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**THE PURSUIT OF PHARMACY RESIDENCY TRAINING AND
THE THEORY OF PLANNED BEHAVIOR**

by

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of the requirement for the degree of

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The Pursuit of Pharmacy Residency Training and the Theory of Planned Behavior

To the Faculty of the University of Houston, College of Pharmacy:

The members of the committee appointed to examine the project of Stephen C. Hickerson find it satisfactory and recommend that it be accepted on May 5, 2015.

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Abstract

The Pursuit of Pharmacy Residency Training and the Theory of Planned Behavior

Objectives: The primary objective is to examine the motivating factors and barriers to pursuing residency training using the Theory of Planned Behavior (TPB) framework to determine the contribution of the constructs attitude (A), subjective norm (SN), and perceived behavioral control (PBC) on the intention to apply for a pharmacy residency. The secondary objective will be to identify the past behaviors and specific behavioral beliefs that indirectly predict pharmacy students' intention to apply for a postgraduate residency program.

Methods: A cross-sectional, 26-item, online questionnaire was developed from a literature review of factors found to influence the decision to pursue residency training. A total of 983 second and third-year pharmacy students from four Texas pharmacy schools were surveyed. Descriptive statistics and multiple linear regression analyses were utilized to assess the study objectives.

Results: The response rate was 25.5% (251/983). The TPB model was found to explain 50% of the variance in intention to apply for a residency ($R^2 = 0.50$, $p < 0.001$). Attitude, SN, and PBC were significant predictors of intention ($\beta = 0.32$, 0.58 , and 0.36 , respectively, $p < 0.001$). The results of past behavior show that attending ASHP's Midyear meeting or other residency showcase is a significant predictor of intention ($\beta = 0.71$, $p = 0.006$). Significant predictors of A were the beliefs a residency would increase confidence in practicing pharmacy ($\beta = 0.36$, $p < 0.001$) and help achieve career goals ($\beta = 0.16$, $p < 0.02$). Significant predictors of SN were the social influence of faculty members ($\beta = 0.10$, $p = 0.003$) and family ($\beta = 0.08$, $p = 0.02$). Significant predictors of PBC were the beliefs that financial obligations ($\beta = 0.20$, $p = 0.006$), feeling afraid of the competition and/or not matching ($\beta = 0.24$, $p < 0.001$), needing to relocate

($\beta = 0.09, p = 0.04$), and the lengthy application and/or interview process ($\beta = 0.12, p = 0.04$) would make it more difficult to apply for a residency.

Conclusions: The TPB model among our study sample was useful in predicting pharmacy students' intention to apply for a residency. All TPB constructs were significant predictors of intention, with SN being the strongest predictor. Therefore, interventions that target students' A, SN, and PBC may be valuable to increase their intention, especially the specific beliefs found to indirectly influence intention. Future research into ways in which these motivating factors can be encouraged and perceived barriers can be addressed will increase interest and participation in postgraduate residencies, and thus promote the completion of residency training as the professional norm for pharmacists. Additionally, future studies assessing whether intention translates into students completing the residency application process are needed to strengthen these findings.

Table of Contents

Copy Authorization	i
Title Page	ii
Approval Page	iii
Acknowledgement	iv
Dedication	v
Abstract	vi
Table of Contents	viii
List of Appendices	x
List of Figures	xi
List of Tables	xii

Chapter One

Introduction	1
Significance	1
Background – Environmental factors influencing the decision process	2
Background – The current literature.....	7
The Theory of Planned Behavior	14
Research objectives	19

Chapter Two

Methodology	20
Research design	20
Sample selection	20
Survey instrument	21
Data collection	27
Data analysis	28

Chapter Three

Results	29
Response rate	29
Descriptive analysis of demographic characteristics and past behavior	30
Reliability and validity analysis	32
Descriptive analysis of direct measures attitude, subjective norm, perceived behavioral control, and intention	33
Correlations of TPB constructs	36
Descriptive analysis of indirect belief measures	37
Analysis of study objectives using multiple linear regression	40
Exploratory analysis using multiple logistic regression to predict TPB constructs, past behavior, and demographics	44

Table of Contents (continued)

Chapter Four

Discussion	46
TPB constructs as predictors of intention	46
Past behavior and intention	47
Specific indirect predictors of intention	47
Limitations and strengths	50
Conclusion.....	51

Chapter Five

Appendices	52
References	63

List of Appendices

Appendix A. Consent to assist in data collection	52
Appendix B. Cover letter	53
Appendix C. Questionnaire	54
Appendix D. Coding of variables	59

List of Figures

Figure 1. The Theory of Planned Behavior	15
Figure 2. Proposed Theory of Planned Behavior extended model for this study.....	16

List of Tables

Table 1. Summary of the current literature	8
Table 2. Number of responses per college by data collection stage	30
Table 3. Sample demographics	31
Table 4. Frequency of past behavior	32
Table 5. Mean score and reliability coefficients of direct measures of A, SN, PBC, and intention	35
Table 6. Mean score and adjusted reliability coefficients of direct measures	36
Table 7. Summary statistics of TPB constructs	36
Table 8. Spearman's rho correlations of TPB constructs with intention	37
Table 9. Descriptive analysis of indirect behavioral beliefs	38
Table 10. Descriptive analysis of indirect normative beliefs and motivation to comply	38
Table 11. Descriptive analysis of indirect control beliefs	39
Table 12. Multiple linear regression of TPB constructs and past behavior with intention	40
Table 13. Multiple linear regression of behavioral beliefs with attitude	41
Table 14. Multiple linear regression of normative beliefs and motivation to comply composite with SN	42
Table 15. Multiple linear regression of control beliefs with PBC	43
Table 16. Multiple logistic regression to predict positive intention by TPB constructs, past behavior, and demographics	45

