salary per year of post-Ph.D. degree job; and registered terms and lapsed time between the end of course work and the end of the dissertation predicted the lapsed times between B.A. and Ph.D. and Ph.D. entry to reception and the registered time from Ph.D. entry to reception at the .05 alpha level of significance.

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CHAPTER I

RATIONALE OF THE STUDY

Statement of the Problem

Increased public recognition of the crucial importance to any modern society of professionally prepared individuals, together with the existence of an unabated imbalance between doctoral supply and demand,[1] have caused the length of time involved in doctoral study to emerge as one of the major issues in graduate education according to Berelson, Carmichael, Heiss, Keniston, and the National Academy of Sciences.[2]

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[1]Hans Rosenhaupt, Graduate Students: Experience at Columbia University, 1940-1956 (New York: Columbia University Press, 1958), p. 90.

[2]Bernard Berelson, Graduate Education in the United States (New York: McGraw-Hill Book Company, Inc., 1960), p. 156; Oliver C. Carmichael, Graduate Education: A Critique and a Program (New York: Harper and Brothers, 1961), p. 138; Ann M. Heiss, "Berkeley Doctoral Students Appraise Their Academic Programs," Report of the Center for the Study of Higher Education (Berkeley: University of California, 1964), p. 16; Hayward Keniston, Graduate Study and Research in the Arts and Sciences at the University of Pennsylvania (Philadelphia: University of Pennsylvania Press, 1959), p. 5; National Academy of Sciences, Doctorate Recipients from United States Universities 1958-1966 (Washington, D. C.: National Academy of Sciences, 1967), p. 64.

The time issue raises little debate as regards the "expected" period of time specified for doctoral study, i.e., generally 3 to 4 calendar years;[3] or as regards doctoral requirements themselves since the independent investigative nature of the Ph.D. research precludes time definition.[4] Instead, the primary question is the actual amount of time it takes students to obtain the doctorate and the manner of this time distribution.[5] The National Academy of Sciences Report[6] notes that an important aspect of the doctoral education process is the time needed to complete the degree or the time lapse from receipt of the baccalaureate to the completion of the doctorate.

With the geometric expansion of knowledge and the increasing need to gain control over it, less actual time is not seen as educationally or even societally debatable.[7] But when this actual time spent at work on the doctorate (3 to 3.5 years) more than doubles in time elapsed from the reception of the bachelor's degree

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[3]Kenneth M. Wilson, Of Time and the Doctorate: Report of An Inquiry Into the Duration of Doctoral Study (Atlanta: Southern Regional Education Board, 1965), p. 2.

[4]Moody E. Prior, "A Manifesto on Graduate Education," The Journal of Higher Education, XXXIII, No. 5 (May, 1962), p. 283.

[5]Berelson, op. cit., p. 157.

[6]National Academy of Sciences, op. cit., p. 64.

[7]Wilson, op. cit., p. 4.

to the doctorate (7 to 10 years), then the desirability of seeking out and alleviating the causes of unnecessary prolongation becomes essential.[8]

The National Academy of Sciences Report, in listing the total calendar time elapsed between year of baccalaureate and year of doctorate, shows large field differences. The total median time for all fields for the years 1964 to 1966 is 8.2 years. The physical sciences and engineering have the shortest lapsed median time with 6.3 years, while the biological sciences follow with 7.3 years, the social sciences with 8.0 years, the arts and humanities with 9.5 years and the professional fields with 10.8 years. Education completes the list showing the longest lapsed time--13.8 years.[9]

Tucker, Gottlieb, and Pease's study reveals somewhat similar field differences for total lapsed time from baccalaureate to doctorate though mean time rather than median time is employed. The mean for all fields is 8.9 years. Physical sciences again has the shortest time lapse (7.3 years) followed by the biological sciences (7.9 years), social sciences (9.4 years), and the humanities (11.7 years). In measuring the lapsed

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[8]Gustave Arlt, "The First Ph.D.'s under Title IV: Baccalaureate to Doctorate in Three Years," The Journal of Higher Education, XXXIV (May, 1963), p. 241.

[9]National Academy of Sciences, op. cit., p. 64.

time from beginning of post-master's study to Ph.D. reception, this study shows that 4.8 years is the mean for all fields with the physical and biological sciences possessing the shortest time (4.1 years) followed by the social sciences (5.1 years) and the humanities (6.0 years).[10]

Tucker's data also show that the average number of years that Ph.D. recipients were actually enrolled for doctoral work was 3.9 for all fields, with the biological sciences averaging 3.7 years, the physical sciences 3.8 years, the social sciences 4.0 years and the humanities 4.1 years. Tucker concludes that although humanities students seem to take longer to earn the doctorate than do physical science students, the additional time is really a function of the amount of time they are not in school, once they begin their program, rather than a longer doctoral program itself.[11]

Not surprisingly, then, Carmichael, Perkins and Snell, and Beach[12] see in such a great lag between the

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[10]Allen Tucker, David Gottlieb, and John Pease, Attrition of Graduate Students At the Ph.D. Level in the Traditional Arts and Sciences. Report No. 8 of the Office of Research Development and the Graduate School (East Lansing: Michigan State University, 1964), pp. 57-67.

[11]Ibid., pp. 124-125.

[12]Carmichael, Graduate Education: A Critique and a Program, p. 146; Dexter Perkins and John L. Snell, The Education of Historians in the United States (New York: McGraw-Hill Book Co., Inc., 1962, p. 188; and Leonard B. Beach, "The Graduate Student," in Graduate Education Today, ed. by Everett Walters (Washington, D. C.: American Council on Education, 1965), p. 123.

the bachelor's and Ph.D., the loss of the best equipped and potentially most stimulating teachers and scholars. Pressey and Wolfle[13] also point out the importance of expeditious completion of doctoral requirements for the enhancement of the productivity and professional status of the individual. And, if in fact, the needed time for the Ph.D. can be curtailed, graduate schools may be able to produce up to 50 per cent more Ph.D.'s every year without increasing facilities or teaching staff.[14]

Purpose of the Study

The purpose of this study is to investigate those variables which a review of the literature postulates to have been consistently, and to a significant degree, most influential in prolonging doctoral study. Such an investigation will be specifically concerned with the lengthening effect of these factors on Michigan State University doctoral recipients' degree programs.

Consequently, the following hypotheses in their research form were formulated for the total Michigan State doctoral recipients' sample:

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[13]Sidney L. Pressey, "Age and the Doctorate--Then and Now," Journal of Higher Education, XXXIII (March, 1962), p. 153; Dael Wolfle, "Delayed Independence," Editorial in Science, CXLII (January 10, 1964).

[14]Rosenhaupt, op. cit., p. 77.

1. Doctoral recipients who exhibit late decision about, and lack of commitment to, their field of study goals, show a greater lapsed time between B.A. and Ph.D. reception than those who do not.

2. Doctoral recipients with more total years of post-B.A. interruptions have a greater lapsed time between B.A. and Ph.D. reception.

3. Doctoral recipients who show greater lapsed time in interruptions during the Ph.D. program, show greater lapsed time from Ph.D. entry to Ph.D. reception.

4. The greater the lapsed time spent off-campus after the end of course work, the longer the lapsed time between B.A. to Ph.D. and Ph.D. entry to reception.

5. The greater the number of transfer credits, the shorter the lapsed time between Ph.D. entry and reception.

6. The greater the number of part-time registered terms, the greater the lapsed and registered time between Ph.D. entry and reception.

7. The fewer the number of full-time registered terms, the greater the lapsed and registered time between Ph.D. entry and reception.

8. The fewer the number of quarters fellowship stipends are received during doctoral study, the greater the lapsed time between Ph.D. entry and reception.

9. The smaller the average amount of fee remission stipends received during doctoral study, the greater the registered time between Ph.D. entry and reception.

10. The greater the number of quarters teaching assistantship stipends are received during doctoral study, the greater the registered time between Ph.D. entry and reception.

11. The greater the average amount of teaching assistantship stipends received during doctoral study, the greater the lapsed time between Ph.D. entry and reception.

12. The fewer the number of quarters research assistantship stipends are received during doctoral study, the greater the lapsed time between Ph.D. entry and reception.

13. The smaller the average amount of research assistantship stipends received during doctoral study, the greater the lapsed time between Ph.D. entry and reception.

14. The lower the age of the doctoral recipient at entry to doctoral study, the greater the lapsed time between Ph.D. entry and reception.

15. The greater the family obligations, the greater the lapsed time between Ph.D. entry and reception.

16. The greater the number of credits taken before the organization of the guidance committee, the greater the registered time between Ph.D. entry and reception.

17. The greater the lapsed time between the end of course work and the end of the dissertation, the greater the lapsed time between Ph.D. entry and reception.

18. Those doctoral recipients who had no prior research experience evidence greater lapsed time between Ph.D. entry and reception.

19. The greater the number of pages in the dissertation, the greater the lapsed time between Ph.D. entry and reception.

20. The greater the lapsed time or registered terms until the fulfillment of the language requirement, the greater the lapsed time and registered time between Ph.D. entry and reception.

21. The greater the lapsed time before the passage of the general examinations, the greater the lapsed time between Ph.D. entry and reception.

22. Doctoral recipients who lack prior doctoral language proficiency show more lapsed time between Ph.D. entry and reception.

23. The greater the lapsed time or registered terms until course work completion, the greater the lapsed and registered time between Ph.D. entry and reception.

24. The greater the number of Ph.D. credits taken, the greater the lapsed and registered time between Ph.D. entry and reception.

25. The greater the number of credits taken below the 800 level, the greater the lapsed and registered time between Ph.D. entry and reception.

26. Doctoral recipients exhibiting a lower Ph.D. Grade Point Average show greater registered time from Ph.D. entry to reception.

27. Doctoral recipients exhibiting a lower graduate Grade Point Average show greater registered time from Ph.D. entry to reception.

28. Doctoral recipients exhibiting a lower undergraduate Grade Point Average show greater lapsed time from B.A. to Ph.D. reception.

29. Doctoral recipients who have attended a greater number of institutions since the B.A. exhibit a greater lapsed time B.A. to Ph.D.

30. Doctoral recipients who did not hold a scholarship during Ph.D. study exhibit greater lapsed time from Ph.D. entry to reception.

31. Doctoral recipients who entered doctoral study under a provisional or special non-degree admission status exhibit greater lapsed time from Ph.D. entry to reception.

32. U.S. doctoral recipients show greater lapsed time between Ph.D. entry and reception than do foreign doctoral recipients.

33. Those doctoral recipients who express dissatisfaction with their major advisor evidence greater lapsed time between Ph.D. entry and reception.

34. Doctoral recipients who rate their departments low on their overall doctoral program, have greater lapsed time between Ph.D. entry and reception.

35. Doctoral students in the humanities, the social sciences, the professions, and education show greater lapsed time between B.A. and Ph.D. reception than do those in the biological and physical sciences.

36. Doctoral recipients in education have greater lapsed time between B.A. and Ph.D. reception than those of any other field.

37. Women doctoral students in education have greater lapsed time between the B.A. and Ph.D. reception than do men.

38. The lower the first post-doctoral position's annual salary for humanities doctoral recipients, the greater the lapsed time between B.A. and Ph.D. reception and Ph.D. entry and reception.

Basic Assumptions

A primary assumption of this study is that all Michigan State University doctoral students share a common set of experiences in their pursuit of the doctoral degree which are identifiable, measurable, and which can be described in objective terms. At the same time, these students possess certain differences which affect in varying degrees the duration of their doctoral study.

A second basic assumption is that certain comparisons by field of study can be made and that there is a definable nature to each of these fields. It is further assumed that such comparisons by field of study are both desirable and necessary to reveal the peculiar patterns among fields which in turn affect the length of doctoral study.

Theory

The theories which attempt to explain the problem of prolonged time in earning the doctorate are numerous. Keniston theorizes that financial problems stemming from

lack of fellowships and preventing full-time study, lack of an established and clearly defined 3 year program norm, the out-moded language requirement and final examination, and the unlimited scope of the doctoral dissertation are factors involved in unduly lengthening the time of doctoral study.[15] Berelson reports lack of financial support as an important cause, with the problems surrounding the dissertation secondary in importance. He emphasizes the lack of faculty encouragement, due, in part, at least to the candidates' usefulness to the faculty as teaching and research assistants.[16] Carmichael disagrees with the primacy of the financial support factor maintaining the real reasons for the prolongation of doctoral study to be the unclarified goals of graduate study on the part of departments, lack of clearly stated preparatory steps for foreign language and qualifying exams, unduly delayed faculty approval of the dissertation and general faculty reluctance to push candidates.[17] Arlt, Brown, Perkins and Snell, and Bent,[18] however, view

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[15]Keniston, op. cit., p. 24.

[16]Berelson, op. cit., p. 163.

[17]Carmichael, op. cit., p. 147.

[18]Arlt, "The First Ph.D's under Title IV: Baccalaureate to Doctorate in Three Years," p. 247; David G. Brown, "A Student Evaluation of Research Assistantships," The Journal of Higher Education, XXXIII, No. 8, November, 1962, p. 438; Perkins and Snell, The Education of Historians in the United States, p. 204; Henry E. Bent, "Fellowships, Assistantships, and Traineeships," in

the lack of proper financial support as the primary cause and strongly recommend more unencumbered service-free awards, especially fellowships and research assistantships. Rosenhaupt asserts that what is needed for successful doctoral degree completion is sufficient support for full-time attendance, high undergraduate ability, and high motivational level.[19] Grigg also views academic ability as a success factor while deploring the inability of graduate schools to draw the potentially best students.[20]

Davis agrees with Rosenhaupt's and the other above authors' lack-of-support reasoning as well as the need for attracting better students. Doing all one's graduate work in a single institution and the tightening up of the training process, as well as better orientation and articulation of the beginning and the end of the doctoral program, are also seen as shortening the doctorate duration. It is Davis' statistical findings which seem to establish the idea that married men with a family tend to take longer than others to complete their degree; and that low post-degree salaries and a reluctance to go from graduate school to a college teaching position is

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Graduate Education Today, ed. by Everett Walters (Washington, D. C.: American Council on Education, 1965), p. 151.

[19]Rosenhaupt, op. cit., p. 42.

[20]Charles M. Grigg, Graduate Education (New York: The Center for Applied Research in Education, Inc., 1965), p. 95.

the reason for protracted study in certain areas of the humanities.[21]

Heard includes inherent differences among disciplines, vocational indecision, and lack of proper supervision of the dissertation as well as lack of funds, lack of program coordination, and low post-degree remuneration among his reasons for prolongation of doctoral study.[22] Heiss observed from her Berkeley study interviews with Ph.D. students that a significant number of doctoral students seem to enter and pursue their studies with no time schedule or sequential pattern in mind. She noted a lack of planning and direction with a consequent loss of motivation and drive. At least half of the interviewees admitted they had drifted a year before settling down to a definite target. Like Carmichael, Heiss sees the need for establishing realistic limits for the completion of doctoral study as well as an increased role on the part of faculty in encouraging, guiding, and prodding along procrastinating students.[23]

Wilson, in sampling over 1900 doctoral degree recipients representing over 120 graduate departments and 15 doctoral fields, lists 15 factors which were

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[21]James A. Davis, Stipends and Spouses: The Finances of American Arts and Sciences Graduate Students (Chicago: University of Chicago Press, 1962), pp. 125-130.

[22]Alexander Heard, The Lost Years in Graduate Education (Atlanta: Southern Regional Education Board, 1963), p. 19.

[23]Heiss, op. cit., p. 17.

reported as lengthening doctoral programs. The 6 factors which proved influential for a significant percentage of the sample include discontinuity of graduate attendance, work as a teaching assistant, nature of the dissertation topic, writing the dissertation off-campus, financial problems, and inadequate preparation in languages. Wilson found the correlation between the median time lapse and the incidence of selected factors as lengthening influences to be .83 for discontinuity of attendance, .81 for off-campus dissertation, and .72 for financial problems. He also reported that the responses of graduate deans and departmental representatives suggested a pattern of variables affecting doctoral duration very similar to those of the graduates' responses above. These respondents, particularly the deans, pointed out the crucial importance of clarity of institutional and departmental requirements and expectations as well as the nature of the advisory relationship with graduate students.[24]

Data from the National Academy of Sciences supports the relation to the time lapse of such factors as the doctoral field, amount of institutional transfer during graduate work, the decision to take a master's degree, time of beginning of graduate work, graduate study

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[24]Wilson, op. cit., pp. 46-47, 56.

continuity and commitment (full or part-time), and sex. In addition, the NAS Report states that most fellowship programs have as a major goal the reduction of the baccalaureate-to-doctorate time span, thereby indirectly pointing up the influence of support level in shortening the time lapse. The NAS Report, however, cites data to negate the often held assumption that the doctoral time lapse is lengthened in the case of a person who receives his baccalaureate from a non-doctoral undergraduate institution.[25]

Organization of the Study

Ninety independent variables will be run against as many as 3 dependent time lapse variables to determine the various strengths of association. In this fashion, significant relationships between certain variables and time lapses will be established for the sample of 320 Michigan State University doctoral degree recipients. In addition, the 6 basic fields represented will be analyzed to elucidate any associative bonds, existing by reason of these fields' peculiar natures, between the appropriate dependent and independent variables.

Chapter I has presented the rationale for, and relevance of, the study of length of doctoral degree programs. Chapter II reviews the literature and discusses

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[25]National Academy of Sciences, op. cit., pp. 64-77.

the related ideas concerning the prolongation of doctoral study. Chapter III offers an analysis of the 90 independent and 3 dependent variables together with the nature and source of the data and the methodology employed to appropriately interpret the data. Chapter IV presents the results obtained from the analysis while Chapter V presents a summary and states the conclusions.

CHAPTER II

REVIEW OF THE LITERATURE AND RELATED IDEAS

A great diversity of reasons has been reported by many authors in support of the differences in the time lapse between the baccalaureate and doctorate. An analysis of their studies reveals, however, certain factors which are most frequently cited and more heavily supported by data.

Discontinuities of Attendance

Wilson reported the factor of discontinuity of attendance to be first in influence in the lengthening of the doctorate time lapse, both in the view of the graduate deans and faculties and of the more than 1900 doctorate respondents (32 per cent ranked it first). Wilson further reported a .83 correlation between the median time lapse and the incidence of this factor.[1]

The National Academy of Science data show that the differences in time lapses between broad fields are sharply reduced when total registered time is used (5.1 years for physical sciences to 6.8 years for education).

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[1]Wilson, op. cit., p. 56.

Thus, a major cause for prolonging the time lapse is the interrupting of the actual study time. Moreover, NAS's data support a relationship between increased time lapse and taking a bachelor's, master's, and doctorate at different institutions.[2]

The data also confirm the assumption that those who omit the master's degree finish in less lapsed time in all fields. In the "Total All Fields" category, even registered time elapsed in median time ranges from .7 years to 1.6 years less for those omitting the master's degree. In addition, delayed entry into graduate study causes prolongation in various fields with the physical sciences having only .2 median years delay but education showing 1.0 median years delay.[3] Wilson reports that the incidence of delayed entry (of at least 6 months) into graduate school across all fields and all respondents is at the 34 per cent level. Thirty-seven per cent of his sample of respondents report one or more interruptions in their doctoral study of at least 6 months duration.[4] Beach points out that 83 out of 100 undergraduate students have high orientation toward further study and that 77 actually intend to go on, yet

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[2]National Academy of Sciences, op. cit., pp. 64, 79.

[3]Ibid.

[4]Wilson, op. cit., p. 64.

only 25 per cent of college graduates actually enroll in graduate and professional school immediately upon graduation.[5]

Heard reports in his summary of the Southern Regional Education Board study that, in regard to the timing of the graduate study goals variable, pursuit of graduate study became an objective only after senior year in college for 38 per cent of the slow group as compared with 15 per cent of all the others. Correspondingly, only 47 per cent of the slow students went into graduate study within 6 months of college graduation, whereas 84 per cent of the fast students had. Moreover, Heard states that the doctoral degree had become an objective for the slower 65 per cent of students by the end of the first year of graduate study as compared to 87 per cent of the faster students.[6]

Wilson reports from his investigation that for more than 27 per cent of all baccalaureate graduates pursuit of graduate training had not yet become established as a definite personal goal. Among English baccalaureates, the percentage soared to 42 per cent. By the end of the college senior year, interest in the field of doctorate was established across all fields at the 76 per cent level,

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[5]Beach, op. cit., p. 119.

[6]Heard, op. cit., pp. 9-10.

but the definite personal goal of earning a doctorate was indicated by only 30 per cent.[7]

Patterns of Financial Assistance and Support

Data from the Tucker study show that because of their financial situation, 35 per cent of the doctoral students surveyed were forced to extend their length of time in doctoral study. When respondents were asked to identify the single most important reason for not yet receiving their degree, the greatest number (19 per cent) reported lack of sufficient finances, followed by 12 per cent who listed family responsibilities.[8]

The doctoral recipients in Wilson's study rated the factor of financial problems fifth, with over 27 per cent finding it lengthening their programs. In sources of financial support which were considered to be of major importance during their beginning and advanced stages of study, veterans' benefits, teaching assistantships, research assistantships, and spouses' earnings led all others by a large margin. Of the respondents over all fields, nearly 64 per cent held teaching assistantships with a mean duration of 2.0 years, while

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[7]Wilson, op. cit., pp. 64-66.

[8]Tucker, Gottlieb, and Pease, op. cit., pp. 230, 255.

nearly 43 per cent held research assistantships with a mean duration of 2.0 years.[9]

Tucker, Gottlieb and Pease report, similarly, that among doctoral recipients, the teaching assistantship was a financial source cited by 60 per cent; 39 per cent listed the research assistantship and about 50 per cent reported some type of fellowship or scholarship stipend.[10]

Davis too, in his sample of over 2800 respondents representing 140 graduate institutions, in 1958, reported that the characteristic source of income for the majority of graduate students was stipends, i.e., scholarships, fellowships, and assistantships. Over 70 per cent received stipend income, with 41 per cent receiving half or more of their total income from stipends. For approximately 25 per cent of Davis' students, spouse income was an important source, while for only a small minority was full-time employment a major source of income. About 50 per cent of the sample had a non-duty stipend and 40 per cent had a duty stipend, i.e., one for which they had to perform some kind of service. Teaching assistantships were twice as common as research assistantships, with 25 per cent holding the former. Natural

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[9]Wilson, op. cit., pp. 79, 86-87.

[10]Tucker, Gottlieb, and Pease, op. cit., p. 214.

science students had the higher probability of holding a stipend of any type and received more money from their non-duty stipends.[11]

In the advanced stages of doctoral study, the teaching assistantships were the most important source of support, and yet, nearly 32 per cent of Wilson's sample cited the teaching assistantship as a lengthening factor in their programs, giving it second position in the ratings.[12] Wilson further states that a correlation of .91 exists between the incidence over fields of teaching assistantships and their rated "lengthening effect," whereas in the case of the incidence of research assistantships and their rated "lengthening effect," the correlation is but .54. Moreover, the relationship over fields of the incidence of research assistantships and the median "entry to doctorate time lapse" was a negative .55. As a result, Wilson concludes that the role of the teaching assistantship is perceived as financially sustaining, but not directly instrumental, while the research assistantship is perceived as both sustaining and directly instrumental to the completion of the doctorate.[13]

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[11]Davis, op. cit., pp. 126-128.

[12]Wilson, op. cit., p. 48.

[13]Ibid., pp. 91-92.

Elder in his 1958 study of Harvard graduate students found that 5 per cent of the doctoral students in natural science, 13 per cent in social science and 14 per cent in humanities were delayed considerably by lack of money. Moreover, Elder noted that teaching assistantships delayed considerably 12 per cent of natural science doctorates, 8 per cent of social science, and 16 per cent of humanities doctorates.[14]

Tucker, Gottlieb, and Pease remark that the financial situation is more austere for the humanities and social sciences and seem to think that the nature of the disciplines and the characteristics of the individuals in them also influence both the amount of attrition and the time it takes to earn the degree.[15]

Although 43 per cent of humanities graduates reported fellowships as compared to 40 per cent in the physical sciences, the average total value of the latter was more than 50 per cent higher.[16] Thus, it is possible that if the fellowship support is significantly high, the median lapsed time for the doctorate could be affected in the direction of less lapsed time.

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[14] J. P. Elder, A Criticism of the Graduate School of Arts and Sciences in Harvard University and Radcliffe College (Cambridge, Mass.: Harvard University, 1958), p. 21.

[15] Tucker, Gottlieb, and Pease, op. cit., p. 50.

[16] Wilson, op. cit., p. 89.

Arlt seems to feel that the only really significant factor in his study was the fact that of the 755 students on fellowships under Title IV, 14 per cent were able to complete their Ph.D.'s in 3 years including summers. For him, then, a short but sustained span of adequate fellowship support is the major cause of finishing the doctorate within the "expected" time, i.e., 3 years.[17]

A discordant note in the assistance picture is struck by Berelson in reporting the responses to his questionnaire on graduate education. He states that 41 per cent of the graduate deans, 30 per cent of the graduate faculty and 36 per cent of the recent doctorate recipients agreed that major professors often exploit Ph.D. candidates by keeping them too long as research assistants.[18]

Rosenhaupt states in his Columbia study that, though greater financial support in itself cannot guarantee more rapid doctorate completion, generally students who must support themselves have less time to spend on their graduate training, and that an increase in fellowships will at least shorten the time needed for degrees. He cites the case of Princeton (known at the time for allowing only full-time graduate study and for its insistence on rapid doctorate completion) which, in 1956, gave 73 per cent of its graduate students fellowships or

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[17]Arlt, op. cit., p. 241.

[18]Berelson, op. cit., p. 162.

assistantships as compared with the national figure of 24 per cent. Rosenhaupt's survey reveals, in addition, that Columbia's fully supported group of veterans completed the doctorate more rapidly than the non-veterans, in some cases by as much as 2.3 median years. Remarkably, the time gains were most pronounced in the 2 areas where non-veterans received the least support and least pronounced where 60 per cent of all students received aid.[19]

Lack of funds is also seen by Perkins and Snell in their study of historians to be a main problem of their sample of candidates. Their data reveal that 42 per cent of the 1958 Ph.D.'s completed their residence in graduate school in 3 years or less and 75 per cent within 4 years. Yet doctoral programs of 8, 9, 10 and sometimes more years are not usually caused by time in residence, but by the needed full-time employment which, in turn, delays completion.[20]

Another facet to this lack of financial support factor is brought out by Rosenhaupt who points out that Columbia Ph.D. candidates in fields that offered high post-degree salaries finished the degree rapidly.[21] On the other hand, Davis reports that in the humanities

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[19]Rosenhaupt, op. cit., pp. 61-62.

[20]Perkins and Snell, op. cit., pp. 179-188.

