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POSTGRADUATE EDUCATIONAL PLANS OF WISCONSIN
PHARMACY STUDENTS AND RECENT GRADUATES:
A SOCIAL PSYCHOLOGICAL APPROACH

by

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CHAPTER 1
INTRODUCTION

In recent years there has been increased concern about graduate enrollments in colleges of pharmacy (Schumacher, 1979; Zografis, 1979; Gerald, 1979a and 1979b). Some have suggested that the advent of advanced professional pharmacy degree programs and an emphasis on practice-based instruction in undergraduate pharmacy curricula will have a negative impact on graduate enrollment in the basic pharmaceutical sciences. Others have observed the increasing number of women in the profession and wondered whether this change will have an effect on the number of pharmacy graduates who are willing and able to pursue postgraduate training and subsequent careers in research and pharmacy education. Still others are faced with the problem of being unable to fill certain types of faculty positions because there is a shortage of qualified candidates in particular fields.

Although these trends raise many important issues, there have been very few studies quantifying them. It is not known to what extent pharmacy students plan on pursuing postgraduate training and what fields and degrees they are most interested in studying. Also unclear are what factors best explain students' postgraduate educational plans. Researchers in the area of educational and

occupational attainment have addressed these questions by studying the postgraduate plans of college students in general, but few studies have focussed specifically on pharmacy students. Consequently, it is not clear how pharmacy academicians should proceed in order to maximize the number of qualified pharmacists who pursue postgraduate training in the various basic science and clinical practice disciplines.

Besides these practical concerns, there are two theoretical bases of interest regarding enrollment of pharmacy-trained graduate students. First of all, taking a functional approach to the study of professions, one finds that one criterion of a profession is that it generates and maintains a unique body of knowledge (Montagna, 1977; Wilensky, 1964). It is reasonable to assume that it is necessary to maintain a core of pharmacy-trained scientists generating research, and not solely chemists, biochemists, pharmacologists, historians, and sociologists who have no specific allegiances to pharmacy. A second point of theoretical interest is that in view of the professional socialization occurring during the educational process, it seems important to have a critical mass of pharmacy-trained professors in pharmacy schools who act as role models for the students (see, for example, Moore, 1969, or Shuval, 1978).

The above practical and theoretical concerns formed the basis upon which this study was conceived. The primary objectives of the study are:

- 1.) to determine the extent that pharmacy students and recent graduates plan on pursuing postgraduate training, and the extent to which they are interested in particular degrees and fields of study;
- 2.) to determine whether students' perceived probability of pursuing postgraduate training can be explained by:
 - a.) individual background characteristics, such as sex and parents' education;
 - b.) belief and performance factors, such as reason for entering pharmacy school, grade point average, satisfaction with choice of pharmacy as a major, and interest in doing practice related research; and
 - c.) enabling factors, such as encouragement from faculty, family, and friends as well as perceived financial barriers to graduate study;
- 3.) to determine whether the factors in (2) above operate similarly in explaining perceived probability of pursuing postgraduate training at different points in students' pharmacy education.

To accomplish these objectives, third, fourth, and fifth year students and 1980 graduates of the University of Wisconsin School of Pharmacy were surveyed. Implementation plans are described in Chapter Three, but first a review of the relevant literature is presented.

CHAPTER 2
REVIEW OF THE LITERATURE
AND PROPOSED MODEL OF EDUCATIONAL PLANNING

Little work dealing specifically with the postgraduate educational aspirations and attainment of pharmacists is reported in the literature. In light of this void, this review of the literature is organized in three sections. First, an overview of the theoretical perspectives underlying the study of educational aspirations is presented. Next, studies are cited which focus on the postgraduate aspirations and attainment of college students. Thirdly, work dealing specifically with the educational plans of pharmacists is outlined. A model of educational planning is then proposed and specific hypotheses are posited.

Theoretical Perspectives

Studies on educational aspirations and attainment have been motivated by two groups of researchers. One of these are those sociologists who are interested in the process of stratification. For them, education is seen as a result of family status and a predictor of future occupational attainment and income. The other group of researchers are psychologists interested in vocational counselling. Theories of educational aspiration generated by each of these groups are presented below.

Traditionally, studies of educational and occupational attainment utilized a structural approach whereby environmental constraints directly affected performance outcome. In their book The American Occupational Structure, Blau and Duncan (1967) documented that a son's socioeconomic achievements are not independent of his family's prestige. That study opened the way for analysis of how the family's socioeconomic status is passed on to sons and a social psychological theory of the status attainment process was developed (Sewell and Hauser, 1975). The present state of theory concerning the process of status attainment is that social psychological mechanisms may be intervening factors between social characteristics of family and performance variables of sons (Otto and Haller, 1979). The mechanisms involve the adolescent's academic ability, his significant other status indications, and his status aspirations. The model has been tested and shown to have predictive and explanatory power (see, for example, Sewell and Hauser, 1975; Alexander, Eckland, and Griffin, 1975; and Otto and Haller, 1979).

One study by Wilson and Portes (1975) however disconfirms the importance of the social psychological model of status attainment. They found that the significant other influence and self-assessment of abilities variables failed to mediate the effect of parental status on educational

attainment, while the structural variables of parental status and academic performance had a strong direct effect. This apparent contradiction is important to consider, but as Otto and Haller (1979, p. 903) suggest, it should not discredit the social psychological model, which has been otherwise consistent, because the discrepancies may be due to differences in measuring socioeconomic background. In previous studies, separate indices of mother and father's education and father's socioeconomic status (Duncan SEI score) are used, while Wilson and Portes utilized a composite socioeconomic index score of father's occupational status, mother and father's education, possessions in the home, number of books in the home, and number of rooms per person in the home. According to Otto and Haller, judgment on the Wilson and Portes conclusions should be deferred until their data are re-analyzed disaggregating this variable.

As mentioned previously, vocational psychologists have also been interested in educational aspiration and attainments. Their interest focusses on how selectivity of college affects the educational aspirations of college students. Relative deprivation theory, as postulated by Davis (1966) says that attending a selective college adversely affects motivation for graduate study due to low grades which in turn leads to relatively low self-esteem.

Environmental press theory suggests just the opposite (Thistlewaite and Wheeler, 1966). The press theory posits that educational plans will approach the norm, and hence motivation for graduate study is higher at a selective college than at a non-selective college because the environmental press favors advanced study.

Werts and Watley (1969) tested the validity of these two theories regarding their conflicting prediction of college effects on educational plans using multiple regression analysis. Their data supported relative deprivation theory. Another study by Drew and Astin (1972) tested the validity of the theories. Again, relative deprivation theory was supported, but the environmental press theory was ambiguously supported. The authors suggest that a complete model should employ variables allowing simultaneous operation of both theories.

Discussions of these two theories do not appear per se in the current educational aspiration and attainment literature. My opinion is that this is primarily because attributes of the two theories are incorporated in the social psychological model currently accepted. The social psychological model includes the variables of the relative deprivation model (student characteristics, college grades, and perceived ability) as well as the influence of peers and teachers which are both

inherent in the environmental press theory. Missing in the social psychological model is the measure of college selectivity. This is not considered a serious omission though. Selectivity is postulated to affect educational plans sequentially through college grades and perceived ability. Since these mediating variables are included in the social psychological model, the effect of college selectivity is tapped, even though it is not measured directly. This, in fact, seems preferable to measuring selectivity directly, for it allows varying individual threshold tolerances of selectivity to operate.

Postgraduate Aspiration and Attainments of College Students

Studies of educational aspiration and attainments have traditionally dealt with the college plans of adolescents. There are but a handful of studies exploring the postgraduate plans of college students. These studies are often descriptive, but in most cases they do consider variables applicable to the social psychological model of educational planning.

In his book Great Aspirations, Davis (1964) describes the results of a comprehensive study of the postgraduate training plans of college seniors. The data are based on responses to a self-administered questionnaire in the Spring of 1961 of 33,982 June college graduates. The response represents 85 percent of the sample population

from 135 American colleges and universities. The study addressed the questions of who goes on for postgraduate training, in what numbers, in what fields, and do student characteristics differ by intended field of study. Of interest to the present study, Davis found that 77 percent of the respondents intended to pursue postgraduate training in the future. Twenty percent had been accepted for graduate study for Fall of 1961, while 57 percent had less definite plans. Davis states that the delay of planned entry into postgraduate training is characteristic of American higher education, and suggests that the delay is related to the function of the graduate degree in different occupations (p. 60).

The reasons for not attending graduate school were divided into two types: motivational factors and external barriers. The internal motivational reasons of lack of interest and the desire to get practical experience first were commonly cited by those with deferred or no plans for postgraduate training. Financial barriers were seen by the respondents not going on as the major external barrier. Academic inability or inappropriate undergraduate training was not considered an obstacle by 97 percent of the students.

Respondents with high academic ability were much more likely to plan immediate study than those with low academic

ability.¹ Sex differences were apparent, for when controlling for ability, career field, or marital status, women were much less likely to pursue immediate study than men. This appeared to be due to motivational reasons and not external obstacles. In addition, Davis found that given students with high academic ability, respondents with lower family socioeconomic status had lower attendance expectations than their cohorts from high socioeconomic status families.² Differences in religion, race, and hometown size were also found but the direct effects of these are unclear since they all tended to be associated with family socioeconomic status.

Interestingly, Davis found that members of the college faculty were almost as important in providing career advice as parents were (57 percent and 60 percent respectively). No comparison of the relative importance of faculty and parents' career advice was made for students planning postgraduate study versus those not planning postgraduate study however.

¹The academic ability variable is a composite measure of the student's cumulative gradepoint average and the selectivity of the college they attended as measured by the intellectual caliber of the college's freshmen (p. 27-29).

²Davis (1964) utilized a pooled index of socioeconomic status, constructed from family income, father's education, and parental occupation. It has a range of 0 to 3, and is dichotomized into high (scores 2 and 3) and low (scores 0 and 1) (p. 20-21).

There are two limitations of results generated from the Davis data. First of all, given Davis's statement that delayed study appears to be characteristic of American higher education, conclusions regarding the importance of sex and family socioeconomic status should be held in abeyance since the findings are a comparison of those who plan immediate study versus all others. It could very likely be that women and students from lower socioeconomic status backgrounds are more likely to defer postgraduate training. Plausible arguments for this can be made. Re-evaluating Davis's data, it appears that not being female but being a married female has more of an effect in explaining never planning to pursue postgraduate training (p. 88). Unfortunately, data are not presented on the SES score for a similar analysis to be done.

A second limitation is that the data are almost twenty years old, and the results may not hold true today.

In the Spring of 1971, Baird (1976) surveyed about 21,000 college seniors at 94 American universities regarding their background, views of work, educational histories, plans for the future, and how they made those plans. A year later, a follow-up questionnaire soliciting their current activities was sent to all students who had intended to attend graduate or professional school in the Fall of 1971 and a quarter of those not intending immediate

graduate study. Results are based on responses from about 8,000 students.

Examining first the results for the entire sample of college seniors, one finds that seniors who plan on pursuing postgraduate training are motivated primarily because they are interested in learning more about their field (82 percent) and because their desired vocational field requires an advanced degree (78 percent). The vocational reasons of improving salary and gaining greater prestige are less often cited as reasons (61 and 45 percent respectively). Being unable to find satisfactory employment was an important factor for 22 percent of the respondents planning to pursue immediate postgraduate training. Interestingly, parents' encouragement and encouragement of college faculty were important factors for 50 percent and 45 percent of the students. Dividing the students by intended field of study, academic encouragement was important for twice as many students planning graduate programs in the arts and sciences than students planning to attend law or medical school, while parental encouragement was important for about fifty percent more of the professional students than those in the other graduate programs.

About 80 percent of the seniors planned to get a postgraduate degree at some point in the future. Fewer women than men planned on pursuing immediate postgraduate

training (29 percent versus 44 percent), despite the fact that women had higher grades than men. Other researchers have also identified this trend (see, for example, Adler, 1976; Davis, 1964).

Reviewing the results of the follow-up questionnaire, one finds that a third of the seniors were attending graduate or professional school. The anticipated sex differences based on their plans were found. Twenty-five percent of the women pursued immediate postgraduate study compared to 38 percent of the men. The differences are reflected in the fields of law, medicine, business, and the biological and physical sciences where smaller proportions of women than of men are found. Overall, about 75 percent of the men and 65 percent of the women who had planned to attend graduate or professional school immediately after college had done so.

Baird found that attending graduate school was related to family income, with students from wealthier families attending more often. In looking at field of study however, he found that family income was not related to students' implementation of their plans in graduate fields. It was positively related with medical school attendance however, and negatively related with law school attendance. He suggested that the latter finding possibly reflects the better access to financial aid and scholarships that lower

socioeconomic status law students have (p. 34).

Students who went on for postgraduate training received more encouragement from their family and friends than students who did not go on, and further, students in law and medical school received more encouragement from their parents than students in graduate programs. Baird also indicates that seniors who went on for postgraduate training had good grades, were less often married, and had high estimations of their academic ability.

Wegner (1969) examined a structural model of postgraduate educational aspirations and attainment. He interviewed college juniors and seniors at one institution in the Fall of 1958, followed with a questionnaire in the Spring of 1964. Data on 266 respondents are reported, for an overall response rate of 80 percent. The structural constraints of sex, time of marriage, socioeconomic status of origin, and academic ability were included in the model predicting educational aspiration and attainment. Time of marriage was operationalized as early or late, early meaning before or during their year of probable graduation. Socioeconomic status of origin was classified as high, middle, or low based on the occupation and education of the head of the family. Cumulative gradepoint average measured the respondent's academic ability.

Fifty-nine percent of the sample had intended to

obtain postgraduate education in 1958; in 1964, 50 percent were either working towards or had completed a graduate or professional degree. The previously noted finding that fewer women aspire to and attain postgraduate education was upheld in this study. Sixty-five percent of the men intended to pursue postgraduate training and 76 percent of these obtained it. In contrast, 47 percent of the women intended to go on for advanced training and only 58 percent did. Since this study does overcome a limitation of Davis (1964) and Baird (1976) in that it measures postgraduate educational plans and attainment allowing time for deferred study, the results suggest that there are differences in the educational aspirations and attainment of men and women.

Stratifying his sample by sex, Wegner found that academic ability positively predicted aspiration and attainment of postgraduate education for both men and women. For men, this was the only significant predictor. For women, academic ability and socioeconomic status predicted aspirations while those two variables plus time of marriage predicted attainment. Women who marry late, have high ability, and low socioeconomic status were associated with higher probability of obtaining postgraduate education. The low socioeconomic status finding is contrary to previous educational attainment studies,

and Wegner suggests that it may be due to the selection process of women into college. Only career oriented low status women may go to college, whereas higher status women may attend college regardless of their career plans.

Path analysis revealed that in addition to these direct effects on postgraduate attainment, there were indirect effects through aspirations as an intervening variable. The causal model explained 39 percent of the variance in postgraduate education for men, and 36 percent of the variance for women.

A recent study by Reitzes and Mutran (1980) brings together in a multivariate model many of the variables shown to be important in postgraduate educational aspirations and attainment. They employed a social psychological model of educational plans, attempting to explain educational expectations with selected background characteristics, past academic performance (high school grades), sex, perceived importance of significant others, praise from significant others, self-concepts, and academic performance (college grade point average). The results are based on a survey of 396 college students at one institution; this represents 78 percent of the sample population.

They measured educational expectations on a three point scale. The mean for educational expectations was 2.62, where 2 represents college graduation and 3

represents graduate school.

In contrast to previous studies, Reitzes and Mutran found that father's education and father's income did not significantly explain respondents' educational expectations. Sex was also insignificant, as were high school grades. While the importance of college friends and parents were not significant predictors of educational expectations, the importance of a high school intimate negatively predicted educational plans. Self-esteem and commitment to ideas were positively related to educational aspirations, while commitment to college was negatively related. The other self variables of sociability, personal assertiveness, and intellectual curiosity were not found to be significant. Not surprisingly, high college gradepoint average significantly predicted higher educational expectations.

There are several plausible explanations why father's income and education and respondent's sex are not significant predictors of postgraduate educational expectations in this study while they were all found to be associated with educational plans in previous studies. First, the previously cited studies were conducted between 1958 and 1972. The Reitzes and Mutran data were collected in the late 1970's. Social and economic changes have occurred in the last twenty years whereby access to higher education is improved for both low socioeconomic status individuals

and women. Financial aid is readily available for undergraduate and graduate education and hence the effect of family socioeconomic status on educational plans may be minimal. In addition, the role of women in society and the labor force is changing and may be reflected in their educational pursuits. It is possible that family socioeconomic status and respondent sex are no longer significant predictors of educational aspirations.

Secondly, the Reitzes and Mutran findings based on a sample of students attending one institution may not be generalizable to all college students.

Finally, by sequentially adding sets of variables to the regression equation, the self variables were found to be the major intervening variables between background variables and the dependent variable. These results suggest that a social psychological model of educational planning operates on the postgraduate level just as it does on the undergraduate level and the effects of the background variables in predicting plans are mediated by other variables. It may be that the previously cited results of studies utilizing bivariate statistics or just structural constraint variables do not represent a true picture of the effects of the variables analyzed.