CHAPTER 1 INTRODUCTION

Significance

Residency programs are designed to accelerate the professional growth of pharmacists and attain the skills necessary to perform as expert clinicians. Because residency training is an important contributor to the professional growth and preparation of new pharmacists providing patient care, it is worthwhile to investigate the factors influencing pharmacy students to pursue a pharmacy residency. Although the number of applicants for postgraduate residencies is on the rise, research into why the majority of pharmacy students opt not to pursue a residency can provide valuable information for the future of pharmacy practice. This is the first study to survey pharmacy students (not residents) about the factors influencing the pursuit of residency training since 2005 (Baker, et al., 2005; McCollum et al., 2005). The job market has changed dramatically over the past ten years, and the extent to which known motivating factors and barriers to pursuing a residency play a role in current pharmacy students' decision process are likely to have changed as well. Many previous studies surveyed only current residents and/or pharmacy school faculty members (Bucci et al., 1995; Fit et al., 2005; Bernhardt et al., 2012; McCarthy et al., 2013). These findings do not reflect the attitudes or beliefs of the majority of pharmacy students not entering residency programs. An understanding of the motivating factors and barriers influencing pharmacy students' pursuit of postgraduate residency training is necessary to form initiatives at the individual college and national levels designed to promote residency training by fostering interest and participation in residency programs (McCollum et al., 2005). While the current literature has found many factors influencing pharmacy students to apply for postgraduate residency training, no study has used a validated behavioral theory to examine the influence that constructs like attitudes, social norms, and perceived behavioral control have on the decision process.

Background – Environmental factors influencing the decision process

In recent years many events have shaped the existing pharmacist supply and demand, the need for pharmacy residency training, and the overall vision of the profession. The pharmacy profession has transformed from a mostly distributive role to providing non-dispensing direct patient activities such as immunizations, medication therapy management (MTM), and disease state management in ambulatory care. Pharmacists have become a respected part of interdisciplinary teams, and have taken their rightful place as drug therapy experts. Pharmacists continue to gain new skills and expand their roles in healthcare delivery, which has led to increased educational and training requirements for new pharmacists entering practice.

After many years of discussion, the profession completed the transition from a Bachelor of Science in Pharmacy to the Doctor of Pharmacy degree in 2000 (Bright et al., 2010). This new degree also brought with it expectations for the significant expansion of direct patient care roles for pharmacists (Brown, 2013). Today, there is an ongoing debate about mandatory postgraduate training for the next generation of pharmacists (Bright et al., 2010). Despite the large push for residency training by pharmacy stakeholders, a study of every United States pharmacy school graduating class from 2008 to 2011 revealed that only 14.2% of graduates matched with a residency program (Morton et al., 2013). Although many factors discussed may provide insight into a students' decision process, it remains predominantly uncertain why the vast majority of pharmacy students do not pursue residency training after graduation.

Many major pharmacy organizations have promoted the need for graduates to obtain residency training. At a conference led by the American Society of Health-System Pharmacists

(ASHP) and many key pharmacy groups in 2005, the stakeholders concluded that by 2015 many more pharmacists will be routinely providing direct patient care and will need residency training to acquire the skills necessary to care for more complex patients (Teeters et al., 2005). In 2006, the American College of Clinical Pharmacy (ACCP) stated a postgraduate year 1 (PGY1) residency should be a prerequisite for practice in direct patient care settings. In addition, both ACCP and ASHP declared that by 2020 direct patient care will be provided by pharmacists in all settings, and therefore residency training should be a requirement for all new pharmacists entering pharmacy practice (Murphy et al., 2006; ASHP Policy Positions, 2014). As 2020 grows nearer, this goal appears more impractical as the number of unmatched residency applicants rises each year. A study by Knapp et al concluded that a 17% average annual growth rate is required to have a sufficient amount of PGY1 residency positions available for all Pharm.D. graduates by 2020, whereas actual residency growth in 2008 was significantly lower at 9.9% (Knapp et al., 2009).

Colleges of pharmacy influence both the supply and demand for residency positions. The number of pharmacy schools and pharmacy graduates entering the job market each year continues to grow (McCarthy et al., 2013). From 1996 to 2008, the number of functioning colleges and schools of pharmacy in the United States rapidly increased from 75 to 109, a 45% increase in 12 years (Knapp et al., 2009). As of July 2014, there are now approximately 130 accredited colleges of pharmacy (Preaccredited and Accredited Programs, 2015). Texas is anticipated to see a rise in pharmacy graduates as new pharmacy colleges open their doors. In the last decade alone, the number of Texas Pharmacy schools will increase from 5 to 8. In 2006, the Texas A&M Irma Lerma Rangel College of Pharmacy opened in Kingwood, a small city in South Texas, in an effort to appease the shortage of pharmacists in the region (About the

College, 2015). Then in fall 2013, the University of North Texas Health Science Center's (UNTHSC) School of Pharmacy welcomed its first class of students (Our History, 2015). Another school is expected to receive its first class in fall 2015 as part of the University of Texas at Tyler, the Ben and Maytee Fisch College of Pharmacy, becoming the first Doctor of Pharmacy program in East Texas (Ben and Maytee Fisch, 2015). As new schools open and existing programs expand at a rapid pace, the slower growth of residency programs will increase the competitiveness for existing positions, leading to a rise in unmatched applicants each year.

Pharmacy residencies are also becoming increasingly competitive. ASHP's Resident Matching Program has a much higher number of applicants each year than the number of PGY1 pharmacy residency positions available (McCarthy, 2013). In 2013, ASHP reported 3,933 applicants participated in the national residency match process for PGY1 residencies, and AACP reported a total of 13,207 Pharm.D. degrees were awarded that year. This means only 30% (3,933/13,207) of graduating pharmacy students chose to apply for residency positions in 2013. Of the 3,933 PGY1 applicants, only 2,495 (63%) matched with a residency program. Therefore, only 19% (2,495/13,207) of 2013 pharmacy graduates went on to receive residency training while 81% of pharmacy students entered the workforce upon graduation (Match statistics, 2015; Pharmacy degrees conferred, 2015). The slow growth in supply of residency programs and a sharp increase in the number of applicants since 2007 has created stiff competition and an increased number of unmatched applicants each year. The unmatched applicants then enter the job market with their fellow graduates and further saturate the pharmacist workforce (McCarthy et al., 2013)

Many years of reported pharmacist shortages have begun to shift towards job saturation in many areas. The Pharmacy Manpower Project collects data on the demand for pharmacy services compared to the current supply of licensed pharmacists in the United States. One of the highest national aggregate demand indexes (ADIs) came in August 2006 at 4.31, representing a moderate-to-high demand with some difficulty filling open positions, indicating a pharmacist shortage. The pharmacy workforce picture has significantly changed in recent years. Since 2006, it has slowly declined to an ADI of 3.47 in September 2014, indicating a more balanced supply and demand profile with a slightly higher demand than supply. As of September 2014, several states in the northeast region of the United States have already dropped below the 3.0 “equilibrium point” into saturation. The most prevalent pharmacy practice setting, community pharmacy, has a national ADI near equilibrium at 3.25. Institutional settings like hospitals and healthcare systems have an ADI of 2.68, suggesting that this area of pharmacy has a net surplus of pharmacists with high competition for available positions (Aggregate Demand Index, 2015).