[21]Rosenhaupt, op. cit., p. 75.

where low post-degree salaries were expected, candidates apparently showed a reluctance to leave graduate school for the unattractive financial incentives of college teaching positions. Davis concludes from his statistical data that the higher the current income and the lower the expected salary for Ph.D. candidates, the greater the proportion of students who expect to take more than 5 years.[22]

In looking further at the question of student income, Davis discovered that the higher incomes are concentrated among married students. However, it is the family role position which is the major determinant of financial situations, with only the fathers appearing to have financial troubles due not to low incomes but to income sources which divert them from their studies. The fact that there is a strong negative relationship between amount of employment and course loads completed only tends to aggravate their situation. Davis points out, however, that regardless of employment or stage of study, older students and those with higher incomes carried lower academic loads.[23]

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[22]Davis, op. cit., p. 129.

[23]Ibid., pp. 124-125.

The Dissertation Requirement

In Wilson's study, over 27 per cent of the doctorate recipients reported both the nature of the dissertation subject and the conditions under which it was completed as significant factors influencing the prolongation of the doctorate. As a result, these 2 factors ranked second and third among the top 5.

The formal approval of the dissertation topic occurred after more than 3.0 median years of attendance for over 37 per cent of the sample. Less than 12 per cent of the respondents reported completing the dissertation prior to course and residence requirements, with over 7 per cent reporting no topic as yet chosen at that time.[24]

Completion of the dissertation measured in lapsed time from the date of formal topic approval involved a mean interval of more than 2.0 calendar years. For nearly 50 per cent of the sample, average time taken to complete the dissertation is related to median entry-to-doctorate time lapse at .61. Moreover, using Berelson's median page length of the dissertation and comparing it with Wilson's median time between topic approval and completion, a moderate correspondence of .65 is shown.[25]

[24] Wilson, op. cit., pp. 96-100.

[25] Ibid., p. 102.

Berelson reports that in reply to one of his 'criticisms and reforms' statements, i.e. "Doctoral dissertations, at least outside the sciences are too long"--71 per cent of the graduate deans, 32 per cent of the graduate faculty, and 27 per cent of the recent doctorate recipients were in agreement. Sixty-four per cent of the deans and 32 per cent of the graduate faculty and recent recipients agreed that too often the dissertation is made to be a major contribution to research rather than a manageable topic.[26]

Berelson had earlier reported that the median length of a dissertation in the biological sciences is 108 pages, in the physical sciences 105 pages, but in the social sciences 226 pages, and in the humanities 285 pages.[27] Tucker, Gottlieb, and Pease go on to suggest that the number of pages in a doctoral dissertation will have a correlation with the amount of time it takes humanities and social sciences doctoral students to earn their degrees as well as be a reflection of the differences in the nature of their disciplines and their characteristics as individuals.[28]

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[26]Berelson, op. cit., p. 289.

[27]Ibid., p. 181.

[28]Tucker, Gottlieb, and Pease, op. cit., p. 50.

Wilson, in reporting data regarding the amount of time spent in full-time employment before dissertation completion, states that over all fields, 30 per cent spent 1.0 years or more in full-time employment between approval of the dissertation and its completion. He further found a relationship between rank of the field in terms of median entry-to-Ph.D. time lapse and the above 30 per cent of respondents to be .84, a correspondence which is consistent with Wilson's graduate sample who assessed the "off-campus dissertation" as a lengthening influence. Finally, because the natural science recipients spent more time on campus during the critical dissertation phase (37 and 28 per cent of the biological and physical science students spent 2.0 years or more as against 3.6 and 15 per cent of those in the social sciences and humanities), they enjoyed greater opportunity for holding research assistantships directly related and applicable to their dissertation (33 and 38 per cent in the biological and physical sciences in contrast to 16 and 2 per cent in the social sciences and humanities).[29]

Tucker found that it took their sample of Ph.D. recipients 2 years less to earn the degree than it takes the A.B.D.'s (All But Dissertation) not to earn the degree. The average lapse of time for the A.B.D.'s was

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[29]Wilson, op. cit., pp. 102-104.

6.0 years, ranging from 5.4 years in the biological sciences to 6.4 years in the humanities.[30]

In addition, Tucker's study reported that, as the quality (Tucker believes that there is a high correlation between doctorate production and quality) of a college decreases, the lapse of time between the beginning of post-master's study and the obtaining of the doctorate increases, and the lapse of time for the A.B.D.'s between the beginning of post-master's study and the completion of all-but-the-dissertation increases.[31]

The Language Requirement and Preliminary (General) Examination

Perkins and Snell view the foreign language requirement as a major obstacle to efficient Ph.D. completion reporting that only 14 per cent of all high school students in the nation study even one foreign language.[32]

Seventy-one per cent of the graduate deans and 75 per cent of both the graduate faculty and recent doctorate recipients in Berelson's study agree that the foreign language requirement is, in most cases, "more form than substance," thereby giving this factor the greatest percentage of any response.[33] Twenty-seven per cent of

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[30]Tucker, Gottlieb, and Pease, op. cit., p. 58.

[31]Ibid., p. 68.

[32]Perkins and Snell, op. cit., p. 184.

[33]Berelson, op. cit., p. 289.

Wilson's respondents listed inadequate preparation in language as lengthening their doctorates. Moreover, Wilson's data on the incidence of a particular language studied as an undergraduate as compared to the percentage qualifying in that same language reveal a major source of the language problem. In all fields, 44 per cent studied French for their doctorate. Only 22 per cent of the total sample indicated no need for special preparation in any language. Of the German qualifiers, 61 per cent needed special preparation, as did 52 per cent of those in French.[34]

Departmental (disciplinary) differences in foreign language preparation and use do exist; only 14 per cent needed no special preparation in the social sciences, while 25 and 27 per cent needed none in the physical sciences and humanities respectively. As regards use, Berelson's study reveals that under 20 per cent in education, economics, and psychology reported professional use of a language, whereas 75 per cent or more was reported for the physical and biological sciences.[35]

In the Southern study, Wilson reported 23 per cent listing inadequate preparation in a field as a lengthening factor and one of the measurable variables which exhibit this inadequate preparation is the preliminary examination

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[34]Wilson, op. cit., p. 110.

[35]Berelson, op. cit., pp. 197-198.

in one's discipline.[36] Carmichael remarks that graduate students have been known to flounder for 2 years or more attempting to get ready for their general exams without knowing for what they were preparing.[37]

Personal Variables

Ability

Ability is seen to have a definite temporal influence by Berelson who states that the evidence suggests that the ablest students tend to finish sooner and are more productive afterwards as measured by production of scholarly articles.[38] The ability factor can be partially explained in terms of the ablest having more chance of getting support and attention. Davis' study further concludes that 33 per cent of the highest academic performance index group are postponing their graduate studies after their baccalaureate, thereby depriving doctoral programs of abler students.[39] Berelson's questionnaire results reveal 35 per cent of the graduate deans, 28 per cent of the graduate faculty,

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[36]Wilson, op. cit., p. 47.

[37]Carmichael, op. cit., p. 150.

[38]Berelson, op. cit., p. 165.

[39]James A. Davis, Great Aspirations (Chicago: National Opinion Research Center, University of Chicago, 1963), I, p. 317.

and even 25 per cent of recent recipients agree that the initial selection of graduate candidates is poor.[40]

The grade point average at the Ph.D. level, as reported by Tucker is a better indicator of potential for completing requirements for a Ph.D. than the grade point average at the master's level and the master's average is better than that at the undergraduate level.[41]

Age

A wide range of departmental differences was shown to exist in the average age of graduates in the Wilson study. The median for all departments was 31.9 years of age, whereas history alone was 35.1 and chemistry only 28.8.[42]

Rosenhaupt's study at Columbia reveals that a larger percentage of those who entered graduate study while young obtained Ph.D.'s than did those entering at a more advanced age. Yet, those who entered after 23 took less time to finish than did the younger candidates, with those over 29 finishing the fastest.[43]

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[40]Berelson, op. cit., p. 290.

[41]Tucker, Gottlieb, and Pease, op. cit., p. 210.

[42]Wilson, op. cit., pp. 36-37.

[43]Rosenhaupt, op. cit., p. 75.

Sex

Time lapse appears to vary by sex as well. Women have longer total time lapse than men in almost every field (identical in the physical sciences) and are more concentrated in fields with long total time lapses (arts and humanities and education where they take 10.8 and 16.0 years respectively, as opposed to 9.2 and 13.3 years for men). Moreover, a smaller number of women than men complete the doctorate with minimal interruption. As a result, the median age at the completion of the doctorate for women in all fields is 35 as compared with 31 for men. Again, only in the physical sciences, where women receive the doctorate at a younger median age than men (28.7 to 29.3 years of age), do women finish with the same time lapse as men (6.3 years).[44]

Departmental Variables

The graduate deans in Wilson's study ranked in second place factors connected with departmental expectations and faculty attributes. A major variable cited was the nature and degree of clarity of departmental expectations especially as seen through the major professor's, advisor's or thesis director's guidance, attitudes, and standards of progress. Changes in the

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[44]National Academy of Sciences, op. cit., pp. 111-113.

dissertation committee, for example, was listed eighth (by more than 6 per cent) as a lengthening experience among the Southern sample of doctorate recipients.[45]

The number of doctoral advisees per major advisor may well show a lengthening influence within fields. Though the social sciences show a ratio of 1.88 doctorate recipients per advisor per 3 year period, psychology with the highest ratio (2.07) also possesses the shortest median time lapse from master's to Ph.D. (4.2 years). And anthropology and archeology, exhibiting the lowest ratio (1.65), have the longest time lapses (5.6 years).[46]

Perkins and Snell reported that 300 history graduate students indicated something less than satisfaction concerning advice from professors--46 per cent of 19 Ph.D.'s from one of these 7.[47] Berelson reported that 38 per cent of the graduate deans, 35 per cent of the graduate faculty, and 43 per cent of recent recipients agreed that graduate students do not clearly know what they must do to get the doctorate and are not well counselled, i.e., experience ill-defined expectations and inadequate guidance.[48]

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[45]Wilson, op. cit., pp. 45-47.

[46]National Academy of Science, op. cit., pp. 58-59.

[47]Perkins and Snell, op. cit., pp. 182-183.

[48]Berelson, op. cit., p. 290.

In general, the Wilson study reveals substantial differences among the doctoral graduates of various doctoral departments in overall rate of progress relative to field norms and in age. As noted earlier, the median rates of progress tend to be higher in departments where a higher proportion of recipients omitted the master's and in which smaller percentages interrupted study upon master's reception.[49]

Finally, Poulton, in his study of doctoral programs at Michigan State University, reports time data on 729 successful degree recipients representing 70 different departmental programs or majors. He found that from doctoral admission date to completion of language requirements, 2.0 years were required; from admission date to completion of preliminary examinations 3.0 years were needed; from admission date to completion of all degree requirements 4.5 years were needed; and that the average number of terms registered during the doctoral program was 13.9.[50]

His analysis of the lapsed and registered time required to complete the degree reveals a wide range of departmental differences. Accounting exhibits the least

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[49]Wilson, op. cit., p. 25.

[50]B. R. Poulton, "An Assessment of Doctoral Programs at Michigan State University" (East Lansing: Office of Institutional Research, Michigan State University, April, 1967), pp. 3-4. (Mimeographed.)

average lapsed time with 3.2 years while history takes the most time with 6.8 years.[51]

Summary

In the above review of the literature, an analysis has been made of the numerous variables which the various authors associate in varying degrees of strength with the prolongation of doctoral degrees.

Those variables more heavily supported by research data fall readily into 6 general groupings--discontinuities of attendance; patterns of financial assistance and support; the dissertation requirement; the language, course work, and general examination requirements; personal variables; and departmental variables.

It will be, then, these general areas and the particular variables which compose them which will be analyzed through application of the Michigan State doctoral degree total sample data, and where appropriate, through field data.

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[51] *Ibid.*, Table 2, pp. 1-3.

CHAPTER III

GENERAL DESIGN AND METHODOLOGY

The design of the study is treated in 4 general sections: (1) Sample, (2) Sources of the Data, (3) Nature of the Data, and (4) Analysis Procedures.

Sample

The population from which the sample was selected consisted of the doctoral recipients of Michigan State University during the academic years 1966-67 and 1967-68. Ten doctoral recipients from each of those Michigan State University departments which graduated at least 10 such students during the above years were then randomly selected except in those cases where there were but 10 recipients. In the latter instances, all 10 were selected.

It was felt that the use of fewer than 10 degree recipients would not have provided sufficient data from which significant conclusions and/or implications could be drawn. Requiring more than 10 recipients per department would have narrowed the departmental scope of the study considerably.

As a result, the sample selected numbered 320, and represented 32 of the 57 Michigan State University departments that granted doctoral degrees during the 1966-67 and 1967-68 periods. The division of these departments into 6 fields was based on similar categorizations as given in the reports of the National Academy of Sciences[1] and Tucker[2] together with the particular organizational structure existing at Michigan State University (Table 3.1).

Sources of the Data

Data on the selected sample of doctoral recipients and their departments were collected from 6 different sources.

The first source, graduate transcripts, was obtained for each member of the sample from the Office of the Registrar.

The second data source, the Office of the Graduate School Doctoral Candidate Questionnaire and the Questionnaire for Candidates for Doctor's Degrees (Appendix), was obtained from the records of the School for Advanced Graduate Studies.

The Application for Admission to Graduate Study, the third data collection instrument, was obtained in the Office of the Registrar's Non-Current Records Division.

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[1]National Academy of Sciences, op. cit., pp. 3-11

[2]Tucker, Gottlieb, and Pease, op. cit., pp. 22-24.

TABLE 3.1.--Departments divided by field.

Field		Total Number in Sample
I.	PHYSICAL SCIENCES	50
	Agricultural Engineering Chemistry Electrical Engineering Mathematics Physics and Astronomy	
II.	BIOLOGICAL SCIENCES	100
	Biochemistry Botany and Plant Pathology Dairy Food Science Forestry Horticulture Microbiology and Public Health Physiology Soil Science Zoology	
III.	HUMANITIES	40
	English History Music Speech	
IV.	SOCIAL SCIENCES	50
	Communications Economics Geography Psychology Sociology and Anthropology	
V.	EDUCATION	40
	Administration and Higher Education Counseling, Personnel Services, Educational Psychology Elementary and Special Education Secondary Education and Curriculum	
VI.	PROFESSIONAL	40
	Accounting and Financial Administration Agricultural Economics Management and Personnel Marketing	

The fourth source of information, research grants data, was collected from the Office of the Registrar, Division of Research Grants.

Scholarship, fellowship, and fee remission data, the fifth source, were collected from the Registrar's Non-Current Records Division, while the sixth source, assistantship and other on-campus employment information, was taken from the Office of the Payroll.

Nature of the Data

From the 6 sources of data outlined above, 90 independent and 6 dependent variables were initially gathered on each member of the sample. The 90 independent variables (Table 3.2) selected for analysis were chosen on the basis of the strong and frequent support granted them in the literature in the form of research data and/or experiential observation.

Thus, each of the 90 independent variables align themselves under one of the 6 general categories described in Chapter II. In addition, the source of, and data format under which, each variable was collected for measurement and analysis is listed in Table 3.2.

The 6 dependent variables selected were also chosen because of the frequent evidence in the review of the literature of their usefulness and appropriateness in measuring the time spent by doctoral students in their pursuit of the Ph.D. They were:

TABLE 3.2.--Independent variables.

	Variable Description	General Category[a]	Source	Data Format
1.	Number of Field Changes B.A. to Ph.D.	I	Transcript and Graduate Questionnaire (1)	Numerical Units
2.	Admission Status	V	Transcript	Dichotomous: Regular or Provisional
3.	Total Number of Advisors	I	Transcript	Numerical Units
4.	Registered Terms until Passage of First Language	IV	Transcript	Three Month Invervals
5.	Lapsed Time until Passage of First Language	IV	Transcript	Three Month Intervals
6.	Registered Terms until Passage of Second Language	IV	Transcript	Three Month Intervals
7.	Lapsed Time until Passage of Second Language	IV	Transcript	Three Month Intervals
8.	Registered terms until Passage of General Exams	IV	Transcript	Three Month Intervals
9.	Lapsed Time until Passage of General Exams	IV	Transcript	Three Month Intervals
10.	Part-Time Terms	I	Transcript	Three Month Intervals
11.	Full-Time Terms	I	Transcript	Three Month Intervals
12.	Registered Terms before Course Completion	IV	Transcript	Three Month Intervals
13.	Lapsed Time until Course Completion	IV	Transcript	Three Month Intervals
14.	Credits Taken outside Department	IV	Transcript	Numerical Units
15.	Registered Time between End of Course Work and End of Dissertation	III	Transcript	Three Month Intervals
16.	Lapsed Time between End of Course Work and End of Dissertation	III	Transcript	Three Month Intervals
17.	Number of Credits below 800	IV	Transcript	Numerical Units
18.	Credits Taken before Organization of Guidance Committee	IV	Graduate Questionnaire (36)	Numerical Units
19.	Grade Point Average--Ph.D.	V	Transcript	Cumulative Average to Two Decimals
20.	Pages in Dissertation	III	Library	Numerical Units
21.	Lapsed Time in Residence after End of Course Work	I	Transcript	Three Month Intervals
22.	Lapsed Time Off-Campus after End of Course Work	I	Transcript	Three Month Intervals

23.	Lapsed Time of Doctoral Study Interruptions	I	Transcript	Three Month Intervals
24.	Number of Ph.D. Credits	IV	Transcript	Numerical Units
25.	Sex	V	Admissions Form	Dichotomous: Male, Female
26.	Number of Institutions since B.A.	I	Admissions Form	Numerical Units
27.	Rating of M.A. Institution	V	Admissions Form	Dichotomous: Ranked in Cartter's Top Twenty, Not in Top Twenty
28.	Grade Point Average-Undergraduate	V	Admissions Form	Cumulative Average to Two Decimals
29.	Grade Point Average--Graduate	V	Admissions Form	Cumulative Average to Two Decimals
30.	Research Experience	III	Admissions Form	Dichotomous: Yes, No
31.	Age at End of Ph.D.	V	Graduate Questionnaire (25)	Chronological Units
32.	Number of Children at End of Ph.D.	II	Graduate Questionnaire (31)	Numerical Units
33.	Spouse Activities	II	Graduate Questionnaire (32)	Dichotomous: Worked/ Did not Work
34.	Age at Entry to Ph.D.	V	Transcript	Chronological Units
35.	Development of Field of Study Goals	I	Graduate Questionnaire (3)	Interval Scale Data
36.	Career Plans at Graduate Entrance	I	Graduate Questionnaire (5)	Interval Scale Data
37.	Importance of Ease and Speed for Attending Michigan State University	I	Graduate Questionnaire (7)	Interval Scale Data
38.	Importance of Research Opportunity for Attending Michigan State University	III	Graduate Questionnaire (7)	Interval Scale Data
39.	Importance of scholarship/assistantship for Attending Michigan State University	II	Graduate Questionnaire (7)	Interval Scale Data
40.	Evaluation of Decision to Attend Michigan State University	VI	Graduate Questionnaire (9)	Interval Scale Data
41.	Rating of Department among Experts	VI	Graduate Questionnaire (12)	Interval Scale Data
42.	Rating of Department's Research Training	VI	Graduate Questionnaire (13)	Interval Scale Data
43.	Number of Faculty Known to Discuss Problems	VI	Graduate Questionnaire (15)	Interval Scale Data
44.	Rating of Department's Sensitivity to Student Needs	VI	Graduate Questionnaire (16)	Interval Scale Data

*Category I--Discontinuities of Attendance; II--Patterns of Financial Assistance and Support; III--The Dissertation Requirement; IV--The Language, Course and General Exam Requirements; V--Personal Variables; and VI--Departmental Variables.

TABLE 3.2.--Continued.

	Variable Description	General Category	Source	Data Format
45.	Rating of Department's Research Skills	VI	Graduate Questionnaire (16)	Interval Scale Data
46.	Comparison of Michigan State University Stipends (Assistantships, etc.) to Those of Other Universities	II	Graduate Questionnaire (17)	Interval Scale Data
47.	Comparison of Michigan State University Research Facilities to Those of Other Universities	III	Graduate Questionnaire (17)	Interval Scale Data
48.	Importance of Financial Need for Assistantships, etc.	II	Graduate Questionnaire (19)	Interval Scale Data
49.	Validity of Department's Formal Hurdles	VI	Graduate Questionnaire (20)	Interval Scale Data
50.	Validity of Department's Too Low Admission Standards	VI	Graduate Questionnaire (20)	Interval Scale Data
51.	Validity of Department's Student Exploitation	VI	Graduate Questionnaire (20)	Interval Scale Data
52.	Validity of Department's Reward for Conformity	VI	Graduate Questionnaire (20)	Interval Scale Data
53.	Validity of Department's Over-Interest in Research	VI	Graduate Questionnaire (20)	Interval Scale Data
54.	Lengthening Due to Inadequate Preparation	IV	Graduate Questionnaire (21)	Interval Scale Data
55.	Lengthening Due to Remedial Work	IV	Graduate Questionnaire (21)	Interval Scale Data
56.	Lengthening Due to Language Requirement	IV	Graduate Questionnaire (21)	Interval Scale Data
57.	Lengthening Due to Teaching Assistantship	II	Graduate Questionnaire (21)	Interval Scale Data
58.	Lengthening Due to Research Assistantship	II	Graduate Questionnaire (21)	Interval Scale Data
59.	Lengthening Due to Work Off-Campus	II	Graduate Questionnaire (21)	Interval Scale Data
60.	Lengthening Due to Veteran's Benefits	II	Graduate Questionnaire (21)	Interval Scale Data
61.	Lengthening Due to Leave and Work	II	Graduate Questionnaire (21)	Interval Scale Data
62.	Lengthening Due to Family Obligations	II	Graduate Questionnaire (21)	Interval Scale Data
63.	Lengthening Due to General Exams	IV	Graduate Questionnaire (21)	Interval Scale Data
64.	Lengthening Due to Thesis	III	Graduate Questionnaire (21)	Interval Scale Data
65.	Evaluation of Procedures for Selection of Major Professor	VI	Graduate Questionnaire (34)	Interval Scale Data
66.	Length of Time before Assignment of Major Professor	VI	Graduate Questionnaire (35)	Interval Scale Data
67.	Number of Meetings with Major Professor	VI	Graduate Questionnaire (45)	Interval Scale Data

68.	Department's Orientation Program	VI	Graduate Questionnaire (46)	Interval Scale Data
69.	Amount of Supervision of Thesis Given	VI	Graduate Questionnaire (49)	Interval Scale Data
70.	Amount of Supervision of Thesis Preferred	VI	Graduate Questionnaire (49)	Interval Scale Data
71.	Opportunity to Incorporate Own Ideas into Thesis	VI	Graduate Questionnaire (51)	Interval Scale Data
72.	Opportunity to Incorporate Student Ideas into Thesis if Student were Professor	VI	Graduate Questionnaire (52)	Interval Scale Data
73.	Number of Quarters Fellowship, etc. Held	II	Office of the Registrar	Numerical Units
74.	Average Value per Quarter of Fellowship	II	Office of the Registrar	Average in Dollars
75.	Number of Quarters Fee Remission Held	II	Office of the Registrar	Numerical Units
76.	Average Value per Quarter of Fee Remission	II	Office of the Registrar	Numerical Units
77.	First Language Proficiency	IV	Admissions Form	Dichotomous: Yes, No
78.	Second Language Proficiency	IV	Admissions Form	Dichotomous: Yes, No
79.	Number of B.A. to Ph.D. Interruptions	I	Graduate Questionnaire (2)	Numerical Units
80.	Total Years of B.A. to Ph.D. Interruptions	I	Graduate Questionnaire (2)	Three Month Intervals
81.	Scholarship or Not	V	Office of the Registrar	Dichotomous: Yes, No
82.	Total Number of Quarters Teaching Assistantship Held	II	Office of the Registrar	Three Month Intervals
83.	Average Value per Quarter of Teaching Assistantship	II	Office of the Registrar	Average in Dollars
84.	Total Number Quarters Research Assistantship Held	II	Office of the Registrar	Three Month Intervals
85.	Average Value per Quarter of Research Assistantship	II	Office of the Registrar	Average in Dollars
86.	Number of Quarters On-Campus Jobs Held	II	Office of the Registrar	Three Month Intervals
87.	Average Value per Quarter	II	Office of the Registrar	Average in Dollars
88.	Salary per Year of Ph.D. Job	II	Graduate Questionnaire (Form 53)	In Dollars
89.	Number of Transfer Credits	I	Graduate Questionnaire (Form 53)	Numerical Units
90.	Citizenship	V	Graduate Questionnaire (Form 53)	Dichotomous: U.S., Other

1. The lapsed time between reception of the bachelor's and doctor's degrees.
2. The lapsed time between reception of the bachelor's degree and entrance to graduate study.
3. The lasped time between entrance to graduate study and reception of the master's degree.
4. The lapsed time between the master's reception and entrance to Ph.D. study.
5. The lapsed time between entrance to Ph.D. study and reception of the Ph.D.
6. The registered time between entrance to Ph.D. study and reception of the Ph.D.

The above 6 variables, gathered from copies of the doctoral recipients' transcripts, were measured in terms of quarters or 3 month intervals.

Analysis Procedures

Factor analysis, correlational analysis, the t-test of significance, and multiple regression analysis were the 4 basic procedures employed in the statistical treatment of the data.

Since this study deals with a population that has already achieved their doctoral degrees, and therefore cannot further be manipulated, the analysis of the data cannot focus on an investigation of any direct causality between the independent variables and the dependent variables of time between the baccalaureate and the doctorate.

Rather, the analysis of the data will involve a determination of the varying strengths of the functional

relationships between the dependent variables and the various independent variables listed in Table 3.2.

In order to avoid as much as possible overlapping measures and to insure more independence in the dependent variables used, factor analysis was employed using Michigan State University's Computer Institute for Social Science Research (CISSR) routines.[3]

First, a 6 by 6 correlation matrix routine was run, which in turn served as input for the Factor A program. The Factor A routine produced a principal axis Quartimax and Varimax rotation analysis which indicated the use of less than the original 6 dependent variables.

Then, as the second step toward testing 34 of the 38 hypotheses stated in Chapter II, a 93 by 93 correlation matrix was run involving the 90 independent variables and the 3 dependent variables using the CISSR IDCORR routine[4] with adjustment calculations made for missing or non-applicable data.

From the above correlation coefficients generated by the correlation matrix, the 34 hypotheses were then

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[3]A. Williams, "Factor Analysis Factor A: Principal Components and Orthogonal Rotations," Technical Report No. 34 of the Michigan State University Computer Institute for Social Science Research, East Lansing, Michigan, October 23, 1963. (Mimeographed.)

