A STUDY OF THE FOREIGN LANGUAGE REQUIREMENT FOR THE DOCTOR OF PHILOSOPHY DEGREE IN THE BIOLOGICAL AND THE PHYSICAL SCIENCES

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PREFACE

With the considerable increase in the number of Ph.D. degrees being granted and in view of the present interest in the foreign language requirement for the Ph.D., a study of the foreign language requirement for the Ph.D. in the biological and the physical sciences should be timely.

The purpose of the study was to investigate how the foreign language requirement for the Ph.D. was satisfied, what use was made of foreign languages both during graduate school and after graduation, and how university personnel felt about proposals being urged in the literature on the subject.

Sincere appreciation is expressed to all who have contributed toward the completion of this study, particularly to the writer's committee, Dr. Roy W. Jones, Chairman; Dr. Richard E. Bailey; Dr. Jacob W. Blankenship; Dr. Delbert L. Rutledge; and Dr. Kenneth E. Wiggins. Much credit is due to Dr. Carl E. Marshall, who helped in numerous ways, but especially with his statistical knowledge.

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INTRODUCTION

Statement of the Problem

With the considerable increase in the number of Ph.D. degrees being granted, an unusual interest in the foreign language requirement for the Ph.D. is evident. Articles which appear in the literature urge changes, discussions in faculty meetings turn into heated debates, informal campus groups argue the topic, but no general agreement exists as to the best method of administering the graduate language requirement. A detailed study of the foreign language requirement could prove to be timely and valuable, contributing to a greater understanding of the problems associated with the requirement.

Dissatisfaction with foreign language requirements still seems widespread, various changes having been made or being contemplated. A survey by Admussen (1967) to determine current trends in the Ph.D. language requirement revealed many recent changes. Graduate deans of the forty-six schools belonging to the Association of Graduate Schools were polled, forty-three responding. The following changes were noted:

(1) 81 per cent of the schools polled had significantly altered their Ph.D. language requirement in the last ten years.

(2) 47 per cent had decreased the number of languages required, in two cases from two languages to no

language required.

(3) 54 per cent permitted departmental autonomy in establishing the number of languages required.

(4) 34 per cent allowed substitution of other research tools for one or both languages.

The problem is not a recent one on the educational scene. Herndon (1931) made a summary of reports on the modern foreign languages. He reported that in one survey, considerably more than one-half of the Ph.D. scholars had read no book in a foreign language in the year preceding the inquiry and a slightly larger proportion had read none in the three years following the awarding of the degree. More than half of these scholars took their degrees prior to 1920.

Foreign language study declined in the secondary schools during the 1920's and the 1930's. Walsh (1955) indicated that enrollments in modern foreign languages in our public high schools dropped steadily until they hit a low point of 13.7 per cent in 1949. In that year, French attracted 4.7 per cent of the students as compared to the 15.5 per cent it enjoyed in 1922. German attracted only 0.8 per cent of the total high school population in 1954, attracting 27.9 per cent before World War I. Of all the public high schools of the United States, 56.4 per cent offered no modern foreign language instruction in 1954.

As the foreign language study declined in the secondary schools, the trend spread upwards to the undergraduate colleges. Parker (1961) and Waas (1953) stated that a development in college curricula that tended to limit foreign language enrollments was general education or the core curriculum. General education prescribes a planned, integrated program for the first two years, leaving but few electives, and

often putting foreign language courses among the electives. The entrance and degree requirements reflected this trend. Of 899 accredited institutions granting the B.A. degree, 68.4 per cent had no foreign language entrance requirement, though 85.9 per cent did have a language degree requirement (Plottel 1960). Of 568 accredited institutions granting the B.S. degree, 76.9 per cent required no foreign languages for entrance, but 69.2 per cent required foreign language study for the degree (Wolfe 1959). The requirement was usually expressed as a matter of hours and credits and not as a test of proficiency.

With the erosion in foreign language requirements at the undergraduate level, it was not surprising that the foreign language requirement at the graduate level met with more and more criticism. These waves of criticism and change came at a time of revival of national interest in the study of foreign languages. Will the renewed interest in foreign language study at lower levels be a trend which spreads upward also?

In 1951, foreign languages were being taught in public elementary schools of fifty-seven scattered American communities, but by 1960, at least 8,000 public school systems and at least 1,000,000 children were participating in foreign language study. In public secondary schools, a rise in foreign language enrollments began in 1952, reaching 19.1 per cent of the total student population in 1959, an increase of 5.4 per cent over 1949. In undergraduate colleges, 20 per cent of the persons in institutions of higher learning were enrolled in modern foreign language classes in 1960, an increase of 12.4 per cent over 1959 enrollments (Parker 1961).

College entrance requirements are theoretically determined by

college faculties, but during the forty years preceding 1956, entrance requirements have generally reflected the dominant curriculum in public secondary education (Bowles 1956). Criticism of foreign language requirements at the graduate level may stem from inadequacies at lower levels. On the other hand, the requirements as they exist could possibly be independent of all other levels.

The present study was an attempt to make a broad study of the foreign language requirement for the Ph.D. in the biological and the physical sciences. The study investigated how the requirement was satisfied, how university personnel felt about proposals being urged in the literature on the subject, what use was made of foreign languages both during graduate study and after graduation, and what functions foreign languages served at the graduate level.

Assumptions of the Study

1. The sample selected is representative of the biological and the physical sciences population now employed at the state universities of the United States.
2. The data-gathering instrument is valid.
3. The returns on the questionnaire are representative of the population sampled.

Limitations of the Study

Instrument

The instrument may have been designed with less than adequate skill to obtain the necessary information or the true feelings of the respondents. Circled responses were used in the questionnaire to

encourage high returns. Bias may have been introduced by limiting the freedom of response in this manner, but spaces for comments were provided to help overcome any such deficiency.

Limited Sample

The total population is so large that the study of necessity included only a small sample.

Respondents and Non-respondents

Due to the nature of the study, the survey may be biased by the willingness to answer, some of those not responding having particular reasons besides neglect for not answering. Also, it was considered best to exclude all personal identification, making it impractical to have a follow-up letter to non-respondents.

CHAPTER II

REVIEW OF LITERATURE

Differences of opinion arise as to the reason for the foreign language requirement. In an exhaustive survey of graduate education by Berelson (1960), graduate deans and graduate faculty were asked:

> Two justifications are usually given for the foreign language requirement for the doctorate: (1) the cultural justification that foreign languages are needed as a mark of the educated man; and (2) the professional justification that the languages are needed as a tool for research in the discipline. Which justification seems more important to you?

The results were as follows (in percentages):

	Professional	Cultural	Both Equally	Can't Say
Graduate Deans	31	14	51	4
Graduate Faculty	43	17	35	5
Biological Sciences	50	6	42	2
Physical Sciences	58	6	34	2

Berelson considered that the professional reason for keeping the foreign language requirement was gaining strength, but that there was still a large proportion of faculty members who believed the cultural basis of the requirement was important.

Waas (1953) made a study in which he tried to determine how to do a better counseling job with undergraduate students who planned to do graduate work. He questioned medical schools, technological schools, and graduate schools. This study agreed with the point made by

Berelson that the professional reason for keeping the foreign language requirement was growing. Of twenty schools of arts and sciences answering, use of languages as a tool was considered primary by twelve, while six considered the cultural value and the tool value of equal importance. Only two schools considered use of foreign languages of primary importance as a means of cultural development. (The results from the survey of schools of arts and sciences contrasted to answers from sixteen medical schools where there is diminishing importance of languages with prescriptions not filled in Latin. Three schools considered languages of first importance culturally, and nine considered the tool value and the cultural value of equal importance.) Considering all forty-three schools from the three categories, twenty-two put the tool subject value ahead of the cultural value, and sixteen appraised the tool value and the cultural value equally.

When consideration is given to the preference of graduate schools for particular languages, the indication would be towards using them as a tool. Overwhelmingly, the languages preferred were the ones which were considered important for reading research literature.

Two studies, quite similar to the Waas one, were made by Hemenway and Way (1959) and Alexander (1964). In the study by Hemenway and Way, questionnaires were sent to fifty physics departments concerning the languages used to fulfill the graduate language requirement. Many of the schools required that German be one of the two languages, forty-nine out of fifty accepted Russian or French as one of the two languages, while seventeen accepted Italian, four accepted Spanish, and only two accepted Japanese. Alexander sent questionnaires to sixty-one colleges and universities. She found that seventeen languages were

recognized as requirements for higher degrees, all of them European languages except for Japanese. At the doctoral level, German led with three hundred sixteen acceptances, followed by French with three hundred nine, Russian with two hundred one, Spanish with seventy-two, and Italian with fifty-five. Since most of these languages have long been considered to cover the bulk of foreign research, these two surveys seemed to point to foreign languages as a basis for gaining access to technical literature.

Marchand (1958) stated that the purpose of the Ph.D. language requirement was to insure that the candidate had the competence to use languages in his research. The attacks leveled at the Ph.D. language requirement were not leveled at the idea of such a requirement per se, but rather at existing programs. According to Marchand, an agonizing reappraisal of our program for satisfaction of the language requirement was needed.

Nock (1958) added his voice by writing that it must be kept firmly in mind that none of the arguments, except the professional one, advanced for the foreign language requirement on the undergraduate level applied at the graduate level. The relevance of foreign language learning to the work of a given department was the main point, for the purpose of the requirement was to give assurance that the student had a research tool available. He did not see the cultural position as an argument for pursuit of foreign languages during graduate study. The cultural aspect might well be an argument for requiring knowledge of a language for entrance to graduate college or it might be an argument for a broader and deeper requirement, but it could not be an argument for the requirement as universally found. Nock did consider that the

requirement seemed to be based on something more than the mere desire to set an additional hurdle in the way of the student hurrying towards his Ph.D.

McCloy (1955) would like to see a renewal of foreign language reading for research because those who took the trouble to investigate what was going on in other countries were probably both surprised and delighted at what they discovered. They probably learned that scholars in the United States held no monopoly on excellent research or on profundity of thinking. He objected to substitution of statistical methods as a tool of research, the substitute doing nothing to prepare the student to read professional literature in the language for which the substitution was made.

An array of other scholars would strongly argue the cultural aspect of foreign languages. Van Willigen (1964) seemed to recognize the fact of the requirement as a tool, but urged the desirability of languages as a cultural activity. He said the practical use of the study of at least one foreign language was no longer contested, but rather generally accepted. He reminded that satisfaction with this development should not induce us to forget the dangers enclosed in this very development. In the end the practical use might indeed dominate, and the cultural value become secondary.

What is meant by culture or cultural activity in connection with a foreign language? The views of several authors will be used to elaborate the point. Van Willigen (1964) wrote that every contact with language was in itself a cultural activity. Like every cultural act, the speech act is two-sided: it is the personal possession of the individual and the common property of the group. It transmits results

of activities of former generations and it has to be created anew by each generation. The speech act therefore becomes both a possession and a debt. Language is not universal, but rather it is tied to culture, conditioned by culture, so consequently it is limited in its validity. The cultural value of foreign language teaching is great and irreplaceable. He wrote that foreign language teaching develops and sharpens intellectual faculties, widens and enriches the mind, enables the spirit and arms it against prejudice and national complacency, facilitates contact with other peoples and other cultures, and enables international and intercultural appreciation and understanding. Moreover, foreign languages strengthen at the same time a sound consciousness of one's own language and culture.

Mac Eoin (1959) defined culture as embracing all those historically created designs for living, explicit and implicit, rational and irrational, which exist at any given time as potential guides for the behavior of men. This being true, any man, no matter what the occupation, needs more seriously to know what things influence the behavior of other persons. The various aspects of culture are all delicately interlinked into a total structure. Mac Eoin considered downgrading of language study had done a great disservice to America in this respect.

Nock (1958) expressed the learning of a foreign language as a liberalizing experience because, among other things, it taught the limitations which the speech patterns of any single language imposed upon individual thinking processes or even upon national attitudes and assumptions. Parker (1957) echoed the idea of language learning as a liberalizing experience in saying that a person with no knowledge of a

second language had missed an intellectual experience which has been integral to the humanistic tradition in universities of the Western world from their remotest beginnings. The person who had never comprehended, spoken, read, or written a language other than his mother tongue had little perspective on his own language. Even more important, he had never penetrated the rich areas of learning and experience lying beyond monolingual communication. As viewed by Parker, his linguistic horizon was fixed.