The Pharmacy Forecast 2013 -2017, a strategic planning report for pharmacy departments in hospitals and health-systems, reports that the vacancy rate for hospital staff pharmacists dropped from 7.2 to 2.4% from 2002 to 2011. The report also states that it remains difficult to fill some managerial and clinical pharmacist positions, likely due to the expansion of academia and number of pharmacists receiving specialized residency training (Brown, 2013). The recent economic downturn is also likely to have impacted the availability and growth of pharmacist positions. This has led to an increase in competition for open pharmacist positions and a need for pharmacy graduates to set themselves apart as employers may favor applicants

with residency training. Many pharmacists have even chosen to “backtrack” and seek residency training after at least one year of working in the field (Bright et al., 2010).

According to the Bureau of Labor Statistics, in 2012 an estimated 61% of pharmacists were employed in community settings such as drug stores, grocery stores, department stores, or other general merchandise stores (Occupational Outlook Handbook; Occupational Employment Statistics). Employers in the community pharmacy setting may not yet value residency training to the extent of hospitals or ambulatory clinics, as evidenced by the high rate of pharmacy graduates entering community pharmacy upon graduation without residency training. Also, there are much fewer community pharmacy residency positions available than at health-systems and hospitals, with community-based residencies accounting for approximately 14% of all PGY1 programs in 2014 (Match statistics, 2015). Additionally, many pharmacy students forgo residency training when offered community pharmacist positions before graduation. Since there is little data on student interest and availability of community pharmacy residencies, this potential barrier to entering postgraduate residencies warrants additional investigation (McCollum et al., 2005).

Economics has shown to be a complicated factor in the decision process, especially with students continuing to borrow more to finance their education. The average tuition cost for pharmacy school increased 54% from 2004 to 2012. While tuition continues to increase in a linear fashion, available pharmacist positions and salaries have not increased at the same rate. In 2011, the average pharmacy student indebtedness (\$114,422) was greater than the average first-year salary (\$112,160) for the first time. Students of other healthcare fields have seen similar trends in the cost of tuition, but from 2008 to 2012, pharmacy students’ total debt

increased 23% compared to only 4.7% and 8.5% for medical and dental students, respectively (Cain et al., 2014). Over 89% of 2014 pharmacy graduates reported borrowing money to pay for their Pharm.D. education, and with an average pharmacy student loan debt reaching a substantial \$144,718 in 2014, an 8.2% increase from 2013, residents may find it necessary to defer payment on their student loans during their training (AACP student survey, 2015).

Although pharmacy residents are compensated, they are paid much less than a staff pharmacist. Most PGY1 residencies provide an estimated \$40,000 - \$45,000 stipend, while the median pharmacist salary is significantly higher at \$116,670 (Occupational Outlook Handbook). The high demand for pharmacists in the past has caused entry-level salaries to continually increase, further widening the salary disparity between residents and their peers entering the workforce (Bright et al., 2010). Pharmacy students may find it a more sensible option to seek higher-paying entry-level pharmacist positions in order to more quickly pay off their student loan debt. This is especially true for students with job offers before graduation. Due to the significantly lower income of a resident, financial status may take priority over additional training in initial career decisions (McCarthy et al., 2013).

Background – The current literature

The current literature has found many factors influencing pharmacy students to apply for postgraduate residency training, but no studies have used a validated behavioral theory to examine the influence that constructs like attitudes, social norms, and perceived behavioral control have on the decision process. The findings of the top motivating factors and barriers to pursuing pharmacy residency training from the current literature are summarized below in Table 1.

Table 1. Summary of the current literature

Reference	Year	Population	Top motivating factors [†]	Top barriers [‡]
Bucci et al.	1995	Residents, fellows, pharmacy school faculty	<ul style="list-style-type: none"> • To gain knowledge and experience • Recognition of new and challenging roles of pharmacists • Desire for specialized training 	<ul style="list-style-type: none"> • Financial reasons • Job available upon graduation
McCarthy et al.	2013	Residents and fellows (n= 865); Pharmacy school faculty (n= 65)	<ul style="list-style-type: none"> • To gain knowledge and experience (70%) • Desire for specialized training (47%) • Understood as prerequisite for certain jobs (36%) • Recognition of new and challenging roles of pharmacists (36%) • Gain confidence (32%) 	<ul style="list-style-type: none"> • Financial reasons (72%) • Job available upon graduation (69%) • Family obligations (22%) • Geographical limitations (21%) • Competition for programs (14%) • Afraid of the competition (13%) • Disappointment of not matching (11%)
Baker et al.	2005	First and third-year students from two Pennsylvania colleges of pharmacy (n= 235)	<ul style="list-style-type: none"> • Desire to enhance existing knowledge base (85%) • Competitive advantage in the job market (59%) • Residency is necessary/valuable based on career plans (54%) • Improve self-confidence (43%) • Networking opportunities (25%) 	<ul style="list-style-type: none"> • Job available upon graduation (58%) • Financial obligations (57%) • Burn out with school (51%) • Not interested (49%)
McCollum et al.	2005	Graduating classes of University of Colorado School of Pharmacy (n= 81)	<ul style="list-style-type: none"> • Increase clarity of professional opportunities and career goals (100%) • Improve general clinical skills (100%) • Enhance job satisfaction (100%) • Desire to specialize (89%) • Improve competitiveness in job market (78%) • Interactions with preceptor (78%) • Networking opportunities (67%) 	<ul style="list-style-type: none"> • Unwilling to continue training at a resident salary (54%) • Family obligations (50%) • Debt level too high (44%) • Residency not required for desired job (42%) • Unwilling to relocate (29%)
Fit et al.	2005	Residents in Chicago area (n= 28)	<ul style="list-style-type: none"> • Enhance knowledge and experience (96%) • Enhance confidence (64%) • Opportunity for specialized training (43%) • Requirement for desired job position (43%) 	<ul style="list-style-type: none"> • Financial obligations (57%) • Fear of not matching (46%) • Job available upon graduation (36%)
Bernhardt et al.	2012	TMC residents (n=30); Non-TMC residents (n= 23)	<ul style="list-style-type: none"> • Enhance knowledge and experience (93%) • Requirement for desired job position (73%) • Opportunity for specialized training (63%) • Enhance confidence (37%) 	N/A