[4]David Kline, "IDCORR: Incomplete Data Correlation Program," Technical Report No. 4 of the Michigan State University Computer Institute for Social Science Research, East Lansing, Michigan, June 28, 1968. (Mimeographed.)

tested for significance at the .05 alpha level by means of the t-test of significance for paired observations where

$$t = r\sqrt{\frac{N - 2}{1 - N^2}}$$

The 34 research hypotheses were tested in their null form, i.e., the value of the correlation coefficient is equal to zero, or: H_o: $\rho = 0$.

In addition, the remaining independent variables were subjected to the t-test to determine their significance with each of the dependent variables. After the above correlation matrix was run on the total sample, a second correlation matrix employing the identical routine was run on the 6 fields which comprise the total sample. The resulting correlation coefficients were tested for significance in the same manner as those of the total sample and included the testing of Hypotheses 35, 36, 37, and 38.

Finally, in order to obtain a multiple regression equation capable of predicting an unknown time lapse for a doctoral student given the knowledge of his score on one or more known variables, the following statistical procedures were undertaken.

First, to provide a simplified description of the relationships between the 90 independent variables,

thereby facilitating an interpretation, comprehension, and management of such a large collection of items, the CISSR Factor Analysis routine was again employed. Fourteen of the 90 variables which exhibited more than 30 missing or non-applicable observations were taken out and each of those items having fewer than 30 were supplied with the mean of the particular variable's total observations. The above adjustment of the data was necessary since the succeeding Least Squares Deletion analysis (LSDEL)[5] permits no missing data.

Factor analysis with an absolute criterion of 28 (28 factor rotation) was then run for a principal axis, Varimax, and Quartimax analysis on the 76 dependent variables.

The next step planned was to use as raw data for the Least Squares Deletion analysis only those variables which loaded highest on the rotated factors. However, a preliminary test run of the Least Squares analysis revealed the presence of at least one negative regression coefficient where a positive one was expected, indicating the possible influence of suppressor variables. If one or more suppressor variables were operating, it would be possible that an independent variable, though

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[5]Mary E. Rafter, and William L. Ruble, "Stepwise Deletion of Variables from a Least Squares Equation (LSDEL Routine)," STAT Series Description No. 8 of the Michigan State University Agricultural Experiment Station, November, 1968. (Mimeographed.)

correlating only slightly with the dependent variable itself, could, through the difference between it and a second variable (even one with a negative correlation), add significant predictability to the regression equation.

Consequently, to preclude the possibility of losing negative correlations from the regression analysis, not only were the variables loading highest on the rotated factors included, but all of the 76 variables as well.

Summary

A doctoral recipient sample was drawn from Michigan State University's degree-granting departments for the academic years 1966-67 and 1967-68. To determine the differing strengths of the relationships between the 3 dependent and the independent variables as stated in the 38 hypotheses, an intercorrelation matrix generating correlation coefficients both for the total sample and for the 6 fields was utilized. Then, in order to develop a multiple regression equation capable of predicting a doctoral student's time lapse period needed to obtain his Ph.D. degree, factor analysis procedures on 76 selected variables were employed, followed by a Least Squares Regression analysis.

CHAPTER IV

STATISTICAL ANALYSIS

The present chapter describes the statistical procedures and results of (1) the factor analysis of the 6 dependent time variables; (2) the correlational analysis of the 90 independent variables with 3 dependent variables together with the corresponding t-test of significance results including the testing of the 34 hypotheses; (3) the results of the principal axis, Quartimax, and Varimax rotations of the factor analysis on 76 independent variables; and (4) the predictive equations determined from the Least Squares Regression Analysis from the 76 independent and 3 dependent variables.

Dependent Variables

Though 6 dependent variables were initially selected (p. 52) as potentially useful in yielding significant relationships with the 90 independent variables, 3 were expected to yield information more useful to this study.

The first, Lapsed Time: B.A.-Ph.D., was chosen because it basically covers the total period of time most directly connected with the pursuit of the doctorate.

The second, Lapsed Time: Ph.D. Entry-Reception, and third, Registered Time: Ph.D. Entry-Reception, were selected both on the basis of their general importance in covering the period of time during which actual doctoral level study was being conducted, and on their specific potential significance for Michigan State University as the institution concerned in the doctoral degree-granting programs.

Consequently, the Lapsed Time: Ph.D. Entry-Reception variable was seen as the most significant phase of the total B.A.-Ph.D. time period, while the allied Registered Time: Ph.D. Entry Reception was similarly viewed as important in permitting distinction in the relative associative strength between time actually enrolled and actual total lapsed or calendar time.

At this point, factor analysis was utilized to aid in a closer examination of the underlying association that might have existed between the 6 original dependent variables and to support the reduction of their number to an expected and more manageable 3.

The resulting factor analysis[1] consisted of a 3 factor rotation since an earlier analysis had shown that only the eigenvalues of these first 3 factors were 1.00 or above (Table 4.1). Both the Quartimax and Varimax rotation analyses yielded the highest loadings on

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[1]A. Williams, op. cit.

TABLE 4.1

FACTOR ANALYSIS OF THE SIX DEPENDENT VARIABLES

I. THREE FACTOR ROTATION

	FACTOR I		FACTOR II		FACTOR III	
	Quartimax Loadings	Verimax Loadings	Quartimax Loadings	Verimax Loadings	Quartimax Loadings	Verimax Loadings
A. Eigenvalues	2.02	2.02	1.48	1.48	1.10	1.10
B. Proportion of Variance	.270	.272	.271	.271	.227	.224
C. Dependent Variables						
I. Lapsed Time BA - PH.D.	.793	.804	-.280	-.276	-.524	-.509
II. Lapsed Time Ph.D. Entry-Reception	.091	.097	-.883	-.882	-.116	-.115
III. Registered Time PH.D. Entry - Reception	.003	.004	-.868	-.868	.138	.137
IV. Lapsed Time MA Reception-Ph.D. Entry	.284	.298	.115	.117	-.735	-.729
V. Lapsed Time Graduate Entry-MA Reception	-.205	-.191	-.047	-.047	-.701	-.705
VI. Lapsed Time BA-Graduate Entry	.927	.924	.020	.025	.145	.164

II. TWO FACTOR ROTATION

A. Eigenvalues	1.82	1.82	1.40	1.40
B. Proportion of Variance	.412	.411	.394	.395
C. Dependent Variables				
I. Lapsed Time BA - Ph.D.	.322	.317	.854	.855
II. Lapsed Time Ph.D. Entry-Reception	.873	.872	.175	.180
III. Registered Time Ph.D. Entry - Reception	.868	.868	-.087	-.082
VI. Lapsed Time BA - Graduate Entry	.165	-.170	.900	.899

Variables 1, 2, 3, and 6 (Table 4.1) and accounted for over 54 per cent of the total variance. The third factor on which Variable 1 as well as 4 and 5 loaded accounted for another 23 per cent (Table 4.1).

Since Variable 1 was represented in Factor 3 with a relatively high loading (-.53), Variables 4 and 5 were no longer viewed as essential for this study and were dropped from further factor analysis.

A second Quartimax and Varimax rotation using a 2 factor solution on Variables 1, 2, 3, and 6 yielded the expected 2 eigenvalues of 1.00 or above with the 2 factors accounting for over 80 per cent of the total variance (Table 4.1).

The highest loadings under Factor 1 were on Variables 2 and 3 and on Factor 2 on Variables 1 and 4 (Table 4.1). And, since dependent Variable 1 covered the entire B.A.-Ph.D. period, it was selected as more suitable than Variable 4 for this study.

The above factor analysis, then, supports the reduction of the initial 6 dependent variables to the 3 variables most appropriate and germane to the present study.

Correlational Analysis: Total Sample Findings

Each of the selected dependent variables were then run against the 90 independent variables as outlined in

Table 3.1 to determine the level of associative strength that existed between them on the total sample of 320.[2] The findings in the form of means, standard deviations, degrees of freedom, correlation coefficients, and the t-tests of significance results are given in Table 4.2. Consequently, all those variables (one or more) connected with each of the 34 hypotheses were tested at the .05 level of significance using the critical values of the correlation coefficient.[3]

Of the 34 hypotheses tested for the total sample in the null form $\rho = 0$, 27 permitted the rejection of the null hypothesis (Table 4.2) (Hypotheses 1, 2, 3, 4, 6, 7, 8, 9, 10, 12, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32). In these cases then, the null hypothesis was rejected at the .05 level and the data supported the research hypothesis that ρ is significantly different than zero at a 95 per cent level of confidence (Table 4.2). The data did not support the remaining 7 hypotheses when tested at the .05 alpha level (Hypotheses 5, 11, 13, 14, 18, 33, 34). As a result, the null hypothesis was retained in these instances.

In addition, in 8 of the 27 significant hypotheses (Hypotheses 2, 3, 4, 6, 17, 20, 21, 23), the data

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[2]David Kline, op. cit.

[3]George A. Ferguson, Statistical Analysis in Psychology and Education (New York: McGraw-Hill Book Company, Inc., 1966), Appendix, Table F, p. 413.

TABLE 4.2

MEANS, STANDARD DEVIATIONS, CORRELATIONS, DEGREES OF FREEDOM AND t-TESTS BETWEEN THE NINETY INDEPENDENT AND THREE DEPENDENT VARIABLES

Independent Variables	Hypothesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA - Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
1. Number of Field Changes BA to Ph.D.	1	0.84	0.96	317	0.335*	0.123*	0.092
2. Admission Status	31	1.16	0.39	318	0.131*	0.155*	0.119*
3. Total Number of Advisors	32	1.58	0.86	318	0.185*	0.468*	0.378*
4. Registered Terms until Passage of First Language	20	6.47	4.41	318	0.132*	0.448*	0.609**

* Significant at the $\alpha = .05$ level

**Significantly greater than $\rho = .5$ at the $\alpha = .05$ level

1. Mean for Dependent Variable I = 40.59; II = 18.14; III = 18.45

2 Standard Deviation of Dependent Variable I = 21.75; II = 8.75; III = 4.67

3 degrees of freedom for all three Dependent Variables = 318

4 Critical Values of the Correlation Coefficient (George A. Ferguson, Statistical Analysis in Psychology and Education (New York: McGraw-Hill Book Company, Inc., 1966), Appendix, Table F, p. 413.

TABLE 4.2--Continued

Independent Variables	Hypothesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA-Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
5. Lapsed Time until Passage of First Language	20	8.06	6.90	318	0.290*	0.644**	0.455*
6. Registered Terms until Passage of Second Language		7.27	4.22	318	-0.023	0.270*	0.469*
7. Lapsed Time until Passage of Second Language		8.93	6.42	318	0.176*	0.564*	0.326*
8. Registered Terms until Passage of General Exams		9.77	3.90	317	0.119*	0.553*	0.776**
9. Lapsed Time until Passage of General Exams	21	12.20	6.81	317	0.336*	0.828**	0.544*
10. Part-time Terms	6	7.18	4.80	318	0.124*	0.449*	0.800**

TABLE 4.2--Continued

Independent Variables	Hypothesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA - Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
11. Full-time Terms	7	6.26	2.74	318	0.010	0.159*	0.196*
12. Registered Terms before Course Completion	23	8.77	3.74	318	0.134*	0.457*	0.704**
13. Lapsed Time until Course Completion	23	10.51	6.53	318	0.322*	0.696**	0.499*
14. Credits taken outside Department		21.90	16.20	318	0.052	0.041	0.151*
15. Registered Time between end of Course Work and end of Dissertation		4.68	3.25	318	0.038	0.300*	0.543*
16. Lapsed Time between end of course work and end of Dissertation	17	7.39	6.11	318	0.200*	0.646**	0.284*

TABLE 4.2--Continued

Independent Variables	Hypothesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA - Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
17. Number of Credits below 800	25	15.01	13.29	318	0.108*	0.169*	0.218*
18. Credits taken before Organization of Committee	16	14.45	13.03	318	-0.002	0.132*	0.253*
19. Grade Point Average Ph.D.	26	3.59	0.30	318	-0.003	-0.051	-0.209*
20. Pages in Dissertation	19	163.95	95.29	289	0.149*	0.218*	0.036
21. Lapsed Time in Residence after end of Course Work	4	3.29	3.44	318	-0.197*	-0.161*	0.079
22. Lapsed Time off Campus after end of Course Work	4	4.18	6.81	318	0.305*	0.672**	0.207*
23. Lapsed Time of Interruptions	3	4.80	7.24	318	0.405*	0.830**	0.086

TABLE 4.2--Continued

Independent Variables	Hypothesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA - Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
24. Number of Ph.D. Credits	24	92.50	22.05	318	0.198*	0.347*	0.435*
25. Sex		1.03	0.18	318	0.086	0.007	-0.051
26. Number of Institutions since BA	29	1.68	1.09	318	0.329*	-0.080	-0.099*
27. Rating of MA Institutions		1.78	0.42	123	-0.153*	-0.057	-0.059
28. Grade Point Average [Under-graduate]	28	3.11	0.44	204	-0.177*	-0.109	-0.110
29. Grade Point Average [Graduate]	27	3.54	0.36	240	-0.001	-0.083	-0.212*
30. Research Experience	18	1.58	0.51	258	-0.004	0.062	0.041
31. Age at end of Ph.D.		32.53	6.04	318	0.892**	0.462*	0.154*

TABLE 4.2--Continued

Independant Variables	Hypo-thesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA - Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
32. Number of children at end of Ph.D.	15	1.56	1.55	317	0.441*	0.232*	0.110*
33. Spouse Activities		1.45	0.64	263	-0.026	0.019	0.017
34. Age at Entry to Ph.D.	14	28.10	5.40	318	0.851**	0.157*	-0.045
35. Development of Field of Study Goals	1	4.14	1.66	318	0.239*	0.086	0.106*
36. Career Plans at Graduate Entrance		1.74	0.78	307	-0.211*	-0.076	0.015
37. Importance of Ease and Speed for Attending Michigan State University		3.15	1.19	318	-0.105*	-0.044	-0.025
38. Importance of Research Opportunity for Attending Michigan State University		2.35	1.22	318	0.137*	0.052	0.002

TABLE 4.2--Continued

Independent Variables	Hypothesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA - Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
39. Importance of Scholarship/ Assistantship for Attending Michigan State University		2.11	1.26	318	0.262*	0.072	-0.000
40. Evaluation of Decision to attend Michigan State University		1.59	0.64	311	-0.130*	0.009	0.173*
41. Rating of Department among Experts	34	1.88	0.95	318	-0.075	-0.029	0.015
42. Rating of Department's Research Training	34	1.83	1.03	318	-0.066	-0.059	-0.050
43. Number of Faculty known to Discuss Problems		3.25	1.11	316	-0.143*	-0.039	0.072

TABLE 4.2--Continued

Independent Variables	Hypothesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA - Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
44. Rating of Department's Sensitivity to Student Needs	34	1.72	0.72	318	-0.116*	-0.050	0.027
45. Rating of Department's Research Skills	34	1.50	0.65	318	-0.095*	-0.052	0.017
46. Compare Michigan State University Stipends [assistantships,etc.]		1.87	0.78	318	-0.069	0.032	0.062
47. Compare Michigan State University Research Facilities		1.91	0.81	318	-0.087	-0.063	-0.107*
48. Importance of Financial Need for Assistantships, etc.		2.43	0.90	318	-0.122*	-0.025	-0.044
49. Validity of Department's Formal Hurdles	34	2.33	0.93	318	0.060	0.087	0.024

TABLE 4.2--Continued

Independent Variables	Hypothesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA - Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
50. Validity of Department's too Low Admission Standards	34	2.82	0.81	318	0.010	0.026	0.042
51. Validity of Department's Student Exploitation	34	2.63	0.94	318	0.107*	0.089	-0.008
52. Validity of Department's Reward for Conformity	34	2.75	0.85	318	-0.028	0.002	-0.046
53. Validity of Department's Over Interest in Research	34	2.47	0.88	318	0.019	0.032	-0.024
54. Lengthening due to Inadequate Preparation		2.43	0.77	193	0.073	-0.143*	-0.155*

TABLE 4.2--Continued

Independent Variables	Hypothesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA - Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
55. Lengthening due to Repeat Work		2.72	0.54	131	0.093	-0.128	-0.067
56. Lengthening due to Language Requirement		2.30	0.75	289	-0.044	-0.218*	-0.242*
57. Lengthening due to Teaching Assistantship		2.25	0.73	189	0.001	-0.291*	-0.251*
58. Lengthening due to Research Assistantship		2.81	0.90	156	-0.143*	-0.141*	-0.050
59. Lengthening due to Work Off Campus		1.79	0.87	77	-0.301*	-0.411*	-0.226*
60. Lengthening due to Veteran's Benefits		3.17	0.51	34	-0.068	-0.181	-0.129
61. Lengthening due to Leave and Work		1.61	0.84	77	-0.244*	-0.406*	-0.104

TABLE 4.2--Continued

Independent Variables	Hypothesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA - Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
62. Lengthening due to Family Obligations	15	2.27	0.84	199	-0.139*	-0.451*	-0.299*
63. Lengthening due to General Exams		2.41	0.68	298	-0.020	-0.178*	-0.208*
64. Lengthening due to Thesis		1.83	0.80	303	-0.112*	-0.283*	-0.233*
65. Evaluation of Procedure		1.30	1.12	318	-0.015	-0.023	0.020
66. Length of Time Before Assignment of Major Professor		1.62	1.19	318	-0.024	0.189*	0.191*
67. Number of Meetings with Major Professor		2.12	1.19	318	-0.201*	-0.231*	-0.068
68. Department's Orientation Program	34	2.37	1.06	318	-0.129*	-0.075	-0.061

TABLE 4.2--Continued

Independent Variables	Hypothesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA - Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
69. Amount of Supervision of Thesis Given	33	2.73	1.75	318	-0.047	-0.022	0.014
70. Amount of Supervision Preferred	33	2.82	1.36	318	-0.081	-0.032	0.030
71. Opportunity to Incorporate Own Ideas	33	1.12	0.38	318	-0.067	0.005	0.027
72. Opportunity if Student Were Professor	33	2.77	0.64	318	-0.029	-0.063	-0.052
73. Number of Quarters Fellowship, etc. Held	8	1.23	2.68	318	-0.229*	-0.109*	0.030
74. Average Value per Quarter	9	785.34	289.93	86	0.074	-0.005	-0.030

TABLE 4.2--Continued

Independent Variables	Hypothesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA - Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
75. Number of Quarter Fee Remission Held		4.54	3.19	80	-0.218*	-0.134	0.008
76. Average Value per Quarter		157.90	102.90	80	0.162	-0.143	-0.231*
77. First Language Proficiency	22	1.42	0.52	119	-0.069	-0.007	0.143*
78. Second Language Proficiency		1.56	0.55	142	-0.002	-0.009	-0.001
79. Number of Interruptions	2	1.36	1.19	80	0.588**	0.347*	0.099*
80. Total Years of Interruptions	2	4.59	5.32	318	0.833**	0.332*	0.054
81. Scholarship or not	30	1.64	0.48	318	0.210*	0.102*	0.018
82. Total Number of Quarters Teaching Assistantship Held	10	2.13	4.06	318	-0.144*	-0.006	0.119*

TABLE 4.2--Continued

Independent Variables	Hypothesis Tested	Mean[1]	S.D.[2]	d.f.[3]	CORRELATION AND t-TEST SIGNIFICANCE[4] I Lapsed Time BA - Ph.D.	II Lapsed Time Ph.D. Entry-Reception	III Registered Time Ph.D. Entry-Reception
83. Average Value per Quarter	11	218.47	336.68	318	-0.144*	-0.059	0.030
84. Total Number of Quarters Research Assistantship Held	12	3.58	5.59	318	-0.190*	-0.140*	0.073
85. Average Value Per Quarter	13	801.08	132.51	115	-0.103	-0.003	-0.029
86. Number of Quarters On Campus Jobs Held		2.48	4.72	318	0.063	0.100*	0.044
87. Average Value Per Quarter		1371.05	563.68	117	0.057	0.073	0.062
88. Salary per Year of Ph.D. Job		16192.10		318	-0.068	-0.062	0.067
89. Number of Transfer Credits	5	40.84	24.39	83	-0.161	0.098	-0.018
90. Citizenship	32	1.18	0.38	318	0.037	-0.168*	-0.138*

supported the research hypothesis that ρ is greater than .5 at the 95 per cent level of confidence (Table 4.2).

Finally, those independent variables (36) not connected with any of the 34 hypotheses (36) were tested for the significance of their relationship with each of the 3 dependent variables (Table 4.2) again using the t-test of significance. Of these 36, 22 variables correlated significantly at the .05 alpha level (where $\rho = 0$) with one or more of the 3 dependent variables (Table 4.2).

Lastly, 2 of these, Hypotheses 8 and 31 (Table 4.2), were found to correlate significantly greater than $\rho = .5$ at the $\alpha = .05$ level.

Correlational Analysis: Discussion

Hypothesis 1: Though the correlation coefficient is small (.123), the Lapsed Time: Ph.D. Entry-Reception variable as well as the Lapsed Time: B.A.-Ph.D. variable correlates significantly with the independent variable, Number of Field Changes. Thus, field changes are made frequently enough even after pursuit of the doctorate degree has begun.

Similarly, Development of Field of Study Goals correlates with Registered Time: Ph.D. Entry-Reception as well as with Lapsed Time: B.A.-Ph.D. Apparently, late decision about the field of study has some influence on increasing the number of registered terms needed to complete the degree.

Finally, it is rather surprising to find that there is a significant negative correlation between the doctoral recipient's response to Career Plans at Graduate Entrance and Lapsed Time: B.A.-Ph.D., indicating that the less definitive the doctoral student's commitment was to his career plans, the less actual calendar time it would take him to complete his degree, B.A. to Ph.D.

Hypotheses 2 and 3: Both the Number of and the Total Years of Interruptions B.A. to Ph.D. variables correlate at significantly greater than .5 (.588 and .833) with the Lapsed Time: B.A.-Ph.D. variable, making the interruption of pursuit of the doctorate a strong candidate for determining the total length of time of a doctorate. As would be expected, Lapsed Time: Ph.D. Entry-Reception is significantly correlated with the same 2 "interruption" variables.

Similarly, the Lapsed Time of Ph.D. Interruptions should be helpful in determining why a recipient takes a longer time to finish once he enters doctoral study since it correlates significantly with Lapsed Time: Ph.D. Entry-Reception at .830.

Hypothesis 4: Lapsed Time Off Campus after the End of Course Work correlates significantly with all 3 dependent variables and significantly greater than .5 (.672) with Lapsed Time: Ph.D. Entry-Reception. Basically, this variable indicates that period of time

of doctoral study known as the A.B.D. ("all but the dissertation") phase.

Hypotheses 6 and 7: Part-time Registered Terms correlates significantly with all 3 dependent variables and exhibits a significantly greater than .5 correlation (.800) with Registered Time: Ph.D. Entry-Reception, lending weight to the statement in the literature that full time study is the shortest route to the doctorate. Though not nearly as significantly correlated, the Full-time Terms variable of Hypothesis 7 supports the foregoing statement about full-time study.

Hypotheses 8, 9, 10, 11, 12, and 13: These hypotheses deal with the various kinds and levels of financial support or lack of it and its influence on the length of the doctorate. The actual possession of a scholarship, fellowship, or other unencumbered (service-free) stipend correlates significantly with Lapsed Time: Ph.D. Entry-Reception so that the doctoral recipients without it take longer to finish. On the other hand, the Average Value per Quarter of the Scholarship does not correlate significantly apparently because there is not sufficient variance among the recipients.

Teaching and research assistantship holders who possess stipends with service requirements exhibit an interesting anomaly. As the total number of quarters of a teaching assistantship increases, so does the Registered

Time: Ph.D. Entry-Reception. And yet, this is not true of the research assistants; for, there is no significant correlation between Total Number of Quarters Research Assistantship Held and Registered Time: Ph.D. Entry-Reception (.073). In addition, there is a significant negative correlation (-.140) between Lapsed Time: Ph.D. Entry-Reception and the Number of Quarters Research Assistantship held. This difference seems best explained by the fact that the research assistantship's (but not the teaching assistantship's) service function is often related directly to his thesis thereby tending to shorten the time lapse.

Nevertheless, both the above independent variables exhibit a significant negative correlation with Lapsed Time: B.A.-Ph.D. This apparent discrepancy perhaps is due to the fact that both the research and the teaching assistant's superior academic ability or experience are involved in their obtaining their assistantships in the first place, and therefore, they might well be expected to finish sooner than those recipients without any assistantship.

Again, as in the case of the scholarship, the average value per quarter of the assistantships does not influence the length of time taken.

Hypothesis 14: Age at Entry to Ph.D. correlated significantly but positively (.157) where a negative

correlation was hypothesized. In fact, there was a correlation significantly greater than .5 (.851) with Lapsed Time: B.A.-Ph.D. In retrospect, the hypothesis needs to be more specific, using discrete delimited age categories in order to properly test out the literature's contention that entry to doctoral work before age 23 tends to lengthen the Ph.D. time lapse and entry after age 29 tends to shorten it.

Hypothesis 15: Doctoral recipients reporting that family obligations had a lengthening effect did in fact experience a greater Registered Time: Ph.D. Entry-Reception (-.299), as well as a greater Lapsed Time: Ph.D. Entry-Reception (-.451) and Lapsed Time: B.A.-Ph.D. (-.139). The second variable measuring family obligation, Number of Children at End of Ph.D., also correlated significantly with all 3 time variables.

Hypotheses 16, 24, and 25: These hypotheses test the lengthening effect of the type and number of credits taken. Credits Taken before the Organization of the Doctoral Recipient's Committee correlates significantly (.132) and (.253) with the Lapsed and Registered Times: Ph.D. Entry-Reception variables. Consequently, there is some influence regarding time taken on those who do not take early steps to set up and finalize their doctoral program. There is also significant relationships between the Number of Ph.D. Credits Taken and the 3 dependent

time variables. In the case of the Lapsed and Registered Times: Ph.D. Entry-Reception, the strengths of the relationships are rather substantial (.347 and .435). As a result, the amount of time it takes to complete actual doctoral study varies directly with the number of Ph.D. credits taken for the doctoral recipients as a group.

Similarly, the Number of Credits Taken below 800 is correlated significantly with the 3 time variables. Thus, though the influence is not great, it is true for the sample that as the number of credits taken below 800 rises, so does the length of time taken to complete the doctorate. This is probably so because such credits were in courses not in the major field of competency of the recipient.

Hypotheses 17, 20, 21, and 23: These 4 hypotheses are concerned with the formal requirements of the doctorate: the dissertation, the language requirement, the general examinations, and the course work.