According to Mac Eoin (1959), attacks on the foreign language requirement for doctorates were based on a misunderstanding of its being a tool for research. He admitted it was true that languages could be of practical use in research, but that was beside the point. A person must be educated before he starts to specialize. If the language was merely a tool for research, in some fields, there were more useful tools, as mathematics, statistics, and testing techniques. Once the tool theory was accepted, you could not challenge the argument. The criteria left to decide whether the language was necessary or not then only depended on the field of research. Mac Eoin continued by stating the Ph.D. was a scholarly degree, which meant something quite different from mere evidence of an ability to carry on specific research. Since scholarship entailed more, he doubted whether a person not well equipped to go beyond the limits of his own language could be considered a true scholar. Sensitivity to the nuances of one's own language and an ability to express oneself properly in it was one of the major benefits obtained from the study of a foreign language.

Lederer (1958) defended the requirement only on the ground that it contributed to the student's general education. He claimed that

practical benefits from the study of foreign languages accrue in world affairs, international trade, foreign travel, mutual understanding, and in the field of science. To break through the language barrier which isolates the student from the rest of the world means to acquire simple and yet earthshaking awareness that other people talk differently, think differently, and look at the world differently. Their way of organizing and expressing sensations, perceptions, and expressions is as arbitrary and justifiable as our own. Lederer further stated that the foreign languages should give the student true insight into the country of the language he was studying.

From the above discussion and summary, it can be seen that while the professional reason for having the foreign language requirement was growing, the criticism against it was also growing. Berelson (1960) thought that the professional reason gaining strength probably accounted for many of the inroads on the traditional requirement. The cultural reason may account for keeping it. In his study, about three-fourths of all respondents (graduate deans, graduate faculties, and recent recipients of the Ph.D.) agreed with the proposition that the foreign language requirement at the doctoral level had come to be a form without much substance in a sizable proportion of cases. They agreed more strongly on this statement than on any other in a list of over forty. Yet there was sharp disagreement on which remedy to apply, as in the same study, one-third voted to keep the requirement unchanged, while the other two-thirds were split evenly between stiffening and relaxing the requirement.

Drennon (1941) said it was seriously doubtful whether the perfunctory manner in which the reading knowledge of foreign languages was

tested in many universities was evidence that students could really use languages intelligently as a tool of research. They were going through the motions after it had lost its meaning. He felt that there were more pertinent barriers to be put in the way of those who were not Ph.D. material if the doctorate needed protection.

Several others were critical of the level of proficiency. Carmichael (1961), in his criticism of graduate education, stated that unless the person could use the foreign language, it was a futile requirement. The current requirement was frequently not up to date and would best be met at the undergraduate level. Anderson (1964) echoed that the required proficiency was often so modest and demonstrated so late that the whole requirement tended to be somewhat farcial.

In a study prepared for the Commission on Teacher Education, Hollis (1945) reported that on no aspect of the subject of improving the Ph.D. program was more eloquence displayed than that of languages needed for the doctorate. With few exceptions there was general agreement to the effect that the present requirement was utterly meaningless and should either be made significant or abolished.

According to Brickman (1961), at the 1960 Conference on the Doctorate in Education, many members favored retention of the foreign language requirement as a safeguard for academic respectability or thought that the mental discipline it afforded would generally be good for students. The language could even represent an effective device for screening out the less competent. Brickman went on to say that evidently these men never learned the languages and merely passed a test. Hence the low repute of foreign languages in educational research.

White (1954) argued that students did not learn to use foreign languages significantly. Since no preliminary training was ordinarily required and there was no sufficient background for the tests, they crammed day and night. Students felt that the languages took time from more important work and viewed them as productive of nothing but wasted time and frustration. The result was a language examination which served as a hurdle.

Is this the way graduates view their foreign language preparation? Wilson (1965) reported a study of one hundred twenty graduate schools representing fifteen doctoral fields in more than a score of Southern universities. Almost three-fourths of the graduates believed that their undergraduate preparation in foreign languages was less than adequate. One-fourth of the graduates reported inadequate undergraduate preparation increased the time taken to attain their doctorate. Only 22 per cent of the graduates needed no special preparation in any language after beginning graduate study. Two years was the mean length of language study prior to graduate school. Elder (1958) reported that 16 per cent of the graduate students in the natural sciences at Harvard felt the language requirement had delayed their training.

Of the literature reviewed, most writers seemed to agree there was a cultural advantage to keeping the foreign language requirements for the Ph.D., but Alexander (1964) opposed this view. She stated there was no adequate proof that learning of a foreign language broadened a student's conceptual cultural range and appreciation. A person forced to take a foreign language could dislike everything associated with it. She further stated that even as a tool for research, the student might not make practical use of languages since a considerable part of the

material needed had already been translated into his own tongue, or his research could be well on the way before he had taken his language examinations. Also, the literature needed in a foreign tongue may not be available at his institution. From her study, variations in the foreign language requirements seemed to depend on particular requirements of institutions rather than on any widely accepted philosophy of higher education, technological or cultural.

Keniston (1959) wrote that if students were able to pass preliminary examinations and could write an acceptable dissertation without any knowledge of foreign languages, it was clear that the requirement, as a universal rule, had lost its meaning. Even when the rules were vigorously enforced, there was no reason to believe that in a few weeks or months of study a student could attain sufficient mastery of a foreign language to permit him to make an exact translation. Many staff members never assigned foreign books or articles as a regular part of the reading in their courses. If the language requirement was kept for its cultural aspects, cramming could not result in any real understanding of linguistic values or cultural content. If the language requirement was kept lest we become intellectually isolated from the rest of the world, there could be no escape if we did not use it after the examination was passed.

Concern was expressed that the testing remain a reading knowledge. Marchand (1958) advised that it was unfair to test on the ability to translate. Since the candidate would need merely to read and understand in his research, he should be tested accordingly. Nock (1961) would adhere to high and rigid standards for a reading knowledge and work hard to have increased and superior foreign language instruction.

He reiterated that the language requirement for the Ph.D. is, and is properly, a matter of reading knowledge. Nock stated that some have said that Ph.D.'s should be able to go to other countries to attend meetings, to do research, to exchange ideas with scholars of these countries, and to use the languages of these countries. Although he thought the theory was beautiful and he favored the idea, the Ph.D. was a degree based on learning facts and methods, and doing research. A language major without experience prior to undergraduate college could achieve conversational ability only after four years of study. It was out of the question to expect this amount of effort and time to be given to achieve mastery of a language by a graduate student.

What about the use made of languages? Alciatore (1965) found that in the opinion of former University of Minnesota Ph.D.'s, a reading knowledge of foreign languages was greatly overstressed. Of the respondents, 44 per cent reported having acquired a reading knowledge of foreign languages, but yet saw no necessity for the languages in their present employment. If the abilities related to present professional development were compared to those acquired in graduate school, only 6 per cent listed a reading knowledge of foreign languages essential. Elder (1958) sent out questionnaires to 1,482 men who had taken their doctorates at Harvard between 1950 and 1954. On use of languages required for the Ph.D., Elder reported that 27 per cent of the respondents in the natural sciences used the first language frequently, while the other 73 per cent used the language occasionally, rarely, or not at all. Only 18 per cent used the second language frequently.

Weitz, Ballantyne, and Colver (1963) investigated the extent recipients of Ph.D. degrees in all areas, except foreign languages and

literature, used foreign language sources in the preparation of their dissertation. The idea was that the language retention would still be sharp, the dissertation coming immediately after fulfilling the foreign language requirement. The sample consisted of 270 doctoral dissertations at Duke University during 1958 to 1961. Two languages were required at Duke. The total number of references cited by each scholar was compared with the number of foreign language references cited. Of 31,377 citations, 4,048 (13 per cent) were references to foreign language sources. The sciences had the following percentages: botany, 7.8; chemistry, 20.5; physics, 9.6; and zoology, 8.8. Considering individual dissertations, 32.6 per cent used no foreign language references, and 15.9 per cent used one to two foreign language references. Thirteen candidates or 5 per cent of the total candidates accounted for 56 per cent of the total foreign language references. Of the thirteen, four were foreign born, three lived abroad before coming to the United States for doctoral studies, and three studied abroad before or while completing their degrees. The interpretation given (as the present examination procedures at Duke University provide some evidence that students could use foreign languages if they needed to and wanted to) was that the present language regulations were irrelevant to the problem. The assumption was that if a student had mastered a research tool he would use it. They replied that perhaps a more rational hypothesis would be to assume that if a scholar needed a research tool for his work he would acquire it.

The Berelson (1960) study pointed in the opposite direction. In answer to the question of usage of foreign languages in graduate training or in subsequent professional work, the following percentages were

reported for the sciences: botany, 71; chemistry, 85; physics, 62; and zoology, 84.

Recommendations have been suggested to encourage use of foreign languages in graduate training. McCloy (1958) would insist students satisfy the language requirement early, then make use of languages in study programs. The dean should meet with new doctoral students and discuss the value of foreign languages, showing them what new horizons could be opened.

White (1954) brought out that the reasons foreign languages were not closely related to the student's course work and research were three-fold: (1) many graduate teachers were themselves products of a system which set languages in a place apart and which gave them only perfunctory or nuisance value; (2) French and German were the only acceptable languages in many instances, regardless of the student's field of specialization; and (3) the foreign language requirement was satisfied so late it would have been presumptuous to require any practical use of foreign languages before the dissertation stage. By then, the subject might be already chosen and might not require foreign languages. He recommended that various language associations exert a wholesome influence by offering some proof of their wares in the form of special subject-matter lists of significant books and articles currently available in foreign languages. The descriptive lists would be distributed at regular intervals to graduate school departments, serving as a reminder, perhaps as a conscience, to those subject-matter specialists who recommended only English sources. White thought it would seem reasonable to suggest that language requirements be met at least by the middle of the second year of graduate work. Thereafter,

the student would be required to put his competency to meaningful use in specific research projects. Locke (1950), Keniston (1959), Brickman (1961), and Wilson (1965) made similar recommendations--to satisfy the requirement early and to require use of foreign languages in course work.

Nock (1958) stated that satisfying the requirement in a reading course should be generally permitted. The course should be one designed for that purpose and not an undergraduate course. A student who has passed such a course successfully has had at least four months of continuous association with the language after he has passed the elementary stage. The student might not read exclusively in his field, but he has met again and again the problems that confront him regardless of the subject matter.

Nichols (1965) suggested a pass and an honors program. Under the pass program, a foreign language would only be prescribed if it were deemed necessary. Foreign language courses would then be provided to fulfill the requirement. The honors program, being a research oriented degree, would still require a foreign language, the program remaining similar to the one presently administered in most universities.

Flexibility seems to be the key to the recommendations. Weitz, et al. (1963) would place the responsibility for determining the language requirement on the student, strongly reinforced by the dissertation committee. If the research problem necessitated foreign languages, the research problem should not be approved until the student demonstrated an understanding of the language necessary. Under a plan making the student responsible, many would argue that some graduates would not get languages, yet need them later. The authors responded

that the loss which would ensue should this contingency arise was no greater than the present loss involved.

Nichols and Everson (1967) questioned graduates at the University of California, trying to find how much time was spent satisfying the language requirement. Across all departments, it took a mean of approximately four months of full time study per student. Considering the dollar cost per student (for faculty and facilities) at three hundred dollars per month, a university's cost was twelve hundred dollars. At the University of California, language training increased the cost of education by a figure of about nine and one-half million dollars. Accordingly, it was recommended that efficient modern language training be provided for those students whose temperament and career plans gave reasonable evidence that they would benefit. The other students should be urged to devote their time to statistics or other tool courses relevant to their academic and career needs.

Ross and Shilling (1966) suggested that citations in recent literature be used to determine where the research activity was high. For any particular field, it would then be possible to recommend the acceptable and non-acceptable foreign languages to the graduate dean. The plan would have the advantage of bringing the languages accepted up to date, yet being able to adapt itself to the changes in the research.

The literature on the foreign language requirement issue in higher education is extensive and the suggested remedies various and diverse. The review was selective rather than exhaustive, but it gave a fair cross sectional picture of the issue. It served as a basis of comparison between the previous research and the present study, and it tempered the conclusions and the recommendations which were made.

The present study differed from the literature reviewed in three very important respects:

(1) Sampling was on a national scale and concerned the foreign language requirement only. Though many of the studies (Alexander 1964, Berelson 1960, and Wilson 1965) involved extensive sampling, the foreign language requirement was not an only or even a primary concern. They dealt with the issue in a general way or as one aspect of a multi-sided program.

Others have made studies on the foreign language requirement in some depth, but within one university. Studies of this nature were Alciatore (1965) at the University of Minnesota, Elder (1958) at Harvard University, Keniston (1959) at the University of Pennsylvania, and Nichols and Everson (1967) at the University of California. What one finds within a university may serve it well, but the findings may not be applicable outside of that university. With a national sample, the findings would theoretically apply to all universities within the population.