[†] Percent of respondents selecting this item as an important motivating factor per study instructions

[‡] Percent of respondents selecting this item as an important barrier per study instructions

The earliest study on the topic was published by Bucci et al in 1995. It examined the most important factors influencing pharmacy students to pursue residency and fellowship training by surveying pharmacy residents, fellows, and pharmacy school faculty representatives. The top reasons provided by residents and fellows were 'to gain knowledge and experience,' 'recognition of new and challenging roles,' and a 'desire for specialized training.' Pharmacy school respondents also cited 'to gain knowledge and experience' and a 'desire for specialized training' as leading reasons for pursuing residency, while considering the largest barriers to be 'financial reasons' and having a 'job available upon graduation' (Bucci et al., 1995).

Nearly two decades later in 2013, McCarthy et al published an update to Bucci's study assessing the motivating factors and barriers for pharmacy students to seek postgraduate training by surveying pharmacy residents, fellows, and pharmacy school faculty representatives. Residents and fellows were asked to check (not rank) the three most important factors in their decision process, and faculty representatives were asked to check (not rank) the three most important factors in pharmacy students' decision to pursue postgraduate training. The most frequently cited factors among 865 residents and fellows were 'to gain knowledge and experience' (70%), a 'desire for specialized training' (47%), and that a residency was 'understood as a prerequisite for certain jobs' (43%). Leading barriers discouraging residents and fellows were found to be 'financial obligations' (72%), 'a job was available upon graduation' (69%), 'family obligations' (22%), 'geographical limitations' (21%), and that the 'long-term benefit [of a residency was] not stressed' (19%). Faculty members from 65 colleges of pharmacy indicated that important factors persuading pharmacy students to pursue postgraduate training were 'understood as a prerequisite for certain jobs' (54%), 'recognition of the new and challenging roles for pharmacists' (39%), and 'faculty stressing importance' (37%) (McCarthy et al., 2013).

An important finding in McCarthy's study is that compared to 1995, pharmacy students now strongly believe that postgraduate training is a prerequisite for certain jobs. This belief is likely the result of a combination of factors such as the decrease in demand for pharmacists due to rapid pharmacy school expansion, major pharmacy organizations actively supporting residency training, promotion of residency training by faculty from colleges of pharmacy, and the growing number of pharmacists involved in direct patient care (McCarthy et al., 2013). Many pharmacy students are realizing that the key to securing non-entry level pharmacist positions and reaching their career goals is to complete postgraduate residency training. Certain pharmacist specialties like administration, oncology, transplant, infectious diseases, cardiology, and critical care are more likely to require a second year (PGY2) of residency training. Today, pharmacy students seeking careers in these areas are more aware of the postgraduate training required to enter these specialty fields. In addition, as compared to 1995, the survey population in 2013 suggested that the increase in demand for residency training is a barrier to applying for residency positions. Reasons such as being 'afraid of the competition,' 'the belief that grades were not good enough to qualify,' 'competition for highly sought after programs,' and the 'disappointment of not matching' were more frequently reported than in 1995 (McCarthy et al., 2013). This implies that many psychological barriers exist for today's students in their decision process to pursue a residency.

Baker et al surveyed 235 first and third-year pharmacy students from two Pennsylvania colleges of pharmacy in 2005. The most common reasons listed for students planning to pursue a residency were to 'enhance their existing knowledge base' (85.3%), to 'gain a competitive advantage in the job market' (58.8%), 'believing that completing a residency is necessary/valuable based on career plans' (53.9%), and to 'improve their self-confidence'

(43.1%). The most commonly chosen barriers by students not considering to pursue residency training was the 'perception of availability of a job upon graduation' (58.1%), 'financial obligations' (56.6%), 'feeling "burned out" on school' (51.2%), and having 'no interest in pursuing a residency' (48.8%) (Baker et al., 2005).

McCollum and colleagues surveyed the 2003 and 2004 graduating classes of the University of Colorado Health Science Center (UCHSC) School of Pharmacy to explore the characteristics of students entering and not entering residency programs, along with what factors affected their decision process. Among the 2003 graduates entering residency programs, the top reasons for pursuing a residency included 'improving knowledge and skill levels' and 'gaining qualifications for specialty practice in a specific area such as pediatrics or oncology.' The top 3 reasons listed by 100% of the 2004 graduates entering a residency program were to 'increase clarity of professional opportunities and career goals', to 'improve general clinical skills,' and to 'enhance job satisfaction.' For 2004 graduates choosing not to pursue a postgraduate residency, the top factors affecting their decision included 'unwilling to continue training at a residency salary (54%),' 'family obligations (50%),' 'consider their debt level to be too high (44%),' and 'not needing postgraduate training for desired job (42%).' The 'unwillingness to relocate' ranked last with 29% of graduates listing it as a factor in their decision not to pursue a residency (McCollum et al., 2005)

McCollum's study also examined demographic characteristics between students entering and not entering residencies. Only race was significantly associated with the pursuit of residency training, with more white graduates entering residency programs than non-whites. Surprisingly, no significant difference was found in any other demographic variable, including

age, sex, and level of educational debt. The results indicate that the pursuit of residency training appears to be independent of most demographic characteristics and primarily motivated by the personal career goals and self-improvement objectives of individual students. Of the 122 graduates not entering a residency program, 89 students indicated they had secured employment. In response to anticipated practice setting, 73% of the 89 students indicated they intended to work in a chain or independent community pharmacy or in managed care, while 17% of students indicated they would be working in a hospital setting (McCollum et al., 2005).