The correlation between Lapsed Time between End of the Course Work and the End of the Dissertation is significant with each of the 3 dependent time variables (B.A.-Ph.D. = .200; Lapsed Time: Ph.D. Entry-Reception = .646; and Registered Time: Ph.D. Entry-Reception = .284). The Lapsed Time: Ph.D. Entry-Reception is significantly greater than .5. The

significant correlation of the independent variable with the total Lapsed Time: B.A.-Ph.D. is evidence of the lengthening influence on the doctorate of the research phase.

Though the language requirement is no longer an important influence on doctoral programs at Michigan State University, it is of considerable interest that, the often-referred-to-formal-"hurdle" did in fact correlate significantly with all 3 of the time variables to such an extent that both the Lapsed Time: Ph.D. Entry-Reception (.644) and the Registered Time: Ph.D. Entry-Reception (.609) were associated with the independent variables of language passage at a correlation coefficient significantly greater than .5.

Quite similarly, the language requirement's sister "hurdle," the general exams, correlated significantly with the 3 time variables and in fact likewise shared a strong relationship greater than .5 with both Lapsed Time: Ph.D. Entry-Reception (.828) and Registered Time: Ph.D. Entry-Reception (.776).

Finally, as expected, the fourth major doctoral requirement, the course work, measured in either registered terms or lapsed time before completion correlated significantly with the 3 time variables. More especially, the course work variable evidenced a relationship at a significantly greater than .5

correlation with both the Lapsed Time: Ph.D. Entry-Reception (.696) and with Registered Time: Ph.D. Entry-Reception (.704).

Hypothesis 19: The Number of Pages in the Dissertation correlated significantly (.218) with Lapsed Time: Ph.D. Entry-Reception as well as with Lapsed Time: B.A.-Ph.D. (.149). Though this variable may well be more a function of the nature of the discipline and individual involved, it does invite some comment since the time when many theses are mostly written is during the Lapsed Time Between the End of Course Work and End of the Dissertation which correlates similarly (though higher) with the Lapsed Time: B.A.-Ph.D. (.200) and Lapsed Time: Ph.D. Entry-Reception (.646).

Hypotheses 26, 27, 28, 29, 30, and 31: These 6 hypotheses are measuring, in one fashion or another, ability of the doctoral recipients.

Undergraduate Grade Point Average significantly correlates, as expected from review of previous research, negatively with Lapsed Time: B.A.-Ph.D. (-.177). Yet, there was no significant correlation between the Undergraduate Grade Point Average and the actual doctoral study period. Nevertheless, those doctoral students who exhibited lower Undergraduate Grade Point Averages took a longer total time lapse to achieve the degree.

Interestingly, both the Graduate Grade Point Average and the Ph.D. Grade Point Average did not correlate significantly with the Lapsed Time: Ph.D. Entry-Reception (-.083 and -.051), but only with Registered Time: Ph.D. Entry-Reception (-.212 and -.209). This data tends to support the idea that, though registered doctoral time is increased by a lower Ph.D. academic achievement as measured by grade point average, actual lapsed time before reception of the doctorate is not. In other words, perseverance in pursuit of the doctorate may well be as sensitive a predictor as grade point average.

The Number of Institutions Attended since the B.A. correlates significantly with Lapsed Time: B.A.-Ph.D. (.329) and negatively with Registered Time: Ph.D. Entry-Reception (-.099). The former positive correlation is expected while the latter, though unexpectedly negative, can be explained by the fact that while those who attend more institutions would tend to take more lapsed time, their actual registered time in fact could be less since they tend to accumulate transfer credits usable at the Ph.D. institution.

Non-Possession of a Scholarship correlates significantly both with Lapsed Time: B.A.-Ph.D. (.210) and Lapsed Time: Ph.D. Entry-Reception (.102). Consequently, those doctoral students who did not possess

the benefits of a scholarship (whether we measure ability or financial support with it) take longer lapsed times to finish.

Finally, doctoral recipients who entered their doctoral programs under a provisional or non-degree status took longer Lapsed Time: B.A.-Ph.D. (.131), longer Lapsed Time: Ph.D. Entry-Reception (.155) and longer Registered Time: Ph.D. Entry-Reception (.119).

Hypothesis 32: Citizenship proved to be a significant variable. Doctoral recipients reporting U.S. citizenship took longer Lapsed (-.168) and Registered (-.138) Time: Ph.D. Entry-Reception than did those of foreign citizenship. Yet, total Lapsed Time: B.A.-Ph.D. is not significantly different for either the United States or foreign citizen. The shorter lapsed and registered times for the actual doctoral study for the foreign student is perhaps clarified by the fact of the "on-loan-from-their-country" status of foreign students who, though they perhaps are influenced by no personal desire to hasten their own return home are under some governmental or financial pressure to do so.

Correlational Analysis: 22 Other Significant Variables

Though not used in the 34 hypotheses, 22 variables of the other 36 remaining were found to correlate with one or more of the dependent variables.

Variable 31, Age at End of Ph.D., correlated significantly with all 3 dependent variables with Lapsed Time: B.A.-Ph.D. being significantly greater than .5 (.892). Such a high correlation is expected, however, since age is by its nature closely allied to lapsed calendar time.

Variables 6, 7, 8, and 15 are related to the formal requirements of the degree. Variable 8, Registered Terms until Passage of the General Exams, displayed a correlation significantly greater than .5 (.776). In addition, Variable 8 correlated significantly with Lapsed Time: B.A.-Ph.D. (.119) and Lapsed Time: Ph.D. Entry-Reception (.553). The former correlation shows the influence of the general exams passage on the total time taken for the doctorate. In general, then, doctoral recipients who have taken more registered terms before passage of their general exams will show longer registered and lapsed time periods along their route to the degree.

Variables 6 and 7, Registered and Lapsed Time until Passage of Second Language, both correlated significantly on both the Lapsed (.326) and Registered (.469) Time: Ph.D. Entry-Reception, though not as highly as the corresponding time periods for passage of the first language, thereby lending some weight to the feeling that the longer the passage of the first language is delayed, the longer the lapsed and registered time will be.

Again, as in Variable 16, those recipients who took more Registered Time Between the End of Course Work and the End of the Dissertation (Variable 15) took more Lapsed (.300) and Registered (.543) Time: Ph.D. Entry-Reception.

Variable 48 reveals that recipients who reported that their departments awarded assistantships or scholarships on the basis of grades rather than financial need took longer Lapsed Time: B.A.-Ph.D. (-.122) than those who did not. The fewer Number of Quarters Fee Remission Was Held (Variable 76), the greater the total Lapsed Time: B.A.-Ph.D. required (-.218). On the other hand, the less the Average Value Per Quarter of the fee remission (Variable 76), the more Registered Time: Ph.D. Entry-Reception was required (-.231).

Reasons for attending Michigan State University are the area of concern of Variables 38, 39, and 40. The less important Research Opportunity was for Attending Michigan State University (Variable 38), the more Lapsed Time: B.A.-Ph.D. (.137) was required for the degree. The supposition underlying this relationship seems to be that those who view research opportunity as not important, either are in the less strictly research oriented fields which traditionally take more lapsed time, or were not interested in research and later found the dissertation research to be quite demanding.

Similarly, those doctoral recipients who rated the Importance of Scholarship/Assistantship for Attending Michigan State University (Variable 39) as not important also took a longer Lapsed Time: B.A.-Ph.D. (.262) than those who rated it highly important. In this case, it would appear that a substantial proportion of those who rated the scholarship or assistantship as unimportant did not expect to get one and therefore did not have this added financial aid to hasten their doctoral pursuit.

The major professor or advisor is the central component of Variables 66 and 67. Doctoral recipients who had to wait a longer Length of Time Before Assignment of Their Major Professor (Variable 66) found both their Lapsed (.189) and Registered (.191) Time: Ph.D. Entry-Reception to be greater. And, those who had fewer Meetings With Their Major Professor (Variable 67) had a greater Lapsed Time: Ph.D. Entry-Reception (-.231).

Variables 54, 56, 57, 59, 61, 63, and 64 deal with the self-reporting by the doctoral recipients concerning "factors" which they felt affected the length of time it took them to get their doctoral degrees.

Four of the variables (54, 56, 63, and 64) are concerned once again with the formal requirements of the doctorate and all 4 correlated significantly and negatively with both Lapsed and Registered Time: Ph.D. Entry-Reception.

Consequently, recipients reporting Lengthening Due to Inadequate Preparation (Variable 54) had longer Lapsed (-.143) and Registered (-.155) Time: Ph.D. Entry-Reception. The Language Requirement (Variable 56) also lengthened the Lapsed (-.218) and Registered (-.242) Time: Ph.D. Entry-Reception as did Variable 63, General Exams (-.178 for Lapsed and -.208 for Registered Time: Ph.D. Entry-Reception), and Variable 64, Thesis (-.283 for Lapsed and -.233 for Registered Time: Ph.D. Entry-Reception).

The other 3 variables, 57, 59, and 61, dealt with the lengthening effect of the need for financial support which requires a service function. Thus, those recipients who reported Lengthening Due to the Teaching Assistantship (Variable 57), Working Off Campus (Variable 59), or Leaving School to Work (Variable 61) did in fact experience in the former two instances both longer Lapsed (-.291 and -.411) and Registered (-.251 and -.226) Time: Ph.D. Entry-Reception. In addition, those reporting Lengthening Due to Work Off-Campus also showed greater Lapsed Time: B.A.-Ph.D. (-.301) which again supports the statement that full time pursuit of the doctorate without being encumbered by the need to leave school to work is more conducive to a speedier reception of the degree.

The correlational analysis also lends support to the idea that the more Credits that are Taken Outside the doctoral student's Department (Variable 14) the more likely he is to take greater Registered Time: Ph.D. Entry-Reception (.151). Perhaps the underlying reason is in the doctoral student's decision (or his department's) to take a lighter credit load for a term when taking courses outside his major field of competency.

Finally, those recipients who reported a smaller Number of Faculty Known With Whom to Discuss Problems (Variable 43), took greater Lapsed Time: B.A.-Ph.D. (-.143). Since there is no significant correlation with the Lapsed and Registered Ph.D. Entry-Reception variables, it seems reasonable to assume that the factor which influences the B.A.-Ph.D. Lapsed Time variable lies not within the department's or college's faculty, but within the characteristics of the individual recipient involved.

Correlational Analysis: Six Fields

Each of the 3 dependent variables were then run against the 90 independent variables (Table 3.2) to ascertain the varying levels of strength of relationship existing between them for each of the 6 fields (Table 3.1).

The findings in the form of means, standard deviations, degrees of freedom, correlation coefficients, and t-tests of significance results are given in Table

4.3 together with the reporting of the various means for Hypotheses 35 and 36, and the testing of Hypotheses 37 and 38 at the .05 level of significance again using the critical values of the correlation coefficient[4] where H_o: $\rho = 0$.

As reported in Table 4.3, Footnote 1, the physical and biological sciences with a mean Lapsed Time: B.A.-Ph.D. of 31.86 and 36.05 quarters respectively, take considerably shorter total lapsed time than do the humanities with a mean of 47.25, the social sciences with a mean of 37.88, education with a mean of 55.95, and the professions with a mean of 44.25. Thus, education's doctoral degree recipients, with more than 9 quarters of longer lapsed time than the field with the next longest time lapse, have taken a substantially longer period of Lapsed Time: B.A.-Ph.D. than any of the other 5 (nearly 16 calendar years).

In the case of both Hypotheses 37 and 38, which were tested at the .05 alpha level, the null hypothesis--H_o: $\rho = 0$, was retained and the conclusion was that the data did not support the research hypothesis, H_o: $\rho \neq 0$. In addition, not only did the 2 independent variables, Sex and Salary Per Year of Ph.D. Job not manifest a significant relationship with any of the 3 dependent

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[4] Ibid.

TABLE 4.3
SIX FIELDS

MEANS, STANDARD DEVIATIONS, DEGREES OF FREEDOM, CORRELATIONS AND t-TEST SIGNIFICANCE
BETWEEN FOUR INDEPENDENT AND THREE DEPENDENT VARIABLES

Independent Variables	PHYSICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	BIOLOGICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
1. Number of Field Changes BA - Ph.D.	[illegible]	[illegible]	48	.19-	[illegible]	[illegible]	1.70	0.75	48	.182	[illegible]	-.136
2. Admission Status	1.10	0.37	48	.165	.282	.163	1.10	0.31	98	.010	.170	.23-*
3. Total Number of Advisors	1.10	0.87	48	-.115	.30-*	.421*	1.31	0.59	98	.060	.390*	.430*
4. Registered Terms Until Passage of First Language	7.46	4.36	48	.366	.396*	.425*	6.11	2.90	97	.140	.511**	.44-**

Independent Variables	HUMANITIES (Arts & Letters) Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	SOCIAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
1. Number of Field Changes BA - Ph.D.	0.33	0.53	30	.300	-.110	-.109	1.46	0.92	78	.308*	.312*	.092
2. Admission Status	1.10	0.39	30	.261	.187	.071	1.06	0.30	40	.100	.246	.046
3. Total Number of Advisors	1.70	1.25	30	.119	.553*	.29-	1.76	0.90	48	.291*	.390*	.310*
4. Registered Terms Until Passage of First Language	5.40	3.06	30	.150	.479*	.443*	6.00	3.29	48	.087	.340*	.341*

Independent Variables	EDUCATION Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	PROFESSIONS Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
1. Number of Field Changes BA - Ph.D.	2.15	0.97	31	.313*	-.130	.076	1.30	0.60	78	-.013	-.040	-.002
2. Admission Status	1.30	0.56	30	.227	.279	.129	1.10	0.30	30	-.127	-.000	-.082
3. Total Number of Advisors	1.00	1.00	30	.172	.413*	.406*	1.40	0.72	30	.367*	.350*	.400*
4. Registered Terms Until Passage of First Language	8.26	5.69	37	.035	.340*	.600**	6.83	4.40	33	.461*	.400*	.300*

* Significant at the α = .05 level
** Significantly Greater than ρ = .3 at the α = .05 level
1 Mean for Dependent Variable I: Phy. Sci. = 21.[illegible]; Bio. Sci. = [illegible]; Humanities = 47.71; Soc. Sci. = 37.[illegible]; Education = [illegible] and the Professions [illegible]
Dependent Variable II: Phy. Sci. = [illegible]; Bio. Sci. = 13.73; Humanities = 22.[illegible]; Soc. Sci. = 19.30; Education = [illegible] and the Professions 17.85
Dependent Variable III: Phy. Sci. = 14.30; Bio. Sci. = 13.10; Humanities = 12.73; Soc. Sci. = 13.78; Education = 13.13 and the Professions [illegible]
2 Standard Deviation of Dependent Variable I: Phy. Sci.=13.30; Bio. Sci.=10.16; Humanities=21.07; Soc. Sci.=18.79; Education=[illegible] and the Professions=[illegible]
Dependent Variable II: Phy. Sci.= 7.17; Bio. Sci.= 6.13; Humanities=11.73; Soc. Sci.= 8.79; Education=11.70 and the Professions 7.29
Dependent Variable III: Phy. Sci.= 4.73; Bio. Sci.= 4.[illegible]; Humanities= 4.41; Soc. Sci.= 3.[illegible]; Education= 5.81 and the Professions= 5.87
3 Degrees of Freedom for all Three Dependent Variables: Phy. Sci.=48; Bio. Sci.=98; Humanities=30; Soc. Sci.=48; Education=[illegible] and the Professions=[illegible]
4 Critical Values of the Correlation Coefficient George A. Ferguson, Statistical Analysis in Psychology and Education (New York: McGraw-Hill Book Company, Inc., 1966), Appendix, Table F, p. 413.
5 I = Lapsed Time: BA - Ph.D.
6 II = Lapsed Time: Ph.D. Entry - Exemption
7 III = Registered Time: Ph.D. Entry - Exemption

TABLE 4.3 CONTINUED

Independent Variables	PHYSICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	BIOLOGICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
5. Lapsed Time until Passage of First Language	8.12	1.65	40	.380*	.415*	.408*	6.95	5.77	57	.290*	.728**	.340*
6. Registered Terms until Passage of Second Language	9.07	4.63	40	.413*	.447*	.330*	8.29	4.04	58	-.053	.475*	.607**
7. Lapsed Time until Passage of Second Language	9.06	5.20	40	.430*	.316*	.310*	9.40	5.23	58	.132	.605**	.342*
8. Registered Terms until Passage of General Exams	10.16	4.36	40	.378*	.758**	.711**	6.11	3.90	57	[illegible]	[illegible]	[illegible]
9. Lapsed Time until Passage of General Exams	11.30	5.42	40	.317*	[illegible]	[illegible]	11.36	5.36	57	[illegible]	.781**	[illegible]
10. Part-time Terms	6.00	4.07	40	.133	.360*	.709**	7.16	4.77	56	.115	.360*	.777**
11. Full-time Terms	6.46	3.40	40	.290*	.362*	.340*	6.05	2.57	56	-.042	.176	.279*
12. Registered Terms before Course Completion	6.34	4.21	40	.390*	.360*	.673*	6.97	3.04	57	[illegible]	[illegible]	.737**
13. Lapsed Time until Course Completion	9.80	4.71	40	[illegible]	[illegible]	[illegible]	9.17	4.34	57	[illegible]	.375*	[illegible]
14. Credits taken Outside Department	15.30	16.36	40	.081	-.305	-.230	20.35	16.81	53	.279*	.461*	.307*

Independent Variables	HUMANITIES (Arts & Letters) Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	SOCIAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
5. Lapsed Time until Passage of First Language	7.30	6.21	30	.104	.580*	.331*	9.19	7.00	45	.378*	.047*	.000
6. Registered Terms until Passage of Second Language	7.33	3.32	30	.072	.321*	.679*	7.10	3.30	47	.235	.371*	.310*
7. Lapsed Time until Passage of Second Language	18.70	6.04	30	.135	.759**	[illegible]	9.37	7.82	47	[illegible]	.850*	[illegible]
8. Registered Terms until Passage of General Exams	9.13	3.42	30	.015	[illegible]	[illegible]	9.37	3.11	47	.157	.380*	[illegible]
9. Lapsed Time until Passage of General Exams	13.03	8.93	30	.290	.331**	[illegible]	12.25	6.00	47	[illegible]	.742**	.330*
10. Part-time Terms	6.10	4.04	30	-.106	.377*	[illegible]	7.26	4.36	45	.476*	.335*	[illegible]
11. Full-time Terms	6.00	2.47	30	.10	-.025	.240	6.39	3.11	47	.257	.430*	.282
12. Registered Terms before Course Completion	6.13	3.10	30	.139	.327	[illegible]	6.12	3.02	46	.200	.415*	[illegible]
13. Lapsed Time until Course Completion	16.05	6.46	30	.221	[illegible]	[illegible]	16.74	6.19	46	.305*	[illegible]	.27
14. Credits taken Outside Department	11.90	13.06	30	-.021	-.207	.181	21.90	12.44	30	.179	.340*	[illegible]

Independent Variables	EDUCATION Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	PROFESSIONS Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
5. Lapsed Time until Passage of First Language	12.36	18.40	37	.327*	.670**	[illegible]	6.40	6.56	33	.575*	.769*	.383*
6. Registered Terms until Passage of Second Language	7.10	4.43	30	.022	.470*	.757**	5.30	2.0	33	.367	.381*	[illegible]
7. Lapsed Time until Passage of Second Language	14.30	9.30	30	.340	[illegible]	[illegible]	6.40	4.07	33	.37	.362*	[illegible]
8. Registered Terms until Passage of General Exams	16.41	4.90	37	[illegible]	.780**	[illegible]	5.16	2.26	30	.157	[illegible]	[illegible]
9. Lapsed Time until Passage of General Exams	14.04	9.22	37	.290	[illegible]	.763**	14.90	4.90	30	.320	[illegible]	[illegible]
10. Part-time Terms	7.76	6.40	30	.308	[illegible]	[illegible]	7.72	3.13	37	.230	.712**	[illegible]
11. Full-time Terms	6.38	2.30	37	-.300	-.073	.136	6.23	2.19	30	-.343	-.166	-.306
12. Registered Terms before Course Completion	18.00	4.00	30	.183	[illegible]	[illegible]	6.06	2.25	30	.180	.372*	.117*
13. Lapsed Time until Course Completion	13.05	11.13	30	[illegible]	[illegible]	.390*	5.30	3.90	37	.241	.713**	.337*
14. Credits taken Outside Department	27.90	9.77	30	-.227	.053	.235	31.90	34.13	30	-.441	.330	.082

TABLE 4.3 CONTINUED

Independent Variables	PHYSICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	BIOLOGICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
15. Registered Time between end of Course Work and end of Dissertation	5.30	3.66	40	-.022	.429*	.472*	4.36	2.89	95	.143	.319*	.116*
16. Lapsed Time between end of Course Work and end of Dissertation	8.46	5.36	40	.111	.584**	.549*	5.05	4.63	96	.227*	.837**	.283*
17. Number of Credits below 600	8.46	11.29	40	.175	.240	.175	22.18	13.43	94	.143	.316*	.237*
18. Credits taken before Organization of Committee	14.08	12.76	40	.214	.344*	.343*	19.78	18.96	74	.213	.329*	.416*
19. Grade Point Average - Ph.D.	3.86	0.36	40	-.131	-.313*	-.299*	3.43	0.32	98	-.082	-.173	-.204*
20. Pages in Dissertation	184.11	68.80	40	.213	.218	.080	114.71	43.70	80	.079	.161	.137
21. Lapsed Time in Residence after end of Course Work	6.30	3.65	40	-.186	-.056	.054	4.46	3.32	83	.121	.477*	.310*
22. Lapsed Time off-campus after end of Course Work	2.16	4.81	40	.271	.788**	.571*	9.22	6.08	21	.618*	.872*	-.073

Independent Variables	HUMANITIES (Arts & Letters) Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	SOCIAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
15.	9.55	3.18	30	.300	.194	.043*	5.82	3.42	40	.404*	.303*	.676*
16.	11.63	9.78	30	.179	.830**	.068	9.19	5.73	40	.398*	.854*	.495*
17.	17.30	12.43	30	.185	-.090	.409*	14.87	9.04	35	.023	.121	.040
18.	13.78	11.08	30	-.057	-.144	.013	22.43	11.70	35	.214	.240	.385*
19.	3.75	0.22	30	-.090	-.309*	-.435*	3.73	0.34	40	.080	-.122	-.243
20.	288.70	122.30	31	-.028	-.054	-.079	178.67	91.88	43	.290	.274	.131
21.	7.63	3.43	30	-.275	-.218	.312	5.12	2.90	22	.230	.094	.167
22.	9.10	14.76	30	.244	.811**	.001	12.13	5.42	22	.119*	.863**	.215

Independent Variables	EDUCATION Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	PROFESSIONS Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
15.	3.13	2.18	36	.131	.130	.344*	5.78	3.48	30	.184	.489*	.388*
16.	5.45	3.72	36	-.023	.178	.086	8.58	5.09	30	.371*	.732**	.778**
17.	13.64	8.29	35	.109	.370*	.362*	13.80	8.34	30	-.087	-.330	.011
18.	15.08	11.35	23	.163	-.210	-.092	19.47	13.41	30	-.104	.415	.165
19.	3.00	0.19	36	-.089	-.061	-.360*	3.47	0.27	30	-.072	-.358	-.082
20.	188.90	88.67	37	-.131	.191	.143	239.96	88.65	35	-.136	.087	.174
21.	3.30	2.55	13	.309*	.293	.198	4.83	2.39	27	-.068	.021	.200
22.	6.71	3.79	22	-.426*	-.125	-.085	12.75	3.87	14	.303	.798	.828*

TABLE 4.3 CONTINUED

Independent Variables	PHYSICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[a] I[5]	II[6]	III[7]	BIOLOGICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[a] I[5]	II[6]	III[7]
23. Lapsed Time of Interruptions	1.88	3.72	40	.315*	.795**	.461*	5.04	5.34	47	.380*	.719**	-.062
24. Number of Ph.D. Credits	86.46	21.30	40	.390*	.437*	.476*	85.83	21.50	50	.330*	.370*	.447*
25. Sex	1.00	0.00	40	.000	.000	.000	1.02	0.14	50	-.004	-.087	-.037
26. Number of Institutions Since BA	1.30	0.65	40	.317*	-.110	-.070	1.72	0.91	54	.270*	.026	.094
27. Rating of BA Institution	1.90	0.30	30	-.170	-.115	-.084	1.94	0.37	38	-.165	-.074	-.204
28. Grade Point Average (Undergraduate)	3.18	0.34	28	-.329*	-.340*	-.390*	3.46	0.39	66	-.046	-.062	-.032
29. Grade Point Average (Graduate)	3.47	0.65	27	-.030	-.300	-.319*	3.51	0.30	70	.126	-.122	-.291*
30. Research Experience	1.66	0.46	30	-.150	.180	.127	1.47	0.54	82	-.240*	.040	.061
31. Age at end of Ph.D.	29.22	3.31	40	.613**	.464*	.367*	31.46	5.27	50	.500**	.324*	.021
32. Number of children at end of Ph.D.	1.35	1.30	40	.370*	.330*	.304	2.13	1.06	66	.272*	-.130	-.177
33. Spouse activities	1.42	0.50	39	.220	.080	-.012	1.32	0.86	64	-.054	-.064	-.044
34. Age at Entry to Ph.D.	25.12	2.78	40	.670*	-.119	-.119	27.73	4.08	56	.600**	.117	-.150

Independent Variables	HUMANITIES (Arts & Letters) Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[a] I[5]	II[6]	III[7]	SOCIAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[a] I[5]	II[6]	III[7]
23. Lapsed Time of Interruptions	18.78	18.79	30	.317*	.816**	-.019	7.43	7.11	40	.377*	.800**	-.036
24. Number of Ph.D. Credits	86.13	21.13	30	.340	.055	.330*	85.82	22.18	40	.312	.478*	.379*
25. Sex	1.05	0.22	30	.119	.087	-.021	1.04	0.20	40	.041	.053	-.019
26. Number of Institutions Since BA	1.05	1.00	30	.442*	-.004	-.055	1.04	0.76	45	.434*	.009	.104
27. Rating of BA Institution	1.80	0.41	18	-.145	.075	-.014	1.43	0.50	33	-.071	.035	.004
28. Grade Point Average (Undergraduate)	3.43	0.35	21	-.204	-.137	-.202	3.31	0.30	27	-.104	.103	-.104
29. Grade Point Average (Graduate)	3.80	0.26	30	-.21*	-.212	-.300*	3.41	0.25	36	.171	.030	-.087
30. Research Experience	1.05	0.34	22	-.039	-.050	-.021	1.34	0.50	36	-.104	-.304	-.087
31. Age at end of Ph.D.	34.00	6.63	30	.861**	.416*	-.061	32.10	5.13	40	.800**	.603*	.579*
32. Number of children at end of Ph.D.	1.46	1.78	37	.420*	-.004	-.190	2.17	1.09	77	.061	.136	.132
33. Spouse activities	1.31	0.47	30	-.036	.234	.036	1.30	0.46	30	-.305	.011	-.075
34. Age at Entry to Ph.D.	28.00	5.41	30	.682**	-.061	-.190	27.40	4.33	40	.600**	.330*	.440*