(2) Statistics were used in a research type study. Much of the literature treated the foreign language requirement in a general way, discussing the many sides to the issue, but few used statistics to show the relationships which exist. The writings by Drennon (1941), Lederer (1958), Mac Eoin (1959), Marchand (1958), McCloy (1955), Nock (1958), Van Willigen (1964), and White (1954) came under this category.

(3) The study involved the biological and the physical sciences only. Indications are that the problems associated with the

foreign language requirement differ in the above two areas with those in other areas. If so, this study helps to fill the need for a specialized study in the two areas. Hemenway and Way (1959) did a specialized study, but in the physics departments only. Their primary concern was finding what languages were used to satisfy the foreign language requirement.

Others have made specialized studies about the foreign language requirement, but included many areas, as did Admussen (1967) and Weitz, et al. (1963).

CHAPTER III

METHODOLOGY

The study was designed to determine how various factors involved in foreign language study at the graduate level affected later performance and what functions the foreign language served. In an attempt to accomplish the purpose, relationships of several factors were studied, as represented by the following hypotheses:

Hypotheses

H.1. The option chosen to satisfy the foreign language requirement is independent of the prior language experience of the respondents.

H.2. The option chosen to satisfy the foreign language requirement is independent of the usage made of languages after graduation.

H.3. The amount of research published or supervised is independent of the foreign language capabilities of the researcher.

H.4. The amount of research published or supervised is independent of the suggested foreign language requirement recommendations.

H.5. The suggested foreign language requirement recommendations are independent of the foreign language

capabilities of the respondents.

Data-gathering Instrument

The construction of an appropriate data-gathering instrument was of primary importance. Considerable time and effort were devoted to this phase, revising the questionnaire several times. Once the questionnaire seemed to be ready, it was mailed as a pretest to three state colleges in Louisiana.

Pretest Questionnaire

A pretest form of the questionnaire was designed to detect any flaws before the final form of the questionnaire was sent to the study sample. It was similar in content to the study questionnaire except for a few minor revisions which were made after analyzing returns from the pretest. A four-page duplicated form was used for the pretest.

Study Questionnaire

The questionnaire was designed after a review of the literature on the subject. A list of questions was developed during the academic year 1966-1967 and during the fall of 1967. With the help of the advisory committee, friends, and a statistician, the questionnaire was revised many times and duplicated in pretest form. After sufficient returns were received from the pretest, the questionnaire was once again revised and printed in its final form.

The questionnaire was printed on a sheet seventeen inches by eleven inches so that it could be folded in the middle to form four pages eight and one-half inches by eleven inches. The questions were

designed for computer tabulation and the information was transferred to IBM cards. The respondents were asked to circle the appropriate response, and though this limited the freedom of response, it was conducive to higher returns. Spaces were provided and the respondents were urged to make free comments, partly offsetting the above disadvantage.

The questions were divided into four sections with appropriate questions within each. The four sections were as follows: (1) personal data, (2) foreign language background, (3) use of foreign languages, and (4) recommendations concerning the foreign language requirement.

To further encourage high returns, all personal identification was excluded from the questionnaire.

A copy of the questionnaire is in Appendix A, pages 63-68.

Sample

The population consisted of the administrators, researchers, and teachers in the departments of botany, chemistry, physics, and zoology of the state universities of the United States. The universities were divided into three categories and a number were selected at random from each. The universities selected were as follows:

A. Land Grant A. and M. Universities
    1. Cornell University - Ithaca, New York
    2. Louisiana State University - Baton Rouge, Louisiana
    3. Rutgers University - New Brunswick, New Jersey
    4. Texas A. and M. - College Station, Texas
    5. Texas Tech - Lubbock, Texas
    6. Virginia Tech - Blacksburg, Virginia
    7. Washington State University - Pullman, Washington

B. Land Grant and Comprehensive State Universities

1. University of California - Berkeley, California
2. University of Connecticut - Storrs, Connecticut
3. University of Hawaii - Honolulu, Hawaii
4. University of Kentucky - Lexington, Kentucky
5. University of Massachusetts - Amherst, Massachusetts
6. University of Minnesota - Minneapolis, Minnesota
7. University of Nebraska - Lincoln, Nebraska
8. University of Tennessee - Knoxville, Tennessee

C. Comprehensive Non-Land Grant State Universities

1. Florida State University - Tallahassee, Florida
2. University of Indiana - Bloomington, Indiana
3. University of Iowa - Iowa City, Iowa
4. University of Kansas - Lawrence, Kansas
5. University of Michigan - Ann Arbor, Michigan
6. University of New Mexico - Albuquerque, New Mexico
7. University of North Dakota - Grand Forks, North Dakota
8. University of Oklahoma - Norman, Oklahoma
9. University of Oregon - Eugene, Oregon
10. University of Southern Illinois - Carbondale, Illinois
11. University of South Carolina - Columbia, South Carolina
12. University of Texas - Austin, Texas

From the above universities, a sample was selected representing the departments of botany, chemistry, physics, and zoology. Plans were to send forty-seven questionnaires to each university, forty-six being sent to the four departments and one to the graduate dean. Some departments had an insufficient number of Ph.D.'s to complete the

mailings, so the final total was reduced by nine, giving twelve hundred sixty questionnaires mailed.

In addition, a sample was selected for a pretest. Three state colleges of Louisiana (McNeese State College, Lake Charles; Northwestern State College, Natchitoches; and, University of Southwestern Louisiana, Lafayette) were selected. Five questionnaires were sent to each of the four departments, thus mailing sixty pretest questionnaires.

Collection of the Data

The cooperation in the study was excellent, having approximately sixty per cent returns on both the pretest and the study. About 70 per cent of the respondents availed themselves of the opportunity to comment, making the study more meaningful. As another evidence of interest in the study, several letters were received amplifying the responses.

Procedure for Obtaining Addresses

Catalogs from the selected universities were obtained by writing to the office of the registrar. Using the faculty lists in the catalogs, names were selected from each of the four departments. A questionnaire was sent directly to the respondent. Being unable to obtain a few catalogs, a small number were contacted by sending the questionnaires to the head of the department. The latter method of contact was used for the pretest and proved effective.

Mailings

A letter introducing the study and explaining its purpose was enclosed with the questionnaire. A stamped, addressed return envelope was provided.

The pretest was mailed during the second week of January, 1968. The timing was selected to come after the Christmas holidays and before final examinations were to be given.

The study questionnaires were mailed during March, 1968. By then, ample returns had been received from the pretest and the mailings came at a time preceding the spring holidays. The cut-off date for returns was June 1, 1968. Several questionnaires were received after that date, but they were too late to be included in the study, the material having been readied for computer tabulation.

Returns

Twelve hundred sixty questionnaires were mailed, but of that number, thirty-two were returned for one reason or another, e.g., the respondent having changed university. An additional six returns could not be used due to incomplete responses. Thus, the effective number of questionnaires mailed was twelve hundred twenty-two. Seven hundred eighteen completed questionnaires were received, giving 58.8 per cent returns. A distribution by categories is given in Table I, page 29.

The percentages of the returned total amount to over one hundred per cent because many of the deans responded as a member of one of the four science groups in addition to their administrative category.

TABLE I

DISTRIBUTION OF THE RETURNS BY CATEGORIES

Category	Number Mailed	Number Returned	Per Cent of Returns	Per Cent of Returned Total
Deans	27	24	88.89	3.34
Botany	301	147	48.84	20.58
Chemistry	301	207	68.77	28.99
Physics	292	163	54.15	22.83
Zoology	301	190	63.12	26.61

Analysis of the Data

The data were coded and punched on IBM cards for use in computer tabulations. They were such that analysis by percentages yielded interesting and useful information.

Statistical analyses were made to test the hypotheses, accomplished by performing numerous chi-square tests. Chi-square is a non-parametric technique for testing significant differences among distributions. The basic computation equation is given below:

$$\text{Chi-square} = \frac{(\text{Observed frequencies-Expected frequencies})^2}{\text{Expected frequencies}}$$

The expected frequency for any cell is obtained from the product of the sums of that row and that column, divided by the total sample size. If a marked difference exists between the observed frequencies

falling in each category and the frequencies expected to fall in each category, then the chi-square test will yield a numerical value large enough to be interpreted as statistically significant. By statistically significant, we mean that the observed phenomena represents a significant departure from what might be expected by chance alone. The larger the value of chi-square, the greater the difference between the groups.

Once the chi-square value has been computed, a table of probabilities from the distribution of the chi-square statistic provides significance levels. To use the table, we must know the degrees of freedom, obtained by the product of the rows minus one and the columns minus one (Popham 1967).

The five per cent level of significance was used as a criterion for rejection or non-rejection of the null hypotheses.

CHAPTER IV

RESULTS OF THE STUDY

The Study Sample

The data were classified into several categories as to possible factors influencing responses. The sample was 97 per cent males and 3 per cent females.

The dates of receiving the Ph.D. were divided into three categories, based upon pre-World War II graduates, post-World War II to Sputnik graduates, and post-Sputnik graduates. The percentage breakdown was as follows: (1) prior to 1946, 22.45 per cent, (2) 1946 to 1954, 30.82 per cent, and (3) 1955 or later, 46.72 per cent.

As to institution, 24.79 per cent were from land grant A. and M. universities, 32.31 per cent were from land grant and comprehensive state universities, and 42.90 per cent were from comprehensive non-land grant state universities.

If the rank of the respondents was considered, 48.61 per cent were professors, 26.60 per cent associate professors, 19.36 per cent assistant professors, and 5.43 per cent deans, instructors, and researchers.

Dividing the sample by departments shows the following: botany, 20.56 per cent; chemistry, 28.99 per cent; physics, 22.83 per cent; and zoology, 26.61 per cent.

Analysis of the Data

Hypotheses

It was hypothesized that the option chosen to satisfy the foreign language requirement was independent of the prior language experience of the respondents.

Options:

1. Reading knowledge of two languages
2. Reading knowledge of one language
3. Thorough knowledge of one language
4. Reading knowledge of one language and another research tool substituted for the second language.
5. No language used, substituting research tools
6. No language or substitute required

Prior language experience:

1. Grew up with the language(s)
2. Studied the language(s) in school at an early age (high school or younger)
3. Studied the language(s) in undergraduate courses
4. Some type of experience with the foreign language(s) chosen prior to enrolling in graduate school

Using the options-chosen as one variable and the prior language experiences as a second variable, four chi-square tests were computed. For the option-chosen variable, the totals of option one composed one group and the totals of option two, three, and four composed a second group. The two groups of the second variable consisted of either having had language experience or not having had language experience

prior to graduate school. The results are given in Table II.

TABLE II

CHI-SQUARE ANALYSIS RESULTS OF THE OPTION CHOSEN TO SATISFY THE FOREIGN LANGUAGE REQUIREMENT AND THE PRIOR LANGUAGE EXPERIENCE OF THE RESPONDENTS

Prior Experience	Chi-Square
*Significant beyond the .05 level	Degrees of freedom 1
1. Foreign language experience prior to enrolling in graduate school	12.4457*
2. Grew up with language(s)	.3993
3. Studied language(s) in school at an early age (high school or younger)	1.2693
4. Studied language(s) in undergraduate courses	8.1943*

From the first chi-square test, we probably have to reject the null hypothesis that the option chosen to satisfy the foreign language requirement was independent of the prior language experience of the respondents. The prior experiences of an individual modify his later actions and choices. If the individual had an intimate knowledge of foreign languages by growing up with them or if he had an early (high school or younger) contact with foreign languages, the option chosen was independent of prior language experience. It seemed to give him

more choice. On the other hand, if the individual had language experience prior to graduate school, but it was of the type acquired at a later age (undergraduate), his choice of options was related to his prior language experience. These tests seem to strengthen the notion that an early contact with foreign languages would be advantageous to graduate students.

Further considering the option chosen, a second hypothesis was that the option chosen to satisfy the foreign language requirement was independent of the use made of languages after graduation. The options-chosen variable was treated in the same manner as the first hypothesis, using option one for one group and combining options two, three, and four for the second group. The second variable involved seven groups, listed in Table III.

Most of the respondents in the sample chose option one, a reading knowledge of two foreign languages. The option would probably prepare best, of all the uses listed, to read research articles. Of the seven uses listed, only the reading of research articles yielded a significant chi-square statistic. The probability was $<.02$, considering a two-tailed test, that this distribution happened by chance alone. Thus, for all the other variables, we failed to reject the null hypothesis and considered that there was no significant difference between the option chosen to satisfy the foreign language requirement and the use made of languages after graduation, with the exception of the reading of research articles. The tests seemed to indicate that regardless of the way in which the foreign language requirement was satisfied, the use of languages was the same. That could be an erroneous conclusion because the statistic tested if the languages were used, but

not to what extent languages were used. However, the fact still remained that there existed little relationship between the type of option chosen and the use of languages for the majority of respondents.