In 2005, Fit and colleagues surveyed 28 pharmacy residents in the Chicago area regarding motivating factors and barriers they encountered in their pursuit of residency training. When asked to identify who was most influential in their decision, the majority (54%) indicated they were self-motivated, and approximately one-third (36%) of the residents answered either a faculty member or preceptor had influenced their decision. The top reasons provided for pursuing a residency were enhanced knowledge and experience (96%), enhanced confidence (64%), the opportunity for specialized training (43%), and a residency was a requirement for their desired job position (43%). The most commonly identified barriers were financial obligations (57%), fear of not matching with a program (46%), availability of a job after graduation (36%), and a lack of knowledge regarding residencies (32%). Almost all the participants (82-91%) found that experiences such as attending residency showcases, residency presentations at their school, and interacting with residents encouraged them to pursue residency training. This correlates to the belief that pharmacy students may gain new perspectives on residency training when exposed to pharmacy residents, thus influencing the future demand for residencies. These activities are considered “past behaviors” that may influence the intention to pursue a residency. Furthermore, all of the residents who attended

the ASHP Midyear Clinical Meeting found that it encouraged them to apply for residency programs (Fit et al., 2005)

A 2012 study by Bernhardt and colleagues surveyed 53 residents, 30 from the Texas Medical Center (TMC) and 23 from non-TMC sites, to identify key factors involved in the decision-making process to pursue residency training at the TMC compared to programs outside the TMC. Participants were asked to which degree they agreed or disagreed with motivating factors related to residency training on a 5-point Likert scale. When asked if the decision to pursue a residency was influenced by pharmacy school faculty, lecturers, or mentors, the mean score for TMC residents was 4.23 ± 0.94 and 3.87 ± 1.25 for non-TMC residents, indicating resident agreement. When asked if the decision to pursue a residency was influenced by preceptors or rotations during the fourth year of pharmacy school, the mean score for TMC residents was 4.47 ± 0.63 and 3.87 ± 1.14 for non-TMC residents, indicating a strong agreement by TMC residents and general agreement by non-TMC residents. The variety of PGY2 specialty residencies offered at their current institution or within the general geographic area did not influence their decision, with a mean of 3.07 ± 1.39 for TMC residents and 2.48 ± 1.31 for non-TMC residents. Also, personal or family commitments did not appear to influence the decision to pursue a residency, with mean scores of 2.77 ± 1.30 for TMC residents and 3.05 ± 1.43 for non-TMC residents. Another section of the survey asked residents to rank their top three choices from a list of motivating factors. The top three factors for both TMC and non-TMC residents were to enhance one's knowledge and experience, the opportunity for specialized training, and that residency training was perceived as a requirement for a desired job position (Bernhardt et al., 2012).

The Theory of Planned Behavior

The Theory of Planned Behavior is intended to predict deliberate behavior, stating that one's intention to perform a behavior is what lies between one's beliefs and the actual behavior. The conceptual framework states that three constructs form the intention that leads to the behavior under consideration: attitude (A), subjective norm (SN), and perceived behavioral control (PBC). Intention captures the motivational factors that influence a behavior, and are indications of how much effort an individual is willing to exert in order to perform the behavior (Ajzen, 1991). The TPB was designed to explain almost any human behavior, and has been used successfully to explain many health-related behaviors by providing strong predictions of intention and behavior (Godin et al., 1996). We hypothesize that the TPB can be utilized for modeling and predicting intention related to pharmacy students' decision to apply for postgraduate residency training.

To appropriately measure all constructs of the TPB, Francis and colleagues suggest both direct and indirect measurements of each construct should be considered since both methods make distinct assumptions about the underlying cognitive structures (Francis et al., 2004). Each variable may be measured directly by asking individuals about their overall attitude, or indirectly by asking individuals about specific behavioral beliefs and the influence of those beliefs. Direct measurement assumes that people can accurately summarize and provide a comprehensive estimate of a belief that may consist of mixed positive and negative beliefs. Indirect measurement does not make this assumption, and instead assumes that people can report beliefs in a probabilistic way by relative weightings (Francis et al., 2004). Measuring the TPB constructs by both methods may explain more variation in intention and behavior. Thus, we developed a TPB questionnaire comprised of both direct and indirect measurements of

attitudes, subjective norm, and perceived behavioral control. The utilization of indirect measurements may also delineate which factors have the most influence on intention and behavior. These factors may then be examined in future studies or become targets for interventions aimed at promoting residency training. The traditional TPB model is presented in Figure 1, and the proposed TPB model for this study is shown in Figure 2.

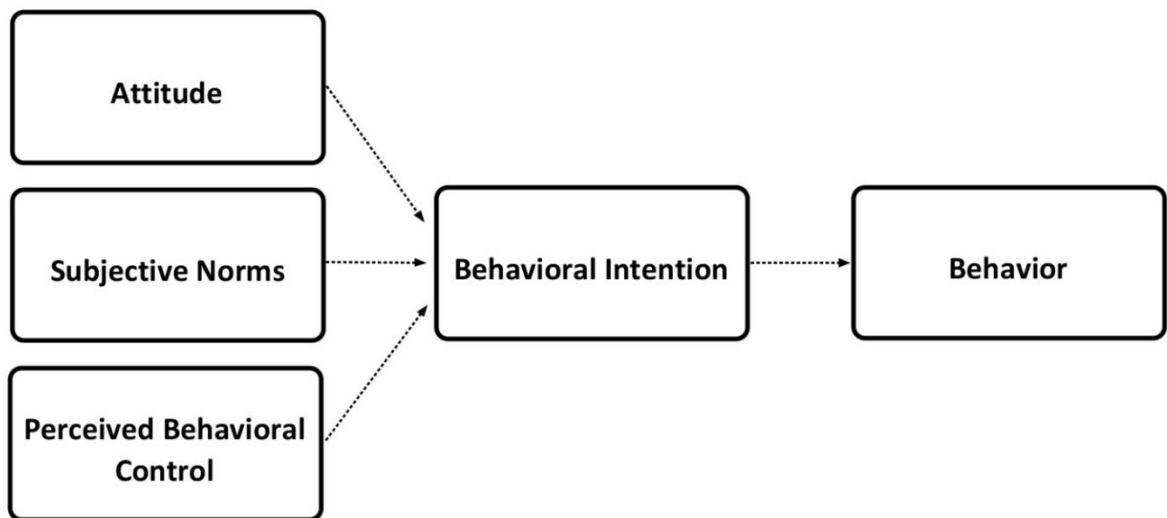


Figure 1. The Theory of Planned Behavior (TPB)