Independent Variables	EDUCATION Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[a] I[5]	II[6]	III[7]	PROFESSIONS Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[a] I[5]	II[6]	III[7]
23. Lapsed Time of Interruptions	8.92	9.07	31	.330	.887**	.002	6.17	5.83	27	.460*	.400*	.410*
24. Number of Ph.D. Credits	100.00	17.94	30	-.304	.232	.383*	96.30	17.67	30	-.753	.112	.190
25. Sex	1.10	0.30	30	.400*	-.300	-.080	1.03	0.18	30	.022	-.130	-.073
26. Number of Institutions Since BA	2.06	1.34	33	.346	-.300	-.304	1.75	1.18	34	.003	-.318	-.190
27. Rating of BA Institution	1.07	0.30	1	.821*	-.971*	-.002	1.00	0.00	0	.000	.000	.000
28. Grade Point Average (Undergraduate)	3.13	0.41	34	-.005	.190	.442*	3.17	0.44	34	-.100	-.110	-.132
29. Grade Point Average (Graduate)	3.33	0.29	29	-.150	-.146	-.008	3.33	0.25	30	-.103	-.136	-.330
30. Research Experience	1.03	0.30	27	.074	.023	-.000	1.30	0.51	31	.190	.231	.171
31. Age at end of Ph.D.	37.20	6.72	30	.879**	.400*	.100	33.00	7.35	30	.000**	.479*	.200
32. Number of children at end of Ph.D.	2.04	1.30	33	.404*	.300*	.332*	2.41	1.13	25	.400*	.400*	.230
33. Spouse activities	1.30	0.51	34	-.003	.707	.100	1.00	0.50	30	-.130	-.137	.147
34. Age at Entry to Ph.D.	32.20	6.05	30	.814**	.010	-.100	30.03	6.00	30	.900**	.221*	.130

a - Testing Hypothesis 37 (non-significant)

TABLE 4.3 CONTINUED

Independent Variables	PHYSICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	BIOLOGICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
35. Development of Field of Study Goals	3.30	1.71	40	.350*	.097	.229	4.76	1.32	97	.013	.087	.133
36. Career plans at Graduate Entrance	1.90	0.75	46	-.201	-.198	-.093	1.81	0.61	94	-.216*	.011	.015
37. Importance of Ease and Speed for Attending Michigan State University	2.92	1.29	40	.010	.022	-.013	2.40	0.76	93	-.065	.050	.040
38. Importance of Research Opportunity for Attending Michigan State	2.16	1.13	40	.019	.197	.182	1.86	0.88	95	.237*	.197*	-.087
39. Importance of scholarship/assistantship for attending Michigan State	1.70	1.11	40	-.017	-.130	-.134	2.13	1.12	98	.182	.076	-.070
40. Evaluation of Decision to attend Michigan State University	Due to Maximum Limit of [illegible] Being Exceeded, Deleted as of Lesser Significance											
41. Rating of Department among Experts	2.00	0.80	40	-.062	.130	.247	1.81	0.98	98	-.090	.037	.139
42. Rating of Department's Research Training	1.86	0.88	40	-.173	.020	.032	1.57	0.72	98	-.063	.127	.173

Independent Variables	HUMANITIES (Arts & Letters) Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	SOCIAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
35. Development of Field of Study Goals	34.50	0.83	30	.213	-.009	-.205	4.30	1.50	48	.300*	.201	.327*
36. Career plans at Graduate Entrance	1.46	1.70	37	-.000	-.017	-.094	1.71	0.76	47	-.178	.000	.230
37. Importance of Ease and Speed for Attending Michigan State University	2.25	1.10	28	-.123	-.251	-.081	2.64	0.77	43	-.372*	-.119	-.404*
38. Importance of Research Opportunity for Attending Michigan State	2.00	1.20	28	-.031	-.303*	.026	2.70	1.10	45	-.262	-.300*	-.309*
39. Importance of scholarship/assistantship for attending Michigan State	2.05	1.30	30	.421*	-.001	-.180	2.10	1.26	47	-.141	-.199	-.182
40. Evaluation of Decision to attend Michigan State University							Due to Maximum Limit of [illegible] Being Exceeded, Deleted as of Lesser Significance					
41. Rating of Department among Experts	2.40	1.43	30	-.294	-.017	.180	1.74	0.53	47	-.133	-.187	-.112
42. Rating of Department's Research Training	2.25	0.89	30	-.112	-.243	.026	1.90	1.07	47	-.210	-.230	-.180

Independent Variables	EDUCATION Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	PROFESSIONS Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
35. Development of Field of Study Goals	5.00	1.53	30	.214	.011	-.068	4.45	1.19	38	.302	.200	.187
36. Career plans at Graduate Entrance	1.77	0.71	37	-.099	-.006	-.008	1.43	0.79	36	-.201	-.176	.082
37. Importance of Ease and Speed for Attending Michigan State University	2.21	1.02	36	-.096	-.212	-.377*	2.14	0.95	25	.070	.330*	.309*
38. Importance of Research Opportunity for Attending Michigan State	2.00	0.83	36	.119	-.000	-.000	2.86	1.15	34	.247	.416*	.219
39. Importance of scholarship/assistantship for attending Michigan State	2.73	1.20	30	.380*	.423*	.371*	2.11	1.21	35	.400*	.071	.180
40. Evaluation of Decision to attend Michigan State University												
41. Rating of Department among Experts	1.85	1.07	37	-.012	-.184	-.070	1.70	0.99	38	.190	-.184	-.161
42. Rating of Department's Research Training	2.20	0.90	37	-.110	-.180	-.300*	2.41	1.10	35	.063	.061	.020

TABLE 4.3 CONTINUED

Independent Variables	PHYSICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	BIOLOGICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
43. Number of Faculty Known to [illegible] Problems	Due to Maximum Limit of ISCORR Being Exceeded, Deleted as of Lesser Significance											
44. Rating of Department's Sensitivity to Student Needs	1.85	0.84	40	.060	.213	.193	1.33	0.61	96	-.290*	-.0[illegible]	.035
45. Rating of Department's Research Skills	1.84	0.80	40	-.001	-.006	.036	1.43	0.57	96	-.260*	-.036	.100
46. Comparison of Michigan State University Stipends [assistantships, etc.] to Those of other Universities	2.00	0.82	40	-.027	.195	.279	1.94	0.72	97	.071	.002	.027
47. Comparison of Michigan State University Research Facilities to those of other Universities	1.96	0.82	40	-.179	-.263	-.274	1.84	0.67	98	.022	.006	.014
48. Importance of Financial Need for Assistantships, etc.	2.34	1.00	40	-.010	.279*	.257	2.04	0.36	92	-.004	.042	.042
49. Validity of Department's Formal Studies	2.20	0.65	40	-.005	-.009	-.123	2.11	0.66	94	.111	-.019	-.04[illegible]

Independent Variables	HUMANITIES [Arts & Letters] Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	SOCIAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
43.	Due to Maximum Limit of ISCORR Being Exceeded, Deleted as of Lesser Significance											
44.	1.10	0.73	30	-.307*	-.304*	-.079	1.92	0.67	47	.011	.262	.310*
45.	1.40	0.63	30	-.023	.014	-.023	1.74	0.53	47	-.103	-.107	-.112
46.	1.93	0.83	30	-.046	.036	.030	1.90	0.71	46	-.002	-.143	-.077
47.	2.35	0.89	30	-.405*	-.316*	-.100	2.04	0.65	46	-.130	-.201	-.136
48.	2.40	0.91	30	-.076	-.230	-.130	2.40	0.34	42	-.131	-.040	.005
49.	2.35	1.03	30	.361*	.221	.013	2.30	0.93	46	.310*	.40[illegible]*	.300*

Independent Variables	EDUCATION Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	PROFESSIONS Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
43.	Due to Maximum Limit of ISCORR Being Exceeded, Deleted as of Lesser Significance											
44.	1.09	0.00	37	-.127	-.112	-.276	1.85	0.74	39	.140	.100	.008
45.	1.75	0.66	36	-.111	-.070	-.137	1.80	0.60	38	.127	-.107	.007
46.	1.90	0.83	36	-.031	.147	.157	1.87	0.86	37	-.152	-.000	-.122
47.	1.92	0.76	35	-.005	-.053	-.236	2.00	0.88	38	-.078	-.290	-.085
48.	2.61	0.80	36	.143	.072	.000	2.53	0.80	36	-.210	.323	.057
49.	1.92	0.75	36	.390	.309	-.016	2.33	0.76	38	.038	-.076	.016

TABLE 4.3 CONTINUED

Independent Variables	PHYSICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	BIOLOGICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
90. Validity of Department's Too Low Admission Standards	2.84	0.72	40	-.077	-.027	-.086	2.86	0.56	97	-.011	-.005	.018
91. Validity of Department's Student Exploitation	1.98	0.82	40	-.146	-.213	-.290*	2.79	0.86	97	.045	.084	-.029
92. Validity of Department's Concern for Conformity	2.74	0.80	40	-.120	-.273	-.304*	2.90	0.80	95	.016	-.083	-.304*
93. Validity of Department's Over Interest in Research	2.30	0.86	40	-.287	-.239	-.276	2.57	0.78	95	-.079	-.084	-.063
94. Lengthening Due to Inadequate Preparation	2.32	0.81	32	-.140	-.221	-.206	2.29	0.80	82	-.187	.246*	-.210*
95. Lengthening Due to Unpaid Work	2.75	0.30	10	-.006	-.214	-.040	2.70	0.50	40	.005	-.061	-.103
96. Lengthening Due to Language Requirement	2.30	0.75	46	-.105	-.204	-.302	2.11	0.75	89	-.140	-.137	-.143
97. Lengthening Due to Teaching Assistantship	2.00	0.80	32	-.110	-.146	-.140	2.29	0.76	90	-.161	-.110*	-.226

Independent Variables	HUMANITIES (Arts & Letters) Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	SOCIAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
90.	2.40	0.84	30	.204	.187	.181	2.84	0.73	46	.019	-.016	.001
91.	2.63	0.95	30	.441*	.370*	.200	2.49	0.85	46	.230	.277*	.136
92.	2.00	0.85	30	.260	.172	-.195	2.16	0.72	40	-.079	.047	-.120
93.	2.03	0.83	30	.410*	.100	.047	2.43	0.72	45	.003	.122	.100
94.	2.06	0.72	22	.467*	-.206	-.329*	2.00	0.85	30	-.006	-.271	-.014
95.	2.74	0.46	17	.213	-.377	-.315	2.67	0.66	19	-.013	-.336	-.046
96.	2.15	0.71	27	-.183	-.463*	-.421*	2.33	0.78	44	.070	.082	.087
97.	2.21	0.82	27	.151	-.334	-.356	2.36	0.83	36	-.190	-.344	-.371

Independent Variables	EDUCATION Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	PROFESSIONS Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
90.	2.61	0.70	35	.135	.270	.340*	3.03	0.63	37	-.030	.400*	.180
91.	2.34	0.89	36	-.107	.023	.141	2.86	0.62	38	.104	.237	.180
92.	2.34	0.68	37	.143	.033	.139	2.75	0.81	38	.081	.250	.211
93.	2.05	0.70	37	-.030	.090	.121	2.30	0.82	38	-.112	-.123	.089
94.	2.74	0.38	17	.241	.177	.084	2.41	0.59	28	.204	-.087	.070
95.	2.80	0.35	6	.061	.008	.330	2.73	0.46	13	.250	.190	.141
96.	2.59	0.74	32	.182	-.371*	-.412*	2.36	0.75	32	-.213	-.400*	-.383*
97.	2.10	0.72	15	.025	-.188	-.409	2.40	0.75	23	.340	-.207	-.383

TABLE 4.3 CONTINUED

Independent Variables	PHYSICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	BIOLOGICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
58. Lengthening Due to Research Assistantship	3.34	0.83	27	-.102	.259	.246	2.06	0.93	72	-.011	-.249*	-.129
59. Lengthening Due to Work Off Campus	2.22	0.97	7	-.0009	-.218	-.418	1.93	0.80	13	-.329	-.427	.008
60. Lengthening Due to Veteran's Benefits	Due to Maximum Limit of INCOME Being Exceeded Deleted as of Lesser Significance											
61. Lengthening Due to Learn and Work	1.88	0.98	6	-.822*	-.043	-.103	1.09	0.83	16	-.270	-.311	.265
62. Lengthening Due to Family Obligations	1.97	0.76	27	-.419*	-.331*	-.419*	2.53	0.77	57	-.075	-.253*	.076
63. Lengthening Due to General Exams	2.37	0.85	64	-.188	.014	-.082	2.11	0.84	89	.182	-.185	-.219*
64. Lengthening Due to Thesis	1.90	0.86	46	-.088	-.419*	-.303*	1.98	0.82	93	-.097	-.253*	-.176
65. Evaluation of Procedures for Selection of Major Professor	1.12	1.36	48	-.133	.018	-.018	1.83	0.78	63	-.169	.008	.000
66. Length of Time Before Assignment of Major Professor	2.30	1.47	48	-.158	.301*	.176*	1.17	0.86	98	.034	.267*	.240*
67. Number of Meetings with Major Professor	2.50	1.11	48	-.332*	-.319*	-.270	2.90	1.14	98	-.188	-.213*	-.043

Independent Variables	HUMANITIES (Arts & Letters) Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	SOCIAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
58.	1.06	1.10	3	.741	.040	.063	2.57	0.74	28	-.470*	-.170	-.307
59.	1.82	0.98	9	-.423	-.613*	-.073	1.73	0.78	13	.360	-.049	.040
60.							Due to Maximum Limit of INCOME Being Exceeded, Deleted as of Lesser Significance					
61.	1.26	0.56	17	-.072	-.541*	-.185	2.40	0.81	13	-.388	-.231	-.219
62.	2.34	0.97	23	.185	-.579*	-.179	2.13	0.76	29	-.636*	-.379*	-.332*
63.	2.36	0.71	27	-.000	-.362*	-.046	2.40	0.72	46	.009	-.040	-.009
64.	1.80	0.79	36	-.248	-.306*	-.071	1.73	0.81	43	-.083	-.119	-.298
65.	1.46	1.09	36	-.284	-.185	.076	1.77	0.83	33	.183	.309*	.227
66.	1.63	1.13	38	-.187.	.138	.014	2.28	1.53	40	.072	.145	.132
67.	1.78	1.18	36	.183	-.130	.031	1.74	0.84	47	-.000	-.008	.015

Independent Variables	EDUCATION Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	PROFESSIONS Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
58.	2.44	0.88	7	-.340	.061	-.173	2.77	0.73	12	-.134	-.309	-.386
59.	1.42	0.69	17	-.228	-.653*	-.479*	1.90	1.10	8	-.400	-.408	-.380
60.												
61.	1.77	0.93	11	-.035	-.230	.080	1.17	0.75	9	-.117	.118	-.092
62.	2.23	0.88	33	-.167	-.429*	-.323*	2.32	0.84	28	-.118	-.460*	-.388
63.	2.51	0.61	35	.208	-.075	-.172	2.18	0.78	38	-.388	-.488*	-.410*
64.	1.00	0.72	37	.180	-.134	-.287	1.67	0.77	37	-.144	-.469*	-.272
65.	1.77	0.73	38	-.105	-.405*	-.140	2.27	0.98	29	-.221	-.238	-.384
66.	1.79	0.88	38	.208	.031	.140	1.35	1.05	35	.008	.387*	.173
67.	1.11	0.83	37	-.009	-.073	-.238	1.49	0.78	37	-.184	-.134	-.082

TABLE 4.3 CONTINUED

Independent Variable	PHYSICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	BIOLOGICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
68. Department's Orientation Program	2.34	1.18	40	-.131	.004	.174	2.35	0.90	93	-.000	.022	-.030
69. Amount of Supervision of Thesis Given	2.34	1.74	40	.100	.3290	.2870	3.00	1.1.	91	-.090	.022	.037
70. Amount of Supervision Preferred	2.94	1.18	40	.023	.238	.2870	3.20	1.25	97	-.170	.071	.009
71. Opportunity to Incorporate Own Ideas	1.18	0.37	40	-.290	-.056	-.087	1.15	0.60	97	.050	-.010	.010
72. Opportunity to Incorporate Student Ideas If Student were Professor	2.08	0.94	40	.026	-.090	-.119	2.00	0.57	97	-.013	-.112	-.000
73. Number of Quarters Fellowship, etc. Held	1.02	2.04	40	-.2790	-.113	-.124	7.00	4.00	17	-.167	-.017	.190
74. Average Value per Quarter	720.14	707.00	13	-.114	.130	.115	702.47	300.17	17	-.090	-.133	.002
75. Number of Quarters Fee Reduction Held	4.70	2.34	15	-.302	-.304	-.470	5.61	4.32	20	-.121	.077	.201
76. Average Value per Quarter	151.03	102.23	16	-.006	-.435	-.5340	134.73	94.71	20	-.123	-.370	-.376
77. First Language Proficiency	1.71	0.46	38	-.220	.000	.201	1.06	0.50	75	-.130	.012	-.014

Independent Variable	HUMANITIES (Arts & Letters) Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	SOCIAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
68.	2.73	1.11	30	-.222	-.290	-.230	2.27	0.06	47	-.213	-.006	-.033
69.	2.30	1.60	30	-.165	.014	-.125	2.06	1.30	40	-.103	-.000	.221
70.	2.20	1.36	30	-.102	-.015	-.170	2.00	1.30	45	-.172	-.242	-.030
71.	1.10	0.30	30	.035	.014	.103	1.10	0.31	40	.070	.047	-.001
72.	2.70	0.06	30	.007	-.190	-.0480	2.73	0.04	40	-.105	-.257	.000
73.	6.95	2.10	30	-.211	-.202	-.004	2.00	2.30	8	-.277	-.054	-.061
74.	071.90	494.43	8	-.372	-.139	-.011	610.12	181.00	8	.000	.000	-.130
75.	3.04	1.51	9	-.0400	-.0030	-.000	4.22	3.11	7	.219	.361	.290
76.	140.30	115.77	9	.102	.394	/778	151.67	100.79	7	-.331	-.024	-.190
77.	1.36	0.45	29	.034	.109	.211	1.70	0.44	31	.203	.270	.174

Independent Variable	EDUCATION Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	PROFESSIONS Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
68.	2.76	0.43	35	-.017	-.117	-.000	2.00	1.10	37	-.307	.009	-.073
69.	2.05	1.41	30	.030	-.154	-.3390	2.10	1.29	31	.030	-.004	.000
70.	2.00	1.30	34	.131	.000	-.107	2.37	1.30	36	.030	-.132	.013
71.	1.13	0.34	37	-.106	.170	-.104	1.10	0.30	30	-.106	.016	.140
72.	2.02	0.51	30	.230	.150	.093	2.90	0.35	30	.110	-.071	-.133
73.	3.40	1.71	8	-.218	.000	.112	2.47	1.30	18	.067	.078	.025
74.	902.00	304.01	8	.100	.120	-.017	719.03	223.47	16	.004	-.163	-.000
75.	4.00	3.41	9	-.061	.103	.374	3.00	2.01	9	.000	-.302	-.330
76.	190.01	61.08	9	.003**	-.357	-.087	192.00	127.41	9	.304	-.207	-.106
77.	1.30	0.51	10	.026	-.003	.112	1.37	0.50	17	-.271	.163	.087

TABLE 4.3 CONTINUED

Independent Variables	PHYSICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	BIOLOGICAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	HUMANITIES (Arts & Letters) Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
78. Second Language Proficiency	1.59	0.50	30	.092	.000	.029	1.67	0.47	62	.042	-.036	-.113	1.43	0.50	22	.360	.576*	.279
79. Number of Interruptions	0.92	1.06	46	.400*	.299*	.277	1.79	0.91	50	.479*	.236	.101	1.03	1.22	30	.756**	.431*	.077
80. Total Years of Interruptions	2.14	2.77	46	.620*	.449*	.361	5.42	4.44	50	.825*	.246	.018	5.19	5.52	30	.756**	.261	-.300
81. Scholarship or not	1.52	0.51	46	.282*	.076	.043	1.74	0.44	50	.132	.062	-.029	1.43	0.49	30	.300	.178	-.025
82. Total Number of Quarters Teaching Assistantship Held	4.00	6.22	46	.184	.087	.241	6.16	3.02	17	-.017	.279	.191	2.40	2.97	30	-.447*	-.170	.032
83. Average Value per Quarter	200.36	200.10	46	.045	-.010	.136	741.06	64.67	17	.270	-.234	.071	391.73	365.10	30	-.366*	-.347*	-.022
84. Total Number Quarters Research Assistantship Held	5.10	5.95	46	-.096	-.013	.090	11.15	5.31	50	-.150	.134	.175	5.19	5.52	30	-.154	-.154	-.095
85. Average Value per Quarter	702.98	69.03	22	-.088	-.542*	-.318	788.80	78.11	50	.243	-.000	.045	650.00	0.00	0	.000	.000	.000
86. Number of Quarters on Campus Jobs Held	1.76	3.32	46	-.082	.100	.000	7.00	0.00	36	.000	.000	-.000	2.23	0.51	30	-.024	.183	-.340
87. Average Value per Quarter	1301.61	470.27	16	.000	.229	.304	1308.33	566.72	36	-.115	.747	-.705	1225.27	460.93	13	.214	-.170	-.004
88. Salary per Year of Ph.D. Job	17177.00		46	-.087	.138	.093	17798.51		50	-.033	.005	.077	13238.25		30	-.349*	-.313*	.185
89. Number of Transfer Credits	40.05	30.16	16	-.270	-.097	-.203	41.00	30.02	19	-.203	.190	-.010	37.14	35.35	5	-.142	-.316	.009
90. Citizenship	1.30	0.46	46	.301	-.173	-.130	1.19	0.36	50	.229	-.250	-.204	1.05	0.16	30	-.104	.112	.010

a - Testing Hypothesis 3I (non-significant)

TABLE 4.3 CONTINUED

Independent Variables	SOCIAL SCIENCES Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	EDUCATION Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]	PROFESSIONS Mean[1]	S.D.[2]	d.f.[3]	Correlation and t-Test[4] I[5]	II[6]	III[7]
78. Second Language Proficiency	1.50	0.52	10	-.319	.150	-.083	1.33	0.58	1	-.024	-.371	.000	1.00	0.00	2	.000	.000	.000
79. Number of Interruptions	1.07	1.04	36	.462*	.322	.340*	2.40	0.92	36	.367*	.102	.027	1.71	0.90	29	-.052	.001	.300
80. Total Years of Interruptions	5.16	3.95	36	.846**	.380*	.467*	4.79	6.02	36	.730**	.331*	.073	7.40	8.00	29	.950**	.247	.110
81. Scholarship or not	1.72	0.45	46	.167	.108	.200	1.43	0.49	30	.221	.103	.026	1.46	0.50	30	.361*	.051	.061
82. Total Number of Quarters Teaching Assistantship Held	6.00	4.61	17	-.244	.043	.217	3.33	1.63	6	.081	.279	-.148	3.79	2.29	12	.041	.133	.375
83. Average Value per Quarter	673.21	135.83	17	-.244	-.300	-.173	668.67	176.30	6	.400	.462	.757	636.78	198.73	12	-.089	-.238	-.271
84. Total Number Quarters Research Assistantship Held	6.77	3.13	13	.304	.367	.461	5.57	3.16	5	.736*	-.204	.082	5.00	4.08	8	-.241	-.250	-.183
85. Average Value per Quarter	695.13	169.27	13	-.000	-.170	-.221	707.29	223.53	5	-.614	.305	.613	1002.00	198.76	8	-.229	.170	.098
86. Number of Quarters on Campus Jobs Held	0.00	0.00	30	.420*	.387*	.470*	5.36	2.41	12	.005	.007	.300	6.33	3.37	30	.003	.213	.140
87. Average Value per Quarter	637.35	730.57	30	.346*	.108	.227	1222.67	877.04	12	-.183	.300*	.003	1087.30	279.04	30	-.127	-.100	-.447*
88. Salary per Year of Ph.D. Job	687.00		36	-.040	.000	.037	14823.30		30	.092	.073	.188	17340.40		30	.005	-.290	-.130
89. Number of Transfer Credits	30.94	10.21	15	.250	.940*	.110	47.30	33.37	8	-.275	.303	-.060	36.30	14.03	10	-.090	-.000	-.005
90. Citizenship	1.22	0.42	46	.307*	-.090	-.112	1.10	0.30	30	-.141	-.130	-.167	1.30	0.41	30	-.138	-.175	-.115

variables in the field of education or the humanities, neither did they show a significant correlation within any of the other fields (Table 4.3).

Correlational Analysis: Discussion of the 90 Variables in Relation to the Fields

In the correlational analysis of the total sample, 62 of the 90 independent variables were found to be significantly different from zero at the .05 alpha level (14 of which were significantly greater than $\rho = .5$ at the .05 alpha level) and the remaining 28 were found to be non-significant (Table 4.2).

In reviewing the results of the correlations within the 6 fields (Table 4.3), it was found that the physical and biological sciences, with a population of 50 and 100 respectively, show 42 independent variables (not all the same ones) correlating significantly with one or more of the 3 dependent variables while 45 do not. Seven of the 42 physical sciences' variables correlate significantly greater than .50 at the .05 alpha level while 14 in the biological sciences do (Table 4.3).

The humanities with a population of 40 lists 44 significant and 43 non-significant variables with 12 being significantly greater than .50.

Both the social sciences with a population of 50 and education with a population of 40 report 37 significant and 50 non-significant variables with the former

having 8 variables correlating significantly greater than .50, and the latter 14.

Finally, the professions with a population of 40 had 29 significant and 50 non-significant independent variables with 14 correlating significantly greater than .50.

Of those independent variables which show correlations significantly greater than .50, Lapsed Time until Passage of General Exams (9), Part-time Terms (10), and Age at End of Ph.D. (31), do so in all 6 fields. Two others, Age at Entry to Ph.D. (34) and Total Years of Interruptions (80), are represented at the significantly greater than .50 correlation in 5 of the 6 fields, the exception being the physical sciences which still correlated highly significantly greater than zero (.676 and .620).

All 6 fields have at least significant correlations with 12 other independent variables (3, 4, 5, 6, 7, 8, 12, 13, 15, 23, 62, and 81). Eight of these variables are concerned with formal doctorate requirements, and one each with number of major advisors, doctoral study interruptions, family obligations, and scholarships.