TABLE III

CHI-SQUARE ANALYSIS RESULTS OF THE OPTION CHOSEN TO SATISFY THE FOREIGN LANGUAGE REQUIREMENT AND THE USE MADE OF LANGUAGES AFTER GRADUATION

Use of Languages	Chi-Square
*Significant beyond the .05 level	Degrees of freedom 1
1. Do not use languages	.1262
2. Pursue bibliography	.9235
3. Read abstracts	3.7767
4. Read research articles	6.3691*
5. Read journals	.2521
6. Abstract research articles	.8561
7. Converse effectively	.1709

The third hypothesis proposed that the amount of research published or supervised was independent of the foreign language capabilities of the researcher. One variable was categorized into three groups: (1) no research articles published or doctoral dissertations supervised, (2) one to eight research articles published or doctoral

dissertations supervised, and (3) more than eight research articles published or doctoral dissertations supervised. The second variable was listed with each test in Table IV.

TABLE IV

CHI-SQUARE ANALYSIS RESULTS OF THE AMOUNT OF RESEARCH PUBLISHED OR SUPERVISED AND THE FOREIGN LANGUAGE CAPABILITIES

Language Capabilities	Research Supervised	Research Published
*Significant beyond the .05 level		Degrees of freedom 2
1. Cannot use languages	1.3537	0.9851
2. Pursue bibliography	1.0911	2.9181
3. Read abstracts	1.0853	5.9927
4. Read research articles	1.4317	1.1693
5. Read journals	2.2198	1.9252
6. Abstract research articles	2.8290	3.4025
7. Converse effectively	4.1003	4.0419

None of the tests proved to be significant, so we failed to reject the null hypothesis. If we accepted the hypothesis of no significant difference between the amount of research published or supervised and the foreign language capability, we would be saying languages played a minor role in biological and physical sciences research. Serious

doubts would arise concerning the function foreign languages served in research. With such a limited sample, no definite conclusions could be drawn. However, according to these tests, whether a person could use languages or not, the research continued unabated. Questions still remain as to the type of research done and as to the extent research was hampered by insufficient foreign language background.

It may be of interest to compare the foreign language competency level with the foreign language usage level of the respondents. For the competency level, the foreign language tasks which the respondents could perform were used, figuring the percentages of the yes answers to the total answers. Using like operations, percentages were obtained for the usage level according to the tasks the respondents did use regularly in research. The data are presented in Figure 1, page 38.

Though it was generally assumed that a person who could use languages would use them in research, such was not necessarily the case. At several levels, there was a marked difference between competency and usage. Notice that although only 5 per cent of the respondents could not use languages, a total of 19 per cent did not use them.

Has there been a change in competency and usage levels through the years? A comparison of these according to the date the Ph.D. was received (Table V) reveals the following:

1. A higher level of competency was demonstrated by those graduating after 1946 than those graduating prior to 1946 in pursuing bibliography and reading abstracts.
2. A higher level of competency was demonstrated by those graduating before 1946 than those graduating after 1946 in all other foreign language usages.

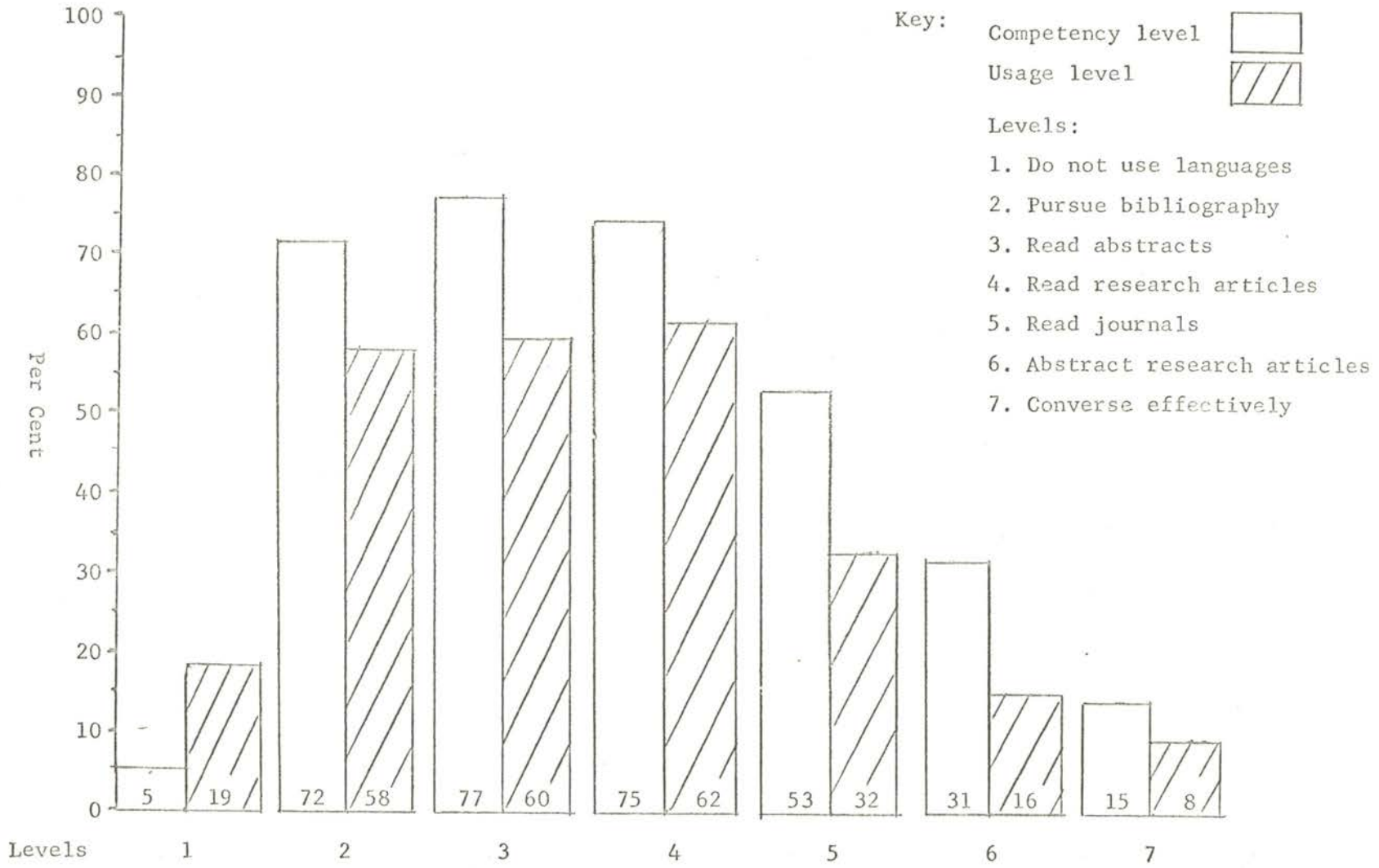

Figure 1. A Comparison of the Foreign Language Competency Level with the Foreign Language Usage Level

TABLE V

A COMPARISON OF THE COMPETENCY LEVEL AND THE USAGE LEVEL ACCORDING TO THE DATE OF RECEIVING THE PH.D.

Levels	Prior to 1946		1946 to 1954		1955 or later	
	Competency	Usage	Competency	Usage	Competency	Usage
1. Do not use languages	3	17	3	16	7	21
2. Pursue bibliography	69	60	73	60	73	56
3. Read abstracts	71	63	78	61	79	59
4. Read research articles	77	68	76	66	74	56
5. Read journals	62	51	50	40	50	29
6. Abstract research articles	39	24	34	19	26	11
7. Converse effectively	16	11	18	9	12	7

3. A gradual erosion of foreign language usage was noted the more recent the Ph.D. was received.

The trends could be interpreted in two different ways: (1) The more recent graduates were not as well prepared to use languages as were those who graduated prior to 1946. The emphasis with more recent graduates could have been in the use of abstracts and research articles, and therefore, in the use of journals, abstracting, and conversing, the recent graduates did not fare as well as earlier graduates. Foreign languages may not have been stressed as much as in former years, hence the erosion in use. (2) The more recent graduates did not have as much experience with languages as earlier graduates due to fewer years of service. The competency level and the usage level of the present recent graduates and the earlier graduates could be comparable after similar years of service. It could again be argued that as more time passed, the level of competency would drop rather than rise due to little usage of foreign languages, the outcome depending on how much use was made of them.

Whether the trend shown in Figure 1 could be explained in terms of better preparation of earlier graduates or in terms of more years of use by earlier graduates, there existed a definite decrease in competency and use by recent graduates. The more difficult the language task to be performed, the more marked was the decline.

A fourth hypothesis was that the amount of research published or supervised was independent of the suggested foreign language requirement recommendations. The research published and the doctoral dissertations supervised were divided into three groups for one variable, as follows: (1) no research articles published or doctoral dissertations

supervised, (2) one to eight research articles published or doctoral dissertations supervised, and (3) more than eight research articles published or doctoral dissertations supervised. The second variable was the suggested foreign language requirement recommendations listed in Table VI.

Only one significant result was obtained, so the null hypothesis of independence between the research published or supervised and the suggested recommendations was considered tenable. The foreign languages are proposed as a research tool, so some sort of relationship should exist between research published or supervised and the suggested recommendations. The failure of the tests to detect a relationship may indicate that languages serve some function other than as a tool.

The one statistically significant test involved the recommendation to permit substitution of proficiency in statistics or computer science for one language. A larger number of respondents than expected were undecided on this recommendation, contributing the bulk of the large statistical result. Therefore, after the data are examined, little can be said for even this one significant finding. Of course, three hundred five of about seven hundred respondents agreed with the recommendation, while two hundred sixty-eight opposed it. This did show rather strong support.

It was further hypothesized that the suggested foreign language requirements recommendations are independent of the foreign language capabilities of the respondents. Chi-square analyses are given in Table VII.

The hypothesis as a whole could not be rejected with any degree of confidence, but neither could it be considered tenable. Notice that

TABLE VI

CHI-SQUARE ANALYSIS RESULTS OF THE AMOUNT OF RESEARCH PUBLISHED OR SUPERVISED AND THE SUGGESTED FOREIGN LANGUAGE RECOMMENDATIONS

Suggested Foreign Language Requirement Recommendations	Research Published	Research Supervised
*Significant beyond the .05 level		Degrees of freedom 4
1. Require foreign language proficiency for the Bachelor's degree	4.8173	4.3729
2. Require foreign language proficiency for admission to graduate study	6.8756	5.7103
3. Require fulfillment of the foreign language requirement before admittance to the doctoral program	8.0695	7.2434
4. Require fulfillment of the foreign language requirement before admittance to the second year of the doctoral program	8.4531	5.4516
5. Make the reading examination more demanding	7.6920	4.2021
6. Require both reading and speaking in one language for the Ph.D.	8.9620	7.2602
7. Permit substitution of proficiency in statistics or computer science for one language	16.6023*	3.1707
8. Require reading knowledge in only one language for the Ph.D.	3.5195	5.0310
9. Permit proficiency in English to meet the language requirement for foreign students	5.4600	6.5638
10. Make the foreign language requirement optional with the department	0.8578	1.9322
11. Make the foreign language requirement optional with the individual's committee	2.5123	5.8008
12. Leave the determination of proficiency in foreign languages to the major department	1.9057	4.9328
13. Delete the foreign language requirement	4.2076	2.9638

TABLE VII

CHI-SQUARE ANALYSIS RESULTS OF THE FOREIGN LANGUAGE REQUIREMENT RECOMMENDATIONS AND THE FOREIGN LANGUAGE CAPABILITIES OF THE RESPONDENTS

Suggested Foreign Language Requirement Recommendations	Cannot Use the Languages	Pursue Bibliography	Read Abstracts	Read Research Articles	Read Journals	Abstract Research Articles	Converse Effectively
*Significant beyond the .05 level						Degrees of freedom 2	
1. Require a foreign language proficiency for the Bachelor's degree	2.0490	11.5274*	10.7598*	11.9198*	11.7572*	6.1158	4.4120
2. Require a foreign language proficiency for admission to graduate study	2.7989	8.6771*	2.0699	9.3518*	14.1961*	5.3706	2.0913
3. Require fulfillment of the foreign language requirement before admittance to the doctoral program	0.2174	6.1428	1.8900	5.4141	5.0691	3.0298	3.3580
4. Require fulfillment of the foreign language requirement before admittance to the second year of the doctoral program	1.3380	7.4327*	2.7257	5.9370	1.9336	3.3185	1.8162
5. Make the reading examination more demanding	0.4985	9.6131*	2.3813	1.9362	1.1469	1.9041	2.5224
6. Require both reading and speaking in one language for the Ph.D.	0.3868	8.1564*	5.5216	1.2732	0.0542	0.5274	12.7563*
7. Permit substitution of proficiency in statistics or computer science for one language	2.4474	8.1135*	7.2484*	6.8895	12.9583*	7.1759	8.9399*
8. Require reading knowledge in only one language for the Ph.D.	0.6896	7.1261	8.1796*	15.4548*	18.6542*	3.6788	6.9570
9. Permit proficiency in English to meet the language requirement for foreign students	4.5489	9.2114*	7.0989	9.3783*	14.8233*	5.7475	3.8328
10. Make the language requirement optional with the department	1.9210	6.8522	4.7984	2.2736	11.5617*	2.0391	2.4765
11. Make the foreign language requirement optional with the individual's committee	0.4120	6.7492	3.8698	4.3780	5.1243	0.3917	1.9294
12. Leave the determination of proficiency in foreign languages to the major departments	0.8394	6.3920	6.6654	3.2340	2.3753	2.6024	3.1412
13. Delete the foreign language requirement	18.6788*	14.2519*	7.6870*	17.9417*	14.8113*	0.6309	2.6366

the language capabilities were listed in a general order of increasing difficulty through conversing effectively. The first recommendation proposed requiring foreign language proficiency for the Bachelor's degree, which was the way 63 per cent of the sample had their major encounter with foreign languages. Those who learned languages earlier than undergraduate school were the ones who could abstract research articles and converse effectively, so their recommendation in this respect was independent of their capability. The recommendation of the others was significantly related to their capabilities, which was probably in turn related to their background. The same interpretation could probably be applied to the second recommendation.