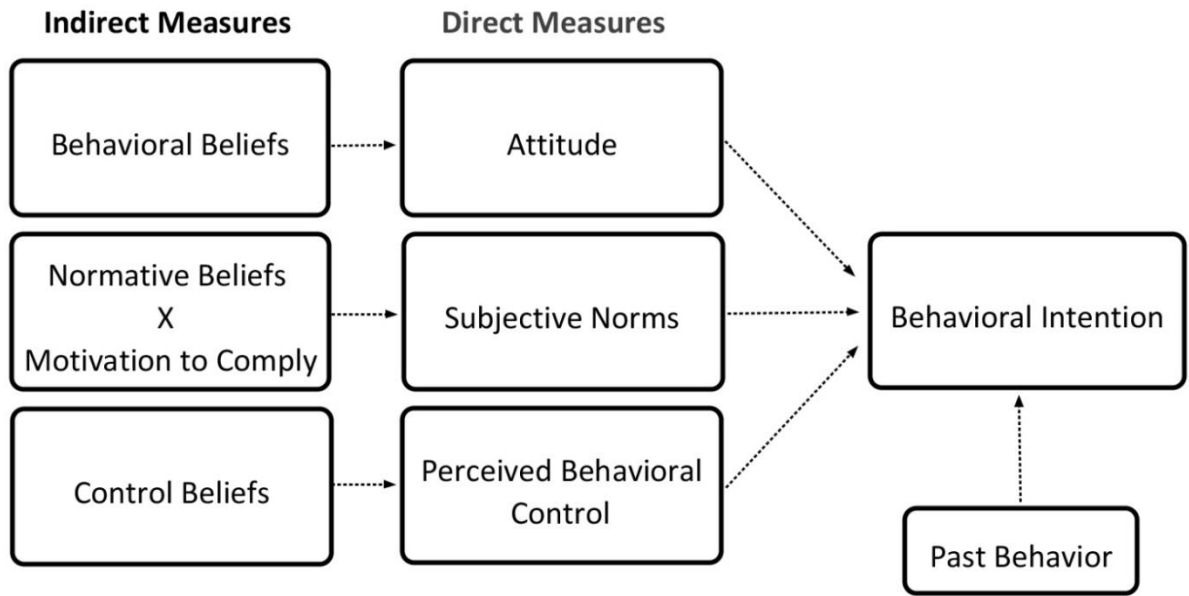


Figure 2. Proposed TPB extended model for this study

An individual's *attitude* refers to the extent in which an individual has a favorable or unfavorable evaluation of a behavior. The attitudes or beliefs towards the behavior may be influenced by perceived consequences and potential benefits of performing or not performing the behavior. Additionally, an individual's positive or negative evaluation of the behavior may be affected by their own experience with the behavior (Ajzen, 1991). Each student carries out a self-assessment of the perceived consequences and potential benefits of pursuing or not pursuing a residency and must consider the likelihood that these factors will occur upon becoming a pharmacy resident. Pharmacy students must also consider whether the positive benefits outweigh the perceived negative outcomes of completing a residency. The specific attitudinal beliefs can be measured from two components. The first component is what an individual believes about the positive or negative consequences of the behavior (*behavioral beliefs*), and the second component is whether the individual judges these consequences to be favorable or unfavorable (*outcome evaluations*) (Francis et al., 2004).

The *subjective norm* refers to how an individual perceives social pressures to perform or not to perform the behavior. These social pressures are reflective of attitudes from “relevant others” like family, friends, or colleagues, or other professionals (Ajzen, 1991). Pharmacy students may be influenced by friends, family, classmates, faculty members, pharmacy residents, and/or pharmacists. The specific subjective norm beliefs can be measured from two components. The first component is how those considered important to the individual would like them to behave (*normative beliefs*), and the second component is how much the individual cares about the opinions of the people considered important to them (*motivation to comply*) (Francis et al., 2004).

Perceived behavioral control refers to an individual’s perception of the resources and opportunities (e.g., time, money, skills) available to them, which to some extent dictates the likelihood of performing the behavior. It also refers to an individual’s confidence based on perceived ease or difficulty of anticipated obstacles that must be overcome to perform the behavior. While these control beliefs may be based in part on past experience with the behavior, they can also be influenced by second-hand information about the behavior from the experiences of friends and acquaintances. The more resources and opportunities individuals believe they possess and the fewer obstacles they anticipate, the greater their perceived control over the behavior should be (Ajzen, 1991). For example, pharmacy students may consider barriers such as financial obligations and feeling “burned out” as effortlessly insignificant or as difficult obstacles based on their own personal experience and information they obtained from other students. Specific perceived behavioral control beliefs can be measured from two components. The first component is comprised of beliefs about factors that make it easy or

difficult to perform the behavior (*control beliefs*) and the second component is the corresponding power of these factors to influence the behavior (*influence of control beliefs*) (Francis et al., 2004).

Past behaviors are measured in this study to assess which behaviors are more likely to increase a pharmacy student's intention to apply for a residency. The saying that 'past behavior is the best predictor of future behavior' is supported by a great deal of evidence. A strong correlation between past and future behavior demonstrates the temporal stability between the two. Depending on the nature of the intention and behavior measures, often a measure of past behavior contributes to the prediction of future behavior even after accounting for the predictor variables in the TPB. Despite its predictive ability, past behavior fails to meet the criteria for inclusion as a construct in the TPB because it does not constitute a "causal antecedent" of intention (Ajzen, 2011). Namely, it is difficult to argue that a past behavior directly causes an individual's current intention. Past behavior is instead commonly considered a proxy for habit strength. For example, the more frequently a behavior has been performed, the more likely it is to form a habitual response regardless of one's intention (Ajzen, 2011). Domains in which habits are unlikely to develop, such as the past behavior measures used in this study, behavior is more likely to be controlled by cognitive reasoning processes. Thus, the influence of past behavior on future behavior is then mediated by intention (Ouellette et al., 1998).