Based on these results, plus the historical similarity of the development of this model to that of the general

aspiration model which was initially structural and then social psychological, I agree that a social psychological model of educational aspirations and attainment best represents the postgraduate educational aspirations of college students. Continued research of large national samples is needed to lend further support to the model. In addition, its utility in explaining the postgraduate plans of college students in specific majors is yet to be explored. The present study aims to do that for pharmacy students.

Pharmacy Graduate Education

Because pharmacy is an undergraduate professional degree, there are important characteristics of pharmacy which make postgraduate training of pharmacists distinguishable from that of the average college graduate. First of all, postgraduate training is not a prerequisite for practice. Secondly, the job market for pharmacists in community and hospital settings is relatively good, and there are alternative job opportunities for B.S. level pharmacists in government agencies, professional associations, and the pharmaceutical industry. Starting salaries are generally good, and as both Jencks (1968) and Perucci (1969) noted for engineering (also an undergraduate professional degree), this is a deterrent to pursuing postgraduate work. In addition, the return on investment

is an important consideration when making education plans (Gross, 1969) and for pharmacy this return seems marginal. All of these factors may contribute to the finding that fewer pharmacy graduates pursue postgraduate education relative to other college graduates (Jencks, 1968, p. 229; Davis, 1965, p. 51-52).

As stated in the introduction to this work, pharmacy educators are concerned about enrollment of pharmacy students in graduate programs. They speculate that the clinical based pharmacy curricula lure qualified students into post-B.S. clinical programs at the expense of the pharmaceutical sciences (Gerald, 1979a, 1979b; Zografis, 1979). It is suggested that this may occur because the clinical programs select into pharmacy school practice-oriented rather than research-oriented students, and the programs do not adequately prepare students for graduate study in the pharmaceutical sciences. The access pharmaceutical science faculty have to pharmacy students in their final year of study is limited and thereby they are unable to provide encouragement and role-modelling influence during that crucial decision-making period. Other pharmacy educators disagree of course, stating that since pharmacy is a service profession one can't be overly concerned that practice-oriented students are attracted to pharmacy and that able students are interested in becoming more qualified to practice pharmacy through further

clinical education (Gourley, 1979; Schumacher, 1979). Rather, the clinical and pharmaceutical sciences can and should co-exist for their mutual benefit (also see Gerald, 1979a). The basic problem underlying all of these discussions is the lack of adequate data quantifying concerns.

The American Association of Colleges of Pharmacy annually compiles data on graduate enrollments. The Fall of 1978 enrollment report indicates that 2,776 students are enrolled full or part-time in 55 colleges of pharmacy in the United States (Schlegel, 1979a). Sixty-six percent are full-time students. Doctorate candidates comprise 43 percent, while the remaining 57 percent are working towards a master's degree. About 29 percent of the students are foreign. The number of women students enrolled full-time is increasing, and they account for over 26 percent of the population. It should be noted that the percentage of foreign women students is higher than the percentage of American women students (36 percent and 23 percent respectively). Forty-one percent of the students enrolled in undergraduate professional pharmacy degree programs are women (Schlegel, 1979b).

Of special interest to pharmacy educators is the number of graduate students who have a pharmacy undergraduate degree. The figures in Table 1 are based on 1978

1,2

TABLE 1. GRADUATE STUDENTS WITH A PREVIOUS DEGREE IN PHARMACY

	FULL-TIME			PART-TIME			TOTAL		
	<u>Pharm.D.</u>	<u>M.S.</u>	<u>Ph.D.</u>	<u>Pharm.D.</u>	<u>M.S.</u>	<u>Ph.D.</u>	<u>Pharm.D.</u>	<u>M.S.</u>	<u>Ph.D.</u>
Previous Pharmacy Degree	346	353	318	28	518	52	374	871	370
Nonpharmacy Degree	-	212	443	-	207	53	-	419	496
Total	346	565	861	28	725	105	374	1290	866

¹ Data taken from the 1978 Graduate Enrollment Report (Schlegel, 1979a).

² Data includes American and Canadian students.

enrollment of American and Canadian graduate students. Overall, 68 percent of the master's candidates and 44 percent of the Ph.D. students held a previous pharmacy degree. Naturally, all of the doctor of pharmacy (Pharm.D.) students did. The discrepancy in the percentages for the masters and doctoral degrees probably reflects the high percentage of pharmacy graduates enrolled in the hospital pharmacy masters programs which is generally a practice rather than research discipline. Data are not available to quantify this. In addition, the breakdown of previous degrees by sex is unavailable and so it is not understood to what extent women versus men pharmacy graduates pursue postgraduate training.

Zografis (1979) compared the number of pharmacy trained graduate students to the total undergraduate enrollment. He found that in 1978 the graduate enrollment was about 10 percent of undergraduate enrollment. This figure has hovered about this mark since 1965. This is the closest estimate of the number of pharmacy graduates pursuing postgraduate education. It must be used cautiously however. First of all, the number of pharmacy graduate students cited by Zografis includes foreign pharmacy graduates and hence inflates the percentage figure. Secondly, the number of pharmacy-trained graduates is compared to the current number of undergraduates enrolled.

If a large percentage of students defer their postgraduate training, the base figure more appropriately should reflect an average level of undergraduate enrollment over an appropriate period. Finally, there is no measure of how many pharmacy students pursue postgraduate training in fields other than pharmacy.

Very little research on the educational and related career plans of pharmacy undergraduates is available. A recent study by Curtiss and Shepard (1980) indicates that about 13 percent of New England pharmacy students preferred a nonpharmacy practice career after pharmacy school. Almost 5 percent selected graduate school as their preferred career plan, 1.5 percent indicated medical or dental school, and just over 4 percent chose industrial pharmacy. Kirk and Ohvall (1975) found that of 273 pharmacy students, four planned careers in the pharmaceutical industry or planned to attend graduate school. This represents 1.5 percent of the respondents. Interestingly, while women comprised only 19 percent of the sample, 3 of the 4 aspirants of nonpharmacy practice careers were women.

Recent interest in the topic of explaining who goes on for postgraduate training appears in the pharmacy literature however. Two studies comparing the

personalities of Pharm.D. students (or aspirants) have appeared. One of these compared the locus of control dimensions of senior Pharm.D. students electing a post-Pharm.D. residency to other pharmacy students, hospital and community pharmacist preceptors, and the clinical faculty members at one university (Gourley, Kapel, and Hill, 1981). The dimensions used were self-control, social systems of control, and fatalism. They found that the locus of control dimensions of fifth year students electing to take the post-Pharm.D. residency was most like the clinical faculty. The authors stated that this implied a similar personality profile.

Similarly, Talbert and his colleagues (1980) compared the personality profiles of (post-B.S.) Pharm.D. students and the clinical faculty at the University of Texas using the Jackson Personality Research Form. The two groups were found to be comparable except that faculty were more dominant and autonomous. The predominant personality profile was that "of an achievement oriented, persevering individual, who is intrigued by abstract problems " (p. 169). A serious limitation of this study is that while they did compare and distinguish the two groups from a normative population, they did not compare them to other pharmacy graduate students and faculty. Therefore, one can not determine if this is exclusively a Pharm.D.

personality profile or one of all those attracted to postgraduate work in pharmacy (or in general).

More important than the results of these studies is the fact that they are being done. It indicates newfound interest on the part of pharmacy researchers in defining the role of one factor, personality, on the postgraduate educational and career decisions of pharmacists. Other important factors have yet to be considered, and these are the variables included in the social psychological model of educational aspirations and attainment discussed previously. This study will be a first pass at measuring the influence of some of those factors in the educational plans of pharmacy students and recent graduates.

Proposed Model of Educational Planning and Hypotheses

A proposed model explaining educational planning of pharmacy students and recent graduates is presented. Educational plans is the dependent variable and will be measured as the respondent's reported probability of pursuing postgraduate training in the future. This measure has advantages over measures used in previous research. As a continuous variable ranging from 0 to 100 percent, the degree of uncertainty individuals face regarding their postgraduate educational plans is recognized, and the measure allows respondents to make a realistic assessment of their plans. Other measures of intention to

pursue postgraduate education as a yes or no response (Wegner, 1969) or as a single statement of the highest level of education expected to complete (Reitzes and Mutran, 1980) do not allow for any uncertainty. These structured measures may artificially categorize interested but undecided respondents.

Another advantage of the proposed measure of postgraduate educational plans over previously used measures is that it does not impose any time restrictions on initiation of postgraduate training. Baird (1976) and Davis (1964) measure educational plans in terms of attending graduate school next fall, and hence those who plan delayed entry into graduate school are categorized as "not going on". In addition, the utility of the time-restricted measure is limited to studies of college seniors, while the proposed measure is applicable to studies of all college students regardless of class year.

Because the proposed study is cross-sectional in design, there is no measure of educational attainment included in the model. However, previous studies indicate that intention predicted educational attainment quite well. Warkov (1965) found that 69 percent of those college seniors planning to study law were studying law one year later. Likewise, Baird (1976) found that about 75 percent of the men and 65 percent of the women who had planned to attend

graduate or professional school immediately after college had done so. Increasing the time between measuring intentions and attainment improves the fit between them. Wegner (1969) reported that 85 percent of those college juniors and seniors planning advanced study attained it five years later. Similarly, a longitudinal study showed that 79 percent of seniors at a women's college desiring postgraduate training in 1968 had gotten it by 1975 (Almquist, Angrist, and Michelsen, 1980).

Included in the model of pharmacy students' educational planning are variables discussed in the review of the educational aspirations literature. Specifically, these are sex, parents' education³, grade point average, and encouragement from significant others.⁴ It is anticipated that these variables will operate similarly for pharmacy

³Initially, I intended to include both mother and father's education in the model. This was not advisable however because the two variables were found to be highly correlated ($r = 0.457$). I decided to use mother's education in the model because that variable was more highly correlated with other variables of interest not included in the model and hence could potentially "do more" in subsequent analyses. In addition, the effect of mother's education on sons' and daughters' educational aspirations and attainment has been neglected in the literature. The sample for the present study is almost 50 percent women, and mother's education was assumed to be just as valid a measure of the educational milieu of the family as father's education.

⁴Marital status is not included in the model because it was anticipated that just a small percentage of the sample was married. This was the case.

students as generally found for college students. That is, female pharmacy students will be less apt to go on for postgraduate training and respondents with more educated mothers, higher gradepoint averages, receiving encouragement from family and friends and from faculty will be more likely to go on for postgraduate training.

Because this study is intra-occupational rather than inter-occupational, it is possible to include variables which are deemed to be attributes of educational planning relevant to the profession of pharmacy. These are reason for selecting pharmacy as a major, satisfaction with choice of pharmacy as a major, interest in doing practice related research, and perceived financial barriers to graduate study.

Researchers have identified a variety of reasons why pharmacy students select pharmacy as a major (Bray and McKercher, 1979; Kirk, 1975; Kirk and Ohvall, 1975; Smith, Gibson, Tyrone, and Mikeal, 1974). These reasons can be grouped as: 1.) selected pharmacy because it was challenging; 2.) satisfied vocational interests - was a good job with promotional opportunities, and could be used as a stepping-stone in a career; 3.) provided service opportunities; and 4.) enabled one to pursue personal interests in addition to one's career. It is anticipated that students choosing pharmacy for the challenge or for

vocational reasons will have a higher probability of pursuing postgraduate education. Gerald (1979a) went further and suggested that a student's chosen program of graduate study would reflect his or her reason for choosing pharmacy initially.

There is concern in the literature regarding disillusioned pharmacy students (see, for example, Schwirian and Facchinetti, 1975; Knapp and Knapp, 1968). The variable satisfaction with choice of pharmacy as a major is intended to tap that discontent (if present) in order to measure its effect on students' postgraduate educational plans. In a survey of pharmacists who had a post-B.S. Pharm.D. degree, it was found that dissatisfaction with their job was a motivating factor to pursue the Pharm.D. degree for over 17 percent of the sample (O'Hara, Kirk, and Sperandio, 1978). Quite likely, this variable may be operating on the undergraduate level and is reflected as satisfaction with choice of pharmacy as a major. In the present model, the hypothesized effect of satisfaction with choice of pharmacy as a major is that as satisfaction increases, the probability of postgraduate training decreases.

Baird (1976) found that "interest in learning more about my field" and "desired vocational field requires an advanced degree" were important factors for 82 and 78 percent of the college seniors who planned to go on for

postgraduate training (p. 22). Since research is an integral component of most graduate education programs and subsequent career plans, it is anticipated that students' interest in doing practice related research will predict perceived probability of pursuing postgraduate training in the present model.

Finances are often perceived to be a barrier to postgraduate education (Davis, 1964) and it is hypothesized that as the number of fields in which students perceive financial barriers to be present increases, the probability of pursuing postgraduate training decreases.

In addition to studying the proposed model of educational planning, it is interesting to question what effect year in school has on educational plans. With each passing year, students are exposed to more people, ideas, and experiences in pharmacy school. In addition, they are under the constraints of the system. By separating the respondents by year, the effects of dynamic social forces on individual's educational plans occurring at selected points in time may be discernable. Since this is exploratory research, it is uncertain if or how the variables will differ by class year. Therefore, the hypotheses generated for the by-year analysis will be the same as for the entire sample. That is, it is anticipated that the variables will operate similarly in all four class

years.

In summary, this study will first describe the educational plans of pharmacy students and recent graduates. Secondly, a social psychological model of educational planning is tested. Ten variables are hypothesized to be significant predictors of the probability of pursuing postgraduate training of pharmacy students and recent graduates. They are listed in Table 2 with the hypothesized sign of their regression coefficient. For each variable, two hypotheses are posited:

- H¹: Examining aggregate sample data, the variable significantly predicts probability of pursuing postgraduate training in the hypothesized direction.
- H²: Examining the data stratified by class year, the variable significantly predicts probability of pursuing postgraduate training in all four class years in the hypothesized direction.

TABLE 2. VARIABLES HYPOTHESIZED TO BE PREDICTORS
OF PROBABILITY OF PURSUING POSTGRADUATE
TRAINING

<u>Variable Name</u>	<u>Hypothesized Sign of the Regression Coefficient</u>
Sex (male = 0, female = 1)	negative
Mother's education	positive
Selected pharmacy because it was challenging	positive
Selected pharmacy for vocational reasons	positive
Grade point average	positive
Satisfaction with choice of pharmacy as a major	negative
Interest in practice related research	positive
Encouragement from family and friends	positive
Encouragement from academic sources	positive
Perceived financial barriers to graduate study	negative

CHAPTER 3

METHODOLOGY

Data for this research were obtained from students enrolled in the University of Wisconsin School of Pharmacy in Fall 1980 and from 1980 graduates of the School. An eight page questionnaire was administered, and responses were compiled and analyzed using a standard statistical computer program. In this chapter, a review of the research methodology is discussed in greater detail.

The Survey Instrument

The survey instrument was constructed to include items tapping the educational and career plans of pharmacy students and recent graduates, and factors which may influence those plans. Items for inclusion were selected from the review of the literature and from informal interviews with six graduate students at the University of Wisconsin School of Pharmacy who had undergraduate pharmacy degrees and with four undergraduate pharmacy students. Besides the eight pages of questions, the survey instrument included a cover letter explaining the purposes of the study. It also provided a section for the respondent to record his or her name and

permanent address. This section had two purposes. First, that information would make a follow-up study on the outcome of plans in the future possible. Secondly, survey results could be distributed to respondents if they so desired.

A preliminary copy of the survey instrument was reviewed by seven faculty members and graduate students in the School of Pharmacy who were familiar with survey methods. Their suggestions were incorporated into the pre-test copy of the instrument. The pre-test was conducted by administering the questionnaire to 16 fourth and fifth year students enrolled in summer school courses at the School of Pharmacy in August, 1980. The volunteers completed the questionnaire, and were then asked for their reaction and suggestions. The general reaction was favorable, and several changes in wording resulted from their suggestions and a review of their responses. It took 20 minutes on the average to complete the pre-test questionnaire.

The final copy of the survey instrument is shown in Appendix A. The 10 pages of type were reduced in size and printed back-to-back on 3 sheets of 8 1/2 x 11 white paper which were folded and stapled into booklet format. Each questionnaire was numbered sequentially on page one and page nine using a duplicate numbering machine. This number was the respondent's unique identification code, and it

matched his or her responses with his or her name and address (if provided). The questionnaire was printed so that the outer sheet of the booklet contained just the cover letter and page nine with the follow-up information. This outer sheet was easily removed immediately after the survey was completed, and was stored separately from the responses so that confidentiality of the responses was retained.

Sample, Administration, and Response Rate

The sample includes all students enrolled in the University of Wisconsin School of Pharmacy in Fall, 1980, and graduates of the Class of 1980.

Third, fourth, and fifth year students completed the questionnaire in the required pharmaceuticals course for their class during the period of September 2, 1980, through September 17, 1980. I administered the survey to all students except in 2 of the 6 fifth year pharmaceuticals sections where a Teaching Assistant familiar with the study distributed the questionnaire after giving a prescribed introduction. Three fifth year students were contacted personally on September 12, 1980, and were asked to complete the questionnaire because they took the required pharmaceuticals course during the previous summer session. All three returned a completed questionnaire within one week.