What would account for seven of the first nine recommendations being related to the ability to pursue bibliography, while being independent of most of the other abilities? An examination of the first nine recommendations reveals that these dealt with proficiency of the language in some way while the next three recommendations dealt with the language requirement itself (with the possible exception of recommendation twelve). As 72 per cent of the sample could pursue bibliography, a relation existed between this ability and proficiency recommendations. With a greater degree of language ability required, the recommendations suggested were independent of the language capabilities. The verification of a relationship between being able to converse effectively and the recommendation of requiring both reading and speaking in one language for the Ph.D. tends to support the above interpretation. It can probably be said that with increasing language capability, there is a tendency for the recommendations to be independent of the language capabilities. The results shown by recommendation

thirteen, deletion of the foreign language requirements, further substantiated this view. Very strong relationships, most of them well beyond the .001 level of significance, existed between the foreign language capability and the recommendation. At the capability levels of being able to abstract research articles and being able to converse effectively, the thirteenth recommendation was independent of the language capability.

The Recommendations

The Admussen (1967) study reported that several changes had been made in the foreign language requirement for the Ph.D. at many universities and hinted that several more were to be made shortly. Most studies seemed to indicate the biological and physical sciences were somewhat set apart from the general population regarding the foreign language requirement. A comparison of the present study with the Admussen study seemed to confirm that conclusion.

A tabulation of the recommendations as related to several possible factors was made. The tabulation could provide background information for possible future decisions concerning the foreign language requirement for the biological and physical sciences.

The responses were divided into yes, no, and undecided categories and the percentages of the total calculated. Discarding all the undecided answers, the percentages of the no answers were subtracted from the yes answers. The resulting figure indicated the degree of agreement or disagreement with the recommendation, a positive answer showing agreement and a negative answer showing disagreement. The larger the number, the stronger the agreement or the disagreement. The results

are given in Table VIII.

An examination of Table VIII shows that the respondents agreed with but three of the suggested recommendations:

(1) Require foreign language proficiency for the Bachelor's degree. The respondents agreed more strongly on this recommendation than on any other. In the review of literature, one of the top suggestions made was that the language requirement be satisfied early and then used in graduate work (Locke 1950, White 1954, McCloy 1958, Keniston 1939, Brickman 1961, Wilson 1965). With renewed interest in foreign languages at levels below graduate school (Parker 1961), this recommendation shows promise in helping to solve the graduate school foreign language dilemma.

(2) Permit proficiency in English to meet the language requirement for foreign students. The reaction was also strongly favorable on this recommendation, but many respondents had qualified answers. They commented that the recommendation was agreeable if the foreign student's native language had a reasonable scientific literature in his field. According to Viens and Wadsworth (1957), a pattern is developing in which many graduate schools are now allowing increasing substitution away from French or German.

(3) Permit substitution of proficiency in statistics or computer science for one language. A very weak agreement to this recommendation resulted from the tabulation. The more recent graduates, the comprehensive non-land grant state universities, the assistant professors, and the deans gave the major support. Viens and Wadsworth (1957) reported that in their study of 121 graduate schools, nearly 25 per cent made such a substitution possible, either in the school at large

TABLE VIII

DEGREE OF AGREEMENT OR DISAGREEMENT WITH THE SUGGESTED RECOMMENDATIONS AS RELATED TO SEVERAL FACTORS

Suggested Recommendations	Composite	Factors*									
		Time Ph.D. Received			Institution			Rank			
		1	2	3	1	2	3	1	2	3	4
1. Require foreign language proficiency for the Bachelor's degree	+53	+56	+54	+50	+45	+59	+52	+53	+55	+49	+58
2. Require foreign language proficiency for admission to graduate study	- 6	+20	+ 2	-25	-18	- 6	0	+ 5	- 7	-32	- 9
3. Require fulfillment of the foreign language requirement before admittance to the doctoral program	- 5	+12	+ 4	-18	-11	-10	+ 2	+ 4	0	-32	-13
4. Require fulfillment of the foreign language requirement before admittance to the second year of the doctoral program	- 7	+12	- 4	-17	-12	- 7	- 3	- 1	-16	-12	+23
5. Make the reading examination more demanding	-43	-38	-46	-50	-38	-51	-42	-39	-48	-48	-59
6. Require both reading and speaking in one language for the Ph.D.	-54	-59	-51	-55	-60	-53	-53	-52	-51	-64	-58
7. Permit substitution of proficiency in statistics or computer science for one language	+ 6	+ 3	+ 4	+13	- 8	+ 6	+12	- 1	+ 7	+14	+12
8. Require reading knowledge in only one language for the Ph.D.	- 8	-12	- 3	- 7	+ 2	- 5	-14	- 6	- 9	- 3	-21
9. Permit proficiency in English to meet the language requirement for foreign students	+34	+28	+20	+45	+32	+31	+35	+33	+34	+39	+17
10. Make the foreign language requirement optional with the department	- 2	-14	- 1	+ 3	+ 1	- 3	- 4	- 5	- 9	+11	+22
11. Make the foreign language requirement optional with the individual's committee	-37	-41	-43	-33	-46	-39	-31	-40	-45	-14	-47
12. Leave determination of proficiency in foreign languages to the major department	-16	-13	-11	- 8	-16	- 6	-22	-20	-17	- 4	-17
13. Delete the foreign language requirement	-50	-59	-58	-56	-41	-67	-60	-55	-59	-63	-74

*Time Ph.D. Received: (1) Prior to 1946, (2) 1946 to 1954, (3) 1955 or Later

Institution: (1) Land Grant A. and M. Universities, (2) Land Grant and Comprehensive State Universities, (3) Comprehensive Non-Land Grant State Universities

Rank: (1) Professor, (2) Associate Professor, (3) Assistant Professor, (4) Graduate Dean

or in some departments of the school.

None of the other suggested recommendations was agreeable. Disagreement was very strong in three of them, namely (1) require both reading and speaking in one language for the Ph.D., (2) delete the foreign language requirement, and (3) make the reading examination more demanding.

Of the other recommendations on which respondents disagreed, it can be noted that with some, there was general disagreement, but with others, the issue was divided. One such recommendation was the one which dealt with making the foreign language requirement optional with the department. Besides the relatively strong disagreement from those who graduated prior to 1946, the recommendation would have been in the agreeable category. Graduate deans gave strong approval to the recommendation.

It is of importance to note one other point about Table VIII. Respondents who graduated 1955 or later were at variance with the other two "time" categories on most recommendations. They were of completely different opinions (e.g., recommendations two, three, and ten) or they agreed or disagreed more strongly than one or both of the other groups. As trends may indicate possible future directions and problem areas, a trend of this sort is noteworthy since the recent graduates constitute the group. If it had been one of the other two groups, the possible significance would not be very great as any effect resulting from their opinion would be felt now or would have been of no consequence. The impact on the foreign language problem by recent graduates is yet to be felt. For instance, graduate schools do not have a uniform language requirement for admission (Viens and Wadsworth 1957). The prior to

1946 graduates agreed with the recommendation that a foreign language proficiency for admission to graduate school should be required, but the 1955 or later graduates disagreed very strongly (-25). If their opinions remain unchanged, the possibilities of the graduate school tightening the language requirement for admission do not seem probable.

The Functions

Six language functions with no numbered order were listed on the questionnaire. The respondents were asked to number the functions in order of importance, giving the rank of the function foreign languages "should serve" and the rank the foreign language "is serving." So many respondents indicated no function for several of the listed statements that a number seven was assigned to designate "no function."

The ranks of each function were tabulated by computer. Surprising unanimity existed on the functions foreign languages should serve and the functions they are serving. When considering such diverse groupings as administration, times of receiving the Ph.D., and the types of institutions, all agreed with the composite rankings. The degree of ranking was not the same for each group, but the order of ranking was the same. That obviated the necessity of including the above mentioned groups in the comparative table (Table IX). Also, as judged by these groups, no discrepancy was seen between the function the requirement should serve and the function the requirement is serving.

Little difference from the composite can be detected in the function the foreign language requirement should serve as viewed by these groups. The chemists and the physicists placed effective personal communication with foreigners in their native tongue in the third spot,

TABLE IX

A COMPARISON BY GROUPS OF THE FUNCTIONS THE FOREIGN LANGUAGE REQUIREMENT SHOULD SERVE

Functions the Foreign Language Requirement Should Serve	Ranking						
	Composite	Botany	Chemistry	Physics	Zoology	Research	Teaching
1. Research tool	1	1	1	1	1	1	1
2. Obtaining educational information	2	2	2	4	2	2	2
3. Cultural development	3	3	4	2	3	3	3
4. Effective personal communication with foreigners in their native tongue	4	4	3	3	4	4	4
5. Basis for clearer English comprehension	5	5	5	5	5	5	5
6. Maintain interest in foreign languages below the graduate level	6	6	6	6	6	6	6

but disagreed on the ranking of obtaining educational information and cultural development. The physicists gave a high rank to cultural development, while the chemists placed cultural development fourth.

Nothing startling is uncovered by observing the rankings of the functions the foreign language requirement is serving (Table X). Only minor shufflings of the rankings as compared to the composite are detected. A comparison of the table for the functions the foreign language requirement should serve with the table for the functions the foreign language requirement is serving does bring out something worthy of notation. The physicists placed more emphasis upon the function as a means of cultural development than did the other groups, viewing it as of second importance both for the function it should serve and for the function it is serving. The view is not held universally. Seeming to echo Alexander (1964), one respondent wrote that there was no data to indicate that translators and interpreters had become more liberal-minded than non-linguists. He stated that lack of provincialism depended more upon the general level of education and the social environment than upon the learning of a language.

The chemists were the only group which listed the function of maintaining interest in foreign languages below the graduate level at a rank above the sixth spot, and it was listed in the "is serving" group and not in the "should serve" group. The Admussen (1967) study advised that the Ph.D. language requirement as it read in the vast majority of American universities was certain to have a demoralizing effect on the future of undergraduate language learning. In their comments, most of the respondents mentioned that this function was very desirable, but that it had no place at the graduate level. Even so, if the languages

TABLE X

A COMPARISON BY GROUPS OF THE FUNCTIONS THE FOREIGN LANGUAGE REQUIREMENT IS SERVING

Functions the Foreign Language Requirement Is Serving	Ranking						
	Composite	Botany	Chemistry	Physics	Zoology	Research	Teaching
1. Research tool	1	1	1	1	1	1	1
2. Obtaining educational information	2	2	2	4	2	3	2
3. Cultural development	3	3	3	2	3	2	3
4. Effective personal communication with foreigners in their native tongue	4	5	4	3	4	4	5
5. Basis for clearer English comprehension	5	4	6	5	5	5	4
6. Maintain interest in foreign languages below the graduate level	6	6	5	6	6	6	6

for the Ph.D. are to be relevent, all indications point to better training below the graduate level.