In general, the more favorable the attitude and influence from subjective norms, and the greater the perceived behavioral control, the greater the individual's intention is to perform the behavior. In some applications, varying degrees of attitude, subjective norm, and perceived behavioral control play an important role in the decision process, and in others only one or

more of these constructs may have significant contributions towards the behavior (Ajzen, 1991). Although no previous studies have investigated the use of the TPB to examine the positive and negative factors influencing pharmacy students to pursue postgraduate residency training, this theory has demonstrated itself as an important instrument in explaining intention and behavior (Godin et al., 1996).

Research objectives

The primary objective of this study is to examine the motivating factors and barriers to pursuing residency training using the Theory of Planned Behavior (TPB) framework to determine the contribution of the constructs attitude (A), subjective norm (SN), and perceived behavioral control (PBC) on the intention to apply for a pharmacy residency. The secondary objective will be to identify the past behaviors and specific behavioral beliefs that indirectly predict pharmacy students' intention to apply for a postgraduate residency program. We hypothesize that the TPB will be a useful model for predicting pharmacy students' intention to apply for a postgraduate residency.

CHAPTER 2 METHODOLOGY

This chapter describes the methodology of this study in detail, and is divided into the following sections:

- Research design
- Sample selection
- Survey instrument
- Data collection
- Data analysis

Research design

This study is a non-experimental, cross-sectional study designed to examine pharmacy students' A, SN, PBC, and intention towards applying for a residency. An electronic web-based questionnaire survey was utilized to collect data for this study and participants were sent the survey via email. A direct measurement of A, SN, PBC, and intention, as well as indirect measurements of specific beliefs were obtained. Past behavior was also measured and incorporated into our TPB model.

Sample selection

To obtain an appropriate sample size, and due to established connections with the University of Houston College of Pharmacy, a faculty member at each Texas college of pharmacy with current classes of second and third-year students as of January 2015 were solicited to assist in data collection. Consent to distribute the survey from sources at both Texas Southern University College of Pharmacy and Health Sciences and Texas A&M Health Science Center Irma Lerma Rangel College of Pharmacy were unable to be obtained in a timely manner. Therefore, the pharmacy students at these colleges of pharmacy were unable to be surveyed. The study sample was composed of 983 second and third-year pharmacy students of four Texas colleges of pharmacy, including the University of Houston College of Pharmacy, the University of the

Incarnate Word Feik School of Pharmacy, the University of Texas College of Pharmacy, and the Texas Tech University Health Sciences Center School of Pharmacy.

To further discuss the selected study population, first-year students may not be at a point in their education to consider pursuing postgraduate residency training, and therefore were not included. Second-year students are likely to have begun considering if a residency is an appropriate option for them, and also to have been exposed to individuals and organizations that advocate for residency training or inform students on the subject. The third-year students are more than half-way through their professional training, and will be applying for residencies within one year's time of the survey. Their exposure with faculty members has been primarily in the classroom setting, with minimal exposure to preceptors and clinicians at practice sites during introductory rotations. Students may have had interactions with residents from major pharmacy organization meetings, informational seminars, or residency showcase conventions such as ASHP's Midyear clinical meeting. Fourth-year students are more ideal participants since they have an abundance of pharmacy practice experience working with residents, faculty members, and preceptors on advanced practice rotations, as well as being temporally close to the residency application deadline. However, fourth-year students had already applied to residency programs by the time data was collected, and were therefore ineligible to participate in the study.

Survey instrument

The survey instrument was an electronic, web-based questionnaire developed and administered using Qualtrics software (Qualtrics, Provo, UT). The direct and indirect measures were developed using the recommendations provided by Ajzen's guidelines (Ajzen, 2006) and

Francis' instructions (Francis et al., 2004) on constructing a TPB questionnaire. A literature review was performed to elicit pharmacy students' beliefs about factors influencing their decision to apply for residency training. From the six articles analyzed, the most commonly cited motivating factors and barriers to pursuing residency training were utilized in the questionnaire as indirect measures of specific *behavioral beliefs* and *control beliefs*, respectively.

The questionnaire was pre-tested with ten fourth-year pharmacy students to ensure face validity, content validity, and the clarity of all questions. Feedback from the pretest group was evaluated and modifications to the questionnaire were made. The number of questions for the direct measurement of intention was reduced from three to one, after confusion that the questions were too similar and therefore redundant (e.g., "I plan to apply..." and "I will try to apply..."). We believe the single remaining question is sufficient to accurately measure direct intention. An additional question was added regarding the lengthy application and interview process as a barrier to assess the indirect PBC beliefs. The feedback obtained provided a major emphasis that the questionnaire was too long. Also, there was confusion about the questions for *outcome evaluations* and *influence of control beliefs*, which were thought to be too similar and therefore redundant questions of *behavioral beliefs* and *control beliefs*. Thus, to decrease the survey length and improve clarity, the *outcome evaluations* and *influence of control beliefs* were removed from the final questionnaire. Despite these eliminations, we believe the indirect A and PBC behavioral beliefs can still be accurately measured while maintaining content validity. For the second part of indirect measures for SN, the *motivation to comply* questions remained because they were believed to be essential to accurately measure each social belief, and no confusion on this construct was evident in the pretest group. The final questionnaire utilized in the study consisted of 47 items divided into six sections:

Section I: Direct measurements of attitude, subjective norms, perceived behavioral control, and intention

Section II: Indirect measurements of specific attitudinal behavioral beliefs

Section III: Indirect measurements of specific normative beliefs and motivation to comply

Section IV: Indirect measurements of specific perceived behavioral control beliefs

Section V: Past behavior related to applying for a residency

Section VI: Demographic information

The questionnaire utilized a 7-point bipolar semantic differential scale. Ajzen stated there is nothing in the TPB to “inform us whether responses to these scales should be scored in a unipolar fashion (e.g., 1 to 7) or in a bipolar fashion (e.g., -3 to +3),” and that “either type of scoring could be applied with equal justification” (Ajzen, 1991). A bipolar scale was used to measure each construct because we believe a greater contrast in beliefs would be evident among each variable. This is especially evidenced in measuring attitudes, which are usually assumed to form a bipolar continuum, from a negative evaluation on one end to a positive evaluation on the other. Furthermore, bipolar scoring of beliefs may produce stronger correlations with the overall attitude measure than a unipolar scoring (Ajzen, 1991).