The pharmacy graduates of 1980 interning in Wisconsin in September, 1980, were given the questionnaire at one of four Internship Conferences held by Mr. Richard Krumbiegel, Executive Director of the Wisconsin Pharmacy Internship Board, on September 3, 4, 10, and 11, 1980.¹ I accompanied him to the first two Conferences and administered the questionnaire, while Mr. Krumbiegel administered it at the final two Conferences. Attendance at the Internship Conferences was voluntary, and no attendance record was kept. However, Mr. Krumbiegel identified six individuals who were known to be absent, and a cover letter requesting them to complete the enclosed questionnaire and return it in the postage paid envelope was sent to each of these individuals on September 12, 1980.²

The pharmacy graduates of 1980 who were not interning in Wisconsin in September, 1980, were identified by Mr. Krumbiegel. Addresses were obtained from him and from

¹There were five Wisconsin interns who were not graduates of the University of Wisconsin School of Pharmacy. All five were known to be at one of the Conferences. Four of the five had signed their name to the survey and these were pulled from the sample. The fifth, assuming he had completed a questionnaire, did not sign his name, and therefore was included in the sample. It is not anticipated that this one response will bias the results appreciably.

²A sample cover letter is displayed in Appendix B.

the 1979/1980 School of Pharmacy Directory. Again, a cover letter and questionnaire were sent to these 21 individuals, requesting that the questionnaire be returned in the enclosed postage paid envelope.³ One was returned as undeliverable.

The response rates for each year category and for the aggregate sample is shown in Table 3. The overall response rate was 83.2 percent, representing 520 of 625 individuals in the sample.

Population data for September, 1980, were not available to test representativeness of the respondents for three of the four class years. Data were available however on each class when they began pharmacy school. It was realized that any differences found using these data as a base for testing representativeness of the respondents would reflect differences among respondents, non-respondents and class drop-outs. Since the overall drop-out rate for the four classes was low (4.9 percent as shown in Table 4), it was not anticipated that the drop-outs would contribute appreciably to differences in the variable means. Beginning pharmacy school data were used then as population data to test representativeness of the sample.

The groups were compared on available characteristics

³A sample cover letter is displayed in Appendix B.

TABLE 3. RESPONSE RATES

	<u>Population 1980</u>	<u>Number of Responses</u>	<u>Response Rate</u>
Third Year	134	117	87.3%
Fourth Year	141	113	80.1%
Fifth Year	175	162	92.6%
Graduates *	175	128	73.1%
(Wisconsin Interns)	(154)	(113)	(73.4%)
(Non-Wisconsin Interns)	(21)	(15)	(71.4%)
<hr/>	<hr/>	<hr/>	<hr/>
Total	625	520	83.2%
<hr/>			

*This includes a Wisconsin intern who is not a 1980 graduate of the University of Wisconsin School of Pharmacy. See footnote 1, p. 37.

TABLE 4. PERCENT CHANGE IN POPULATION SIZE SINCE STARTING PHARMACY SCHOOL

	<u>Population When Started Pharmacy School</u>	<u>Population 1980</u>	<u>Percent Change</u>
Third Year	134	134	0.0%
Fourth Year	150	141	-6.0%
Fifth Year	189	175	-7.5%
1980 Graduates	184	175	-4.9%
<hr/>	<hr/>	<hr/>	<hr/>
Total	657	625	-4.9%

which were deemed to have remained constant since beginning pharmacy school. Using a two-tailed Z score comparing the four respondent groups to population data when they began pharmacy school, no significant differences were found in sex ratio, percent American citizens, and percent second-degree candidates (Table 5).

Significant differences were found between respondents' self-reported prepharmacy gradepoint average (GPA) and actual prepharmacy GPA for three of the four groups as seen in Table 5. In all cases, the self-reported prepharmacy gradepoint average was higher than the actual. This may reflect:

- 1.) differences between respondents and non-respondents, with respondents having higher than average prepharmacy gradepoint averages;
- 2.) drop-outs may have had lower than average prepharmacy gradepoint averages and this is reflected in the population data;
- 3.) poor recall; and/or
- 4.) self-reported grade inflation.

It is suggested that it is primarily the fourth point which contributes to the reported differences, for the third year group which has no drop-outs, the shortest recall period, and an excellent response rate (87.3 percent), still has a significant difference between self-reported prepharmacy GPA and the actual. This difference is deemed to indicate a validity problem with the variable rather than

TABLE 5. COMPARISONS OF RESPONDENTS TO THEIR CLASS WHEN THEY BEGAN PHARMACY SCHOOL

	<u>Third Year</u>	<u>Fourth Year</u>	<u>Fifth Year</u>	<u>1980 Graduates</u>
Sex (percent female)				
Respondents	51.3%	46.9%	37.7%	42.2%
Class when began pharmacy school	47.4%	45.0%	39.8%	38.9%
American Citizens				
Respondents	94.8%	99.1%	93.8%	96.9%
Class when began pharmacy school	97.7%	99.3%	97.8%	98.3%
Second-Degree Candidates				
Respondents	6.1%	12.4%	14.2%	8.7%
Class when began pharmacy school	8.3%	16.1%	14.5%	8.8%
Prepharmacy Gradepoint Average				
Respondents	3.20*	3.22	3.20*	3.28*
Class when began pharmacy school	3.05	3.11	3.08	3.17

*Significant difference between the means using a two-tailed Z test at $p = 0.05$.

non-representativeness of the sample, and hence should be kept in mind when evaluating subsequent analyses utilizing self-reported gradepoint average which may also have an internal validity problem.

Overall then, barring this exception, the respondents appear to be representative of the population when they began pharmacy school.

Variables

There are three general types of variables involved in subsequent analyses: background characteristics of the individual, belief and performance factors, and enabling factors. In this section, specific variables of each type will be operationalized as they are used in explaining pharmacy students' perceived probability of pursuing postgraduate training.⁴

Background Characteristics of the Individual

Mother's education (question 25) is measured along a six-point continuum ranging from "8th grade or less" to "had some postgraduate training".

Sex (question 18) is treated as a dummy variable (females = 1). The interpretation of this variable in the

⁴For each variable described below, the number of the corresponding questionnaire item is included. The questionnaire is displayed in Appendix A.

regression analysis will indicate the effect of being female on explaining perceived probability of pursuing postgraduate training.

Belief and Performance Factor Variables

Question three gives four descriptions of pharmacy students, and respondents were asked to "rank them in" terms of how they described you when you first decided to study pharmacy". The reasons described in each paragraph, in the order they appear in the question, can be summarized as pharmacy seemed (provided): 1.) compatible with other interests; 2.) challenging; 3.) service opportunities; and 4.) vocational opportunities. The paragraph indicated as describing them the best was used to create the prepharmacy dummy variables.

The dummy variables are Challenging (2 = 1, all others = 0), and Vocational (4 = 1, all others = 0). The responses that pharmacy was compatible with other interests and that it provided service opportunities served as the baseline category for these variables.⁵

⁵The appropriate baseline category was deemed to be compatible with other interests, but subsequent analysis showed that not enough cases fell into the category to make it a meaningful baseline. When Service Opportunities (3 = 1, all others = 0) was added to the equation as a third reason dummy variable, it was not significant in any of the regressions, and the significance level of the other pre-pharmacy variables decreased slightly. Therefore, the compatible with other interests and service opportunities were combined to form the baseline category.

It is important to remember in interpreting the prepharmacy reason variables that the question is retrospective in nature. One cannot be sure that the stated reason is the primary reason why they chose pharmacy as a major; quite possibly it is the perceived primary reason as seen from the perspective of the individual one month, or one, two, or three years post decision-making point.

Academic ability is measured by grade point average (GPA) which is the respondent's self-reported "most recent cumulative GPA" (question 21). This was rounded to one decimal point on a 0 to 4.0 scale, using standard rounding rules.

Satisfaction with choice of pharmacy as a major is based on the response to the question, "If you had the opportunity to start your education over again, would you choose pharmacy?" (question 5). The available responses were recoded so that no = 0, maybe = 1, and yes = 2.

In order to assess respondent's orientation to research, question 14 was constructed. This tapped interest in doing practice related research during internship. The responses ranged from being definitely uninterested to definitely interested, recoded as ranging from one to five respectively.

Enabling Factor Variables

The two encouragement from others variables were constructed from responses to the question, "Have any of the following persons ever encouraged you to go on for graduate study or advanced professional training?" (question 15). A list of individuals was given, with instructions to check "yes" or "no" for each one (yes = 1, no = 0). Encouragement from family and friends was the sum of encouragement from a parent, brother or sister, spouse or significant other, pharmacy school friend, and another college friend (range 0 - 5). Encouragement from academic sources was the sum of encouragement from a faculty member in pharmacy and a pharmacy graduate student or teaching assistant (range 0 - 2).

Six different disciplines of postgraduate training were listed in question 12, and students were asked if they felt finances generally are a barrier for students in each discipline listed (yes = 1, no = 0). The perceived financial barriers to postgraduate training variable was constructed as a sum of those responses (range 0 - 6).

The Dependent Measure

Educational plans were assessed by the question, "Thinking ahead to the future, what is the probability that you'll pursue postgraduate training of some type?" (question 10). Respondents were asked to check one point

on a line, ranging from 0 to 100 percent. Labels of "not at all interested", "not likely", "possibly", "probably", and "plan to attend" were placed at the 0, 25, 50, 75, and 100 percent points respectively. Eighty-three percent of the respondents checked one of the five indicated points. The remainder checked intervening points which I estimated prior to key-punching.

Data Handling and Analysis

The questionnaire was designed so that it was essentially a pre-coded questionnaire and key-punching could be done directly from it, thereby avoiding the often tedious coding step of data handling. I proofed each questionnaire prior to key-punching, coding question 26 (parents' occupations⁶), question 28 (ethnicity), and any "other" responses recorded as answers to questions 1, 4, 7, and 8. To assure that missing data were coded appropriately, the completed questionnaires were also checked for errors and omissions. A key-puncher on

⁶ Parents' occupations were coded individually using the 1970 Census of Population Alphabetical Index of Industries and Occupations three digit occupational code (U.S. Bureau of the Census, 1971). The corresponding index of occupational socioeconomic status was then determined using a revised index for the total work force (TSE12) (Stevens and Featherman, 1980). The codes were rounded to three digits.

the staff of the Madison Academic Computing Center (MACC) punched the cards according to a "road-map" questionnaire which was developed. Any questionable responses were tagged by the key-puncher and reviewed with me. Manually, I verified ten percent of the cards, and detected errors were corrected.

The data were compiled and analyzed using Statistical Package for the Social Sciences (Nie, 1975) and computer hardware at MACC. Before data analysis was begun, the data were first cleaned by examining all variables' frequency distributions and/or ranges for non-legitimate codes. This procedure identified several key-punching errors, which when corrected, gave expected distributions. Of course, this data-cleaning procedure did not detect errors within expected code ranges, but the overall low rate of key-punching error made me confident that the data were clean.

The analysis plan proceeded as follows. First of all, descriptive statistics were generated describing background characteristics of the sample under study. Secondly, tests for significant differences between the four class years on mean values of the background variables were performed using grouped t-tests. This was done to eliminate these potential differences in background as sources of bias in the subsequent by-year analyses.

Thirdly, respondents' responses to selected questionnaire items are presented and differences between the successive class years are tested for significant trends using grouped t-tests. Finally, all independent variables were simultaneously examined for their relationship with probability of pursuing postgraduate training using multiple regression analysis. This was done for the aggregate sample and for the sample stratified by year. Several interactive terms were introduced and tested for significance.

Results of the first two steps of the analysis are presented in the following section of this chapter, while the description of the respondents' responses and the regression analyses are discussed in Chapter 4.

Respondent Characteristics

Background characteristics for the respondents as a whole are shown in Tables 6 and 7. Over half of the respondents were male (56.1 percent) and most were not married (86.7 percent). Almost 96 percent of the respondents had no children. The majority (96 percent) were American citizens, and 9.8 percent were second-degree candidates when beginning pharmacy school. The average age of the respondents was 22.6 years; this ranged from 19 to 39. They came from families where the mean educational attainment of the mother and father was 3.6 and 4.0 respectively,

TABLE 6. RESPONDENTS' SEX, MARITAL STATUS, NUMBER OF CHILDREN,
AND NUMBER OF PREVIOUS DEGREES

	<u>N</u>	<u>(Percent of Total)</u>
Sex		
Male	292	(56.1%)
Female	228	(43.8%)
(missing)	(0)	
Marital Status		
Not married	450	(86.7%)
Married	69	(13.3%)
(missing)	(1)	
Number of Children		
None	497	(95.9%)
One or more	21	(4.1%)
(missing)	(2)	
American Citizenship		
Yes	497	(95.9%)
No	21	(4.1%)
(missing)	(2)	
Previous Degrees		
None	462	(90.2%)
One or more	50	(9.8%)
(missing)	(8)	

TABLE 7. RESPONDENTS' AGE, MOTHER'S EDUCATION, AND FATHER'S EDUCATION

	<u>Mean</u>	<u>(Standard Deviation)</u>	<u>Range</u>
Age (years)	22.6	(2.5)	19 - 39
Mother's Education	3.6	(1.1)	1 - 6
Father's Education	4.0	(1.4)	1 - 6

where 3.0 means graduated from high school and 4.0 means completed one to three years of college or technical school.

The distribution of the respondents by year is shown in Table 8. One would not expect the overall percentages to be equal (i.e. 25 percent) because enrollment figures have steadily decreased over the last four years.⁷ The high percentage of fifth year students (31.2 percent) represents the higher enrollment as well as the excellent response rate for that group (92.6 percent).

As previously outlined, the next step of the analysis involved stratifying the sample by year, and testing for between year differences of selected variable means. The purpose of these tests was to determine if the four classes of respondents had significantly different background characteristics at the time of starting pharmacy school. Available variables for analysis are: estimated age at time of starting pharmacy school (computed as age minus the number of years of pharmacy school completed), number of second-degree candidates, American citizenship, mother and father's education, and self-reported prepharmacy gradepoint average. Two sample t-tests of all six possible group combinations (third year - fourth year, third - fifth, third - graduates, fourth - fifth, fourth - graduates, and fifth - graduates) were employed for each

⁷The enrollment figures are listed in Table 4, p. 40.

TABLE 8. DISTRIBUTION OF THE SAMPLE BY YEAR

<u>Year in School</u>	<u>N</u>	<u>(Percent of Total)</u>
Third Year	117	(22.5%)
Fourth Year	113	(21.7%)
Fifth Year	162	(31.2%)
1980 Graduates	128	(24.6%)
<hr/>	<hr/>	<hr/>
Total	520	(100.0%)

variable. The tests were two-tailed with the significance level set at $p = 0.05$.

There are no significant differences between groups in mean levels of mother and father's education and self-reported prepharmacy gradepoint average. The fifth year students are significantly different from both the third year students and 1980 graduates in estimated age at time of starting pharmacy school (fifth year students tend to be older), and the percentage of fifth year respondents who are second-degree candidates is significantly different from the percentage of third year respondents (fifth year percentage is higher). The age difference could not be explained solely by controlling for second-degree candidates. There are significantly fewer non-American citizens in the fourth year group as compared to the third and fifth year respondents. The specific t-values for these tests are displayed in Appendix C for the interested reader.

Limitations of Methodology

Exploratory research is often wrought with limitations, and several methodological limitations of this study are explained below.

As mentioned previously, self-reported prepharmacy gradepoint average and most recent cumulative gradepoint average may be inflated measures of actual gradepoint

averages. This is not a serious flaw if respondents uniformly inflate their reported GPAs.

A second point to remember in reviewing the results of this study is that several variables utilized are innovative and the validity and reliability of their measures have not been established. While every effort was made to make them good measures, perceived problems and suggestions for future variable construction seen from a retrospective point of view will be discussed in Chapter 5.

Rather than systematically testing for interactions between variables in the model, selected interactions which seem plausible will be tested post hoc. The one interaction postulated to occur is year, and this is controlled for by testing the model of educational planning on respondents stratified by class year.

A fourth caveat is involved in the by-year analysis of the educational planning model. Since that aspect of the analysis aims to identify differences in respondents' educational plans in terms of the structural constraints and social dynamic processes occurring at selected points in the educational process, it would be ideal to have longitudinal data on the respondents. In the absence of that, at least the respondents should be comparable across classes. As shown in this chapter, efforts were made to

insure comparability of the four classes on background characteristics when they started pharmacy school. Differences in personalities and attitudes cannot be ruled out as contributing to differences seen between groups in subsequent regression analyses however, and this important caveat should be kept in mind. In addition, the effect of personal maturity in explaining probability of pursuing postgraduate training has not been ascertained.

Finally, since the sample is restricted to one college, the findings are suggestive rather than generalizable.

Despite these limitations, it is believed that the proposed analysis is valuable and will shed light on a heretofore unexamined problem. It is felt that the data are sufficient to lay the groundwork for more extensive research in the future and analysis should proceed keeping the caveats in mind to protect against over-interpretation of the findings.

CHAPTER 4

RESULTS

The first section of this chapter includes a description of responses to selected questionnaire items, and significant differences between class years are noted. Following this is a discussion of the multiple regression model, assumptions regarding its use, and results of the regression analyses.

Responses to Selected Questionnaire Items and Trends
Between Class Years

In this section, the distributions of responses to selected questionnaire items are discussed. Included are all independent variables which are included in subsequent regressions (except the background variables discussed in the previous chapter) and the dependent variable. To provide additional information about the respondents' plans, the distributions of their preferred degree, preferred field of study, career plans, and most likely starting date are also discussed.