Although this study presents no experimental evidence to verify the point, from the responses and the comments of the respondents and from the review of literature, it can be said that the foreign language problem is different at the graduate level from all the other levels. It is only at the graduate level that research comes to play a dominant role in the training process. Therefore, the study approach at the graduate level differs from the study approach at the undergraduate level. Whereas the undergraduate approach includes conjugations, conversational ability, customs, and traditions, the graduate strives for a reading knowledge. Hence it cannot be categorized with other language study below the graduate level since the goals of learning are different.

The respondents in the biological and physical sciences stated that the only pertinent function the foreign language requirement should serve and is serving was as a research tool. An indication of how strongly they felt is to observe the per cent of answers which assigned a no function rank to the other functions. The range of percentages ran from 25 per cent for the function of obtaining educational information to 44 per cent for the function of maintaining interest in foreign languages below the graduate level. The trend in their thinking was reflected in a comparison of Table IX and Table X under the research column. The researchers felt that the function of cultural development was presently ranked ahead of the function of obtaining educational information, but that it should be ranked below it.

The comments on the questionnaires belie the above. The responses circled indicated a research function for the language requirement, but the comments indicated some sort of arts function. The language requirement was highly criticized as a nuisance and as an irritant, but these same respondents did not want to delete the foreign language requirement. They stated that the only function the requirement serves is as a research tool, yet indicated that there was no correlation between language ability and ability in scientific research or subsequent productivity in research. That is contradictory.

What is the function of the foreign language requirement? Certainly the function as a research tool is a primary one. Nevertheless, it probably does not account for keeping the requirement. Some intangible factor seems to confound the issue. A person is better off for having studied languages and he is reluctant to do away with the requirement even though he states that it has outlived its usefulness. In other words, languages may have outlived their usefulness as a research tool, but they have not outlived their usefulness to the scientists. If the foreign language requirement for the Ph.D. were to be deleted, 63 per cent of the respondents felt that the quality and the effectiveness of the program would be downgraded, while only 6 per cent felt that the program would be upgraded. Many stated that the downgrading would not affect the research, but that the Ph.D. would be reduced to a technical degree instead of a scholarly one.

Only 34 per cent of the respondents felt that the language requirement was presently serving as a hurdle or screening device, and of that 34 per cent, 71 per cent felt it should not serve such a purpose. Clearly, the respondents would not attach much significance to a hurdle

function. If it does serve such a function it is but a by-product and not an intended one. As one respondent commented, all requirements serve as hurdles, but there are better filters than the language requirement.

Again, the present study hinted that the time factor involved in learning languages had been greatly overplayed. The 1960 Conference Report of the American Association of Colleges for Teacher Education (Brown 1960) indicated that it took a median of five months to satisfy the language requirement, while the Nichols and Everson (1967) study reported that it took four months of full time graduate study. The average time spent by the respondents in the present study was equivalent to three semester hours of graduate study. True, 89 per cent of the respondents had prior language experiences before enrolling in graduate school, but even if they did not have prior experiences, they indicated that the requirement was not a formidable one.

To fully state the function of the foreign language requirement for the Ph.D., a study of the meaning of the degree would first have to be made. The concept of a requirement at the graduate level is intimately interlinked with the purpose of the degree for which that requirement exists. No general agreement seems to exist as to the goals of graduate education or the meaning of the Ph.D. The conclusion of the writer is that the elusiveness of the task of defining an exact function for the foreign language requirement is due to the vagueness of the educational philosophy at the graduate level. Each university should examine its own purposes and set its foreign language requirements in light of its own goals rather than try to follow a traditional pattern.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

On the basis of experimental evidence there is reason to conclude the following:

1. Prior language experiences affect the choice of options to satisfy the foreign language requirement. The greater the extent of foreign language contact before enrolling in graduate school, the greater the independence of choice of options.
2. The option chosen to satisfy the foreign language requirement does not affect the later use made of languages.
3. No relation exists between the language capability and the productivity of the researcher.
4. No relation exists between the productivity of the researcher and the suggested foreign language requirement recommendations.
5. With increasing foreign language capability, there is a tendency for the suggested foreign language requirement recommendations to be independent of the language capabilities.
6. The earlier graduates have higher language competency and usage levels than more recent graduates.
7. Most doctoral students are prepared for the foreign languages before entering graduate school.

8. Foreign language study to pass the proficiency test at the graduate level takes very little time.
9. The primary function of the foreign language requirement as viewed by 68 per cent of the respondents is to provide a research tool.
10. Evidence exists that there is something beside the questioned aspects of this study in languages. Though no relation exists between the language capability and research activity, and though the cultural aspect of languages is not rated highly, some aspect is of sufficient import to merit keeping the foreign language requirement for the Ph.D. Only 10 per cent of the respondents feel it should be deleted.
11. The language problem at the graduate level is different from the language problem at the undergraduate level, the goals being different.
12. The results of the study show that the biological and the physical sciences differ from the other areas (e.g., education, engineering, social science) in the way the respondents view foreign languages.

Recommendations

The major recommendations from the study for further research are as follows:

1. A study to ascertain the relationship between the option chosen to satisfy the foreign language requirement and the amount of use made of the languages after graduation could yield information helpful in making decisions related to the

requirements. The present study compared the use made of the languages with the option chosen, but it made no attempt to find the degree of use.

2. The respondents indicated that research is hampered by the lack of a good foreign language background. The problem of how much the research is impeded should be incorporated in a further study.
3. An additional problem which should be investigated is the relationship of foreign language competency to the length of time since receiving the degree. In general, does the competency level rise or fall with increasing years of service?
4. A study designed to define the function of the Ph.D. degree could help solve some of the dissatisfaction associated with requirements for the degree.

A SELECTED BIBLIOGRAPHY

1. Admussen, Richard L. "Trends in the Ph.D. Language Requirement." Modern Language Journal, 51 (1967), 346-349.

2. Alciatore, Robert Thomas. "The Relationship of Conventional and Experimental Ph.D. Programs to Later Faculty Service and Satisfaction." (Unpublished doctoral dissertation, University of Minnesota, 1965).

3. Alexander, Helen. "Languages for Higher Degrees." Educational Forum, 28 (May, 1964), 477-480.

4. Anderson, Theodore. "Languages in the New Key." Modern Language Association of America Publications, 72 (1957), 49-55.

5. _____. "The Faces of Language." The Graduate Journal, 6 (Fall, 1964).

6. Berelson, Bernard. Graduate Education in the United States. New York: McGraw-Hill Book Company, Inc., 1960.

7. Bowles, Frank. "The Past, Present, and Future of Admission Requirements." College and University, 31 (1956), 309-327.

8. Brown, Laurence D. and Marlowe J. Slater. The Doctorate in Education. Washington: The American Association of Colleges for Teacher Education, 1960.

9. Brickman, William W. "The Language Requirements For the Doctorate." School and Society, 89 (1961), 331.

10. Carmichael, Oliver C. Graduate Education: A Critique and a Program. New York: Harper and Brothers, 1961.

11. Childers, J. Wesley. "Foreign Language Offerings and Enrollments in Public Secondary Schools, Fall 1958." Modern Language Association of America Publications, 76 (May, 1961), 36-50.

12. Decker, Ella. "Foreign Language Entrance and Degree Requirements for the B. A. Degree." Modern Language Association of America Publications, 72 (September, 1957), 34-50.

13. Drennon, Herbert. "Modern Language Requirement for Advanced Degrees." Peabody Journal of Education, 18 (1941), 340-348.

14. Elder, J. P. A Criticism of the Graduate School of Arts and Sciences in Harvard University and Radcliff College. Cambridge, Massachusetts: Harvard University Press, 1948.

15. Fife, Robert Herndon. A Summary of Reports on the Modern Foreign Languages. New York: The MacMillan Co., 1931.

16. Hemenway, C. L. and H. E. Way. "Foreign Language Requirements for the Ph.D. in Physics." American Journal of Physics, 27 (October, 1959), 525-526.

17. Hollis, Ernest V. Toward Improving Ph.D. Programs. Washington: American Council on Education, 1945.

18. Keniston, Hayward. Graduate Study and Research in Arts and Sciences at the University of Pennsylvania. Philadelphia: University of Pennsylvania Press, 1959.

19. Lederer, Herbert. "Give the Customer What He Wants or How To Do Away With Foreign Language Requirements." American Association of University Professors Bulletin, 44 (December, 1958), 762-763.

20. Locke, W. N. "Effective Preparation for Graduate Language Requirements." Modern Language Journal, 34 (November, 1950), 527-536.

21. Mac Eoin, Gary. "The Cultural Need of Foreign Language Competence." Modern Language Journal, 43 (May, 1959), 211-217.

22. Marchand, James W. "Teaching, Testing, and the Ph.D. Language Requirements." Modern Language Journal, 42 (May, 1958), 238-243.

23. McCloy, C. H. "Do Educators Need Foreign Languages?" Modern Language Journal, 39 (Fall, 1955), 77-78.

24. _____. "A Letter to the Dean of the Graduate College." Modern Language Journal, 42 (January, 1958), 45-46.

25. Nichols, David G. and Te Everson. "Ph.D. Language Requirements: California Survey Results." Science, 156 (June, 1967), 1549.

26. Nichols, Roy F. "A Reconsideration of the Ph.D." The Graduate Journal, 7 (Winter, 1965).

27. Nock, Francis J. "Foreign Languages as a Graduate Study Requirement." College and University, 33 (Winter, 1958), 154-162.

28. Parker, William Riley. "Foreign Language Entrance and Degree Requirements." Modern Language Association of America Publications, 68 (September, 1953), 40-55.

29. _____. "Why a Foreign Language Requirement." College and University, 32 (1957), 189-203.

30. _____. The National Interest and Foreign Languages. Washington: United States Government Printing Office, 1961.

31. Parten, Mildred. Surveys, Polls and Samples: Practical Procedure. New York: Harper and Brothers, 1950.

32. Plottel, Jeanine Parisier. "Foreign Language Entrance and Degree Requirements for the B. A. Degree in Accredited Colleges and Universities." Modern Language Association of America Publications, 72 (September, 1960), 14-28.

33. Popham, W. James. Educational Statistics: Use and Interpretation. New York: Harper and Row, 1967.

34. Prior, Moody E. "The Doctor of Philosophy Degree." Graduate Education Today. Ed. Everett Walters. Washington: American Council on Education, 1965, pp. 54-59.

35. Remmers, H. H. "Standardizing Foreign-Language Requirements for the Ph.D." School and Society, 81 (March, 1955), 84-85.

36. Ross, Sherman and Charles W. Shilling. "Language Requirements for the Ph.D." Science, 153 (September, 1966), 1595.

37. Speer, David G. "For Standardized Graduate Language Requirements." Modern Language Journal, 41 (1957), 292-293.

38. Van Willigen, Daam M. "The Cultural Value of Foreign Language Teaching." Modern Language Journal, 48 (December, 1964), 476-483.

39. Viens, Claude P. and Philip Wadsworth. "Foreign Language Entrance and Degree Requirements for the M.A., M.S., and Ph.D. Degrees." Modern Language Association of America Publications, 72 (September, 1957), 22-32.

40. Waas, Glen. "Graduate School Language Requirements and Undergraduate Counseling." Modern Language Journal, 37 (1953), 219-225.

41. Walsh, Donald D. "Foreign Language Offerings and Enrollments in Public High Schools." Modern Language Association of America Publications, 70 (September, 1955), 52-56.

42. Weitz, Henry, Robert H. Ballantyne, and Robert M. Colver. "Foreign Language Fluency: The Ornament of a Scholar." Journal of Higher Education, 34 (November, 1963), 443-449.

43. Wert, James E., Charles O. Neidt, and J. Stanley Ahmann. Statistical Methods in Educational and Psychological Research. New York: Appleton-Century-Crofts, Inc., 1954.

44. White, Lucien. "What's Wrong With the Ph.D. Language Requirement?" Journal of Higher Education, 25 (March, 1954), 150-152, 172.

45. Wilson, Kenneth. Of Time and the Doctorate. Atlanta: Southern Regional Education Board, 1965.

46. Wolfe, Warren J. "Foreign Language Entrance and Degree Requirements for the B. S. Degree." Modern Language Association of America Publications, 74 (September, 1959), 34-44.

APPENDIX A

DATA-GATHERING INSTRUMENT

Schedule No. _____
(leave this space blank)

A Study of the Foreign Language Requirement for the Ph.D. in the Biological and the Physical Sciences

PLEASE CIRCLE THE NUMBER TO INDICATE YOUR RESPONSE

A. Personal Data - Not for purposes of individual identification but for classification of data as to possible factors influencing responses.