A close analysis of the correlational data on the 90 variables across the 6 fields in relation to the total sample's correlational data reveals some rather interesting phenomena.

First, of the 28 variables which are not significantly correlated for the total sample, 19 (68 per cent) are significant for one or more of the fields. Secondly, of the 62 variables correlating significantly in the total sample, 31 (50 per cent) are significant for 3 fields or less out of the 6. In fact, of the 31, 11 are significant for but 1 field, 8 for 2 fields, and 12 for 3 fields. Thirdly, 2 of the variables which are not significant for any of the fields separately are significant for the total sample.

Examining the 19 variables significant for one or more of the fields but not for the total sample may well yield additional influences which are brought to bear on the doctoral recipients' time lapses due to the nature of their fields.

The humanities alone account for 4 of these significant variables. Recipients who reported their Department's Over-Interest in Research (53) to be at least not valid and who in Comparing Michigan State University Research Facilities to Others (47) rated them as good or excellent had longer Lapsed Time: B.A.-Ph.D. with Ph.D. Entry-Reception longer for the latter and Lapsed Time: B.A.-Ph.D. longer for the former. Those recipients who responded that they would give their students more opportunity to Incorporate Their Own Ideas Into Their Thesis (42) than their major professor had given them

took longer Registered Time: Ph.D. Entry-Reception. This finding seems to reflect a dissatisfaction level. Finally, Variable 78, Second Language Proficiency, correlated significantly with Lapsed Time: Ph.D. Entry-Reception. The physical sciences are alone responsible for 3 more of the 19 variables. Recipients who saw Validity in the Criticism of Their Departments's Rewarding of Conformity (52) took longer Registered Time: Ph.D. Entry-Reception and, as in the humanities, those who would have given their students more Thesis Supervision than they got (70), took longer to finish Registered Time: Ph.D. Entry Reception. Not surprisingly for the heavily research oriented physical sciences, those recipients who received less Average Value Per Quarter for a Research Assistantship showed a longer Lapsed Time: Ph.D. Entry-Reception.

Education contributed 3 significant variables as a field. Ph.D.'s who disagreed with the Validity of the Department's Too Low Admission Standards (50) finished with more Registered Time: Ph.D. Entry-Reception--a finding which may reflect a function of ability. Similarly, those recipients who gave at least a good rating to their Department's Research Training (42) finished with longer Registered Time: Ph.D. Entry-Reception. Finally, the sample size (3) was too small to given any meaning to the Rating of the M.A. Institution Attended (27).

Social sciences accounted for 2 of the 19 significant correlations by itself with biological sciences adding one. Somewhat surprisingly, the more Transfer Credits (89) a recipient has had accepted for doctoral study in the social sciences, the longer Lapsed Time: Ph.D. Entry-Reception he exhibits. Again, the greater Number of Quarters On Campus Jobs were Held by a social science doctoral recipient, the longer he took on all 3 time variables. The assumption here is that the working tends to limit the amount of time allocated to the pursuit of the doctorate.

Finally, the biological sciences show a significant correlation for Variable 30, Research Experience. And yet, it does so negatively with Lapsed Time: B.A.-Ph.D. which at first appears unexpected. It can, however, be explained by the fact that Age at the End of the Ph.D. (31) for the biological sciences correlates very highly (.886) with Lapsed Time: B.A.-Ph.D., indicating that time taken to gain research experience takes away time which most recipients seem to put rather early into actual pursuit of the doctorate.

Of the remaining 6 independent variables which are not significant for the total sample, 4 correlate significantly for but 2 fields. Validity of a Department's Formal Hurdles (49) when perceived as invalid criticism correlated with Lapsed Time: B.A.-Ph.D. for

both the social sciences and the humanities. Variable 58, Lengthening Due to Research Assistantships, correlated negatively with Lapsed Time: B.A.-Ph.D. for the social sciences and with Lapsed Time: Ph.D. Entry-Reception in the biological sciences, indicating that those degree recipients who perceived research assistantships as lengthening their doctorate did, in fact, have longer lapsed times. The greater the satisfaction with the Procedures Used in Selecting a Major Professor (65), the less Lapsed Time: Ph.D. Entry-Reception for education's doctorate recipients; the greater the satisfaction for social science recipients, the longer was that time. Similarly, those recipients in education who were given the most Supervision on their Thesis (65) showed longer Ph.D. Entry-Reception Lapsed and Registered Times; whereas, the social science doctorates who reported very little supervision had longer Lapsed Time: Ph.D. Entry-Reception.

Doctoral recipients in the social sciences and education who reported Ease and Speed of degree completion as quite an important reason for attending Michigan State University (37) showed longer Registered Time: Ph.D. Entry-Reception, while the professions' recipients had less Registered and Lapsed Time: Ph.D. Entry-Reception.

Finally, social science and education recipients who averaged more Money Per Quarter for On-Campus Jobs (87) showed longer Lapsed Times: B.A.-Ph.D. and Ph.D. Entry-Reception respectively; whereas, the professions' recipients had less Registered Time: Ph.D. Entry-Reception.

An analysis of the second interesting phenomenon, namely, the 31 variables that are significantly correlated with the dependent variables for 3 or less fields, also yielded results worthy of brief mention. This is especially true of those 11 variables which, though they are significantly correlated for but one field, yet manage by their strength of association to give a somewhat undue importance to the significance of the variables for the total sample.

Number of Field Changes B.A. to Ph.D. (1) has a significant influence only for education's recipients on their Lapsed Time: B.A.-Ph.D.

Career Plans at Graduate Entrance (36) correlates negatively for biological science degree recipients with Lapsed Time: B.A.-Ph.D. Surprisingly enough, then, those recipients reporting that they are trying out the field finish in less Lapsed Time: B.A.-Ph.D. Biological science degree holders who reported their Department Research Skills as excellent took a longer Lapsed Time: B.A.-Ph.D., indicating perhaps more about the recipients'

personal characteristics than of the actual state of the department's research skills. Variable 57, Lengthening Due to Teaching Assistantship, when viewed by biological science doctors as a lengthening factor, had, in fact, lengthened their Lapsed Time: Ph.D. Entry-Reception.

For the physical sciences, those doctors who have held a Scholarship or Fellowship for a lesser Number of Quarters or not held one at all have taken longer Lapsed Time: B.A.-Ph.D. Likewise, those doctoral recipients from the humanities who held fewer or no Quarters of Fee Remission finished with longer Lapsed Time: B.A.-Ph.D. and Ph.D. Entry-Reception. Again, for the humanities' doctors, the fewer quarters they held teaching assistantships, the longer was the Lapsed Time: B.A.-Ph.D. manifested, pointing up that, despite the time consuming service function of the teaching assistantship, the financial support that it gives (in addition to the higher ability level which probably aided in its initial reception) shortens the total lapsed time. This idea is supported by Variable 83 wherein the higher the Average Value Per Quarter of the Teaching Assistantship, the shorter the lapsed time.

On the other hand, for education degree recipients (though the degrees of freedom is but 5), the greater the Number of Quarters a Research Assistantship is held, the longer the total Lapsed Time: B.A.-Ph.D. And finally,

Variable 90, Citizenship, correlates significantly (positively) only with the field of social science so that, those recipients who are of foreign citizenship have a longer Lapsed Time: B.A.-Ph.D. This is somewhat unexpected in that the significant correlation for the total sample is negative.

The third phenomenon, namely, those 2 variables which though not significant for any of the fields separately are significant for the total sample, deserves a brief perusal. It would appear that these 2 variables, Number of Pages in the Dissertation (20) and First Language Proficiency (77), were not strong enough to correlate by themselves with any of the fields but had sufficient cumulative strength to be significant for the 320 recipients as a group.

From the above analysis and discussion of the associative strength of selected independent and dependent variables, it can be asserted that more accuracy and precision about the functional relationships can be made by virtue of a division of the total sample of recipients into their proper fields of doctoral study.

Factor Analysis of the Selected 76 Variables: Findings

As discussed in Chapter III, the Least Squares Deletion routine did not permit missing data. And so the means of the total given observations of those

variables with missing data were supplied, in place of the missing data, but only in those cases where there were no more than 30 blanks. With a total sample of 320, more than 30 could adversely influence the accuracy of the mean.

Consequently, 14 of the original 90 were dropped from the factor analysis: Variable 27, Rating of M.A. Institutions; Variable 30, Research Experience; Variable 33, Spouse Activities; Variable 54, Lengthening due to Inadequate Preparation; Variable 55, Lengthening due to Repeat Work; Variable 57, Lengthening due to Teaching Assistantship; Variable 58, Lengthening due to Research Assistantship; Variable 59, Lengthening due to Work Off Campus; Variable 60, Lengthening due to Veteran's Benefits; Variable 61, Lengthening due to Leave and Work; Variable 62, Lengthening due to Family Obligations; Variable 65, Evaluation of Procedure; Variable 77, First Language Proficiency; and Variable 78, Second Language Proficiency.

For the 76 remaining variables, an absolute criterion of 28 rotated factors seemed appropriate to produce eigenvalues of 1.00 or more. From the principal axis solution and the Quartimax and Varimax rotations, the latter rotation was selected as most representative of the data, though the Quartimax solution was nearly identical. The results of the 28 factor rotation with

their eigenvalues, proportions of variance, and highest factor loadings for the 76 variables are given in Table 4.4. The eigenvalues ranged from 7.79 for Factor 1 to .912 for Factor 28, while the proportion of variance for each factor ranged from .080 for Factor 1 to .016 for Factors 23 and 28. The cumulative proportion of variance attained .758 at Factor 28. The communalities ranged from .513 for Factor 3 to .945 for Factor 22 (Table 4.4).

The purpose of the factor rotation was to load together as many variables under one category as were measuring basically the same factor and assign to it a common descriptive name. Of the 28 factors rotated, 7 consisted of only one variable and so kept their original item description. They were: Citizenship (Variable 90, Factor 16), Importance of Financial Need for Assistantships (Variable 2, Factor 21), Sex (Variable 25, Factor 23), Comparison of Michigan State University Stipends (Variable 46, Factor 25), Rating of Department Among Experts (Variable 41, Factor 26), and Salary Per Year of Ph.D. Job (Variable 88, Factor 28). Two other factors whose variable loadings were measuring nearly the same thing also maintained their earlier variable names. Thus, Variables 69 and 70, Amount of Supervision of Thesis Given and Preferred, and 71 and 72, Opportunity to Incorporate Own Ideas into Thesis and Opportunity if

TABLE 4.4

HIGHEST FACTOR LOADINGS FOR 76 INDEPENDENT VARIABLES USING THE VARIMAX ROTATION ANALYSIS[1]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Eigenvalues	7.789	5.113	4.795	3.999	2.882	2.442	2.259	2.126	2.026	1,885	1.743	1.670	1.553	1.453
Proportion of Variance	.080	.056	.026	.047	.039	.037	.027	.034	.029	.025	.023	.031	.022	.021
Cumulative Prop. of Var.	.080	.136	.162	.208	.247	.284	.310	.344	.373	.398	.420	.452	.474	.495
Variable														
1														
2														
3	.510													
4	.814													
5	.816													
6	.708													
7	.735													
8	.743													
9	.718													

[1] A. Williams, Factor A: Principal Components and Orthogonal Rotations, Computer Institute for Social Science Research: Michigan State University, 1967, Technical Report XXXIV. (An absolute criterion of 28 rotated factors solution was employed).

TABLE 4.4 (cont.)

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Communalities
Eigenvalues	1.425	1.355	1.350	1.304	1.239	1.174	1.139	1.091	1.062	1.003	.966	.930	.924	.912	
Prop. of Variance	.020	.018	.025	.017	.018	.023	.018	.019	.016	.019	.017	.019	.020	.016	
Cum. Prop. of Var.	.514	.532	.557	.574	.592	.615	.633	.651	.667	.686	.703	.722	.742	.758	
Variable															
1													-.709		.726
2							-.752								.693
3															.513
4															.795
5															.790
6															.805
7															.875
8															.848
9															.816

TABLE 4.4 (cont.)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
10	.579													
11								-.556						
12	.793													
13	.778													
14								-.760						
15									.842					
16					-.862									
17								-.718						
18													.729	
19														
20														
21									.772					
22					-.898									
23					-.700									

TABLE 4.4 (cont.)

Variable	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Communalities
10															.910
11															.821
12															.895
13															.855
14															.761
15															.853
16															.935
17															.722
18															.715
19								-.349							.690
20										-.636					.592
21															.840
22															.945
23															.902

TABLE 4.4 (cont.)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
24								-.676						
25														
26														
28														
29														
31		.888												
32		.466												
34		.902												
35														
36														
37														
38														
40												.662		
41														
42												.691		

TABLE 4.4 (cont.)

Variable	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Communalities
24															.864
25									.798						.767
26													-.670		.620
28								-.816							.770
29								-.534							.641
31															.921
32															.727
34															.898
35	.626														.721
36	.750														.688
37					.751										.683
38						-.683									.679
39					.386										.698
40															.683
41												-.666			.675
42															.703

TABLE 4.4 (cont.)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
43			.658											
44			.679											
45												.735		
46														
47														
48														
49														
50												-.376		
51														
52														
53			-.643											
56														-.344
63														-.641
64														-.712
66													.752	

TABLE 4.4 (cont.)

Variable	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Communalities
43															.688
44															.705
45															.680
46											-.745				.747
47										-.443					.653
48				.799											.723
49			.516												.688
50															.714
51			.751												.686
52			.729												.682
53															.703
56															.643
63															.675
64															.692
66															.733

TABLE 4.4 (cont.)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
67														
68												.317		
69										-.874				
70										-.887				
71											.832			
72											-.838			
73				.837										
74				.797										
75				.810										
76				.662										
79		.733												
80		.901												
81				-.879										
82						.833								
83						.858								

TABLE 4.4 (cont.)

Variable	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Communalities
67						.578									.676
68															.674
69															.846
70															.838
71															.762
72															.763
73															.813
74															.798
75															.782
76															.722
79															.688
80															.873
81															.827
82															.863
83															.848

TABLE 4.4 (cont.)

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
84						-.692								
85						-.754								
86							.877							
87							.878							
88														
89							.379							
90														

TABLE 4.4 (cont.)

Variable	15	16	17	18	19	20	21	22	23	24	25	26	27	28	Communalities
84															.844
85															.808
86															.847
87															.801
88														.775	.724
89															.664
90		-.739													.705

Student Were Professor, fell under Factors 10 and 11 respectively.

Factor 1, Time Spent at Michigan State University for Doctoral Program, loaded high on 10 variables most of which dealt with the time needed to fulfill formal doctoral requirements such as the language, general exams, and course completion requirements. The highest loadings were on Variable 4, Registered Terms until Passage of First Language (.814), Variable 5, Lapsed Time until Passage of First Language (.816), and Variable 12, Registered Terms before Course Completion (.793).

Factor 2, Age, had 5 high loadings including Interruptions (.901), Age at Entry and Reception of the Doctorate (.902), and Number of Children at End of Doctorate (.466).

Factor 3 loaded on 3 variables characterized by Departmental Sensitivity. They include Variable 43, Number of Faculty Known to Discuss Problems; Variable 44, Rating of Department's Sensitivity to Student Needs; and Variable 53, Validity of Department's Over-Interest in Research. Variable 44 carried a loading of .677.

Five variables loaded on Factor 4 characterized by Unencumbered Financial Support, including scholarship and fee remission aid. Variable 81, Scholarship or Not, loaded at -.879.

Factor 5, Thesis Done Off Campus, carried 3 high loadings and included Lapsed Time after End of Course Work (-.862), Off Campus after End of Course Work (-.898), and Doctoral Interruptions (-.700).

Encumbered Financial Support described Factor 6 with teaching assistantships viewed as encumbered but directly unrelated to thesis support, while research assistantships were seen as encumbered but related to the thesis. There were 4 high loadings with Variable 83, Average Value per Quarter, the highest (.858).

Factor 7 can be characterized by Encumbered Financial Support Totally Unrelated to Doctoral Study which includes Variables 86, Number of Quarters on Campus Jobs Held, and 87, Average Value per Quarter. Of the 3 loadings, Variable 87 loaded the highest at .878.

Credit Pattern describes Factor 8 and includes the Number of Ph.D. Credits, their level, and their breadth, i.e., whether taken outside of the major department. The latter, Variable 14, loaded highest of the 4 at -.760.

Factor 9, Dissertation Done On Campus, loaded on Variables 15, Registered Time between End of Course Work and End of Dissertation, and 21, Lapsed Time in Residence after End of Couse Work. Variable 15 loaded higher at .842.

Factor 12, High Positive Perceptions of Department, is made up of high loadings on 5 variables including ratings of department's research training and skills and the validity of its low admission standards. Variable 45, Rating of Department's Research Skills, loaded highest at .735.

Doctoral Program Organization characterizes Factor 13 which consists of the Length of Time Before Assignment of Major Professor and Number of Credits Taken before First Committee Meeting. The former loaded at .752.

Factor 14, Influences Perceived as Lengthening Doctorate, encompasses 3 high loadings involving 3 major doctoral requirements: language exams, general exams, and thesis. The latter, Variable 64, loaded highest at -.712.

Factor 15, Development of, and Commitment to, Field of Study Goals, comprises 2 variables, Variable 35, Field of Study Goals (.626), and Variable 36, Career Plans at Graduate Entrance (.750).

Conformity to the Departmental Rules of the Doctoral Degree Program characterizes Factor 17. Validity of Departmental Student Exploitation, Conformity, and Over-Interest in Research are the 3 variables involved, with Variable 51 being the highest (.751).

Factor 19 is identified as Incentives for Attendance at Michigan State University. Variable 37, Importance of Ease and Speed for Attending Michigan State University, loaded highest with .751.

Research Orientation, Factor 20, is comprised of 2 variables of which Importance of Research Opportunity for Attending Michigan State University, Variable 38, had the higher loading at -.683.

Factor 22, Grade Point Average, is comprised of the undergraduate, graduate, and Ph.D. grade point averages. The Undergraduate Grade Point Average, Variable 28, loaded highest at -.816.

Factor 24, Quantitative Measures of the Doctoral Program is composed of 2 variables, Course Credits and Dissertation Pages with the latter loading the higher at -.636.

Finally, Factor 27, Field and Institutional Change, had a 2 variable loading with Number of Field Changes, Variable 1, the higher at -.709.

Of the 76 variables loading on the 28 factors, all 76 loaded high on one of the factors so, though it would have been possible, as initially planned, to select out for the Least Squares Regression routine one or more of the highest loading representative variable members of each factor, the possibility of the presence of "suppressor" variables made a more conservative

approach desirable.[5] In fact, the technique of factor analysis discussed above was employed initially to reduce the number of 76 available, useable predictor variables and use some of the resulting factors in a regression equation in place of the original variables.

Nevertheless, when reliable variables such as age or lapsed time of various kinds are used as they are in this study, it could happen that factors which account for very little variance in the predictor variables could still be highly useful in predicting the dependent variables. In other words, given 2 original variables that are highly correlated as Lapsed and Registered Time until Passage of the Second Language (.78), the factor consisting of the difference between the scores of these 2 would account for little variance in the original 2 variables. Yet such a difference might have had a strong influence on the time lapse and thus correlate more highly with some external criterion than would a factor consisting not of the difference but of the sum of the 2 scores on registered and lapsed time.

Consequently, to avoid such potential loss of predictive power, the strategy of stepwise regression based on the use of the original variables as input data was selected. Darlington defends this computer-assisted

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[5]Richard B. Darlington, "Multiple Regression in Psycholgoical Research and Practice," Psychological Bulletin, LXIX (1968), p. 19.

routine since stepwise regression has the desirable property of using the only statistics relevant to selecting predictor variables from a larger number of variables--initial sample validity, N, and n for each of the possible regression equations created from different combinations of the variables.[6]

Such a technique of choosing all the 76 independent variables avoids the danger of losing the added predictability of what Darlington describes as "suppressor" variables. He defines a suppressor variable as one which, when included in a regression equation in which the variables have been scored in the direction which makes their correlation in the population positive, nevertheless, takes on a negative weight when the regression equation is derived for the population.[7]

The Least Squares Regression Analysis

The Least Squares Regression routine employed consisted of a stepwise deletion in which an initial least squares equation was formed using all of the independent variables. Then, the variable out of the total least useful (significant) to the prediction was deleted from the equation and a new least squares equation estimated. The process continued until only those variables remained which were selected as candidates for deletion

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[6] Ibid., p. 18.

[7] Ibid., pp. 5-7.

but were found to be significant at the .05 level and thus retained.

As mentioned earlier, 76 independent variables were initially selected as candidates for the least squares routine. Variable 31, Age at End of Ph.D., however, was dropped just prior to the computer run because it was viewed, due to its post-hoc nature, as incapable of serving as a meaningful or useful predictor.

Three Least Squares Deletion routines were then performed each on a separate computer run using the 75 independent variables and one of the 3 dependent variables for each pass. The resulting regression coefficients and beta weights and their standard errors, F critical values and their significance levels, the partial correlation coefficients and the R^2 deletes together with the multiple correlation coefficients (R and R^2) and the standard error of estimates for those independent variables which met the .05 significance level criterion are listed in Table 4.5.

Regression Equation Formulation: Dependent Variable I--Lapsed Time: B.A.-Ph.D.

Together with the constant, 11 of the 75 independent variables met the .05 significance criterion for inclusion in the final multiple coefficient regression equation. These variables of the 75, then would be

TABLE 4.5

FINAL REGRESSION COEFFICIENTS, BETA WEIGHTS, STANDARD ERRORS, LEVELS OF SIGNIFICANCE, PARTIAL CORRELATION COEFFICIENTS AND R^2 DELETES FROM A STEPWISE DELETION OF 75 INDEPENDENT VARIABLES FROM A LEAST SQUARES REGRESSION EQUATION IN WHICH THE DEPENDENT VARIABLE IS LAPSED TIME: BA - PH.D.[1]

Independent Variables	Regression Coefficients	Standard Error	Beta Weights	Standard Error	F Critical Value	F Significance	Partial Correlation Coefficients	R^2 Deletes
0 Constant	-47.302	4.719			100.461	0.0005		
6 Registered Terms until Passage of 2nd Language	0.571	0.269	0.111	0.052	4.502	0.033	0.120	0.845
7 Lapsed Time until Passage of 2nd Language	-0.501	0.184	-0.148	0.054	7.430	0.007	-0.153	0.844
8 Registered Terms until Passage of General Exams	-0.542	0.215	-0.098	0.039	6.332	0.012	-0.142	0.844
10 Part-time Terms	1.042	0.182	0.230	0.040	32.783	0.0005	0.310	0.831
11 Full-time Terms	1.457	0.263	0.184	0.033	30.650	0.0005	0.301	0.832
23 Lapsed Time of Interruptions	0.719	0.106	0.239	0.035	46.286	0.0005	0.361	0.824
26 Number of Institutions since BA	1.929	0.490	0.096	0.024	15.472	0.0005	0.219	0.840
34 Age at Entry to Ph.D.	2.196	0.162	0.545	0.040	184.807	0.0005	0.612	0.756
79 Number of Interruptions	-1.407	0.616	-0.077	0.034	5.220	0.022	-0.129	0.845
80 Total Years of Interruptions	1.500	0.192	0.367	0.047	61.120	0.0005	0.407	0.817
90 Citizenship	3.011	1.314	0.053	0.023	5.253	0.021	0.130	0.845

Variables in Order Deleted: 86, 9, 40, 38, 66, 72, 5, 84, 12, 13, 49, 69, 81, 76, 64, 67, 48, 56, 63, 51, 29, 52, 17, 37, 47, 32, 24, 71, 43, 44, 46, 15, 28, 21, 50, 88, 73, 74, 35, 85, 42, 45, 20, 19, 82, 83, 41, 1, 39, 60, 75, 70, 25, 51, 14, 3, 36, 22, 16, 89, 87, 4, 18, and 2.

[1] M. E. Rafter and W. L. Ruble, Stepwise Deletion of Variables from a Least Squares Equation (LSDEL), Agricultural Experiment Station: Michigan State University, 1968, STAT Series Description VIII. (The Multiple Correlation Coefficients: R=.921, R^2=.847 with a standard error of estimate of 8.65).

TABLE 4.5--Continued

	LAPSED TIME: PH.D. ENTRY-RECEPTION[1]							
0 Constant	-0.676	0.485			1.940	0.161		
6 Registered Terms until Passage of 2nd Language	-0.187	0.056	-0.090	0.027	11.161	0.001	-0.187	0.973
7 Lapsed Time until Passage of 2nd Language	0.143	0.039	0.105	0.029	13.478	0.0005	0.205	0.973
10 Part-time Terms	0.606	0.063	0.333	0.035	92.060	0.0005	0.480	0.966
11 Full-time Terms	0.638	0.069	0.200	0.022	86.076	0.0005	0.468	0.967
12 Registered Terms before Course Completion	0.147	0.060	0.063	0.026	5.890	0.015	0.137	0.974
13 Lapsed Time until Course Completion	0.318	0.059	0.237	0.044	28.645	0.0005	0.292	0.971
21 Lapsed Time in Residence After End of Course Work	0.419	0.066	0.164	0.026	39.753	0.0005	0.339	0.970
22 Lapsed Time Off-Campus After End of Course Work	0.412	0.059	0.320	0.046	49.099	0.0005	0.371	0.970
23 Lapsed Time of Interruptions	0.539	0.059	0.446	0.049	83.730	0.0005	0.463	0.967
36 Career Plans at Graduate Entrance	-0.229	0.104	-0.020	0.009	4.807	0.028	-0.124	0.974
48 Importance of Financial Need for Assistantships, etc.	0.322	0.132	0.023	0.009	5.964	0.015	0.138	0.974
88 Salary per Year of Ph.D. Job	-0.000	0.000	-0.020	0.009	4.610	0.031	-0.122	0.974

Variables in Order Deleted: 84, 49, 81, 20, 14, 29, 40, 76, 52, 56, 38, 89, 90, 80, 50, 25, 9, 46, 71, 35, 87, 17, 24, 79, 75, 2, 18, 53, 66, 44, 19, 68, 70, 72, 73, 74, 43, 41, 86, 15, 85, 82, 28, 51, 34, 1, 26, 83, 45, 67, 32, 39, 63, 64, 69, 42, 5, 4, 8, 3, 16, 47, and 37.