The distributions for each variable are presented in Tables 9 through 22. The aggregate sample distributions are in the far left columns of the tables, while the adjacent columns contain the distributions of the sample

stratified by class year. Where appropriate, means and standard deviations of the variables are recorded. Grouped t-tests or Chi-Square tests were performed to test for significant differences of variables between successive years. Significant differences at $p \leq 0.05$ are noted below.

As seen in Table 9, 38.6 percent of the respondents stated they selected pharmacy as a major because it was challenging. Twenty-seven percent chose it because of its service opportunities and almost 20 percent for vocational reasons. About 15 percent of the respondents selected it because they felt they were able to combine other personal interests with a pharmacy career. There is no significant association between reason for choosing pharmacy as a major and class year.

Average self-reported grade point average was 2.99 (Table 10). Over 70 percent of respondents had grade point averages of 2.8 or better. Self-reported GPA decreased significantly between the third and fourth years, and between the fourth and fifth years.

Respondents' satisfaction with their choice of pharmacy as a major is shown in Table 11. Forty-seven percent would choose pharmacy again as a major if they had the chance, and 36 percent would maybe choose it. There is a trend of decreasing satisfaction with their choice of pharmacy across all years however,

TABLE 9. REASON FOR SELECTING PHARMACY AS A MAJOR

	Total Sample (N = 520)	Third Year (N = 117)	Fourth Year (N = 113)	Fifth Year (N = 162)	1980 Graduates (N = 128)
Selected Pharmacy as a Major Primarily because it was:					
Challenging	199 (38.6%)	45 (39.1%)	46 (40.7%)	66 (41.5%)	42 (32.8%)
Vocational Interests	101 (19.6%)	27 (23.5%)	17 (15.0%)	33 (20.8%)	24 (18.8%)
Service Opportunities	140 (27.2%)	26 (22.6%)	35 (31.0%)	33 (20.8%)	46 (35.9%)
Could Combine Career with Other Interests	75 (14.6%)	17 (14.8%)	15 (13.3%)	27 (17.0%)	16 (12.5%)
(missing cases)	(5)	(2)	(0)	(3)	(0)

$\chi^2 = 12.482$, $df = 9$, $p = 0.19$.

TABLE 10. GRADEPOINT AVERAGE

Gradepoint Average	Total Sample (N = 520)	Third Year (N = 117)	Fourth Year (N = 113)	Fifth Year (N = 162)	1980 Graduates (N = 128)
1.9 - 2.7	149 (29.7%)	11 (9.9%)	33 (29.7%)	66 (42.6%)	39 (31.2%)
2.8 - 3.2	202 (40.2%)	50 (45.0%)	47 (23.3%)	54 (34.8%)	51 (40.8%)
3.3 - 4.0	151 (30.1%)	50 (45.0%)	31 (20.5%)	35 (22.6%)	35 (28.0%)
mean ¹	2.99	3.18	3.00	2.87	2.94
standard deviation	0.47	0.38	0.49	0.49	0.46
(missing cases)	(18)	(6)	(2)	(7)	(3)

¹ Comparing third year to fourth year: $t = 3.10$, $df = 220$, $p = 0.002$.
 Comparing fourth year to fifth year: $t = 2.18$, $df = 264$, $p = 0.030$.
 Comparing fifth year to 1980 graduates: $t = -1.27$, $df = 267$, $p = 0.204$.

TABLE 11. SATISFACTION WITH CHOICE OF PHARMACY
AS A MAJOR

	Total Sample (N = 520)	Third Year (N = 117)	Fourth Year (N = 113)	Fifth Year (N = 162)	1980 Graduates (N = 128)
No	85 (16.4%)	4 (3.4%)	7 (6.2%)	35 (21.6%)	39 (30.7%)
Maybe	188 (36.3%)	33 (28.4%)	41 (36.3%)	63 (38.9%)	51 (40.2%)
Yes	245 (47.3%)	79 (68.1%)	65 (57.5%)	64 (39.5%)	37 (29.1%)
mean ¹ (range 0 - 2)	1.31	1.65	1.51	1.18	0.97
standard deviation	0.74	0.55	0.61	0.76	0.77
(missing cases)	(2)	(1)	(0)	(0)	(1)

¹ Comparing third year to fourth year: $t = 1.73$, $df = 227$, $p = 0.084$.
Comparing fourth year to fifth year: $t = 3.86$, $df = 273$, $p = 0.000$.
Comparing fifth year to 1980 graduates: $t = 2.30$, $df = 277$, $p = 0.022$.

and this is significant between fourth and fifth year respondents, and between the fifth year and graduate respondents.

Almost two-thirds of the respondents are interested in doing practice related research if given the opportunity, and there are no significant differences in the mean value of this variable across the four classes (Table 12).

Seventy percent of respondents reported receiving encouragement from family and friends to go on for advanced training (Table 13). The mean family and friend encouragement score was 1.82 and there were no significant differences in this between successive classes.

In contrast to the high percentage of respondents with encouragement from family and friends, only 33 percent received encouragement from a pharmacy academic source to go on for postgraduate training (Table 14). There was a significant increase in encouragement from academic sources between the third and fourth years.¹

As shown in Table 15, very few respondents indicated no perceived barriers to graduate study (14.5 percent). The mean financial barriers value was 4.07 with a range of 0 to 7, and there were no significant differences between

¹This finding is not surprising since the third year respondents had very little contact with people in the pharmacy school at the time the survey was administered.

TABLE 12. INTEREST IN DOING PRACTICE RELATED RESEARCH

	Total Sample (N = 520)	Third Year (N = 117)	Fourth Year (N = 113)	Fifth Year (N = 162)	1980 Graduates (N = 128)
Interest in doing Practice Related Research					
Very Interested	153 (29.6%)	35 (30.2%)	31 (27.4%)	50 (31.1%)	37 (29.1%)
Interested	188 (36.4%)	37 (31.9%)	49 (43.4%)	52 (32.3%)	50 (39.4%)
Ambivalent or Not Interested	176 (34.0%)	44 (37.9%)	33 (29.2%)	59 (36.6%)	40 (31.5%)
mean ¹ (range 1 - 5)	2.19	3.81	3.87	3.73	3.79
standard deviation	1.06	1.00	1.00	1.18	1.03
(missing cases)	(3)	(1)	(0)	(1)	(1)

¹ Comparing third year to fourth year: $t = -0.43$, $df = 227$, $p = 0.667$.
 Comparing fourth year to fifth year: $t = 0.99$, $df = 272$, $p = 0.323$.
 Comparing fifth year to 1980 graduates: $t = -0.39$, $df = 276$, $p = 0.695$.

TABLE 13. ENCOURAGEMENT FROM FAMILY AND FRIENDS

	Total Sample (N = 520)	Third Year (N = 117)	Fourth Year (N = 113)	Fifth Year (N = 162)	1980 Graduates (N = 128)
Encouragement from Family and Friends					
None	152 (29.8%)	38 (32.5%)	40 (36.4%)	41 (25.9%)	33 (26.4%)
One to Three	257 (50.3%)	63 (53.8%)	49 (44.5%)	87 (55.1%)	58 (46.4%)
Four or Five	101 (19.8%)	16 (13.7%)	21 (19.1%)	30 (19.0%)	34 (27.2%)
mean ¹	1.82	1.56	1.58	1.96	2.06
standard deviation	1.60	1.45	1.61	1.58	1.72
(missing cases)	(10)	(0)	(3)	(4)	(3)

¹ Comparing third year to fourth year: $t = -0.09$, $df = 225$, $p = 0.930$.
 Comparing fourth year to fifth year: $t = -1.89$, $df = 266$, $p = 0.060$.
 Comparing fifth year to 1980 graduates: $t = -0.52$, $df = 271$, $p = 0.602$.

TABLE 14. ENCOURAGEMENT FROM ACADEMIC SOURCES

Encouragement from Academic Sources	Total Sample (N = 520)	Third Year (N = 117)	Fourth Year (N = 113)	Fifth Year (N = 162)	1980 Graduates (N = 128)
None	343 (66.6%)	102 (88.7%)	68 (60.7%)	102 (63.7%)	71 (55.5%)
One or Two	172 (33.3%)	13 (11.3%)	44 (39.3%)	58 (36.2%)	57 (44.5%)
mean ¹	0.46	0.11	0.49	0.49	0.64
standard deviation	0.70	0.32	0.67	0.71	0.85
(missing cases)	(5)	(2)	(1)	(2)	(0)

¹ Comparing third year to fourth year: $t = -5.45$, $df = 225$, $p = 0.000$.
 Comparing fourth year to fifth year: $t = 0.04$, $df = 270$, $p = 0.967$.
 Comparing fifth year to 1980 graduates: $t = -1.64$, $df = 275$, $p = 0.102$.

TABLE 15. PERCEIVED FINANCIAL BARRIERS TO GRADUATE STUDY

	Total Sample (N = 520)	Third Year (N = 117)	Fourth Year (N = 113)	Fifth Year (N = 162)	1980 Graduates (N = 128)
Perceived Financial Barriers to Graduate Study					
None	73 (14.5%)	17 (15.3%)	11 (9.9%)	26 (16.7%)	19 (15.2%)
One to Six	287 (57.1%)	65 (58.6%)	71 (64.0%)	83 (53.2%)	68 (54.4%)
Seven	143 (28.4%)	29 (26.1%)	29 (26.1%)	47 (30.1%)	38 (30.4%)
mean ¹	4.07	4.16	4.12	4.03	4.09
standard deviation	2.49	2.50	2.30	2.60	2.48
(missing cases)	(17)	(6)	(2)	(6)	(3)

¹ Comparing third year to fourth year: $t = 0.14$, $df = 220$, $p = 0.889$.
 Comparing fourth year to fifth year: $t = 0.30$, $df = 265$, $p = 0.767$.
 Comparing fifth year to 1980 graduates: $t = -0.20$, $df = 268$, $p = 0.844$.

classes.

The average reported probability of pursuing postgraduate training was 49.6 percent (Table 16). Thirty-two percent reported a 0 to 33 percent probability of going on, and 39 percent reported a 34 to 67 percent probability. Almost 29 percent said that there was better than a two-thirds chance that they would go on for postgraduate training sometime in the future. There were no significant differences between the classes on the mean values of this variable. In addition, no significant difference between probability of pursuing postgraduate training and respondent's sex is evident (Table 17).

When asked what field they were most interested in studying if they were to go on for advanced training almost 23 percent responded clinical pharmacy (Table 18). Almost 14 percent of the respondents indicated medicine was their preferred field while over 11 percent selected business. Pharmacology and pharmacy administration were the two research oriented fields which attracted a significant number of respondents (13.7 and 9.0 percent respectively).

Table 19 shows the degree respondents would be most interested in pursuing if they were to go on for advanced training. Fifteen percent indicated that their degree of first choice was a Ph.D. Almost 30 percent indicated

TABLE 16. PROBABILITY OF PURSUING POSTGRADUATE TRAINING

	Total Sample (N = 520)	Third Year (N = 117)	Fourth Year (N = 113)	Fifth Year (N = 162)	1980 Graduates (N = 128)
Probability of Pursuing Postgraduate Training					
0% - 33%	168 (32.4%)	38 (32.5%)	43 (38.1%)	53 (32.9%)	34 (26.6%)
34% - 67%	201 (38.7%)	42 (35.9%)	44 (38.9%)	58 (36.0%)	57 (44.5%)
68% - 100%	150 (28.9%)	37 (31.6%)	26 (23.0%)	50 (31.1%)	37 (28.9%)
mean ¹	49.61	50.62	45.36	48.89	49.38
standard deviation	25.46	24.82	26.09	25.36	22.29
(Missing cases)	(1)	(0)	(0)	(1)	(0)

¹ Comparing third year to fourth year: $t = 1.57$, $df = 228$, $p = 0.118$.
 Comparing fourth year to fifth year: $t = -1.12$, $df = 272$, $p = 0.264$.
 Comparing fifth year to 1980 graduates: $t = -0.17$, $df = 276$, $p = 0.866$.

TABLE 17. PROBABILITY OF PURSUING POSTGRADUATE TRAINING AND SEX

	<u>Males</u>	<u>Females</u>
Probability of Pursuing Postgraduate Training		
0% - 33%	94 (32.3%)	74 (32.5%)
34% - 67%	110 (37.8%)	91 (39.9%)
68% - 100%	87 (29.9%)	63 (27.6%)
mean	50.09	49.00
standard deviation	25.46	25.51
(missing cases)	(1)	(0)

$t = -0.48, df = 517, p = 0.632.$

TABLE 18. FIELD OF FIRST CHOICE IF GOING ON FOR ADVANCED TRAINING

Field of First Choice if going on for Advanced Training	Total Sample (N = 520)	Third Year (N = 117)	Fourth Year (N = 113)	Fifth Year (N = 162)	1980 Graduates (N = 128)
Pharmaceutics	22 (4.3%)	4 (3.5%)	7 (6.2%)	5 (3.2%)	6 (4.8%)
Pharmacology	69 (13.7%)	13 (11.4%)	18 (15.9%)	29 (18.4%)	9 (7.3%)
Medicinal Chemistry	24 (4.7%)	12 (10.5%)	1 (0.9%)	9 (5.7%)	2 (1.6%)
Pharmacy Administration	46 (9.0%)	11 (9.6%)	13 (11.5%)	13 (8.2%)	9 (7.3%)
Social Studies in Pharmacy	10 (2.0%)	3 (2.6%)	1 (0.9%)	2 (1.3%)	4 (3.2%)
Continuing Education	17 (3.3%)	1 (0.9%)	1 (0.9%)	3 (1.9%)	12 (9.7%)
Clinical Pharmacy	115 (22.6%)	21 (18.4%)	31 (27.4%)	35 (22.2%)	28 (22.6%)
Medicine	69 (13.7%)	25 (21.9%)	8 (7.1%)	15 (9.5%)	21 (16.9%)
Dentistry	18 (3.5%)	3 (2.6%)	2 (1.8%)	9 (5.7%)	4 (3.2%)
Veterinary Sciences	18 (3.5%)	-	12 (10.6%)	3 (1.9%)	3 (2.4%)
Business	57 (11.2%)	15 (13.2%)	9 (8.0%)	17 (10.8%)	16 (12.9%)
Law	23 (4.5%)	2 (1.8%)	6 (5.3%)	11 (7.0%)	4 (3.2%)
Other	21 (4.1%)	4 (3.5%)	3 (2.7%)	7 (4.4%)	6 (4.8%)
(missing cases)	(11)	(3)	(0)	(4)	(4)

TABLE 19. DEGREE OF FIRST CHOICE IF GOING ON FOR ADVANCED TRAINING

	Total Sample (N = 520)	Third Year (N = 117)	Fourth Year (N = 113)	Fifth Year (N = 162)	1980 Graduates (N = 128)
Degree of First Choice if going on for Advanced Training					
Ph.D.	77 (15.2%)	25 (21.7%)	9 (8.2%)	26 (16.7%)	17 (13.5%)
M.S., M.A., or M.B.A.	180 (35.6%)	41 (35.7%)	43 (39.1%)	53 (34.0%)	43 (34.1%)
Pharm.D. or Residency	149 (29.4%)	26 (22.6%)	35 (31.8%)	52 (33.3%)	36 (28.6%)
Other Professional Degrees	101 (19.8%)	23 (4.5%)	23 (20.9%)	25 (16.0%)	30 (23.8%)
(missing cases)	(13)	(2)	(3)	(6)	(2)

$\chi^2 = 12.812$, $df = 9$, $p = 0.171$.

interest in an advanced pharmacy practice degree (Pharm.D. or pharmacy residency) while 35 percent chose a master's level degree (M.S., M.A., or M.B.A.). A professional degree (other than pharmacy) was reported as the first choice of almost 20 percent of the respondents. This category included the M.D., D.D.S., D.V.M., J.D., and Optometry degrees. There was no significant association between selected degree category and class year.

Respondents' anticipated career plans are displayed in Table 20. Over 41 percent of the respondents plan a career in community pharmacy while 39 percent anticipate a hospital pharmacy career. Stratifying the sample by reported probability of pursuing postgraduate training, interesting trends appear which link educational plans with career aspirations.² Fifty-five percent of the individuals with low probability of pursuing postgraduate training plan careers in community pharmacy compared to only 14 percent of those with high probability. The

²Since there is no definitive causal ordering of the educational and career aspiration variables, Table 20 could be percentagized across as well as down columns. The chosen method should depend on pertinent research questions. In this study, the objective of this analysis is to elucidate the degree of correspondence of career plans with given educational plans, and hence the data are percentagized for the low, average, and high probability of pursuing postgraduate education categories.