1. Sex 1. Male 2. Female

2. Name of university from which the Ph.D. was received _____

_____

3. Time Ph.D. was received
   1. Prior to 1946 2. 1946 to 1954 3. 1955 or later

4. Name of institution where presently employed _____

_____

5. Present rank or title _____

6. Present responsibility among the following three:
   _____% Administration _____% Research _____% Teaching

7. Present area of responsibility:
   1. Botany 2. Chemistry 3. Physics 4. Zoology

8. Excluding your dissertation, how many research articles have you published (or presented at a conference or society) in the last five years?
   0 1 2 3 4 5 6 7 8 More than 8

9. How many books have you published in the last five years?
   0 1 2 3 4 More than 4

10. How many doctoral dissertations have you supervised (as major advisor) in the last five years?
    0 1 2 3 4 5 6 7 8 More than 8

B. Foreign Language Background

11. Which of the following six options were used to fulfill the foreign language requirement for your Ph.D.?
    1. Reading knowledge of two languages
    2. Reading knowledge of one language
    3. Thorough knowledge of one language
    4. Reading knowledge of one language and another research tool substituted for the second language
    5. No language used. Substituted research tool, e.g., statistics and-or mathematics, computer science, etc.
    6. No language or substitute required

12. If you chose option 4 or 5 of number 11, what research tool(s) were selected as a substitute? _____

13. If you used another research tool as a substitute for a language, how much time did you spend while in graduate school in acquiring proficiency in its use? Give the total number of semester credit hours and if done by independent study, give the estimated equivalent in semester credit hours (1 quarter hour equals 2/3 semester hour).
    1 2 3 4 5 6 7 8 9 More than 9

14. If you chose option 1, 2, 3, or 4 of question number 11, did you have experience with the foreign language(s) chosen prior to enrolling in graduate school?
    1. Yes 2. No.

15. If you had language experience prior to graduate school (no. 14), check all the following which apply to your background in the foreign language(s) chosen to meet the requirement for the Ph.D., even if it applies to one language only.
    1. Learned because I grew up with it, either as the native tongue of the home or community, as my parents desired it, or as I traveled abroad (armed services, etc.)
    2. Learned at an early age (high school or younger) in school and continued to use the language(s).
    3. First encountered in undergraduate courses.

16. If you had no language experience prior to graduate school (no. 14), by what means or methods did you acquire knowledge of the language(s) used?
    1. By course work, either by formal course work or by special instruction groups.
    2. By study independent of course work or by use of a tutor.

17. How much time did you spend while in graduate school satisfying the foreign language requirement for the Ph.D.? Give your total time so that it is an estimated equivalent in semester credit hours, whether you took course work or did it independently (1 quarter hour equals 2/3 semester hour).
    1 2 3 4 5 6 7 8 9 More than 9

18. When was the foreign language requirement satisfied?
    1. Prior to receiving the Master's degree
    2. Prior to beginning of dissertation for the Ph.D.
    3. Prior to completion of dissertation for the Ph.D.
    4. After completion of dissertation for the Ph.D.

Any comments pertinent to items 11 through 18 which would explain or give additional information would be greatly appreciated.

Comments:

C. Usage of the Foreign Language

Of the following, circle in the left column (number 19) the ones which you can perform competently.
Using the same list, circle in the right column (number 20) the ones you do use regularly when doing research:

19. Can	20. Do
1. Pursue bibliography	1.
2. Read abstracts	2.
3. Read research articles	3.
4. Read journals	4.
5. Read research articles and abstract them	5.
6. Converse effectively	6.
7. Do none of these	7.

Additional Comments Are Encouraged
Comments:

21. To what extent did you use foreign language(s) in the preparation of your dissertation?
1. None 2. Slightly 3. Moderately 4. Extensively

22. In your present use of foreign language(s) which one of the following would best apply?
1. Reading for information related to course work (educational information)
2. Reading for information related to research
3. Equal usage between educational information and research
4. Reading or speaking for other purposes
5. Do not use

23. If another research tool (e.g., statistics, computer science) was substituted for the second language or both languages, please answer the following:
a. To what extent did you use these tool(s) in the preparation of your dissertation?
1. None 2. Slightly 3. Moderately 4. Extensively
b. After graduation, to what extent have you used these tool(s) in your research?
1. None 2. Slightly 3. Moderately 4. Extensively
c. If you chose one language and one research tool as an option (option 4 of number 11), which of the two has been of more value in research and-or teaching?
1. Language 2. Research tool 3. Both equal 4. Neither of value

24. & 25. In your opinion, what function should the foreign language requirement for the Ph.D. presently serve and what function is it presently serving? Please number these 1 through 6 in descending order of importance, using number 1 for the most important function and placing the answers to Should Serve on the left. Repeat on the right for the answers to Is Serving, numbering them in descending order of importance.

24. Should Serve	25. Is Serving
As a basis for clearer English comprehension	
Maintain interest in foreign languages below the graduate level	
As a means of communicating personally with foreigners in their native tongue	
As a means of cultural development	
As a means of obtaining information to be used in course work	
As a research tool	

Comments on items 21 through 25 are encouraged.
Comments:

26. In the literature on the subject, some writers imply that a function the foreign language requirement is serving is as a device or hurdle to discourage the less competent or less persistent. Do you think this is presently the case?
1. Yes 2. No

27. If your answer to number 26 is "Yes," do you think that it should serve as a screening device?
1. Yes 2. No

Comments:

D. Recommendations

28. In the university where you are presently employed, which of the following do you think should be done? (Disregard whether it is presently being done or not.)

Yes	No	Undecided		
1	2	3	A.	Require foreign language proficiency for the Bachelor's degree
1	2	3	B.	Require foreign language proficiency for admission to graduate study
1	2	3	C.	Require fulfillment of the foreign language requirement before admittance to the doctoral program
1	2	3	D.	Require fulfillment of the foreign language requirement before admittance to the second year of the doctoral program
1	2	3	E.	Make the reading examination more demanding
1	2	3	F.	Require both reading and speaking in one language for the Ph.D.
1	2	3	G.	Permit substitution of proficiency in statistics or computer science for one language
1	2	3	H.	Require reading knowledge in only one language for the Ph.D.

Yes	No	Undecided	
1	2	3	I. For foreign students permit proficiency in English to meet the language requirement
1	2	3	J. Make the foreign language requirement optional with the department
1	2	3	K. Make the foreign language requirement optional with the individual's committee (according to career plans)
1	2	3	L. Leave the determination of proficiency in foreign languages to the major department
1	2	3	M. Delete the foreign language requirement

Comments are encouraged
Comments:

29. If the foreign language requirement were to be deleted, it is possible that some positive values could result. Of the following which one do you think would be most likely? If in your opinion it has no positive value, leave 29 blank.
    1. Increase the time which can be devoted to specialized study
    2. Increase the time which can be devoted to research on the dissertation
    3. Shorten the training time for the Ph.D.

30. Conversely, negative values could result if the foreign language requirement were to be deleted. Of the following, which one would be most likely? If in your opinion none of this would happen, leave it blank.
    1. Develop provincialism
    2. Diminish cultural opportunities
    3. Hamper research in that some material will not be readily available
    4. Limit the vocabulary of American students greatly

31. Considering the total effect, if the foreign language requirement for the Ph.D. were to be deleted, what would happen to the quality and effectiveness of the Ph.D. program?
    1. Be upgraded 2. Be downgraded 3. Remain unchanged

Comments:

APPENDIX B

CHI-SQUARE ANALYSES OF VARIOUS FACTORS ASSOCIATED WITH THE FOREIGN LANGUAGE REQUIREMENT

I. Option Chosen to Satisfy the Foreign Language Requirement and the Prior Language Experience (Table II, Page 33)

Prior Experiences		Option 1	Options 2, 3, 4	X^2
Foreign language experience prior to graduate school	Yes	604	21	12.4457*
	No	65	9	
Grew up with the languages	Yes	41	1	0.3993
	No	628	29	
Learned languages in high school or at a younger age	Yes	245	8	1.2693
	No	424	22	
Learned languages in undergraduate courses	Yes	438	12	8.1943*
	No	231	18	

*Significant beyond the .05 level

II. Option Chosen To Satisfy the Foreign Language Requirement and the Use Made of Languages After Graduation (Table III, Page 35)

Use of Languages		Option 1	Options 2, 3, 4	X^2
Do not use languages	Yes	124	6	0.1262
	No	545	24	
Pursue bibliography	Yes	391	15	0.9235
	No	278	15	
Read abstracts	Yes	408	13	3.7767
	No	261	17	
Read research articles	Yes	420	12	6.3691*
	No	249	18	
Read journals	Yes	253	10	0.2521
	No	416	20	
Abstract research articles	Yes	110	3	0.8561
	No	559	27	
Converse effectively	Yes	54	2	0.1709
	No	615	28	

*Significant beyond the .05 level

III. Amount of Research Published and the Foreign Language Capabilities (Table IV, Page 36)

Language Capabilities		Research Articles Published			
*Significant beyond the .05 level		0	1-8	≥ 9	x^2
Cannot use languages	Yes	4	14	16	0.9851
	No	50	311	322	
Pursue bibliography	Yes	37	235	246	2.9181
	No	17	90	92	
Read abstracts	Yes	38	261	252	5.9927
	No	16	64	86	
Read research articles	Yes	38	244	260	1.1693
	No	16	81	78	
Read journals	Yes	26	166	188	1.9252
	No	28	159	150	
Abstract research articles	Yes	11	107	106	3.4025
	No	43	218	232	
Converse effectively	Yes	5	44	57	4.0419
	No	49	281	281	

IV. Amount of Research Supervised and the Foreign Language Capabilities (Table IV, Page 36)

Language Capabilities		Research Supervised			
*Significant beyond the .05 level		0	1-8	≥ 9	x^2
Cannot use languages	Yes	12	20	2	1.3537
	No	181	465	37	
Pursue bibliography	Yes	143	345	30	1.0911
	No	50	140	9	
Read abstracts	Yes	157	368	26	1.0853
	No	36	117	13	
Read research articles	Yes	141	373	28	1.4317
	No	52	112	11	
Read journals	Yes	96	266	18	2.2198
	No	97	219	21	
Abstract research articles	Yes	52	157	15	2.8290
	No	141	328	24	
Converse effectively	Yes	21	80	5	4.1003
	No	172	405	34	

V. Amount of Research Published and the Foreign Language Recommendations Suggested (Table VI, Page 42)

Recommendations Suggested		Research Published			
*Significant beyond the .05 level		0	1-8	≥ 9	x^2
Require foreign language proficiency for the Bachelor's degree	Yes	33	231	235	
	No	10	57	57	4.8173
	Undecided	11	37	46	
Require foreign language proficiency for admission to graduate study	Yes	22	109	132	
	No	17	154	138	6.8756
	Undecided	15	62	68	
Require fulfillment of the foreign language requirement before admittance to the doctoral program	Yes	22	116	135	
	No	18	157	134	8.0695
	Undecided	14	52	69	
Require fulfillment of the foreign language requirement before admittance to the second year of the doctoral program	Yes	16	123	103	
	No	20	134	132	8.4531
	Undecided	18	68	103	
Make the reading examination more demanding	Yes	12	57	42	
	No	24	192	208	7.6920
	Undecided	18	76	88	
Require both reading and speaking in one language for the Ph.D.	Yes	3	46	37	
	No	35	221	220	8.9620
	Undecided	16	58	81	
Permit substitution of proficiency in statistics or computer science for one language	Yes	18	156	131	
	No	17	118	133	16.6023*
	Undecided	19	51	74	
Require reading knowledge in only one language	Yes	17	103	118	
	No	21	143	124	3.5195
	Undecided	16	79	96	
Permit proficiency in English to meet the language requirement for foreign students	Yes	31	187	187	
	No	7	75	83	5.4600
	Undecided	18	62	67	
Make the foreign language requirement optional with the department	Yes	18	134	132	
	No	23	132	144	0.8578
	Undecided	13	59	62	
Make the foreign language requirement optional with the individual's committee	Yes	9	73	71	
	No	29	193	202	2.5123
	Undecided	16	59	65	
Leave the determination of proficiency in foreign languages to the major department	Yes	14	100	109	
	No	23	152	159	1.9057
	Undecided	17	73	70	
Delete the foreign language requirement	Yes	4	27	43	
	No	35	228	224	4.2076
	Undecided	15	70	71	