TABLE 4.5--Continued

	REGISTERED TIME: PH.D. ENTRY-RECEPTION[1]							
0	Constant	0.991	0.393			6.348	0.012		
6	Registered Terms until Passage of 2nd Language	0.104	0.047	0.094	0.043	4.916	0.026	0.125	0.927
7	Lapsed Time until Passage of 2nd Language	-0.080	0.033	-0.109	0.045	5.923	0.015	-0.137	0.927
10	Part-time Terms	0.754	0.072	0.776	0.074	109.647	0.0005	0.511	0.903
11	Full-time Terms	0.728	0.078	0.428	0.046	86.683	0.0005	0.467	0.908
12	Registered Terms before Course Completion	0.171	0.083	0.137	0.066	4.278	0.037	0.117	0.927
13	Lapsed Time until Course Completion	0.060	0.028	0.084	0.039	4.558	0.032	0.120	0.927
15	Registered Time between End of Course Work and End of Dissertation	0.149	0.072	0.104	0.050	4.280	0.037	0.117	0.927
16	Lapsed Time between End of Course Work and End of Dissertation	0.057	0.015	0.075	0.019	15.122	0.0005	0.216	0.925
48	Importance of Financial Need for Assistantships, etc.	-0.308	0.116	-0.041	0.015	7.057	0.008	-0.149	0.927

Variables in Order Deleted: 2, 82, 28, 53, 51, 63, 34, 23, 29, 67, 50, 87, 32, 70, 75, 35, 22, 21, 37, 42, 43, 71, 24, 20, 84, 66, 83, 76, 80, 79, 1, 86, 18, 52, 44, 25, 3, 85, 38, 8, 9, 45, 89, 49, 74, 81, 90, 72, 46, 19, 40, 73, 56, 39, 26, 64, 14, 17, 36, 4, 5, 88, 68, 69, 47, and 41.

[1] M. E. Rafter and W. L. Ruble, Stepwise Deletion of Variables from a Least Squares Equation (LSDEL), Agricultural Experiment Station: Michigan State University, 1968, STAT Series Description VIII. (The Multiple Correlation Coefficients: $R=.964$, $R^2=.928$, with a standard error of estimate of 1.27).

the best predictors of a doctoral student's Lapsed Time: B.A.-Ph.D.

For the 11, the square (R^2) of the multiple correlation coefficient was .847, indicating that nearly 85 per cent of the Lapsed Time: B.A.-Ph.D.'s variation above that accounted for by its mean was accounted for by the selected independent variables.

In analyzing the 11 predictor variables, normalized weights (beta weights) rather than the regression coefficients (Table 4.5) were employed as more useful and accurate in normalizing the raw scores of the sample, thereby reducing the amount of predictive fluctuation due to large standard deviations. These beta weights, then, do not change when an independent variable is multiplied by a constant resulting in an indication of the contribution of each independent variable as "predictor" or "accounter" for the variation of the dependent variable.

Partial correlation coefficients and R^2 deletes were also reported since they are both useful in approximating the portion of variation which each of the independent variables accounts for in the dependent variable.

Variable 34, Age at Entry to Ph.D., proved to carry the highest beta weight (.545) with a partial correlation coefficient of .612, indicating rather high usefulness as a predictor of the variation of the dependent variable.

Variable 80, Total Years of Interruptions, showed a .367 beta weight and a partial correlation of .407.

The third highest beta weight, .239, was assigned by the Least Squares Regression Equation routine to Variable 23, Lapsed Time of Ph.D. Interruptions, which also was assigned a rather high predictive measure of .361.

Variables 7 and 6 respectively, Lapsed and Registered Terms until Passage of Second Language, carried the next highest beta weights (-.148 and .111). The presence of the negative beta weight is, as discussed earlier, at first view, disconcerting. Variable 7 had correlated significantly and positively (.176) with the dependent variable, Lapsed Time: B.A.-Ph.D. What has happened according to Darlington is that precisely because Variable 7 is measuring more of Variable 6 with which it correlates highly than of the dependent variable, Lapsed Time: B.A.-Ph.D., it receives a negative weight. In other words, Variable 7 is more useful as a predictor in the regression equation as a measure of what Variable 6 doesn't measure in the dependent variable.[8]

The nature of what is being suppressed in 6 that 7 is better at predicting is not easily determined. In fact, Darlington maintains that it is extremely hazardous to reasonably interpret negative or suppressor

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[8] Ibid., p. 4.

relationships in a complex multi-predictor situation. And yet, he concludes that it would be difficult to imagine a researcher with such faith in his ability to conceive of all possible suppressor relationships that he would ignore the improved predictability of negative beta weights.[9]

Variables 8, Registered Terms until Passage of the General Exams, and 79, Number of Interruptions B.A.-Ph.D., also were assigned negative beta weights (-.142 and -.129). Both are interpretable in the same terms as discussed above; the General Exams variable, in leaving the time lapse part of its correlation to Variable 6, takes on a negative character to be more useful as a predictor of Lapsed Time: B.A.-Ph.D. Variable 79 operates in the same fashion leaving to Variable 80 the lapsed time variance to add its negative weight to greater predictability.

Finally, Variable 26, Number of Institutions since B.A. (.096), and Variable 90, Citizenship (.130), finish up the significant predictors for dependent Variable 1, Lapsed Time: B.A.-Ph.D. These 2 carry partial correlation coefficients of .219 and .130 respectively.

At this point, after the last step in the analysis procedures has been taken, of the 75 it is

[9] Ibid., p. 5.

interesting to compare those variables which correlated most highly with Lapsed Time: B.A.-Ph.D. in the correlational analysis with those which the Least Squares analysis reported as the best predictors. The 3 variables, 34, 79, and 80, with significant correlations greater than .50 for the total sample correlational analysis also were selected as 3 of the heaviest weighted predictors. Yet, there were at least 11 other variables with higher correlations in the earlier relationship analysis which were deleted in the regression equation in favor of others of less apparent influence. For example, Full-Time Terms (.010 which is non-significant) was selected over Number of Field Changes (.335) and Number of Children at End of Ph.D. (.441).

Such a result serves to further clarify the function of the multiple regression equation to increase the precision of the prediction capability of the independent variables.

The resulting regression equation for predicting Lapsed Time: B.A.-Ph.D. may be written

$$Z_{y_i} = .111(Z_1) - .148(Z_2) - .098(Z_3) + .230(Z_4) \ldots + .053(Z_{11})$$

where Z_{y_i} = the transformed (normalized) score of a doctoral student's expected Lapsed Time: B.A.-Ph.D. and $Z_1 \ldots Z_{11}$ are his scores on the predictor independent variables multiplied by the corresponding fractions or beta weights.

Regression Equation Formulation: Dependent Variable II--Lapsed Time: Ph.D. Entry-Reception

Twelve of the 75 independent variables together with the constant variable, satisfied the .05 significance criterion and remained in the final regression solution. The square of the multiple correlation coefficient (R^2) was .974 indicating that a very high portion (over 97 per cent) of the Lapsed Time: Ph.D. Entry-Reception's variance was accounted for by these 12 variables and the constant. The standard error of estimate was but 1.43.

Variables 10, Part-Time Terms, and 11, Full-Time Terms, with beta weights of .333 and .200 respectively exhibited usefulness as predictors as measured by partial correlation coefficients of .468 and .137. Variable 23, Lapsed Time of Ph.D. Interruptions, with the highest beta weight (.446) carried a partial correlation coefficient of .463. Variable 22, Lapsed Time Off Campus after End of Course Work (All But the Dissertation) and 21, Lapsed Time in Residence after End of Course Work, with beta weights of .320 and .165 respectively, carried partial correlation coefficients of .371 and .339. Variable 7, Lapsed Time, and Variable 6, Registered Time until Passage of Second Language, reverse the functions they had for predicting dependent Variable I. Here, Variable 7 instead of being negative was positive (.105), while Variable 6 changed from positive to negative (-.090).

Variables 13, Lapsed Time until Course Completion, and 12, Registered Terms until Course Completion, earned beta weights of .202 and .137 respectively and carried partial correlation coefficients of .292 and .137. Both Salary per Year for Ph.D. Job (88) and Career Plans at Graduate Entrance (36) had negative beta weights of -.122 and -.124 respectively.

Finally, Variable 48, Importance of Financial Need for Assistantships, was assigned a beta weight of .138.

Again, as in the case of the Lapsed Time: B.A.-Ph.D. dependent variable, those independent variables that correlated at a significance level greater than .50 (Variables 13, 22, and 23) also were selected by the Least Squares Regression analysis as the best predictors. Similarly though, other variables that correlated significantly were deleted, e.g., Number of Ph.D. Credits (.347) for such non-significant correlations as Salary of Ph.D. Job and Career Plans at Graduate Entrance. Once again the principle of the regression equation was operating to choose the measures of prediction and not necessarily of correlation.

Written in normalized form, the regression equation for dependent Variable II: Lapsed Time: Ph.D. Entry-Reception is

$$z_{y_{ii}} = -.090(z_1) + .105(z_2) + .333(z_3)... -.020(z_{12})$$

Regression Equation Formulation: Dependent Variable III--Registered Time: Ph.D. Entry-Reception

The additive constant together with the 9 variables that met the .05 significance criterion reported a multiple correlation coefficient (R) of .964 so that the resulting R^2 (.928) indicated that the 9 independent variables and constant accounted for nearly 93 per cent of the variation in the dependent variable. The standard error of estimate was 1.27.

Variables 10, Part-Time Terms, and 11, Full-Time Terms, received beta weights of .776 and .428 respectively. Part-Time Terms, then, had a very high usefulness-as-predictor rating of .511 while Full-Time Terms carried a high rating of .467.

Variables 7, Lapsed Time until Passage of Second Language, and 6, Registered Time until Passage of Second Language, were assigned beta weights of -.109 and .094 respectively and partial correlation coefficients of .137 and .125.

Variables 12, Registered Time before Course Completion, and 13, Lapsed Time before Course Completion, received beta weights of .137 and .084 respectively and carried rather low usefulness ratings of .117 and .120.

Variables 15, Registered Terms between End of Course Work and End of Dissertation, and 16, Lapsed Time between End of Course Work and Dissertation, received

beta weights of .104 and .075 respectively. Variable 15 carried a low usefulness rating of .117 while the latter variable had a partial correlation coefficient of .216, even though its beta weight was lower.

Finally, Variable 48, Importance of Financial Need for Assistantships, had a beta weight of -.041 and was assigned a partial correlation coefficient of -.149.

A comparison of the above predictor variables with those of the 75 correlating highly with the dependent variable exhibits a general correspondence. But unlike those of the earlier 2 dependent variables, the predictor variables with the highest predicting capability (Variables 10, 11, 12, and 16) do not all have significant correlations greater than .5 with the dependent variable Registered Time: Ph.D. Entry-Reception. For, Full-Time Terms (Variable 11) carried only a .196 correlation and Variable 16, Lapsed Time between End of Course Work and End of Dissertation carried but .284 while others such as Variable 8, Registered Terms until Passage of General Exams, with a correlation of .776 was deleted. Nevertheless, as happened in the earlier 2 equations, many variables which correlated higher than, for example, Variable 48 (-.04 and non-significant) were deleted including Variable 18, Number of Credits Taken before Organization of Committee (.253 and significant), and Ph.D. Grade Point Average (-.209 and significant).

Thus, the correlational significance of a variable does not necessarily correspond to its predictive usefulness.

The dependent variable, Registered Time: Ph.D, Entry-Reception will be best predicted by the multiple regression equation

$$Z_{y_{iii}} = .094(Z_1) - .109(Z_2) + .776(Z_3) \ldots - .041(Z_9).$$

Summary

After the reduction of the original 6 dependent variables to 3 was supported by a 3-factor rotation followed by one of 2-factors (Table 4.1), a correlational analysis was run. The 3 selected dependent variables (Lapsed Time: B.A.-Ph.D.; Lapsed Time: Ph.D. Entry-Reception; and Registered Time: Ph.D. Entry-Reception) together with the 90 independent variables for the total number of 320 were placed in an intercorrelation matrix to determine the varying strengths of relationship.

Of the 34 hypotheses tested in this manner in the null form $\rho = 0$, 27 (Table 4.2) were found to be significant at the .05 alpha level, thereby permitting the rejection of the null hypotheses in these cases and the conclusion that the data supported the alternate hypothesis that ρ is significantly different from zero. In 8 of these 27 hypotheses the data supported the conclusion that, at the 95 per cent level of confidence, ρ was significantly greater than .50 (Table 4.2).

In addition, of those 39 independent variables not tested by the 34 hypotheses, 23 correlated at the .05 alpha level as being significantly different than zero. Of these, 2 correlated significantly at greater than .50.

Correlational analysis of the total sample population divided into 6 fields or areas of doctoral study followed (Table 4.3). In testing Hypotheses 35 and 36 (Table 4.3, Footnote 1), a one-way analysis of variance was employed followed by the Sheffé Test. The null hypotheses $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6$ at the .05 alpha level were rejected and the data supported the alternate hypotheses. Hypotheses 37 and 38 (Table 4.3) were tested and the null hypothesis retained. A review of the findings concerning the correlations within the 6 fields (Table 4.3) shows the physical and biological sciences as having 42 variables with significant correlations and 45 non-significant; the humanities, 44 significant and 43 non-significant; the social sciences and education, 37 significant and 50 non-significant.

A factor analysis was run on the 76 selected variables for the purpose of reducing the number of variables to be included in the Least Squares Regression analysis. The 76 variables loaded on 28 factors with 2 or more variables loading only on 19 factors. To avoid loss of predictive power due to the likely presence of negative beta weights, not only were the

variables loading high on the 9 factors included in the Least Squares Regression analysis, but all 75 of the selected independent variables as well.

Finally, the Least Squares Deletion routine was undertaken and multiple regression equations were generated for each of the 3 dependent variables. Dependent Variable I, Lapsed Time: B.A.-Ph.D., produced 11 significantly predictive variables which with the constant accounted for 84 per cent of the dependent variable's variation. Dependent Variable II, Lapsed Time: Ph.D. Entry-Reception generated 12 significant predictor variables that together with the constant was responsible for 97 per cent of the dependent variables' variation. Dependent Variable III, Registered Time: Ph.D. Entry-Reception, selected out 9 predictive variables that with the constant accounted for 93 per cent of that dependent variable's variation.

CHAPTER V

CONCLUSIONS AND IMPLICATIONS

The primary focus of the present study was an investigation of, and a testing for, the significance of those independent variables which a review of the literature revealed as most influential in accounting for prolonged lapsed and registered time periods in the pursuit of the doctoral degree.

Toward this end, a doctoral recipient sample of 320 was drawn randomly from Michigan State University's degree-granting departments for the academic years 1966-67 and 1967-68. Then, 34 research hypotheses were generated from 53 of the 90 original independent variables and the 3 dependent time lapse variables. These 34 hypotheses were tested in their null form, $\rho = 0$, at an alpha level of .05 by means of t-tests of significance based on the results of an intercorrelation matrix. Twenty-seven of these hypotheses permitted the rejection of the null hypothesis. Eight of these hypotheses permitted the rejection of the null: H_o: $\rho > .50$ at $\alpha = .05$.

In addition, 23 of the remaining 37 independent variables were found to be significantly associated

with one or more of the dependent variables at the .05 level of significance. Two of these permitted the rejection of H_o: $\rho < .50$.

Next, an intercorrelation matrix was run on the 6 basic fields to search out the presence and strength of any relationships existing between the dependent time lapses and the independent variables, but most particularly between those independent variables which generated Hypotheses 35, 36, 37, and 38. Hypotheses 35 and 36 were found to be significant at the .05 alpha level using a one-way analysis of variance, followed by a Scheffé test.

The 6 fields' intercorrelational matrix also produced the following results: the physical and biological sciences' fields showed 42 of the 90 independent variables correlating significantly different than zero with one or more of the 3 dependent variables. Fourteen of the biological science variables and 7 variables of the physical sciences correlated with one of the 3 dependent variables at significantly greater than .50. The humanities had 44 significant variables with 12 being significantly greater than .50. Both the social sciences and education reported 37 significant variables with the former having 8 variables correlating significantly greater than .50, and the latter having 14. Finally, the professions had 29 significant variables

with 14 correlating with one of the 3 dependent variables at significantly greater than .50.

The 6 fields share a significant correlation regarding 11 independent variables of which 8 deal with the formal doctoral requirements, and one each with number of major advisors, doctoral study interruptions, and family obligations. Three more were found to be significantly greater than .50 across all 6 fields.

A factor analysis was then utilized on 76 of the 90 variables with a resulting 28 factor solution which produced high loadings of 10 on Factor 1 down through 1 on 7 factors. Factor 1 generated an eigenvalue of 7.79, while Factor 28 produced one of .912. The cumulative proportion of variance attained .758 at Factor 28 with Factor 1 producing the largest single proportion of variance at .08.

The above factor analysis, though it would have proven useful in reducing the number of potential predictor variables, was not employed directly in the final step of the study--formulation of multiple regression equations for the 3 dependent time lapse variables. For, in order to preclude the possibility of overlooking a valuable predictor that did not load high on one of the factors and which had the effect of a suppressor variable, all 75 of the independent variables were included in the regression routine.

Thus, the Least Squares Stepwise Deletion procedure was utilized resulting in the generation of 3 multiple regression equations, one for each of the 3 dependent variables. Dependent Variable I, Lapsed Time: B.A.-Ph.D., deleted all but 11 of the 75 independent variables. These 11 had a squared multiple correlation coefficient (R^2) of .847 with beta weights which were all significantly different from zero at the .05 alpha level. Dependent Variable III, Lapsed Time: Ph.D. Entry-Reception, deleted all but 12 of the 75 independent variables producing a R^2 of .974 and beta weights all significantly different from zero. Finally, dependent Variable III, Registered Time: Ph.D. Entry-Reception, left remaining 9 predictor variables with an R^2 of .928 and beta weights that were also significantly different from zero.

Conclusions

The decisions based on the findings produced by the t-tests of significance were, in the following 27 hypotheses, to reject the null hypotheses $\rho = 0$ at the .05 alpha level and to conclude that the data support the following research hypotheses:

1. Doctoral recipients who exhibit late decision about, and lack of commitment to, their field of study goals, show a greater lapsed time between B.A. and Ph.D. reception than those who do not.

2.* Doctoral recipients with more total years of post-B.A. interruptions have a greater lapsed time between B.A. and Ph.D. reception.

3.* Doctoral recipients who show greater lapsed time in interruptions during the Ph.D. program, show greater lapsed time from Ph.D. entry to Ph.D. reception.

4.* The greater the lapsed time spent off-campus after the end of course work, the longer the lapsed time between B.A. to Ph.D. and Ph.D. entry to reception.

5. The greater the number of part-time registered terms required, the greater the lapsed and registered time required between Ph.D. entry and reception.

6.* The fewer the number of full-time registered terms required, the greater the lapsed and registered time required between Ph.D. entry and reception.

7. The fewer the number of quarters fellowship stipends are received during doctoral study, the greater the lapsed time between Ph.D. entry and reception.

8. The smaller the average amount of fee remission stipends received during doctoral study, the greater the registered time between Ph.D. entry and reception.

9. The greater the number of quarters teaching assistantship stipends are received during doctoral study, the greater the registered time between Ph.D. entry and reception.

10. The fewer the number of quarters research assistantship stipends are received during doctoral study, the greater the lapsed time between Ph.D. entry and reception.

11. The greater the family obligations, the greater the lapsed time between Ph.D. entry and reception.

12. The greater the number of credits taken before the organization of the guidance committee, the greater the registered time between Ph.D. entry and reception.

13. The greater the lapsed time between the end of course work and the end of the dissertation, the greater the lapsed time between Ph.D. entry and reception.

14. The greater the number of pages in the dissertation, the greater the lapsed time between Ph.D. entry and reception.

15. The greater the lapsed time or registered terms until the fulfillment of the language requirement, the greater the lapsed and registered time between Ph.D. entry and reception.

16. The greater the lapsed time before the passage of the general examinations, the greater the lapsed time between Ph.D. entry and reception.

17.* Doctoral recipients who lack prior doctoral language proficiency show more lapsed time between Ph.D. entry and reception.

18. The greater the lapsed time or registered terms until course work completion, the greater the lapsed and registered time between Ph.D. entry and reception.

19. The greater the number of Ph.D. credits taken, the greater the lapsed and registered time between Ph.D. entry and reception.

20.* The greater the number of credits taken below the 800 level, the greater the lapsed and registered time between Ph.D. entry and reception.

21.* Doctoral recipients exhibitng a lower Ph.D. Grade Point Average show greater registered time from Ph.D. entry to reception.

22. Doctoral recipients exhibiting a lower graduate Grade Point Average show greater registered time from Ph.D. entry to reception.

23.* Doctoral recipients exhibiting a lower undergraduate Grade Point Average show greater lapsed time from B.A. to Ph.D.

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*Significantly greater than $\rho = .5$ at the $\alpha = .05$ level.

24. Doctoral recipients who have attended a greater number of institutions since the B.A. exhibit a greater lapsed time B.A. to Ph.D.

25. Doctoral recipients who did not hold a scholarship during Ph.D. study exhibit greater lapsed time from Ph.D. entry to reception.

26. Doctoral recipients who entered doctoral study under a provisional or special non-degree admission status exhibit greater lapsed time from Ph.D. entry to reception.

27. U.S. doctoral recipients show greater lapsed time between Ph.D. entry and reception than do foreign doctoral recipients.

The findings of the one-way analysis of Variance followed by the Scheffé test permitted the rejection of the null hypothesis $\mu_1 = \mu_2 = \mu_3 = \mu_4 = \mu_5 = \mu_6$ at the $\alpha = .05$ level and the data support the following research hypotheses:

1. Doctoral students in the humanities, the social sciences, the professions, and education show greater lapsed time between B.A. and Ph.D. reception than do those in the biological and physical sciences.

2. Doctoral recipients in education have greater lapsed time between B.A. and Ph.D. reception than those of any other field.

Statement of Other Significant Results

Since there has been considerable material subjected to analysis in this study that had not been placed in hypothesis form prior to analyzing the data the reporting of certain results of this research seem appropriate.

Significant Variables from the Total Sample Correlational Analysis

Utilizing the t-Test of Significance to test the null hypothesis that $\rho = 0$ at the .05 alpha level and employing critical values under the two-tailed or non-directional test in the tables, the following statements can be reported as significantly different from zero for the total sample:

1. The greater the number of field changes B.A. to Ph.D., the greater the lapsed time: B.A. to Ph.D. and the lapsed time: Ph.D. entry to reception.

2. The greater the number of registered terms required until passage of the second language, the greater the lapsed and registered time: Ph.D. entry to reception.

3. The greater the lapsed time until the passage of the second language, the greater the lapsed time: B.A. to Ph.D., and lapsed and registered time: Ph.D. entry to reception.

4. The greater the registered terms required until passage of the General exam, the greater the lapsed time: B.A. to Ph.D., and the lapsed and registered* time: Ph.D. entry to reception.

5. The greater the number of Ph.D. credits taken outside the department, the greater the registered time: Ph.D. entry to reception.

6. The greater the registered time between the end of course work and the end of the dissertation, the greater the lapsed and registered time: Ph.D. entry to reception.

7. The greater the age at the end of the Ph.D., the greater the lapsed time: B.A. to Ph.D.* and the lapsed and registered time: Ph.D. entry to reception.

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*Significantly greater than $\rho = .5$ at $\alpha = .05$.

8. Doctoral recipients who reported themselves at the time of graduate school decision, as trying out their field of study to see if it would lead to a desirable career, took less lapsed time: B.A. to Ph.D.

9. Doctoral recipients reporting research opportunity as important for attending Michigan State University required less lapsed time: B.A. to Ph.D.

10. Doctoral recipients who reported scholarship or assistantship assistance as important for attending Michigan State University required less lapsed time: B.A. to Ph.D.

11. Doctoral recipients who reported they made the best decision in coming to Michigan State University required greater lapsed time: B.A. to Ph.D. but less registered time: Ph.D. entry to reception.

12. The greater the number of faculty known with whom the doctoral recipient could discuss problems, the less the lapsed time: B.A. to Ph.D.

13. Doctoral recipients who reported financial need as the important departmental criterion on which assistantships were granted, required less lapsed time: B.A. to Ph.D.

14. Doctoral recipients who reported lengthening of their Ph.D. degrees due to inadequate preparation before coming to Michigan State University required greater lapsed and registered time: Ph.D. entry to reception.

15. Doctoral recipients who reported lengthening of their Ph.D. degrees due to the language requirement, required greater lapsed and registered time: Ph.D. entry to reception.

16. Doctoral recipients who reported the lengthening of their Ph.D. degrees due to teaching assistantships, required greater lapsed and registered time: Ph.D. entry to reception.

17. Doctoral students who reported the lengthening of their Ph.D. degrees due to work off campus required greater lapsed time: B.A. to Ph.D., and lapsed and registered time: Ph.D. entry to reception.

18. Doctoral recipients who reported the lengthening of their Ph.D. degrees due to a financial obligation to leave Michigan State University in mid-course and work, required greater lapsed time: B.A. to Ph.D. and Ph.D. entry to reception.

19. Doctoral recipients who reported lengthening of their Ph.D. degrees due to the General Exams, required greater lapsed and registered time: Ph.D. entry to reception.

20. Doctoral recipients who reported lengthening of their Ph.D. degrees due to the thesis, required greater lapsed time: B.A. to Ph.D. and lapsed and registered time: Ph.D. entry to reception.

21. The greater the length of time required before the assignment of the major professor, the greater the lapsed and registered time: Ph.D. entry to reception.

22. The less the number of meetings with the major professor the greater the lapsed time: B.A. to Ph.D. and Ph.D. entry to reception.

23. The greater the number of quarters fee remission was held, the less the lapsed time: B.A. to Ph.D.

Significant Variables from the 6 Field Correlational Analysis

The following 15 statements were found to be significantly greater than .50 at the .05 alpha level using the two-tailed non-directional table of critical values (the pertinent fields are listed before each set of assertions):

All Six Fields

1. The greater the lapsed time required until passage of the General Exams, the greater the lapsed time: Ph.D. entry to reception.

2. The greater the number of part-time terms required, the greater the registered time: Ph.D. entry to reception.

3. The greater the age of the doctoral recipient at the end of the Ph.D., the greater his lapsed time: B.A. to Ph.D.

All Fields but 1

(Exception in parentheses after assertion.)

1. The greater the lapsed time required between end of course work and end of the dissertation, the greater the lapsed time: Ph.D. entry to reception. (education)

2. The greater the lapsed time needed for interruptions during the Ph.D. program, the greater the lapsed time: Ph.D. entry to reception. (professions)

3. The greater the age of the doctoral recipient at entry to Ph.D. study, the greater the lapsed time: B.A. to Ph.D. (physical sciences)

4. The greater the total years of interruptions, the greater the lapsed time: B.A. to Ph.D. (physical sciences)

All Fields but 2

(Exceptions in parentheses.)