TABLE 20. CAREER PLANS AND PROBABILITY OF PURSUING POSTGRADUATE TRAINING

	Total Sample	Low Probability (0% - 33%)	Average Probability (34% - 67%)	High Probability (68% - 100%)
Community Pharmacy				
Owner or Partner	132 (26.2%)	52 (31.5%)	63 (32.3%)	17 (11.8%)
Manager or Assistant Manager	45 (8.9%)	19 (11.5%)	24 (12.3%)	2 (1.4%)
Staff Pharmacist	32 (6.3%)	20 (12.1%)	11 (5.6%)	1 (0.7%)
Hospital Pharmacy				
Director or Assistant Director	40 (7.9%)	6 (3.6%)	12 (6.2%)	22 (15.3%)
Supervisor	85 (16.9%)	24 (14.5%)	36 (18.5%)	25 (17.4%)
Staff Pharmacist	72 (14.3%)	33 (20.0%)	32 (16.4%)	7 (4.9%)
Industrial Pharmacy				
Pharmaceutical Sales Representative	14 (2.8%)	4 (2.4%)	5 (2.6%)	5 (3.5%)
Research Scientist	29 (5.8%)	1 (0.6%)	5 (2.6%)	23 (16.0%)
Other	11 (2.2%)	2 (1.2%)	4 (2.1%)	5 (3.5%)
Other				
Professor (Ph.D. or Pharm.D. level)	12 (2.4%)	0	0	12 (8.3%)
Government Position	7 (1.4%)	1 (0.6%)	2 (1.0%)	4 (2.8%)
Pharmacy Related Position	7 (1.4%)	0	1 (0.5%)	6 (4.2%)
Medical Profession	6 (1.2%)	0	0	6 (4.2%)
Other Health Related Profession	5 (1.0%)	0	0	5 (3.5%)
Other	7 (1.4%)	3 (1.8%)	0	4 (2.8%)
(missing cases)	(16)	(3)	(6)	(6)

percentage of respondents planning a career in hospital pharmacy doesn't change with probability of advanced training (about 39 percent) but anticipated position does. Thirty-two percent of those with high probability anticipate holding a supervisory or directorship position in ten to fifteen years while only 18 percent of those with low probability aspire to that.

Also striking is the observation that 38 percent of those reporting a high probability of pursuing postgraduate training plan a career in which advanced training is a prerequisite for entry. Sixteen percent plan to be a research scientist in the pharmaceutical industry and 8 percent plan to be a professor. Almost 3 percent indicate they will be working in government and 4 percent in pharmacy related fields. Medicine was the anticipated career of 4 percent of those with high probability of pursuing postgraduate study and about 3 percent plan other health related careers. In contrast, only 1 percent of those with low probability and 4 percent of those with average probability of pursuing postgraduate training anticipate careers where postgraduate training is necessary for entry. Thus, while the data do not demonstrate a clean relationship between respondents' educational and career aspirations, there is correspondence between the two.

The majority of respondents reported they would get

licensed as a pharmacist before starting postgraduate training. As shown in Table 21, only 18 percent would most likely start their graduate training prior to or immediately after completion of their pharmacy degree. Thirty-six percent indicated they would be most likely to start the year following licensure as a pharmacist, and 27 percent would work one to two years first. Only 13 percent had no specific starting date in mind.

The crosstabulation of probability of pursuing postgraduate training with anticipated starting date is shown in Table 22. There is a significant association between these two variables, most notably that respondents with high probability of pursuing postgraduate training are more likely than other students to pursue immediate study.

Multiple Regression Model, Assumptions, and Results

Multiple linear regression is a statistical technique through which one can analyze the relationship between a dependent variable and two or more independent variables.³ It allows one to explain variance in the dependent variable and examine the model's explanatory power. The general model of standardized multiple regression is shown in Figure 1.

³For a description of multiple linear regression analysis, please see Pindyck and Rubinfeld (1976) or Blalock (1979).

TABLE 21. MOST LIKELY TIME TO START POSTGRADUATE TRAINING IF GOING ON

Most Likely Time to Start Postgraduate Training if going on	Total Sample (N = 520)	Third Year (N = 117)	Fourth Year (N = 113)	Fifth Year (N = 162)	1980 Graduates (N = 128)
Prior to Completion of Pharmacy School	24 (4.7%)	9 (7.7%)	9 (8.0%)	4 (2.5%)	2 (1.6%)
After Graduation from Pharmacy School	69 (13.4%)	22 (18.8%)	23 (20.4%)	13 (8.2%)	11 (8.7%)
Following Licensure as a Pharmacist	185 (35.9%)	27 (23.1%)	39 (34.5%)	73 (45.9%)	46 (36.2%)
After Practicing 1 to 2 Years in Pharmacy	139 (26.9%)	31 (26.5%)	27 (23.9%)	38 (23.9%)	43 (33.9%)
After Practicing 3 or more Years in Pharmacy	33 (6.4%)	6 (5.1%)	3 (2.7%)	11 (6.9%)	13 (10.2%)
No Definite Date	66 (12.8%)	22 (18.8%)	12 (10.6%)	20 (12.6%)	12 (9.4%)
(missing cases)	(4)	(0)	(0)	(3)	(1)

TABLE 22. MOST LIKELY TIME TO START AND PROBABILITY
OF PURSUING POSTGRADUATE TRAINING

	<u>Low Probability (0% - 33%)</u>	<u>Average Probability (34% - 67%)</u>	<u>High Probability (68% - 100%)</u>
Prior to or Immediately After Graduation	21 (22.6%)	27 (29.0%)	45 (48.4%)
Following Licensure as a Pharmacist	61 (33.0%)	69 (37.3%)	55 (29.7%)
After Practicing 1 to 3 Years in Pharmacy	51 (29.7%)	83 (48.3%)	38 (22.1%)
No Definite Date	33 (50.8%)	22 (33.8%)	10 (15.4%)

(missing cases = 5)

$\chi^2 = 35.960$, $df = 6$, $p = 0.00$.

FIGURE 1. GENERAL MODEL OF STANDARDIZED MULTIPLE REGRESSION

$$y_i = B_1x_{i1} + B_2x_{i2} + \dots + B_kx_{ik} + e_i$$

where: y_i = dependent variable (standardized);

x_i = independent variables (standardized);

B_1 to B_k = regression coefficients
(standardized) of each respective
 x_{i1} to x_{ik} variable;

e_i = error.

The assumptions of the multiple regression model are (Pindyck and Rubinfeld, 1976, p. 55):

- 1.) the model is linear as specified in Figure 1;
- 2.) the independent variables are nonstochastic; that is, their values are fixed in repeated samples. In addition, no exact linear relationship exists among two or more independent variables;
- 3.) the error term has zero expected value and constant variance for all observations;
- 4.) the errors corresponding to different observations are uncorrelated; and
- 5.) the error variable is normally distributed.⁴

Listwise deletion of missing cases was employed in the regression analysis, meaning that cases with missing data on any variable were automatically eliminated from the analysis. The regression analysis was performed on 486 of 520 respondents, or 93.5 percent. Given the initial high response rate, the loss of 6.5 percent of the cases is not expected to bias the results.

The zero order correlations between the probability of pursuing postgraduate training and all independent variables are shown in Table 23. Eight of the variables

⁴The residuals of the final regression equations were plotted against the predicted dependent variable values to detect violations of the assumptions (Draper and Smith, 1966, Chapter 3). Examining these scatterplots, the assumptions about the errors do not appear to be violated. In addition, the linear model appeared to be appropriate. This is reaffirmed by the overall F-ratios and R^2 values for the equations.

TABLE 23. ZERO-ORDER CORRELATIONS BETWEEN PROBABILITY OF PURSUING POSTGRADUATE TRAINING AND ALL INDEPENDENT VARIABLES

<u>Independent Variable</u>	<u>Probability of Pursuing Postgraduate Training</u>	<u>N</u>
Mother's Education	.1393***	512
Sex	-.0211	519
Selected Pharmacy because it was Challenging	.2271***	515
Selected Pharmacy for Vocational Reasons	-.0224	515
Gradepoint Average	.2619***	501
Satisfaction with Choice of Pharmacy as a Major	-.1693***	517
Interest in doing Practice Related Research	.3607***	516
Encouragement from Family and Friends	.4500***	509
Encouragement from Academic Sources	.2557***	514
Perceived Financial Barriers to Graduate Study	-.0995**	502

**p \leq 0.01

***p \leq 0.001

had significant correlations with the dependent variable. These were: mother's education, selected pharmacy as a major because it was challenging, grade point average, satisfaction with choice of pharmacy as a major, interest in doing practice related research, encouragement from family and friends, encouragement from academic sources, and perceived financial barriers to graduate study.

All ten hypothesized independent variables were included in the regression equation predicting probability of pursuing postgraduate training simultaneously. Regressions were performed for the aggregate sample (N = 486) and for each of the four class years separately (N = 108, 109, 149, and 120). Variables were considered significant if the F value of the regression coefficients had $p \leq 0.05$. Mother's education, sex, and perceived financial barriers did not have a significant F value in any of the five regressions, and therefore these variables were excluded from the final regression equations.⁵

Means and standard deviations for regression model variables are shown in Table 24. The final regression model of probability of pursuing postgraduate training is displayed in Table 25. Five variables were shown to be

⁵These regressions, as well as the independent and dependent variable means and standard deviations, are displayed in Appendix D.

TABLE 24. MEANS AND STANDARD DEVIATIONS FOR
REGRESSION MODEL VARIABLES

<u>Independent Variable</u>	<u>Mean</u>	<u>(Standard Deviation)</u>
Selected Pharmacy because it was Challenging	0.38	(0.49)
Selected Pharmacy for Vocational Reasons	0.20	(0.40)
Gradepoint Average	2.99	(0.47)
Satisfaction with Choice of Pharmacy as a Major	1.32	(0.73)
Interest in doing Practice Related Research	3.80	(1.07)
Encouragement from Family and Friends	1.80	(1.59)
Encouragement from Academic Sources	0.45	(0.70)
Probability of Pursuing Postgraduate Training	48.58	(25.28)

TABLE 25. REGRESSION MODEL OF PROBABILITY OF
PURSUING POSTGRADUATE TRAINING

<u>Independent Variable</u>	<u>Standardized Regression Coefficient</u>
Selected Pharmacy because it was Challenging	.1756**
Selected Pharmacy for Vocational Reasons	.0631
Gradepoint Average	.1559**
Satisfaction with Choice of Pharmacy as a Major	-.1067**
Interest in doing Practice Related Research	.2154**
Encouragement from Family and Friends	.3143**
Encouragement from Academic Sources	.0699
<hr/>	
R ²	.3290
R ² (corrected)	.3192
F-ratio for equation (degrees of freedom)	33,4839 (7, 478)
Significance level of F-ratio	.01
<hr/>	

**p ≤ 0.01

highly significant predictors of probability of pursuing postgraduate training. They are: selected pharmacy as a major because it was challenging, grade point average, satisfaction with choice of pharmacy as a major, interest in doing practice related research, and encouragement from family and friends. The equation yields an R^2 of .3290 (.3192 corrected). Each regression coefficient in the equation had the hypothesized sign.

The regression equations for the sample stratified by class year are shown in Table 27. (See Table 26 for variable means and standard deviations.) In all cases, the dependent variable was probability of pursuing post-graduate training.

The reason - challenging variable had the hypothesized positive-signed coefficient for all four class years, and was a significant predictor for the fourth and fifth year respondents. Selected pharmacy for vocational reasons was a significant predictor for the fourth year. This variable did not have the hypothesized positive-signed coefficient in the fifth year equation.

The coefficient of self-reported grade point average had the hypothesized positive sign across all four class years. While it was not significant for third year respondents, it was significant for fourth and fifth year respondents ($p \leq 0.05$ and $.01$ respectively). Grade point

TABLE 26. MEANS AND STANDARD DEVIATIONS FOR REGRESSION MODEL VARIABLES FOR THE SAMPLE STRATIFIED BY CLASS YEAR

	Variable Means (Standard Deviations)			
	<u>Third Year</u>	<u>Fourth Year</u>	<u>Fifth Year</u>	<u>1980 Graduates</u>
Selected Pharmacy because it was Challenging	0.40 (0.49)	0.40 (0.49)	0.41 (0.49)	0.30 (0.46)
Selected Pharmacy for Vocational Reasons	0.23 (0.42)	0.16 (0.36)	0.21 (0.41)	0.19 (0.40)
Gradepoint Average	3.18 (0.38)	3.01 (0.49)	2.86 (0.49)	2.95 (0.45)
Satisfaction with Choice of Pharmacy as a Major	1.65 (0.55)	1.52 (0.60)	1.21 (0.75)	0.98 (0.79)
Interest in doing Practice Related Research	3.84 (0.97)	3.84 (1.00)	3.72 (1.20)	3.84 (1.05)
Encouragement from Family and Friends	1.53 (1.42)	1.56 (1.60)	1.95 (1.57)	2.08 (1.70)
Encouragement from Academic Sources	0.12 (0.33)	0.48 (0.66)	0.51 (0.72)	0.65 (0.83)
Probability of Pursuing Postgraduate Training	49.89 (25.03)	44.64 (26.07)	47.64 (25.19)	52.15 (24.59)

TABLE 27. REGRESSION MODEL OF PROBABILITY OF PURSUING POSTGRADUATE TRAINING FOR THE SAMPLE STRATIFIED BY CLASS YEAR

	Standardized Regression Coefficients			
	Third Year	Fourth Year	Fifth Year	1980 Graduates
Selected Pharmacy because it was Challenging	.0974	.2954**	.1874*	.1094
Selected Pharmacy for Vocational Reasons	.0023	.2551**	-.0185	.0368
Gradepoint Average	.0447	.1949*	.2500**	.0129
Satisfaction with Choice of Pharmacy as a Major	-.2217**	-.0273	-.1097	-.1246
Interest in doing Practice Related Research	.3454**	.0966	.1644*	.2727**
Encouragement from Family and Friends	.4290**	.2960**	.2999**	.1318
Encouragement from Academic Sources	-.0241	-.0214	.0776	.3095**
R ²	.4664	.3209	.3961	.3383
R ² (corrected)	.4290	.2738	.3661	.2970
F-ratio for equation (degrees of freedom)	12.4861 (7, 100)	6.8169 (7, 101)	13.2099 (7, 141)	8.1816 (7, 112)
Significance level of F-ratio	.01	.01	.01	.01

*p ≤ .05

**p ≤ .01

average was not a significant predictor for the 1980 graduates.

Satisfaction with choice of pharmacy as a major had the hypothesized negative-signed coefficient across all four groups, but it significantly predicted probability of pursuing postgraduate training only for the third year respondents.

Interest in practice related research had the expected positive-signed coefficients in all four analyses. It was a significant predictor for third year, fifth year, and graduate respondents.

Encouragement from family and friends was a highly significant predictor of probability of pursuing postgraduate training for the first three class years while it was not significant for the graduate respondents. All coefficients had the hypothesized positive sign. The encouragement from academic sources variable had the hypothesized positive-signed coefficient in the fifth year and graduate equations, and the variable was a significant predictor only for graduate respondents.

The equations for each of the four classes had significant F-ratios, and R^2 values ranged from .3209 to .4664 (.2738 to .4290 corrected).

A summary of the results of the hypotheses tests is presented in Tables 28 and 29. The hypotheses are listed

TABLE 28. SUMMARY OF TESTS OF HYPOTHESIS ONE: AGGREGATE SAMPLE DATA¹

<u>Variable Name</u>	<u>Predicted Sign of Regression Coefficient</u>	<u>Actual</u>	<u>Conclusion</u>
Mother's Education	+	NS	Reject
Sex (male = 0, female = 1)	-	NS	Reject
Selected Pharmacy because it was Challenging	+	+	Accept
Selected Pharmacy for Vocational Reasons	+	NS	Reject
Gradepoint Average	+	+	Accept
Satisfaction with Choice of Pharmacy as a Major	-	-	Accept
Interest in doing Practice Related Research	+	+	Accept
Encouragement from Family and Friends	+	+	Accept
Encouragement from Academic Sources	+	NS	Reject
Perceived Financial Barriers to Graduate Study	-	NS	Reject

¹This summary is based on the regression equation in Table 25. In addition, information for the variables sex, mother's education, and perceived financial barriers to graduate study is drawn from Table 39 in Appendix D.

TABLE 29. SUMMARY OF TESTS OF HYPOTHESIS TWO: DATA STRATIFIED BY CLASS YEAR¹

Variable Name	Predicted Sign of Regression Coefficient	Actual Sign of Regression Coefficient for Each Class Year				Conclusion ²
		Third Year	Fourth Year	Fifth Year	1980 Graduates	
Mother's Education	+	NS	NS	NS	NS	Reject
Sex (male = 0, female = 1)	-	NS	NS	NS	NS	Reject
Selected Pharmacy because it was Challenging	+	NS	+	+	NS	Reject
Selected Pharmacy for Vocational Reasons	+	NS	+	NS	NS	Reject
Gradepoint Average	+	NS	+	+	NS	Reject
Satisfaction with Choice of Pharmacy as a Major	-	-	NS	NS	NS	Reject
Interest in doing Practice Related Research	+	+	NS	+	+	Reject
Encouragement from Family and Friends	+	+	+	+	NS	Reject
Encouragement from Academic Sources	+	NS	NS	NS	+	Reject
Perceived Financial Barriers to Graduate Study	-	NS	NS	NS	NS	Reject

¹This summary is based on the regression equations in Table 27. In addition, information for the variables sex, mother's education, and perceived financial barriers to graduate study is drawn from Table 41 in Appendix D.

²The hypothesis is rejected for each variable because of the stringent test that the coefficient must be a significant predictor in the hypothesized direction in all four class years. Note that where significant, all coefficients have the predicted sign however.

below for the reader's convenience.