VI. Amount of Research Supervised and the Foreign Language Recommendations Suggested (Table VI, Page 42)

Recommendations Suggested		Research Supervised			
*Significant beyond the .05 level		0	1-8	≥ 9	X^2
Require foreign language proficiency for the Bachelor's degree	Yes	124	347	29	
	No	39	79	6	4.3729
	Undecided	30	59	4	
Require foreign language proficiency for admission to graduate study	Yes	59	187	17	
	No	94	203	13	5.7103
	Undecided	41	95	9	
Require fulfillment of the foreign language requirement before admittance to the doctoral program	Yes	62	192	19	
	No	95	203	12	7.2434
	Undecided	36	90	8	
Require fulfillment of the foreign language requirement before admittance to the second year of the doctoral program	Yes	62	162	18	
	No	78	201	9	5.4516
	Undecided	53	122	12	
Make the reading examination more demanding	Yes	36	71	4	
	No	114	287	22	4.2021
	Undecided	43	127	13	
Require both reading and speaking in one language for the Ph.D.	Yes	22	61	3	
	No	141	308	26	7.2602
	Undecided	30	116	10	
Permit substitution of proficiency in statistics or computer science for one language	Yes	87	205	13	
	No	68	181	19	3.1707
	Undecided	38	99	7	
Require reading knowledge in only one language	Yes	57	163	18	
	No	86	188	13	5.0310
	Undecided	50	134	8	
Permit proficiency in English to meet the language requirement for foreign students	Yes	119	267	19	
	No	36	115	14	6.5638
	Undecided	38	103	6	
Make the foreign language requirement optional with the department	Yes	79	189	15	
	No	81	204	14	1.9322
	Undecided	33	92	10	
Make the foreign language requirement optional with the individual's committee	Yes	49	97	7	
	No	100	299	25	5.8008
	Undecided	44	89	7	
Leave the determination of proficiency in foreign languages to the major department	Yes	68	139	16	
	No	86	233	17	4.9328
	Undecided	39	113	8	
Delete the foreign language requirement	Yes	19	54	1	
	No	132	326	29	2.9638
	Undecided	42	105	9	

VII. Foreign Language Requirement Recommendations and the Foreign Language Capabilities of the Respondents (Table VII, page 43)

Language Capabilities		Require Foreign Language Proficiency for the Bachelor's Degree			
*Significant beyond the .05 level		Yes	No	Undecided	X^2
Cannot use languages	Yes	20	8	6	2.0490
	No	479	116	88	
Pursue bibliography	Yes	370	89	59	11.5274*
	No	130	35	34	
Read abstracts	Yes	400	84	67	10.7598*
	No	100	40	26	
Read research articles	Yes	396	84	62	11.9198*
	No	104	40	31	
Read journals	Yes	285	52	43	11.7572*
	No	215	72	50	
Abstract research articles	Yes	167	30	27	6.1158
	No	333	94	66	
Converse effectively	Yes	82	15	9	4.4120
	No	418	109	84	

VIII. Foreign Language Requirement Recommendations and the Foreign Language Capabilities of the Respondents (Table VII, page 43)

Language Capabilities		Require Foreign Language Proficiency for Admission to Graduate Study			
*Significant beyond the .05 level		Yes	No	Undecided	X^2
Cannot use languages	Yes	8	17	9	2.7989
	No	255	292	136	
Pursue bibliography	Yes	201	220	97	8.6771*
	No	62	90	47	
Read abstracts	Yes	207	236	108	2.0699
	No	56	74	36	
Read research articles	Yes	215	227	100	9.3518*
	No	48	83	44	
Read journals	Yes	163	152	65	14.1961*
	No	100	158	79	
Abstract research articles	Yes	96	86	42	5.3706
	No	167	224	102	
Converse effectively	Yes	41	43	22	2.0913
	No	222	267	122	

IX. Foreign Language Requirement Recommendations and the Foreign Language Capabilities of the Respondents (Table VII, page 43)

Language Capabilities		Require Fulfillment of the Foreign Language Requirement Before Admittance to the Doctoral Program			
*Significant beyond the .05 level		Yes	No	Undecided	X^2
Cannot use languages	Yes	12	16	6	0.2174
	No	261	293	129	
Pursue bibliography	Yes	200	224	94	6.1428
	No	74	86	38	
Read abstracts	Yes	211	210	100	1.8900
	No	62	70	34	
Read research articles	Yes	219	226	97	5.4141
	No	54	84	37	
Read journals	Yes	158	151	71	5.0691
	No	115	159	63	
Abstract research articles	Yes	92	86	46	3.0298
	No	181	224	88	
Converse effectively	Yes	45	39	22	3.3580
	No	228	271	112	

X. Foreign Language Requirement Recommendations and the Foreign Language Capabilities of the Respondents (Table VII, page 43)

Language Capabilities		Require Fulfillment of the Foreign Language Requirement Before Admittance to the Second Year of the Doctoral Program			X^2
		Yes	No	Undecided	
Cannot use languages	Yes	10	17	7	1.3380
	No	235	270	178	
Pursue bibliography	Yes	186	202	130	7.4327*
	No	60	86	53	
Read abstracts	Yes	191	221	139	2.7257
	No	54	67	45	
Read research articles	Yes	198	210	134	5.9370
	No	47	80	48	
Read journals	Yes	135	143	102	1.9336
	No	110	147	80	
Abstract research articles	Yes	82	78	64	3.3185
	No	163	210	120	
Converse effectively	Yes	35	41	30	1.8162
	No	210	247	154	

*Significant beyond the .05 level

XI. Foreign Language Requirement Recommendations and the Foreign Language Capabilities of the Respondents (Table VII, page 43)

Language Capabilities		Make the Reading Examination More Demanding			X^2
*Significant beyond the .05 level		Yes	No	Undecided	
Cannot use languages	Yes	5	22	7	0.4985
	No	106	401	176	
Pursue bibliography	Yes	89	306	123	9.6131*
	No	22	115	62	
Read abstracts	Yes	87	329	135	2.3813
	No	24	93	49	
Read research articles	Yes	88	322	132	1.9362
	No	23	102	50	
Read journals	Yes	61	228	91	1.1469
	No	50	196	91	
Abstract research articles	Yes	40	133	51	1.9041
	No	71	291	131	
Converse effectively	Yes	21	61	24	2.5224
	No	90	363	158	

XII. Foreign Language Requirement Recommendations and the Foreign Language Capabilities of the Respondents (Table VII, page 43)

Language Capabilities		Require Both Reading and Speaking in One Language for Ph.D.			X^2
*Significant beyond the .05 level		Yes	No	Undecided	
Cannot use languages	Yes	5	21	8	0.3868
	No	81	454	148	
Pursue bibliography	Yes	70	341	107	8.1564*
	No	16	133	50	
Read abstracts	Yes	73	366	112	5.5216
	No	13	108	45	
Read research articles	Yes	66	364	112	1.2732
	No	20	111	44	
Read journals	Yes	46	253	81	0.0542
	No	40	223	74	
Abstract research articles	Yes	24	150	50	0.5275
	No	62	326	105	
Converse effectively	Yes	22	65	19	12.7563*
	No	64	411	136	

XIII. Foreign Language Requirement Recommendations and the Foreign Language Capabilities of the Respondents (Table VII, page 43)

Language Capabilities		Permit Substitution of Proficiency in Statistics or Computer Science for One Language			X^2
		Yes	No	Undecided	
Cannot use languages	Yes	14	10	10	2.4474
	No	291	258	134	
Pursue bibliography	Yes	223	201	94	8.1135*
	No	82	70	49	
Read abstracts	Yes	242	210	99	7.2484*
	No	63	58	45	
Read research articles	Yes	225	216	101	6.8895
	No	80	52	43	
Read journals	Yes	152	163	65	12.9583*
	No	153	105	79	
Abstract research articles	Yes	84	99	41	7.1759
	No	221	169	103	
Converse effectively	Yes	37	52	17	8.9399*
	No	268	216	127	

*Significant beyond the .05 level

XIV. Foreign Language Requirement Recommendations and the Foreign Language Capabilities of the Respondents (Table VII, page 43)

Language Capabilities		Require Reading Knowledge in Only One Language for the Ph.D.			X^2
*Significant beyond the .05 level		Yes	No	Undecided	
Cannot use languages	Yes	10	13	11	0.6896
	No	228	274	181	
Pursue bibliography	Yes	174	216	128	7.1261
	No	64	74	61	
Read abstracts	Yes	185	232	134	8.1796*
	No	53	56	57	
Read research articles	Yes	169	240	133	15.4548*
	No	69	48	58	
Read journals	Yes	107	181	92	18.6542*
	No	131	107	99	
Abstract research articles	Yes	66	102	56	3.8788
	No	172	186	135	
Converse effectively	Yes	26	52	28	6.9570
	No	212	236	163	

XV. Foreign Language Requirement Recommendations and the Foreign Language Capabilities of the Respondents (Table VII, page 43)

Language Capabilities		Permit Proficiency in English To Meet the Language Requirement for Foreign Students			
*Significant beyond the .05 level		Yes	No	Undecided	X^2
Cannot use languages	Yes	19	4	11	4.5489
	No	386	161	136	
Pursue bibliography	Yes	291	130	97	9.2114*
	No	115	35	49	
Read abstracts	Yes	312	137	102	7.0989
	No	94	28	44	
Read research articles	Yes	301	139	102	9.3783*
	No	105	26	44	
Read journals	Yes	210	107	63	14.8233*
	No	195	58	84	
Abstract research articles	Yes	118	64	42	5.7475
	No	288	101	104	
Converse effectively	Yes	61	26	19	3.8328
	No	345	139	127	

XVI. Foreign Language Requirement Recommendations and the Foreign Language Capabilities of the Respondents (Table VII, page 43)

Language Capabilities		Make the Foreign Language Requirement Optional With the Department			
*Significant beyond the .05 level		Yes	No	Undecided	X^2
Cannot use languages	Yes	17	13	4	1.9210
	No	267	286	130	
Pursue bibliography	Yes	202	222	94	6.8522
	No	81	78	40	
Read abstracts	Yes	213	240	98	4.7984
	No	71	59	36	
Read research articles	Yes	210	234	98	2.2736
	No	74	65	36	
Read journals	Yes	136	180	64	11.5617*
	No	148	119	70	
Abstract research articles	Yes	81	99	44	2.0391
	No	203	200	90	
Converse effectively	Yes	42	48	16	2.4765
	No	242	251	118	

XVII. Foreign Language Requirement Recommendations and the Foreign Language Capabilities of the Respondents (Table VII, page 43)

Language Capabilities		Make the Foreign Language Requirement Optional With the Individual's Committee			X^2
*Significant beyond the .05 level		Yes	No	Undecided	
Cannot use languages	Yes	7	19	8	0.4120
	No	146	405	132	
Pursue bibliography	Yes	118	303	97	6.7492
	No	36	121	42	
Read abstracts	Yes	117	334	100	3.8689
	No	37	90	39	
Read research articles	Yes	111	332	99	4.3780
	No	43	92	40	
Read journals	Yes	74	239	67	5.1243
	No	80	185	72	
Abstract research articles	Yes	49	129	46	0.3917
	No	105	295	93	
Converse effectively	Yes	20	68	18	1.9294
	No	134	356	121	

XVIII. Foreign Language Requirement Recommendations and the Foreign Language Capabilities of the Respondents (Table VII, page 43)

Language Capabilities		Leave the Determination of Proficiency in Foreign Languages to the Major Department			
*Significant beyond the .05 level		Yes	No	Undecided	X^2
Cannot use languages	Yes	13	14	7	0.8394
	No	210	320	153	
Pursue bibliography	Yes	158	246	114	6.3920
	No	65	88	46	
Read abstracts	Yes	168	268	116	6.6654
	No	55	66	44	
Read research articles	Yes	176	252	112	3.2340
	No	47	82	48	
Read journals	Yes	121	182	77	2.3753
	No	102	152	83	
Abstract research articles	Yes	78	96	50	2.6024
	No	145	238	110	
Converse effectively	Yes	36	50	20	3.1412
	No	187	284	140	

XIX. Foreign Language Requirement Recommendations and the Foreign Language Capabilities of the Respondents (Table VII, page 43)

Language Capabilities		Delete the Foreign Language Requirement			X^2
*Significant beyond the .05 level		Yes	No	Undecided	
Cannot use languages	Yes	11	18	5	18.6788*
	No	63	470	150	
Pursue bibliography	Yes	44	370	104	14.2519*
	No	30	119	50	
Read abstracts	Yes	49	387	115	7.6870*
	No	25	101	40	
Read research articles	Yes	46	391	105	17.9417*
	No	28	97	50	
Read journals	Yes	29	282	69	14.8113*
	No	45	206	86	
Abstract research articles	Yes	21	158	45	0.8309
	No	53	330	110	
Converse effectively	Yes	15	71	20	2.6266
	No	59	417	135	

VITA

LeRoy Janies

Candidate for the Degree of

Doctor of Education

Thesis: A STUDY OF THE FOREIGN LANGUAGE REQUIREMENT FOR THE DOCTOR OF PHILOSOPHY DEGREE IN THE BIOLOGICAL AND THE PHYSICAL SCIENCES

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