1. The greater the number of registered terms required until passage of the General Exams, the greater the registered time: Ph.D. entry to reception. (social sciences, professions)

2. The greater the lapsed time required until completion of course work, the greater the lapsed time: Ph.D. entry to reception. (physical sciences, humanities)

All Fields but 3

(Exceptions in parentheses.)

1. The greater the lapsed time until passage of the second language, the greater the lapsed time: Ph.D. entry to reception. (physical sciences, social sciences, professions)

2. The greater the registered terms required before course completion, the greater the registered time: Ph.D. entry to reception. (physical sciences, social sciences, professions)

3. The greater the lapsed time required off campus after the end of the course work, the greater the lapsed time: Ph.D. entry to reception. (biological sciences, education, professions)

2 Fields--Education and Biological Sciences

1. The greater the registered terms required until passage of the first and second languages, the greater the registered time: Ph.D. entry to reception.

2. The greater the lapsed time required until passage of the first language, the greater the lapsed time: Ph.D. entry to reception.

1 Field--Education

1. The greater the average value per quarter of the fee remission held, the greater the lapsed time: B.A. to Ph.D.

The 3 Multiple Regression Equations

The 3 dependent variables were each run separately against the 75 independent variables on the Least Squares Deletion Routine with the stopping criterion set at $\alpha = .05$ so that all resulting beta weights were tested through the null hypotheses $B = 0$ and found significantly different from zero.

The multiple correlation coefficient for dependent variable 1--Lapsed Time: B.A. to Ph.D. was .921 with an R^2 of .847 and a standard error estimate of 8.65. The independent variables resulting from the routine were:

Variable 6. Registered Terms until Passage of 2nd Language
7. Lapsed Time until Passage of 2nd Language
8. Registered Terms until Passage of General Exams
10. Part-time Terms
11. Full-time Terms
23. Lapsed Time of Interruptions
26. Number of Institutions since B.A.
34. Age at Entry to Ph.D.
79. Number of Interruptions
80. Total Years of Interruptions
90. Citizenship

In transformed or normalized form the full equation was:

$$Z_{y_1} = .111(Z_1) -.148(Z_2) -.098(Z_3) +.230(Z_4) +.184(Z_5) +.239(Z_6) +.096(Z_7) +.545(Z_8) -.077(Z_9) +.367(Z_{10}) +.053(Z_{11}).$$

The multiple correlation coefficient for dependent variable 2: Lapsed Time: Ph.D. Entry to Reception was .987 with an R^2 of .974 and a standard error of estimate of 1.43.

The independent variables resulting from the regression analysis were:

Variable 6. Registered Terms until Passage of 2nd Language
7. Lapsed Time until Passage of 2nd Language
10. Part-time Terms
11. Full-time Terms
12. Registered Terms before Course Completion
13. Lapsed Time until Course Completion
21. Lapsed Time in Residence After End of Course Work
22. Lapsed Time Off-Campus After End of Course Work
23. Lapsed Time of Interruptions
36. Career Plans at Graduate Entrance
48. Importance of Financial Need for Assistantships, etc.
88. Salary per Year of Ph.D. Job

The full regression equation in normalized form was:

$$Z_{y_{ii}} = -.090(Z_1) + .105(Z_2) + .333(Z_3) + .200(Z_4)$$

$$+ .063(Z_5) + .237(Z_6) + .164(Z_7) + .320(Z_8)$$

$$+ .446(Z_9) - .020(Z_{10}) + .023(Z_{11}) - .020(Z_{12}).$$

Finally, the multiple correlation coefficient for dependent variable 3 Registered Time: Ph.D. Entry to Reception was .964 with an R^2 of .928 and a standard error of estimate of 1.27. The independent variables remaining after end of the least squares routine were:

Variable 6. Registered Terms until Passage of 2nd Language
7. Lapsed Time until Passage of 2nd Language
10. Part-time Terms
11. Full-time Terms
12. Registered Terms before Course Completion
13. Lapsed Time until Course Completion
15. Registered Time between End of Course Work and End of Dissertation
16. Lapsed Time between End of Course Work and End of Dissertation
48. Importance of Financial Need for Assistantships, etc.

In normalized form the full regression equation was:

$$Z_{y_{ii}} = .094(Z_1) - .109(Z_2) + .776(Z_3) + .428(Z_4) + .137(Z_5)$$

$$+ .084(Z_6) + .104(Z_7) + .075(Z_8) - .041(Z_9).$$

Implications for Future Research

Due to the considerable amount of exploratory material subjected to analysis during this study, there remain many areas of study into which future researchers can probe more deeply and for which more significant results can be uncovered. Some of the more fruitful tasks requiring further examination include:

1. Replicate the study to test for validity of results of the instrumentation and conclusions. Collect the data on the appropriate variables on a random sample of doctoral recipients since spring of 1968 and test out the predictive ability of the 3 regression equations formulated in this study. Do a cross-validation on the regression equations to ascertain true variance.

2. Replicate the study using all 6 dependent variables or a combination of say I, IV, and VI each of which loaded highest on one of the 3 factors in the 3 factor rotation performed in this study.

3. Determine the amount of interdependence existing between the 75 selected variables and select

those with the greatest independence for utilization in a correlation matrix containing the appropriate dependent variables as discussed in Number 1 above.

4. Experiment with a 15 factor rotation solution using the 75 selected independent variables, since in the study over 50 per cent of the cumulative variance has been accounted for by the time the 15th factor is determined (and whose eigenvalue is in excess of 1.4).

5. Using only the highest loading representative variable of each of the above 15 factors, run a correlation matrix including the 3 and/or 6 dependent variables.

6. Execute a Least Squares Regression routine (a Least Squares Add as well as a Delete) using only those variables loading highest on the above 15 (or fewer factors) as potential predictors. Such a procedure is done in the interest of having a smaller number of predictor variables in relation to the number of people in the sample, thereby aiding in a higher estimated true validity and a lower mean square error.

7. Replicate Numbers 4, 5, and 6 on each of the 6 fields but reduce the 15 factor solution to 7. A reduction in the number of variables required for the correlation run with the dependent variables as well as with the number of predictor variables required should keep the mean square error low and the true validity high in a sample with significantly less N.

8. Replicate Numbers 4, 5, and 6 on each of the 32 departments making up the total sample but selecting only 2 or 3 variables at most as correlators or predictors. And perhaps, consider either increasing the sample size in each department before using the least squares routine or employing another statistical method less prone to a small N in relation to number of variables.

9. Replicate Numbers 4, 5, 6, 7, and 8 but perform a factor analysis of both an orthogonal and oblique nature in order to generate factor scores to use as input data for the multiple regression equations. A comparison of these results with those of raw data input should determine the most useful predictive equation.

10. Replicate the study on the basis of the various institutional transfer patterns of doctoral recipients.

11. Replicate the study using departmental characteristics, especially those concerning the role of the major professor and departmental administrative style, especially as it pertains to allocation of departmental resources.

12. Finally, perform in depth interviews and/or case studies on doctoral recipients in conjunction with the above analyses to produce a more accurate interpretation particularly of personal variables influencing the dependent time lapses in the pursuit of the doctorate.

It is hoped that, such replication of, and further investigation into, the research material generated by this study, will enable administrators, faculty and students on individual as well as departmental and collegial levels to increase both the efficiency and efficacy of doctoral programs.

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APPENDIX

OFFICE OF THE GRADUATE SCHOOL
MICHIGAN STATE UNIVERSITY
East Lansing, Michigan

3-11-68

For Office Use Only_____(1-4)

Sex Male_____ (5)
Female_____

Department_____(6-7)

1. Please list below the colleges and universities you have attended, beginning with your first undergraduate school and including your present school.

College or University	Dates of Attendance	Major Field of Study	Degree Received	
				(8)
				(9)
				(10)
				(11)
				(12)
				(13)

2. If you have interrupted your studies (except for summer periods) since you first began as a freshman in college, please indicate what you were doing "in-between" (E.G., military service, physical illness, full time employment.) If you were working full time, indicate what sort of job you held. Please indicate by an X in the right hand column if at that time you would have preferred to stay in school.

Dates	Reasons for Interruption of Study		Would Have Preferred School	
	Job (SPECIFY)	Other (SPECIFY)		
				(14)
				(15)
				(16)
				(17)
				(18)
				(19)
				(20)

(21)___ 3. When did you first seriously consider going into your current field of study? (Circle One Number)

Before entering high school _____ 1

During high school _____ 2

During the first two years of college _____ 3

During the junior year of college _____ 4

During the senior year of college _____ 5

After being out of college _____ 6

(22)___ 4. Have you seriously considered any other field or career since you entered graduate school?

No_____ 1

Yes_____ 2

If "YES" what field or fields?

_____

_____

_____

(23)___ 5. Please think back to the time when you first definitely decided to go to graduate school. Circle the number of the statement which comes closest to describing your career plans at that time.

Definitely committed to the field and a preference for a specific type of job in that field_____ 1

Definitely committed to the field, but no preference for a specific type of job in that field_____ 2

Trying out the field to see if it might lead to a desirable career_____ 3

Other (SPECIFY)_____ 4

6. Please write the number of the statement in question 5 which comes closest to describing your situation right now. _____ (24)___

7. Listed below are some of the things you might have considered when you weighed the advantages and disadvantages of different graduate schools. Please circle the appropriate number in each row in terms of the importance of each factor to you at the time you decided to go to MSU.

Reason	One of the Most Important Reasons	Quite Important	Fairly Important	Not Important	
Reputation of institution_____	1	2	3	4	(25)___
Particular man I wanted to study with_____	6	7	8	9	
Reputation of Department_____	1	2	3	4	(26)___
Ease and speed in getting degree_____	6	7	8	9	
Opportunities for teaching experience__	1	2	3	4	(27)___
Opportunities for research experience__	6	7	8	9	
Chance of getting a better job in the long run_____	1	2	3	4	(28)___
Housing_____	6	7	8	9	
Scholarship or Assistantship_____	1	2	3	4	(29)___
Not wanting to cut Home ties_____	6	7	8	9	

Other important reasons (SPECIFY)_____ (30)___

_____

8. Which single factor above do you consider most important to your choice of MSU? (31)___

_____

(32)___ 9. Looking back, do you think you made the best decision by choosing MSU for your graduate training? (Circle one number.)

I definitely made the best decision by coming here_____ 1

I am pretty sure I made the best decision in coming here___ 2

I am pretty sure I should have gone elsewhere_____ 3

I definitely made a poor decision in coming here_____ 4

10. Given your current knowledge about MSU and your department would you still select this school for your doctoral training if you had to make the choice once again.(Circle one number.)

Yes ____1____

(33)___ No____2____

(34)___ If "NO" to Question 10 what graduate school would you attend?

_____

(35)___ Why would you choose this school?

_____

_____

_____

_____

(36)___ 11. If a close relative or friend was interested in entering your field and wanted to attend MSU, what advice would you give him?

_____

_____

_____

_____

_____

_____

_____

_____

_____

12. In terms of general reputation among experts in the field, how would you rate your department? (37)___

Among the five best in the country _____ 1

Among the top 20 departments, but not among the 5 best _____ 2

Not among the top 20 _____ 3

I have no idea at all _____ 4

13. How would you rate the training opportunities in your department for a student who is interested in _____ (Circle one number in each row.)

	TRAINING OPPORTUNITIES				
	Excellent	Good	Fair	Poor	
Teaching only _____	1	2	3	4	(38)___
Teaching and research _____	6	7	8	9	
Research only _____	1	2	3	4	(39)___
Applied areas of the field _____	6	7	8	9	

14. Do you feel you have had sufficient opportunity to discuss your career plans with members of the faculty? (Circle one) (40)___

Yes 1

No 2

15. How many faculty members of your department did you know well enough, during your doctoral training, with whom you felt you could discuss personal problems? (Circle one) (41)___

All of them _____ 1

Many of them _____ 2

About half of them _____ 3

Very few of them _____ 4

None of them _____ 5

16. As far as graduate training, all in all how would you rate your department's faculty in respect to the following. (Circle one in each row)

		Excellent	Fair	Poor
(42)___	Sensitivity to student needs_____	1	2	3
	Knowledge of their fields_____	5	6	7
(43)___	Teaching ability_____	1	2	3
	Awareness of current trends in the field_____	5	6	7
(44)___	Publishing Productivity_____	1	2	3
	Research skills_____	5	6	7
(45)___	Helpfulness in obtaining jobs for new doctorate recipients_____	1	2	3

17. From your own experiences and from what you have heard, how would you say MSU compares to other universities in respect to the following. (Circle one in each row)

		Excellent	Good	Fair	Poor
(46)___	Housing for graduate students___	1	2	3	4
	Concerts, foreign films, art fairs	6	7	8	9
(47)___	Stipends for graduate assistantships_____	1	2	3	4
	Study facilities_____	6	7	8	9
(48)	Research facilities_____	1	2	3	4
	Library (Journals, references, etc.,)_____	6	7	8	9
(49)___	General academic climate_____	1	2	3	4

(50)___ 18. As you think back, what kind of course do you believe was most valuable?

Lecture_____ 1

Seminars_____ 2

Individual reading_____ 3

Can't decide_____ 4

19. From what you know, how important are the following criteria as the basis for assistantship, fellowships or scholarships awarded to graduate students in your department. (Rank in order of importance 1, 2, 3) (51)___

Grades_____ ___

Faculty personal impressions_____ ___

Financial need_____ ___

20. American graduate schools have been criticized and defended on a number of accounts. Listed below are some of the criticisms which have been made. For each indicate whether you consider it valid or not for the department in which you completed your degree work. (Circle the appropriate number in each row)

	Valid	Somewhat Valid	Not Valid	Dead Wrong	
It encourages over specialization	1	2	3	4	(52)___
It stifles student creativity	6	7	8	9	
Training not really related to jobs students will get	1	2	3	4	(53)___
Too many formal hurdles and initiation rites which are not genuine training	6	7	8	9	
Does not help students get desirable jobs	1	2	3	4	(54)___
It accepts more students than it should	6	7	8	9	
Admission standards are too low	1	2	3	4	(55)___
It exploits its students by using them for cheap labor	6	7	8	9	
It rewards conformity, punishes individualism	1	2	3	4	(56)___
Faculty members are more interested in research than they are in students	6	7	8	9	

Other (SPECIFY) _____ (57)___

_____

_____

21. To what extent did any of the following factors affect the length of time it took you to get a doctor's degree?

		Lengthened Time Considerably	Lengthened Time A Bit	Did not Lengthen The Time	Actually Shortened The Time	Not Applicable
(58)___	Inadequate preparation before coming to MSU	1	2	3	4	5
(59)___	Repeating work here you had already done	1	2	3	4	5
(60)___	Passing foreign language requirements	1	2	3	4	5
(61)___	Being teaching assistant	1	2	3	4	5
(62)___	Being research assistant	1	2	3	4	5
(63)___	Having to work off campus while studying on campus	1	2	3	4	5
(64)___	Lack of financial pressure to get doctorate speedily, owing to continued GI benefits	1	2	3	4	5
(65)___	Being financially obliged to leave here in mid-course and work to earn money	1	2	3	4	5
(66)___	Family obligations	1	2	3	4	5
(67)___	Preparation for preliminary (or general) examinations	1	2	3	4	5
(68)___	Research for and writing of thesis	1	2	3	4	5

(69)___ 22. Of all the above factors, encircle the one which probably was most important in lengthening the time it took you to get a doctorate.

(70)___ 23. If some other factor was more important than any of the above, please note it here.

_____

_____

_____

Deck 2 -- Cols 1-20 -- office use only

24. Which of the following comes closest to describing your career plans now that your studies are completed? (Circle one) (21)___

Position with academic institution	1
Position in industry	2
Position with federal or state government	3
Private practice	4
Other (SPECIFY)	5

25. Which of the following comes closest to describing your present job situation? (22)___

Definitely have a job	1
Negotiating, looks good	2
Negotiating, looks doubtful	3
Have not really started serious job hunting	4

26. If you answered "1" (Have job), how satisfied are you with the position? (23)___

Very satisfied	1
Satisfied	2
Not satisfied	3
Very dissatisfied	4

27. There are many factors which might lead a graduate student to consider or actually drop out of school. For example, some students have mentioned finances, poor grades, failure of graduate school to measure up to expectations, illness, faculty, marriage, military service, children and so forth.

In as much detail as necessary discuss the occasions when you seriously considered dropping out or actually did drop out of graduate school. What were the reasons, how did they come about, what did you do, with whom did you speak?

28. If you actually did drop out of school once you began your post Masters work, discuss the factors which lead to your returning for the completion of your Doctorate.

BACKGROUND INFORMATION

29. What is your age? _____ (24)___

30. What is your marital status? (25)___

Single, never married.....1

Married, no previous marriage.....2

Married, a previous marriage.....3

Separated or divorced.....4

31. Number of children_____ (26)

IF MARRIED

32. During your doctoral work, did your spouse: (27)___

Work full time 1 Work part time 2

Study for Bachelors Degree 3, Masters 4, Doctors 5,

Nondegree 6

Housewife only 7

Other (SPECIFY) 8 _____

_____

33. Which of the following would you say comes closest to describing your spouse's attitude during the time you worked on your doctorate? (28)___
(Circle One)

She thought I spent:

Much too much time on my studies.....1

Somewhat too much time on my studies.....2

About the right amount of time on my studies...3

Somewhat too little time on my studies.....4

Much too little time on my studies.....5

34. Please discuss in as much detail as necessary the procedures by which you were assigned a major professor and a guidance committee. Discuss whether the choice was yours, the extent to which you were involved in the selection, and your general evaluation of the procedures which were followed.

35. From the date of your admission as a doctoral student, how long a period was it before you had a major professor? (Circle one) (29)___

During my first quarter.....1

During my second quarter.....2

During my third quarter.....3

After my first year but before my second.....4

After the start of my second year.....5

36. How long a period was it before you had a guidance committee? (Circle One) (30)___

During my first quarter.....1

During my second quarter.....2

During my third quarter 3

After my first year but before my second.....4

After the start of my second year.....5

37. How soon after the selection of your major professor and your guidance committee did your committee hold its first meeting with you? (Circle the answer which comes closest.) (31)___

About one month later.....1

About two months later.....2

About three months later.....3

About four months later.....4

About five months later.....5

About six months later.....6

Between six months and a year later.....7

After a year..... 8

38. Please discuss your feeling about how your guidance committee operated. Were you satisfied with their attendance and cooperation? Was it difficult to get them together? Did they meet a sufficient number of times?

39. Please discuss your thesis topic and how it was selected. Was it something you were interested in and wanted to do or was it a "practical choice" i.e. something that came from a faculty member's research project? To what extent was your major professor involved in this decision? Were other faculty members involved?

40. How many times did you meet with your full guidance committee during your graduate training? (Circle One) (32)___

Once	1
Twice	2
Three Times	3
Four Times	4
Five Times	5
Six Times	6
Seven Times	7
Eight Times	8
Nine or More	9

41. How many members were there in your guidance committee?_____ (33)___

42. Did you discuss your thesis or program with members of your committee on an individual basis? (Circle One) (34)___

Yes	1
No	2

If Yes

43. How many members of your guidance committee (excluding your major professor) did you meet with on an individual basis? (35)___

_____
(enter number here)

If Yes

44. Of those you did meet with on an individual basis, how frequent were these meetings? (Circle one in each row for each guidance committee member included in question 43 above.)

	Number of Times							
First member.....1	2	3	4	5	6	7	8 or more	(36)___
Second Member.....1	2	3	4	5	6	7	8 or more	(37)___
Third Member.....1	2	3	4	5	6	7	8 or more	(38)___
Fourth Member.....1	2	3	4	5	6	7	8 or more	(39)___

45. How many times in a quarter did you meet with your major professor on the average? (Circle One)

(40)___

Less than 5 times per quarter.....1

Between 6 and 10 times per quarter.....2

Between 11 and 20 times per quarter.....3

More than 20 times per quarter.....4

46. To what extent did your department engage in any of the following activities? (Circle One number in each row.)

		Very Active	Active	Inactive	Very Inactive
(41)___	1. Organized orientation programs for new graduate students.....	1	2	3	4
(42)___	2. Organized informal activities for graduate students.....	1	2	3	4
(43)___	3. Organized informal activities for faculty-student get togethers...	1	2	3	4
(44)___	4. Organized programs or seminars for graduate teaching assistants on teaching methods.....	1	2	3	4

(45)___ 47. Which of the above activities do you feel the department should organize? (Circle as many as apply.)

Number.....1

Number.....2

Number.....3

Number.....4

All of the Above.....5

None of the Above....6

48. In looking back on your experiences at MSU what would you say the administration could have done to make the experience more meaningful in terms of social activities, graduate student organizations and married student activities?

49. In conducting research (laboratory, library, field, etc.) for your doctoral thesis, how much supervision were you given by your major professor (or thesis advisor if not the same person), and how much supervision would you have preferred?

	Supervision Given (Circle One)		Supervision Preferred (Circle One)
	1	Very close and continuous supervision	1
	2	Close supervision, but not on a continuous basis	2
(46)___	3	Continuous supervision, but not very close	3
(47)	4	A moderate degree of supervision	4
	5	Very little supervision	5

50. If you were a major professor (or thesis advisor) and were directing the research of doctoral students in your department, how much supervision (both in frequency and attentiveness) would you give your students? (Circle One)

More than I received from my major professor.....1

(48)___ Less than I received from my major professor.....2

About the same I received from my major professor...3

51. How much opportunity did you receive from your thesis advisor to incorporate your own ideas into the research design for your doctoral thesis? (Circle one)

Unlimited opportunity.....1

(49)___ Limited opportunity.....2

No opportunity.....3

52. If you were a major professor (or thesis director) in your department, how much opportunity would you give your doctoral students to incorporate their own ideas into the research design for their doctoral thesis? (Circle One)

More than I received from my major professor.....1

(50)___ Less than I received from my major professor.....2

About the same I received from my major professor..3

53. During the period of your doctoral training, did you participate in professional meetings? (Circle one)

I attended one or more professional meetings but did not present any papers at these meetings.....1

I attended one or more professional meetings and presented one or more papers at these meetings.....2 (51)__

I did not attend any professional meetings.....3

54. How much encouragement did you receive from faculty members of your department to attend professional meetings and to present papers?

To Attend Professional Meetings (Circle one)		To Present Papers (Circle one)	
1	A great deal of encouragement	1	(52)__
2	A moderate amount of encouragement	2	(53)__
3	A small amount of encouragement	3	
4	No encouragement	4	

55. During the period of your doctoral training, did you develop professional contacts with important scholars or researchers outside of your own department either in your own field or in related fields? (54)__

No 1
Yes.....2

56. If yes, were these professional contacts made with individuals? (55)__
(Circle One)

In other departments of MSU.....1

In other universities.....2

Both.....3

57. How much encouragement did you receive from faculty members of your department to make professional contacts with important scholars or researchers outside of your department?

	With People in Other Departments of MSU (Circle one)		With People in Other Universities (Circle one)
	1	A great deal of encouragement	1
(56)___	2	A moderate amount of encouragement	22
(57)___	3	A small amount of encouragement	3
	4.	No encouragement	4

(58)___ 58. During the period of your doctoral training, did you have any papers, articles, etc. published in professional journals or magazines?

No.....1
Yes.....2

(59) 59. How much encouragement did you receive from faculty members of your department to publish in professional journals or magazines? (Circle One)

A great deal of encouragement.....1

A moderate amount of encouragement.....2

A small amount of encouragement.....3

No encouragement.....4

WE SINCERELY APPRECIATE YOUR HELP.

PLEASE RETURN THE QUESTIONNAIRE TO OUR OFFICE AS SOON AS POSSIBLE.

MICHIGAN STATE UNIVERSITY
SCHOOL FOR ADVANCED GRADUATE STUDIES (#53)

QUESTIONNAIRE FOR CANDIDATES FOR DOCTOR'S DEGREES

Name _____ Sex _____
Last First Middle

Legal residence when admitted to doctoral program _____
State or Country

Degree to be granted: Ph.D. _____ Ed.D. _____ D.B.A. _____ When? _____
Term Year

College and Department granting degree _____
College Department

Term when you began your doctoral program at MSU _____
Term Year

Number of terms a full-time (7 hours or more) doctoral student _____

Number of terms a part-time (less than 7 hours) doctoral student _____

Number of credits earned in MSU off-campus courses applied toward doctorate _____

Number of transfer credits applied to doctoral program _____ from what institution(s)?

_____

Languages for doctoral requirements: _____

Employment (if any) by MSU during your doctoral program: Type of work _____

_____ Terms _____ / Type of work _____ Terms _____

Full-time employment, if any, immediately before beginning doctoral degree:

_____ Public school teaching/admin.
_____ Junior/community college teaching/admin.
_____ Four-year college/univ. teaching/admin.
_____ Industry
_____ Business
_____ Social Services
_____ Government
_____ _____

_____ Number of years in this employment

Type of employment desired after degree:

_____ Public school teaching/admin.
_____ Junior/community college teaching/admin.
_____ Four- year college/univ. teaching/admin.
_____ Industry
_____ Business
_____ Social Services
_____ Government
_____ Post-doctoral study
_____ _____

If employment will be primarily research, check here ☐

If known, give employer's (company's or institution's) name: _____
and location: _____

If known, expected salary (to be kept confidential): _____

Name _____ Sex _____
Last First Middle

Legal residence when admitted to doctoral program _____
State or Country

Degree to be granted: Ph.D. _____ Ed.D. _____ D.B.A. _____ When? _____
Term Year

College and Department granting degree _____
College Department

Term when you began your doctoral program at MSU _____
Term Year

Number of terms a full-time (7 hours or more) doctoral student _____

Number of terms a part-time (less than 7 hours) doctoral student _____

Number of credits earned in MSU off-campus courses applied toward doctorate _____

Number of transfer credits applied to doctoral program _____ from what institution(s)?

_____

Languages for doctoral requirements: _____

Employment (if any) by MSU during your doctoral program: Type of work _____

_____ Terms _____ / Type of work _____ Terms _____

Full-time employment, if any, immediately before beginning doctoral degree:

_____ Public school teaching/admin.
_____ Junior/community college teaching/admin.
_____ Four-year college/univ. teaching/admin.
_____ Industry
_____ Business
_____ Social Services
_____ Government
_____ _____

_____ Number of years in this employment

Type of employment desired after degree:

_____ Public school teaching/admin.
_____ Junior/community college teaching/admin.
_____ Four- year college/univ. teaching/admin.
_____ Industry
_____ Business
_____ Social Services
_____ Government
_____ Post-doctoral study
_____ _____

If employment will be primarily research, check here ☐

If known, give employer's (company's or institution's) name: _____
and location: _____

If known, expected salary (to be kept confidential): _____

Will your post doctoral employment be:
The same job you held before beginning the program _____?
A job you took during your doctoral program _____?
A new job similar to one you held before _____?
A new job unlike any you have held before _____?