- H¹: Examining aggregate sample data, the variable significantly predicts probability of pursuing postgraduate training in the hypothesized direction.
- H²: Examining the data stratified by class year, the variable significantly predicts probability of pursuing postgraduate training in all four class years in the hypothesized direction.

As a final check that the model was correctly specified, selected interaction variables were included in the model and tested for significance.⁶ Since it was infeasible to systematically test all possible interactions, I chose those variables which I felt were most prone to interact.

It seemed likely that receiving encouragement from both family and friends and from academic sources would have a multiplicative effect on postgraduate educational plans over their independent effects. Therefore, the following interaction variable was computed:

Encouragement from Family and Friends	x	Encouragement from Academic Sources
--	---	--

This variable measured the effect of receiving encouragement from both sources and hence had a value of zero if either of the encouragement variables was zero.

⁶See Blalock (1979) or Kerlinger and Pedhazur (1973) for a discussion of interactions in multiple linear regression.

In addition, it seemed likely that each encouragement variable could potentially interact with gradepoint average. It was anticipated that the effect of encouragement on postgraduate plans would be pronounced when combined with high academic performance, and diluted or disregarded if an individual had low gradepoint average. Academic performance could also act as a basis on which faculty, family, and friends decide to encourage individuals. The following two interaction variables were computed, and they each had a value of zero if the respective sources did not encourage the individual:

Encouragement from Family x Gradepoint Average
and Friends

Encouragement from x Gradepoint Average
Academic Sources

It seemed as though interest in doing practice related research could have an increased effect on postgraduate educational plans, depending on the extent that individuals were satisfied with their choice of pharmacy as a major. Hence the following variable was computed:

Satisfaction with Choice x Interest in Practice
of Pharmacy as a Major Related Research

The variable had a value of zero for all individuals who would not select pharmacy again as a major.

Each of the four interaction variables were included individually into each of the final regression equations. The significance of their regression coefficients was noted,

and the amount of increased variance explained was tested for significance using the incremental R^2 test.

None of the interaction variables had significant regression coefficients in any of the regressions. Using the incremental R^2 test, none of the interaction variables significantly explained increased variance except one. In the graduate respondents, the interaction of satisfaction with choice of pharmacy as a major with interest in doing practice related research significantly explained increased variance ($R^2 = 0.3556$, significant increase in R^2 at $p \leq 0.05$).⁷ The importance of this finding is that it provides evidence that the variables operate differently in the different class years. A definitive explanation of the meaning of the interaction variable is not clear however.

It was decided not to include the Satisfaction x Interest in Research variable in the final regression equations. This was done for several reasons. First, the variable explained increased variance in only one of the five equations. Secondly, the inclusion of interaction variables plays havoc with other coefficients in the model due to problems of multicollinearity, and makes it difficult to make "unambiguous statements about the contributions of

⁷The regression equations including this variable are displayed in Appendix E.

independent variables and their interactions" (Kerlinger and Pedhazur, 1973, p. 415). Finally, examination of the plots of the residuals against the predicted dependent variable values indicated no abnormalities, and therefore the linear model adequately fitted the data (fn, p. 79).

CHAPTER 5

DISCUSSION

The results of this analysis are suggestive in considering the relationship between background characteristics, belief and performance factors, enabling factors, and the educational aspirations of pharmacy students and recent graduates. Sex does not appear to be associated with or a predictor of educational aspirations of pharmacy students as it has been for college students in general (Baird, 1976; Davis, 1964; Wegner, 1969). Since mother's education has a significant zero order correlation with probability of pursuing postgraduate training and yet it is not a significant predictor when other factors are controlled for, its effects may be mediated by the other variables.

Grade point average is an important predictor of educational aspirations, as is the social psychological construct encouragement from family and friends. These findings parallel the results of other studies (Otto and Haller, 1979; Reitzes and Mutran, 1980; Wegner, 1969). Just as encouragement from faculty is associated with educational aspirations in other studies (Baird, 1976; Davis, 1964; Otto and Haller, 1979) it is in this study. However, academic encouragement does not appear to be a

significant predictor of educational plans for the aggregate sample; this will be discussed later. In addition, several variables created specifically for the model of pharmacy students' educational plans were influential and this suggests the potential utility of the model in intra-occupational research.

The model adequately explains respondents' educational plans (Table 25, $R^2 = .3290$, corrected $.3192$). The significance levels of individual variables do not seem dependent on statistical limitations; that is, all variables appear to have adequate variation in their means to make the statistical tests meaningful.

All of the above factors suggest that a social psychological model of educational aspirations is operating for this group of pharmacy students and recent graduates.

A very important finding in this analysis is that there seems to be an interaction effect of year operating, and that wrong conclusions could possibly be made on the basis of the aggregate data model. The most striking is that of encouragement from academic sources. The results of the by-year analysis are discussed below, and suggested explanations are offered. The explanations are based on anticipated constraints of the system on the individual at the different points in pharmacy training and the perceived social dynamic processes which may occur. It should be

noted that these explanations are suggestive only and are limited by the available cross-sectional data and my understanding of how the model may operate.

An explanation for the observed pattern of significance for the reason for selecting pharmacy as a major variables is not readily apparent. It would seem reasonable that the reason variables would be more important in explaining postgraduate educational plans for students early in their educational training than for students farther on because those reasons would be more salient to them. However, the reason variables are not significant predictors for the third year respondents in this study while they are for the fourth and fifth year respondents. This pattern of significance may reflect differences in reason for selecting pharmacy as a major and recollected reason for choosing pharmacy as a major for students further along in their studies. Longitudinal study is needed to further specify the effect of reason for choosing pharmacy as a major on educational planning.

A plausible explanation for the differing effects of grade point average can be posited. Grade point average is not significant for the third year students. Their average GPA is 3.18. Grade point average is an important criteria for acceptance into pharmacy school, and beginning students generally take pride in their

acceptance.¹ They may consider that their grade point average was sufficient to get them into pharmacy school and assume that it will likewise get them other places. Average GPA significantly decreased between the third and fourth and fourth and fifth year respondents however, and it appears for both of those groups as an important predictor of educational aspirations. Relative deprivation theory could account for this finding (Davis, 1966). Grade point average is not a significant predictor of recent graduates' educational plans. This suggests that once outside the academic environment, the importance of grade point average as a determinant of future plans may be diminished. Graduates may realize there are other means to achieve their goals, for example, through personal recommendations and merit. In addition, average GPA was somewhat higher for the graduates than for the fifth year respondents, though not significantly. If in fact the graduates did increase their grade point average in their last year of school, quite possibly they regained confidence in their ability and did not let grade point average influence their educational plans.

The study results support the hypothesis that the more satisfied respondents were with their choice of

¹Conversation with Larry Mindel, Assistant to the Dean, University of Wisconsin School of Pharmacy, February 23, 1981.

pharmacy as a major, the less likely they were to plan postgraduate study. Since many of the pharmacy educators potentially come from the pool of graduate students, this finding lends credence to one group of researchers' observation that pharmacy educators may be disillusioned pharmacy practitioners (Manasse, Stewart, and Hall, 1975). All of this begs the question however of what (if anything) they are dissatisfied with. In retrospect that seems a relevant question, for it may shed light on the pattern of significance for the satisfaction variable across the four class years in this study. The variable is highly significant for the third year respondents and insignificant for the others, despite the trend of decreasing satisfaction between the groups. It is unclear what this pattern represents. The most dissatisfied students may drop out after the first year and hence the pattern may reflect selection and retention of students in pharmacy school. In addition, the other classes may find means of dealing with and expressing their dissatisfaction. For instance, there is some indication of an interaction between satisfaction and interest in practice related research. Further study is warranted to determine the nature of the dissatisfaction, and its effect on students' specific educational aspirations.

Also unclear is why the interest in doing practice

related research variable is important in explaining probability of postgraduate training in all subgroups except the fourth year. Quite possibly it may be a consequence of the fourth year respondents' feeling of detachment from the practice of pharmacy. The pharmacy school curriculum they have experienced by the fourth year is didactic coursework in the basic sciences, and they may not be aware of the opportunities practice related research offers.² This may become apparent in subsequent coursework and practical pharmacy experience. If this is the case, one may rightfully ask why the variable is significant for the first year students. I think that may reflect naive and idealistic interest on their part, unencumbered by the pharmacy school experience and ideology.

The enabling factors are especially interesting, both substantively and methodologically. On the basis of the results of the aggregate sample regression, one would conclude that encouragement from family and friends is highly influential in predicting educational plans while encouragement from academic sources is not at all important. This finding would be contrary to previously cited studies and the intuition of numerous pharmacy educators who feel

²One can only speculate how they would respond to a question tapping interest in basic laboratory research.

that their encouragement is influential in their students' educational plans (see, for example, Gerald, 1979a; Zografis, 1979). The conclusion would be highly erroneous however for the by-year analysis indicates that that pattern holds true for students in pharmacy school but just the opposite holds true for recent graduates. There is no simple explanation for this finding, and the suggested explanations pose more research questions than answers.

One might suggest that family and friends encouragement is important, but that when individuals are close to making and acting on their postgraduate decisions, as the recent graduates are, that encouragement is no longer predictive of their aspirations. Because the amount of academic encouragement respondents receive (as measured by this variable) does not significantly change between the fourth, fifth, and graduate classes, it is possible that it is not the academic encouragement per se but the present saliency of that encouragement that is influential in predicting probability of postgraduate training for the graduates. The determination of when the encouragement was received would help clarify this question. Interestingly, there is no interaction effect between encouragement from academic and non-academic sources. Therefore, it appears that encouragement from family and friends is not a necessary condition for academic encouragement to

operate in the model (and vice versa).

A second explanation for the significance of the academic encouragement in the graduate category was alluded to parenthetically above, and that is that it may be due to variable construction. The variable, as defined, may not accurately measure attributes of encouragement from academic sources which may be important in making educational plans. Postulated attributes are explained below. First, the variable does not measure the number of different academic sources giving encouragement, and the intensity of each source's encouragement. For instance, a fourth year respondent receiving encouragement from one professor on one occasion would have the same academic encouragement score as a recent graduate who was encouraged by several professors on numerous occasions. It is likely that the students further along received more encouragement than their underclassmen and this unquantified encouragement is reflected in the significant academic encouragement variable for the graduates.

In addition, the variable does not measure if the encouragement was solicited or unsolicited. The variable may be reflecting the effect of academic encouragement which is a result of interested graduates seeking recent confirmation of their educational aspirations from faculty sources. This is not unlikely, for in making graduate

school plans, contact with the pharmacy school is necessary in order to get information and letter(s) of recommendation.

In retrospect, another deficiency of the academic encouragement measure is that it does not identify the specific source(s) of encouragement. Is the encouragement of a general nature or specific to the discipline of the source? Some pharmacy educators have argued that students' intense exposure to the clinical faculty during the last year in pharmacy school offer the clinical faculty opportunities to encourage students at the expense of the other faculty (Gerald, 1979a; Zografis, 1979). Arguing so, they are assuming that the clinical faculty is offering encouragement specifically to pursue clinical graduate training. One would expect then to see a significant trend of more pharmacy graduates than undergraduates selecting pharmacy practice advanced degrees as their preferred degree. This is not true for this sample however, as seen in Table 19 (p. 71). The clinical exposure more likely may be contributing to an increased propensity to pursue advanced training in other professional fields.

A final explanation for the significance of academic encouragement for graduates and not for the other class years is that the maturity of the older student makes him or her more receptive to the encouragement from faculty

members.

The results of this study plus the unanswered questions posed by these possible explanations lead to the conclusion that encouragement from academic sources appears to be influential in the educational planning of pharmacy graduates, but the nature of that influence is unknown. Further research should aim to measure the intensity, source, specificity, stimulus, and time of the encouragement interactions.

Of interest too is the finding that the perceived financial barriers to graduate study variable was not found to be a significant predictor of educational aspirations in the aggregate or by-year analyses. This is interesting, for it is contrary to intuition and previous reports in the literature that it is an important factor in education decision making (Baird, 1976; Davis, 1964). To my knowledge, the variable has never been incorporated into a regression model however. A possible explanation for the finding is that Wisconsin pharmacy students, based on their experiences, may feel that financial aid and graduate assistantships are available and hence perceived financial barriers can be overcome.

Another possibility is that deficiencies in the variable construction inhibit its meaningfulness in explaining educational plans. The variable is constructed

as a sum of the number of fields in which finances are perceived to be a barrier to graduate study. Quite possibly a more specific question relating to each respondent's educational plans would be more appropriate. The perceived degree of impediment which financial barriers pose and the respondent's perceived ability to overcome them are also two important attributes to be included in further research utilizing this variable.

Further analysis of the data suggests another explanation for the finding. It may be true that perceived financial barriers are not important in explaining perceived probability of pursuing postgraduate study but that they are a significant factor in individuals' decision of what to study. As seen in Table 30, there is a significant trend of degree of study with perceived financial barriers. As the number of fields in which finances are perceived to be a barrier increases, the percentage of respondents preferring other professional degrees decreases. At the same time, the percentage preferring a master's degree or a pharmacy practice degree increases. This is not surprising as both of these degree categories are characterized by shorter programs and part-time study opportunities and hence potentially pose less of a financial burden than the other two degree categories. No trend is observable for those preferring a doctorate

TABLE 30. PERCEIVED FINANCIAL BARRIERS TO GRADUATE STUDY AND DEGREE OF FIRST CHOICE

	<u>Ph.D.</u>	<u>M.S., M.A., and M.B.A.</u>	<u>Pharm.D. and Residency</u>	<u>Other Professional</u>
Perceived Financial Barriers to Graduate Study				
None	9 (12.5%)	20 (27.8%)	16 (22.2%)	27 (37.5%)
One to Six	45 (16.0%)	102 (36.3%)	79 (28.1%)	55 (19.6%)
Seven	20 (14.3%)	53 (37.9%)	49 (35.0%)	18 (12.9%)

(missing cases = 27)

$\chi^2 = 19.343, df = 6, p = 0.003$

degree. This may be because individuals preferring a Ph.D. want it despite financial problems or, equally likely, they chose a Ph.D. as a preferred degree because they recognized financial aid opportunities available there.

CHAPTER 6

SUMMARY AND CONCLUSIONS

The results of this study of the postgraduate educational aspirations of pharmacy students and recent graduates are of substantive, theoretical, and methodological interest, but more ambiguous than expected.

Of interest to pharmacy educators is the finding that almost thirty percent of the students at one university perceived better than a two-thirds probability of pursuing postgraduate training in the future. Fifteen percent of the respondents indicated a doctorate was their preferred degree while 29 percent preferred a pharmacy practice degree. There were no sex differences in probability of pursuing an advanced degree observed.

Even though encouragement from academic sources is not a significant predictor of educational aspirations for the aggregate sample, it is highly influential for the recent graduates. Since these are the ones who are in the best position to act on their decisions, pharmacy educators should themselves be encouraged by this finding and support continued research to learn the nature of their influence.

Interest in doing practice related research was shown to be a significant predictor of probability of pursuing postgraduate training. It is possible that academicians could identify this interest early in a student's career

and give him or her selective encouragement and exposure to research and graduate opportunities. Selecting pharmacy as a major because it is challenging is an overall predictor of pursuing postgraduate study. This could be used as a further means of identifying individuals predisposed to graduate study. In addition, reason for choosing pharmacy could be a basis for selection into pharmacy school.

Theoretically, the results of this study are interesting because a social psychological model of educational aspirations was again shown to have predictive power. In addition, by incorporating measures specific to pharmacy, the utility of the model in intra-occupational research was demonstrated.

Finally, several important methodological points are of interest. Of primary importance is the finding that there is an interaction effect of year. While this interaction may be endemic to this study, it is an important question for other researchers to address for, if present, aggregate data analyses may be hiding discrepancies and leading to erroneous conclusions. Also, studies utilizing samples of varying compositions may not be comparable and the generalizability of their results may be limited. Research aiming to identify the presence of the interaction and further specify its nature is

necessary to fully understand the problem.

Also of methodological interest is the measure of educational aspirations introduced in this study.

Perceived probability of pursuing postgraduate training has the advantages of being a continuous variable, placing no time restrictions on implementation of those plans.

In this study the variable generated the necessary variance to make statistical tests meaningful, and it appeared to be associated with occupational aspirations. Utilization of the measure in future research seems warranted, both to further establish its validity as a measure of educational aspirations and its utility in predicting educational attainment.

Several limitations of the study have been mentioned previously in this work, but it is instructive to summarize them at this point in order to keep the results in perspective and to generate questions for further research.

First of all, since the study is based on respondents from one major university, the results are suggestive and are not generalizable to all pharmacy students or pharmacists. National studies are needed to do that. It would be interesting to compare the model of educational planning for students at pharmacy schools which do not have research graduate programs with those that do.

Secondly, deficiencies in the construction of several

variables were discovered with continued inspection of the model, and these have been noted previously. Specifically, the satisfaction with choice of pharmacy as a major, encouragement from academic sources, and perceived financial barriers variables should undergo the recommended fine-tuning so that a more clear explanation of their role in educational planning can be ascertained.

A third limitation is that cross-sectional data were employed in this study. While that is sufficient for exploratory research, longitudinal data would have several distinct advantages. The causal order of the effects of independent variables on postgraduate educational plans would be validated. Prospective analysis would also eliminate the need to measure prepharmacy grade point average and reasons for selecting pharmacy as a major retrospectively. Drop-outs could be identified and questions regarding selection addressed. In addition, one could examine on an individual basis how the belief and performance factors and enabling factors change with time and identify the social dynamic processes which may account for those changes with more conviction than is possible in this study. Finally, the validity and reliability of the measure of educational aspirations could be established and the social psychological model could be expanded to include that as a predictor of pharmacists' educational attainment.

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APPENDIX A

SURVEY INSTRUMENT

University of Wisconsin Madison

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CENTER FOR HEALTH SCIENCES

School of Pharmacy

425 North Charter Street

Madison, Wisconsin 53706

Telephone: 608/ 263-3959

September, 1980

Dear Future Pharmacist,

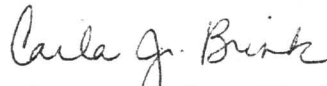
There has been increasing interest in recent years in mapping the career paths of professionals - where they come from, where they end up, and what they do in between. As a pharmacy student or recent graduate of the University of Wisconsin School of Pharmacy, you have the opportunity to participate in a study of this type for pharmacists.

The attached survey aims to elucidate your educational and career plans, as well as your perceptions of the career options available to pharmacy graduates. It is hoped that this information will aid our understanding of the process by which pharmacy students make career decisions, based on their backgrounds, expectations, experiences, and needs. Looking ahead, it is anticipated that these survey results will be the basis for follow-up study on the outcome of your career plans. That future study would be step two in the mapping of pharmacy careers.

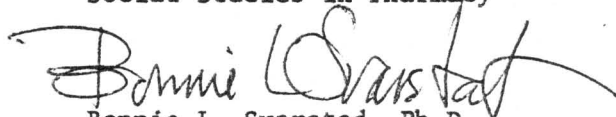
Your responses to the questionnaire will be strictly confidential, and are collected solely for research purposes. Analysis of the results will focus on the patterns for all respondents, and not on specific individuals. On the last page of this questionnaire there is a section for you to report your name, address, and permanent address. This information will be stored separately from your questionnaire, and is being collected so that follow-up on the outcome of your plans in the future is possible. Inclusion of your address will also allow us to send you the questionnaire results if you wish.

We hope you'll find this questionnaire interesting and perhaps useful in sharpening your own career plans. Thank you for your assistance, and good luck to you in the future!

Sincerely,



Carla J. Brink, R.Ph.
Graduate Student,
Social Studies in Pharmacy



Bonnie L. Svarstad, Ph.D.
Associate Professor
Social Studies in Pharmacy

QUESTIONNAIRE

Please answer each of the following questions. Instructions for answering specific questions are included as needed. You are encouraged to provide additional comments to elaborate on your answers.

There are no "right" or "wrong" answers to these questions. Rather, please provide answers which reflect what you truly believe.

It will take you about twenty minutes to complete this form.

1. Make the best prediction of what type of work you expect to be doing ten to fifteen years from now by selecting ONE of the seventeen positions listed below:

Independent community pharmacy (less than 4 units under the same ownership)

- (01) ___ Owner or Partner
 (02) ___ Manager or Assistant Manager
 (03) ___ Staff Pharmacist

Chain community pharmacy (four or more units under the same ownership)

- (04) ___ Owner or Partner
 (05) ___ Manager or Assistant Manager
 (06) ___ Staff Pharmacist

Hospital or Institutional pharmacy

- (07) ___ Director or Assistant Director of Pharmacy Services
 (08) ___ Supervisor (for example, of unit dose, I.V., or in-patient services)
 (09) ___ Staff Pharmacist

Industrial pharmacy

- (10) ___ Pharmaceutical Sales Representative
 (11) ___ Research Scientist
 (12) ___ Production Supervisor
 (13) ___ Other, please specify: _____

Pharmacy Education

- (14) ___ Professor (Ph.D. or Pharm.D. level)
 (15) ___ Supportive Staff (B.S. level)

Government

- (16) ___ Please specify type of position: _____

Other occupations or professions

- (17) ___ Please specify type of position: _____

2. What is your current status? (Check one.)

___ Ph-1 ___ Ph-2 ___ Ph-3 ___ Graduate Intern ___ Other, please specify:
 (1) (2) (3) (4) (5) _____

3. Please read each of the following short descriptions of pharmacy students, and rank them in terms of how they described you when you first decided to study pharmacy.

Use: one for the paragraph describing you the best, two for the paragraph describing you the second best, three for the paragraph describing you the third best, and four for the paragraph describing you the least.

(1) _____ I was interested in pharmacy, but that alone didn't make me choose pharmacy as a career. Outside personal interests and commitments, such as getting married, having a family, being active in church, civic and professional organizations, and being involved in sports and other hobbies, were important to me. I chose pharmacy as a major because it seemed as if it was possible to combine a pharmacy career with these commitments. Also, the availability of part-time job opportunities appealed to me.

(2) _____ I chose pharmacy as a major because I thought it would be challenging. Subjects such as chemistry and human physiology have always intrigued me, and it seemed as if learning how drugs work would be fascinating. I was motivated primarily by my intellectual curiosity, and I found the wide scope of opportunities a pharmacy background opened up very appealing.

(3) _____ I have always liked working with people, and I get a real sense of accomplishment when I help people. This prompted my interest in pursuing a career in a health profession. I figured that I could be a good pharmacist, providing needed services directly to the people, and I wasn't particularly interested in becoming a doctor or a nurse.

(4) _____ The main reason for choosing pharmacy as a major was to prepare myself for an occupation. Pharmacy was a respectable profession, and jobs were generally available. I saw that opportunities for promotion existed in both community and hospital pharmacies. I realized that if I wasn't satisfied with pharmacy, I could always use it as a "stepping-stone" to get another job.

4. Do you hold any previous college degrees (other than pharmacy)?

(0) _____ No

(1) _____ Yes. Please list previous degrees and majors: _____

5. If you had the opportunity to start your education over again, would you choose pharmacy?

(0) _____ No

(1) _____ Yes

(2) _____ Maybe

6. Listed below are a number of practical and educational experiences that pharmacy students may have.

Have you had any of the following experiences? Read each statement, and check "yes" or "no". For each "yes" checked, please indicate how valuable you found that experience to be by circling that number to the right of the statement which best describes the experience.

	NO	YES	VERY VALUABLE	VALUABLE	SOMEWHAT VALUABLE	NOT AT ALL VALUABLE	
a.	___	___	Observed in a pharmacy as a customer or patient	1	2	3	4
b.	___	___	Worked in hospital pharmacy as a clerk or technician	1	2	3	4
c.	___	___	Worked in community pharmacy as a clerk or technician	1	2	3	4
d.	___	___	Externed in hospital pharmacy	1	2	3	4
e.	___	___	Externed in community pharmacy	1	2	3	4
f.	___	___	Took Outpatient Clerkship	1	2	3	4
g.	___	___	Took Inpatient Clerkship	1	2	3	4
h.	___	___	Took the Geriatric Therapy course	1	2	3	4
i.	___	___	Completed a portion of my internship in a hospital	1	2	3	4
j.	___	___	Completed a portion of my internship in community pharmacy	1	2	3	4
k.	___	___	Took an independent study course with a professor	1	2	3	4
l.	___	___	Participated in a research project, for example, by working in a lab for a professor or doing my own experiment or survey	1	2	3	4
m.	___	___	Took the Orientation to Research Seminar	1	2	3	4
n.	___	___	Worked in industrial pharmacy	1	2	3	4

PLEASE MAKE THE ASSUMPTION, WHEN ANSWERING QUESTIONS 7,8, AND 9, THAT YOU ARE INTERESTED IN PURSUING POST-GRADUATE TRAINING.

7. If you go on for advanced training, in what fields would you be most interested? Indicate only your first and second choices by using the numbers "1" and "2".

- (01) Pharmaceuticals
- (02) Pharmacology
- (03) Medicinal Chemistry
- (04) Pharmacognosy
- (05) Pharmacy Administration
- (06) Social Studies in Pharmacy
- (07) History of Pharmacy
- (08) Continuing Education
- (09) Clinical Pharmacy
- (10) Business
- (11) Medicine
- (12) Dentistry
- (13) Veterinary Sciences
- (14) Law
- (15) Other, not elsewhere listed. Please specify: _____

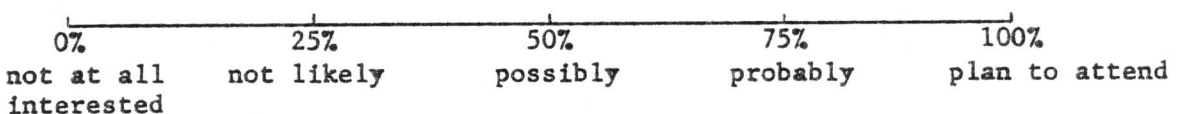
8. If you go on for advanced training, what degree would you most likely be working towards? Indicate only your first and second choices by using the numbers "1" and "2".

- (01) M.S. or M.A.
- (02) M.B.A. (Master of Business Administration)
- (03) Ph.D.
- (04) Pharm. D.
- (05) M.D.
- (06) D.V.M. (Doctor of Veterinary Medicine)
- (07) D.D.S. (Doctor of Dental Surgery)
- (08) J.D. (Doctor of Jurisprudence)
- (09) Pharmacy Residency Program
- (10) Other, please specify: _____

9. If you go on for advanced training, when would you be most likely to start? Make your single best prediction.

- (1) Prior to completion of my pharmacy degree
- (2) In the year following graduation from Pharmacy School
- (3) In the year following licensure as a pharmacist
- (4) After practicing 1 to 2 years in pharmacy
- (5) After practicing at least 3 years in pharmacy
- (6) No specific date in mind

10. Thinking ahead to the future, what is the probability that you'll pursue post-graduate training of some type? Check one point on the line below.



11. Rate each of the following pharmacy positions on the attributes of financial opportunities, service orientation, challenge, and personal interests. Circle "plus" if you think the position, on the average, is good on the attribute or "minus" if it's poor.

The first is done as an example. I would rate the position of secretary, on the average, as being good in terms of personal interests and poor in terms of financial opportunities, service orientation, and challenge. Remember, this is how I would do it; you may rate it much differently.

	FINANCIAL (salary, job security)	SERVICE ORIENTATION (opportunity to be helpful)	CHALLENGE (stimulating independent work)	PERSONAL INTERESTS (can combine job with outside interests)
0. Secretary (EXAMPLE)	(-) +	(-) +	(-) +	- (+)
a. Pharmaceutical Sales Representative	- +	- +	- +	- +
b. Pharmacy Manager or Supervisor	- +	- +	- +	- +
c. Professor of Clinical Pharmacy	- +	- +	- +	- +
d. Staff Pharmacist (Hospital)	- +	- +	- +	- +
e. Research Scientist in the pharmaceutical industry	- +	- +	- +	- +
f. Professor of Pharmaceutical Sciences (pharmaceutics, pharmacology, pharmacognosy, medicinal chemistry)	- +	- +	- +	- +
g. Pharmacy Owner or Partner	- +	- +	- +	- +
h. Director of Pharmacy Services (Hospital)	- +	- +	- +	- +
i. Pharmacist working for a government agency	- +	- +	- +	- +
j. Staff Pharmacist (Community)	- +	- +	- +	- +
k. Professor of Social-Administrative Sciences (social studies, pharmacy administration, continuing education)	- +	- +	- +	- +

12. The following question attempts to determine your perception of what it might be like to be a graduate student. For each type of student listed below, circle "yes" or "no" to the questions regarding perceived financial barrier, challenge, and infringement on other interests that you think students in that field generally experience.

	DO YOU THINK FINANCES ARE A BARRIER?		DO YOU THINK THE COURSEWORK IS CHALLENGING?		DO YOU THINK THE WORK IS DEMANDING AND INFRINGES TOO MUCH ON OTHER INTERESTS?	
	No	Yes	No	Yes	No	Yes
a. Medical Student						
b. Student in one of the Pharmaceutical Sciences (pharmaceutics, pharmacology, pharmacognosy, medicinal chemistry)						
c. Student in Business						
d. Dental Student						
e. Student in one of the Social-Administrative Sciences (social studies, pharmacy administration, continuing education)						
f. Law Student						
g. Student in a clinical master's, Pharm.D., or residency program						

13. Do you know any of the following people well enough to discuss personal interests and/or problems?

NO YES

- a. ___ ___ A professor
- b. ___ ___ A graduate student or teaching assistant
- c. ___ ___ A pharmacist

14. Assuming there were effective arrangements in your internship for following up on research ideas you or your preceptor might develop (for example, regarding clinical or social aspects of pharmacy practice), what do you think your reaction would be to such arrangements? (Check one.)

- (1) ___ I would definitely be enthusiastic about doing some research.
- (2) ___ I might well be interested in participating.
- (3) ___ I might or might not be interested in participating.
- (4) ___ I probably would not be interested in participating.
- (5) ___ I would definitely be uninterested in doing research.

15. Have any of the following persons ever encouraged you to go on for graduate study or advanced professional training? (Check "yes" or "no" for each category.)

NO YES

- a. ___ ___ A pharmacist
- b. ___ ___ A brother or sister
- c. ___ ___ A pharmacy school friend
- d. ___ ___ Another college friend
- e. ___ ___ A spouse or significant other
- f. ___ ___ A faculty member in pharmacy
- g. ___ ___ A parent
- h. ___ ___ A pharmacy graduate student or teaching assistant

16. What do you think the minimum grade point for admission as a graduate student to the University of Wisconsin School of Pharmacy is? (Check one.)

- | | | |
|----------------------|----------------------|-------------------------|
| (01) ___ 3.75 - 4.00 | (04) ___ 3.00 - 3.24 | (07) ___ 2.25 - 2.49 |
| (02) ___ 3.50 - 3.74 | (05) ___ 2.75 - 2.99 | (08) ___ 2.00 - 2.24 |
| (03) ___ 3.25 - 3.49 | (06) ___ 2.50 - 2.74 | (09) ___ less than 2.00 |

THE FOLLOWING QUESTIONS CONCERN YOUR PERSONAL AND FAMILY BACKGROUND. WE ASK THESE KINDS OF QUESTIONS SO THAT YOUR CAREER EXPERIENCES CAN BE COMPARED TO INDIVIDUALS WITH SIMILAR BACKGROUNDS. THIS INFORMATION, LIKE EVERYTHING ELSE, WILL ONLY BE USED FOR RESEARCH PURPOSES.

17. How old were you on your last birthday? _____

18. Are you: (0) ___ Male (1) ___ Female

19. Current Marital Status: (0) ___ Single (2) ___ Separated (4) ___ Widowed
(1) ___ Divorced (3) ___ Married

20. Number of children: _____
Ages: _____

21. What is your most recent cumulative GPA? _____

22. What was your pre-pharmacy GPA? _____

23. Which of the following best describes the community which you considered home during your high school days?

- (1) ___ farm or open country
- (2) ___ a village under 2,500
- (3) ___ a town of 2,501 - 10,000
- (4) ___ a city of 10,001 - 50,000
- (5) ___ a city over 50,000

24. Are you an American citizen? No Yes

25. What is the highest grade in school your father and mother completed?
(Circle one number for each parent.)

	FATHER	MOTHER
8th grade or less	1	1
9th, 10th, or 11th grade	2	2
12th grade (graduated from high school)	3	3
Completed one to three years of college or technical school	4	4
Graduated from college (B.S. or B.A.)	5	5
Had some post-graduate training	6	6
DON'T KNOW	7	7

26. What were your parents' occupations, if any, while you were in high school?

Father's occupation: _____

Mother's occupation: _____

27. Is your religious background, if any, Protestant, Catholic, Jewish, or something else?

- (0) None
- (1) Protestant
- (2) Catholic
- (3) Jewish
- (4) Something else; please specify: _____

28. What is your nationality? That is, what country did your family originally come from? (If mixed, specify the two or three nationalities.)

The following information will be held confidential. It will be stored separately from your questionnaire, and is being collected so that follow-up on the outcome of your plans in the future is possible.

NAME _____
Last First Middle Initial

PRESENT ADDRESS _____
Street

City State Zip

Phone

PERMANENT ADDRESS _____
Street

City State Zip

Would you like to receive a copy of the questionnaire results?

- No.
- Yes, please send it to my present address above.
- Yes, please send it to my permanent address above.
- Yes, please send it to this address:

Street

City State Zip

THANK YOU FOR YOUR COOPERATION!

APPENDIX B

COVER LETTERS TO PHARMACY INTERNS AND PHARMACY GRADUATES

University of Wisconsin  Madison

128

CENTER FOR HEALTH SCIENCES

School of Pharmacy

425 North Charter Street
Madison, Wisconsin 53706
Telephone: 608/262-1416

September 12, 1980

Dear Pharmacy Intern:

I'd like to ask you as a member of the University of Wisconsin School of Pharmacy Class of 1980 to participate in a study regarding your educational and career plans. Your assistance in completing the questionnaire and returning it in the enclosed pre-addressed stamped envelope is appreciated.

Thank you for your cooperation.

Sincerely,



Carla J. Brink, R.Ph.
Graduate Student,
Social Studies of Pharmacy

Enclosures (2)

University of Wisconsin  Madison

129

CENTER FOR HEALTH SCIENCES
School of Pharmacy
425 North Charter Street
Madison, Wisconsin 53706
Telephone: 608/262-1416


September 12, 1980

Dear Pharmacy Graduate:

I'd like to ask you as a recent graduate of the University of Wisconsin School of Pharmacy to participate in a study regarding your educational and career plans. Your assistance in completing the questionnaire and returning it in the enclosed pre-addressed stamped envelope is appreciated.

Thank you for your cooperation.

Sincerely,



Carla J. Brink, R.Ph.
Graduate Student,
Social Studies of Pharmacy

Enclosures (2)

APPENDIX C

T-TESTS BETWEEN CLASSES ON SELECTED BACKGROUND VARIABLES

TABLE 31. T-TESTS BETWEEN CLASSES ON ESTIMATED AGE AT TIME OF STARTING PHARMACY SCHOOL

	<u>N</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>t</u>	<u>df</u>
Estimated Age at Time of Starting Pharmacy School					
Third Year	116	20.83	1.862	-0.36	227
Fourth Year	113	20.93	2.348		
Third Year	116	20.83	1.862	-1.83	276
Fifth Year	162	21.35	2.662		
Third Year	116	20.83	1.862	0.67	242
1980 Graduates	128	20.68	1.597		
Fourth Year	113	20.93	2.348	-1.36	273
Fifth Year	162	21.35	2.662		
Fourth Year	113	20.93	2.348	0.97	239
1980 Graduates	128	20.68	1.597		
Fifth Year	162	21.35	2.662	2.52*	288
1980 Graduates	128	20.68	1.597		

*Significant at $p = 0.05$

TABLE 32. T-TESTS BETWEEN CLASSES ON NUMBER OF SECOND-DEGREE CANDIDATES

	<u>N</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>t</u>	<u>df</u>
Second-Degree Candidates (yes = 1, no = 0)					
Third Year	115	.06	.240	-1.65	226
Fourth Year	113	.12	.331		
Third Year	115	.06	.240	-2.15*	275
Fifth Year	162	.14	.350		
Third Year	115	.06	.240	-0.76	240
1980 Graduates	127	.09	.282		
Fourth Year	113	.12	.331	-0.43	273
Fifth Year	162	.14	.350		
Fourth Year	113	.12	.331	0.94	238
1980 Graduates	127	.09	.282		
Fifth Year	162	.14	.350	1.45	287
1980 Graduates	127	.09	.282		

*Significant at p = 0.05

TABLE 33. T-TESTS BETWEEN CLASSES ON NUMBER OF AMERICAN CITIZENS

	<u>N</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>t</u>	<u>df</u>
American Citizenship (yes = 1, no = 0)					
Third Year	116	.95	.222	-1.89	227
Fourth Year	113	.99	.094		
Third Year	116	.95	.222	0.35	276
Fifth Year	162	.94	.241		
Third Year	116	.95	.222	-0.79	241
1980 Graduates	127	.97	.175		
Fourth Year	113	.99	.094	2.21*	273
Fifth Year	162	.94	.241		
Fourth Year	113	.99	.094	1.22	238
1980 Graduates	127	.97	.175		
Fifth Year	162	.94	.241	-1.19	287
1980 Graduates	127	.97	.175		

*Significant at p = 0.05

TABLE 34. T-TESTS BETWEEN CLASSES ON MOTHER'S EDUCATION

Mother's Education	<u>N</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>t</u>	<u>df</u>
Third Year	115	3.53	1.087	-1.30	226
Fourth Year	113	3.71	1.073		
Third Year	115	3.53	1.087	0.08	271
Fifth Year	158	3.52	1.144		
Third Year	115	3.53	1.087	-0.57	240
1980 Graduates	127	3.61	1.202		
Fourth Year	113	3.72	1.073	1.44	269
Fifth Year	158	3.52	1.144		
Fourth Year	113	3.72	1.073	0.69	238
1980 Graduates	127	3.61	1.202		
Fifth Year	158	3.52	1.144	-0.68	283
1980 Graduates	127	3.61	1.202		

None significant at $p = 0.05$

TABLE 35. T-TESTS BETWEEN CLASSES ON FATHER'S EDUCATION

Father's Education	<u>N</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>t</u>	<u>df</u>
Third Year	113	4.13	1.278	0.28	224
Fourth Year	113	4.08	1.542		
Third Year	113	4.13	1.278	0.74	271
Fifth Year	160	4.01	1.460		
Third Year	113	4.13	1.278	1.75	238
1980 Graduates	127	3.83	1.409		
Fourth Year	113	4.08	1.542	0.40	271
Fifth Year	160	4.01	1.460		
Fourth Year	113	4.08	1.542	1.33	238
1980 Graduates	127	3.83	1.409		
Fifth Year	160	4.01	1.460	1.05	285
1980 Graduates	127	3.83	1.409		

None significant at $p = 0.05$

TABLE 36. T-TESTS BETWEEN CLASSES ON SELF-REPORTED PREPHARMACY GRADEPOINT AVERAGE

	<u>N</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>t</u>	<u>df</u>
Prepharmacy Gradepoint Average					
Third Year	112	3.20	0.37	-0.50	222
Fourth Year	112	3.22	0.45		
Third Year	112	3.20	0.37	-0.07	265
Fifth Year	155	3.20	0.39		
Third Year	112	3.20	0.37	-1.69	224
1980 Graduates	114	3.28	0.40		
Fourth Year	112	3.22	0.45	0.47	265
Fifth Year	155	3.20	0.39		
Fourth Year	112	3.22	0.45	-1.05	224
1980 Graduates	114	3.28	0.40		
Fifth Year	155	3.20	0.39	-1.72	267
1980 Graduates	114	3.28	0.40		

None significant at p = 0.05

TABLE 37. T-TESTS BETWEEN CLASSES ON ESTIMATED AGE AT TIME OF STARTING PHARMACY SCHOOL, CONTROLLING FOR SECOND-DEGREE CANDIDATES

	<u>N</u>	<u>Mean</u>	<u>Standard Deviation</u>	<u>t</u>	<u>df</u>
Estimated Age at Time of Starting Pharmacy School					
Third Year	108	20.60	1.61		
Fourth Year	99	20.42	1.25	0.88	205
Third Year	108	20.60	1.61		
Fifth Year	139	20.94	2.36	-1.26	245
Third Year	108	20.60	1.61		
1980 Graduates	116	20.47	1.44	0.63	222
Fourth Year	99	20.42	1.25		
Fifth Year	139	20.94	2.36	-1.97*	236
Fourth Year	99	20.42	1.25		
1980 Graduates	116	20.47	1.44	-0.27	213
Fifth Year	139	20.94	2.36		
1980 Graduates	116	20.47	1.44	1.84	253

¹ Second-degree candidates were eliminated from this analysis.

*Significant at $p = 0.05$

APPENDIX D

REGRESSION MODELS INCLUDING ALL HYPOTHESIZED VARIABLES

TABLE 38. MEANS AND STANDARD DEVIATIONS FOR VARIABLES IN
THE REGRESSION MODEL WHICH INCLUDES ALL
HYPOTHESIZED VARIABLES

<u>Independent Variable</u>	<u>Mean</u>	<u>(Standard Deviation)</u>
Mother's Education	3.59	(1.13)
Sex	0.44	(0.50)
Selected Pharmacy because it was Challenging	0.37	(0.48)
Selected Pharmacy for Vocational Reasons	0.20	(0.40)
Gradepoint Average	2.98	(0.47)
Satisfaction with Choice of Pharmacy as a Major	1.32	(0.73)
Interest in doing Practice Related Research	3.81	(1.06)
Encouragement from Family and Friends	1.82	(1.60)
Encouragement from Academic Sources	0.45	(0.70)
Perceived Financial Barriers to Graduate Study	4.16	(2.46)
Probability of Pursuing Postgraduate Study	48.43	(25.28)

TABLE 39. REGRESSION MODEL OF PROBABILITY OF PURSUING
POSTGRADUATE TRAINING INCLUDING ALL
HYPOTHESIZED VARIABLES

<u>Independent Variable</u>	<u>Standardized Regression Coefficient</u>
Mother's Education	.0382
Sex	-.0262
Selected Pharmacy because it was Challenging	.1770**
Selected Pharmacy for Vocational Reasons	.0637
Gradepoint Average	.1566**
Satisfaction with Choice of Pharmacy as a Major	-.1063**
Interest in doing Practice Related Research	.1938**
Encouragement from Family and Friends	.3178**
Encouragement from Academic Sources	.0707
Perceived Financial Barriers to Graduate Study	-.0230
<hr/>	
R ²	.3322
R ² (corrected)	.3176
F-ratio for equation (degrees of freedom)	22.7331 (10, 457)
Significance level of F-ratio	.01
<hr/>	

**p ≤ .01

TABLE 40. MEANS AND STANDARD DEVIATIONS FOR VARIABLES IN THE REGRESSION MODEL WHICH INCLUDES ALL HYPOTHESIZED VARIABLES

	Variable Means (Standard Deviations)			
	<u>Third Year</u>	<u>Fourth Year</u>	<u>Fifth Year</u>	<u>1980 Graduates</u>
Mother's Education	3.50 (1.12)	3.70 (1.07)	3.52 (1.14)	3.66 (1.19)
Sex	0.51 (0.50)	0.46 (0.50)	0.38 (0.49)	0.43 (0.50)
Selected Pharmacy because it was Challenging	0.38 (0.49)	0.41 (0.49)	0.39 (0.49)	0.29 (0.46)
Selected Pharmacy for Vocational Reasons	0.23 (0.43)	0.16 (0.37)	0.20 (0.40)	0.19 (0.39)
Gradepoint Average	3.18 (0.38)	3.00 (0.48)	2.85 (0.49)	2.96 (0.45)
Satisfaction with Choice of Pharmacy as a Major	1.64 (0.56)	1.53 (0.60)	1.21 (0.75)	0.99 (0.79)
Interest in doing Practice Related Research	3.83 (0.98)	3.83 (1.00)	3.73 (1.17)	3.87 (1.05)
Encouragement from Family and Friends	1.57 (1.45)	1.56 (1.60)	1.91 (1.58)	2.16 (1.68)
Encouragement from Academic Sources	0.12 (0.32)	0.48 (0.66)	0.49 (0.71)	0.66 (0.83)
Perceived Financial Barriers to Graduate Study	4.20 (2.50)	4.15 (2.29)	4.18 (2.56)	4.11 (2.49)
Probability of Pursuing Postgraduate Training	50.00 (25.09)	44.18 (25.73)	47.17 (25.07)	52.54 (24.84)

TABLE 41. REGRESSION MODEL OF PROBABILITY OF PURSUING POSTGRADUATE TRAINING INCLUDING ALL HYPOTHESIZED VARIABLES FOR THE SAMPLE STRATIFIED BY CLASS YEAR

	Standardized Regression Coefficients			
	Third Year	Fourth Year	Fifth Year	1980 Graduates
Mother's Education	-.0189	.0379	.0899	.0810
Sex	.1083	-.0885	-.0159	-.1140
Selected Pharmacy because it was Challenging	.1233	.3339**	.1737*	.0878
Selected Pharmacy for Vocational Reasons	.0430	.2672**	-.0328	.0130
Gradepoint Average	.0224	.1584*	.2736**	.0291
Satisfaction with Choice of Pharmacy as a Major	-.2241**	-.0060	-.1247	-.1062
Interest in doing Practice Related Research	.3294**	.0343	.1283	.2392**
Encouragement from Family and Friends	.4159**	.2776**	.3114**	.1400
Encouragement from Academic Sources	.0181	.0240	.0557	.2963**
Perceived Financial Barriers to Graduate Study	-.0482	-.1152	.0482	-.0046
R ²	.4736	.3578	.4073	.3468
R ² (corrected)	.4158	.2916	.3621	.2846
F-ratio for equation (degrees of freedom)	8.1873 (10, 91)	5.4041 (10, 97)	9.0033 (10, 131)	5.5755 (10, 105)
Significance level of F-ratio	.01	.05	.01	.05

*p ≤ .05
**p ≤ .01

APPENDIX E

REGRESSION MODELS INCLUDING THE SATISFACTION X INTEREST IN
PRACTICE RELATED RESEARCH INTERACTION VARIABLE

TABLE 42. MEANS AND STANDARD DEVIATIONS FOR VARIABLES IN THE REGRESSION MODEL WHICH INCLUDES THE SATISFACTION X INTEREST IN PRACTICE RELATED RESEARCH INTERACTION VARIABLE

<u>Independent Variable</u>	<u>Mean</u>	<u>(Standard Deviation)</u>
Selected Pharmacy because it was Challenging	0.38	(0.49)
Selected Pharmacy for Vocational Reasons	0.20	(0.40)
Gradepoint Average	2.99	(0.47)
Satisfaction with Choice of Pharmacy as a Major	1.32	(0.73)
Interest in doing Practice Related Research	3.80	(1.07)
Encouragement from Family and Friends	1.80	(1.59)
Encouragement from Academic Sources	0.45	(0.70)
Satisfaction x Interest in Practice Related Research	5.07	(3.26)
Probability of Pursuing Postgraduate Training	48.58	(25.28)

TABLE 43. REGRESSION MODEL OF PROBABILITY OF PURSUING
 POSTGRADUATE TRAINING INCLUDING THE SATISFACTION
 X INTEREST IN PRACTICE RELATED RESEARCH
 INTERACTION VARIABLE

<u>Independent Variable</u>	<u>Standardized Regression Coefficient</u>
Selected Pharmacy because it was Challenging	.1723**
Selected Pharmacy for Vocational Reasons	.0592
Gradepoint Average	.1559**
Satisfaction with Choice of Pharmacy as a Major	-.2372
Interest in doing Practice Related Research	.1526*
Encouragement from Family and Friends	.3157**
Encouragement from Academic Sources	.0691
Satisfaction x Interest in Practice Related Research	.1514
<hr/>	
R ²	.3304
R ² (corrected)	.3191
F-ratio for equation (degrees of freedom)	29.4137 (8, 477)
Significance level of F-ratio	.01

*p ≤ 0.05

**p ≤ 0.01

TABLE 44. MEANS AND STANDARD DEVIATIONS FOR VARIABLES IN THE REGRESSION MODEL WHICH INCLUDES THE SATISFACTION X INTEREST IN PRACTICE RELATED RESEARCH INTERACTION VARIABLE

	Variable Means (Standard Deviations)			
	<u>Third Year</u>	<u>Fourth Year</u>	<u>Fifth Year</u>	<u>1980 Graduates</u>
Selected Pharmacy because it was Challenging	0.40 (0.49)	0.40 (0.49)	0.41 (0.49)	0.30 (0.46)
Selected Pharmacy for Vocational Reasons	0.23 (0.42)	0.16 (0.36)	0.21 (0.41)	0.19 (0.40)
Gradepoint Average	3.18 (0.38)	3.01 (0.49)	2.86 (0.49)	2.95 (0.45)
Satisfaction with Choice of Pharmacy as a Major	1.65 (0.55)	1.52 (0.60)	1.21 (0.75)	0.98 (0.79)
Interest in doing Practice Related Research	3.84 (0.97)	3.84 (1.00)	3.72 (1.20)	3.84 (1.05)
Encouragement from Family and Friends	1.53 (1.42)	1.56 (1.60)	1.95 (1.57)	2.08 (1.70)
Encouragement from Academic Sources	0.12 (0.33)	0.48 (0.66)	0.51 (0.72)	0.65 (0.83)
Satisfaction x Interest in Practice Related Research	6.39 (2.80)	5.81 (2.82)	4.58 (3.35)	3.81 (3.34)
Probability of Pursuing Postgraduate Training	49.89 (25.03)	44.64 (26.07)	47.64 (25.19)	52.15 (24.59)

TABLE 45. REGRESSION MODEL OF PROBABILITY OF PURSUING POSTGRADUATE TRAINING INCLUDING THE SATISFACTION X INTEREST IN PRACTICE RELATED RESEARCH VARIABLE FOR THE SAMPLE STRATIFIED BY CLASS YEAR

	Standardized Regression Coefficients			
	Third Year	Fourth Year	Fifth Year	1980 Graduates
Selected Pharmacy because it was Challenging	.0978	.2951**	.1900*	.1113
Selected Pharmacy for Vocational Reasons	.0026	.2550**	-.0208	.0053
Gradepoint Average	.0445	.1949*	.2545**	.0074
Satisfaction with Choice of Pharmacy as a Major	-.2577	-.0348	.0589	-.6663*
Interest in doing Practice Related Research	.3205	.0917	.2541	.1162
Encouragement from Family and Friends	.4269**	.2958**	.2906**	.1386
Encouragement from Academic Sources	-.0238	-.0214	.0851	.3082**
Satisfaction x Interest in Practice Related Research	.0467	.0088	-.2052	.5753
R ²	.4665	.3209	.3988	.3556
R ² (corrected)	.4234	.2665	.3644	.3092
F-ratio for equation (degrees of freedom)	10.8201 (8, 99)	5.9058 (8, 100)	11.6071 (8, 140)	7.6579 (8, 111)
Significance level of F-ratio	.01	.01	.01	.01

*p ≤ .05

**p ≤ .01