The online questionnaire was divided into five pages. The first page consisted of a consent form similar to a cover page explaining the purpose of the study and elements of consent. This page had to be acknowledged before proceeding to the questionnaire, and respondents were required to answer all questions on each page before continuing to the next. The entire questionnaire is shown in Appendix C. The following are details of each section included in the instrument.

Section 1: Direct measurements of attitude, subjective norms, perceived behavioral control, and intention

Section 1 included an 11-item assessment of the direct measurements of attitude (A), subjective norms (SN), perceived behavioral control (PBC), and intention using a bipolar 7-point semantic differential scale ranging from -3 to +3. Attitude items assessed pharmacy students' overall subjective evaluations of residency training. Direct measurement of A was assessed by asking pharmacy students whether they think residency training is: 1) bad/good; 2) harmful/beneficial; 3) worthless/valuable; and 4) useless/useful, with the scale ranging from -3 to +3 for all items. Subjective norm items assessed pharmacy students' overall subjective judgements of the social pressures to apply or not apply for a residency. Direct measurement of SN were assessed by asking pharmacy students' agreement with: 1) Most people who are important to me think I should apply for a pharmacy residency; 2) The pharmacy students whose opinions I value would apply for a pharmacy residency; and 3) It is expected of me to apply for a pharmacy residency, with the scale ranging from strongly disagree (-3) to strongly agree (+3) for all items. Perceived behavioral control items assessed pharmacy students' overall perceived confidence and difficulty of applying for a residency. Direct measurements of PBC were assessed by asking pharmacy students' agreement with: 1) I am confident in my ability to apply for a pharmacy residency (scale from -3 strongly disagree to +3 strongly agree); 2) The decision to apply for a pharmacy residency is not entirely up to me (scale from -3 strongly disagree to +3 strongly agree); and 3) For me, to apply for a pharmacy residency would be (-3) difficult to (+3) easy. Behavioral intention, the primary dependent variable, assessed the pharmacy students' overall intention to apply for a residency. The direct measurement of behavioral intention was assessed by asking pharmacy students' agreement with: 1) I intend to

apply for a pharmacy residency, with the scale ranging from strongly disagree (-3) to strongly agree (+3).

Section II: Indirect measurements of specific attitudinal behavioral beliefs

Section 2 includes a 6-item assessment of the indirect measurements of specific attitudinal *behavioral beliefs* using a bipolar 7-point semantic differential scale ranging from strongly disagree (-3) to strongly agree (+3) for all items. Each item represented a common motivating factor to pursuing residency training obtained from the literature review. Pharmacy students' were asked the degree to which they agreed or disagreed with: 1) A pharmacy residency would give me a competitive advantage in the job market; 2) A pharmacy residency would provide professional networking opportunities; 3) A pharmacy residency would help me gain additional knowledge and experience; 4) A pharmacy residency would increase my confidence in practicing pharmacy; 5) A pharmacy residency would fulfill my desire for specialized training; and 6) A pharmacy residency would help me achieve my career goals.

Section III: Indirect measurements of specific normative beliefs and motivation to comply

Section 3 includes a 12-item assessment of the indirect measurements of specific normative beliefs and the motivation to comply using a bipolar 7-point semantic differential scale ranging from strongly disagree (-3) to strongly agree (+3) for all items. Each item represented an individual or group expected to have social influence on a pharmacy students' decision to apply for a residency. The first 6-items measured specific *normative beliefs* by asking pharmacy students the degree to which they agreed or disagreed with: 1) The following individuals or groups that I know would think that I should apply for a pharmacy residency: A) Classmates; B) Faculty members; C) Pharmacy residents; D) Pharmacists; E) Family; and F)

Friends. The second 6-items measured the specific *motivations to comply* by asking pharmacy students the degree to which they agreed or disagreed with: 1) Generally speaking, I care what the following individuals or groups think about whether or not I should apply for a pharmacy residency: A) Classmates; B) Faculty members; C) Pharmacy residents; D) Pharmacists; E) Family; and F) Friends.

Section IV: Indirect measurements of specific perceived behavioral control beliefs

Section 4 includes a 9-item assessment of the indirect measurements of specific perceived behavioral *control beliefs* using a bipolar 7-point semantic differential scale ranging from strongly disagree (-3) to strongly agree (+3) for all items. Each item represented a common barrier to pursuing residency training obtained from the literature review and pretest focus group. Pharmacy students were asked the degree to which they agreed or disagreed with: 1) For me, the following factors would make it more difficult to apply for a pharmacy residency: A) Financial obligations; B) Family obligations; C) Large student loan debt; D) Feeling “burned out”; E) Feeling afraid of the competition/not matching; F) Job offer is available upon graduation; G) Needing to relocate; H) Not required for desired job; and I) Lengthy application/interview process.

Section V: Past behavior related to applying for a residency

Section 5 includes a 3-item assessment of past behaviors believed to precede and help predict a students’ intention to apply for a pharmacy residency using a categorical yes/no response. Pharmacy students were asked if they have performed the following behaviors: 1) I have voluntarily attended an informational lecture about pharmacy residency training; 2) I have

researched information on pharmacy residency programs; and 3) I have attended ASHP's Midyear meeting or other residency showcase.

Section VI: Demographic information

Section 6 includes questions about the respondent's demographic characteristics. Data was collected on pharmacy students' age, gender, marital status, race/ethnicity, college of pharmacy, and year of pharmacy school.

Data collection

Data collection was conducted during a one month period from March 12, 2015 through April 8, 2015. This study was considered exempt (Category 2) by the University of Houston Committee for the Protection of Human Subjects. A faculty member from each of the four participating colleges of pharmacy forwarded the email invitation containing a link to the online survey to their respective second and third-year students' email list-serv. A single reminder email was sent out one week following the initial email. The entire process of completing the survey was expected to take an individual between 5 to 10 minutes. In order to maintain confidentiality of the data and protect individuals' privacy, no identifying information was collected in the survey and responses were anonymous. Participation in the survey was voluntary and respondents had the option to withdraw from participation at any time during the online submission. Participants were informed that the decision to participate would have no effect on their academic standing. As an incentive, participants were given the opportunity after survey submission to enter a drawing for a chance to win one of four \$50 Amazon.com gift cards by providing their email address on a Google Docs form (Google, Mountain View, CA). The

survey responses and email addresses provided were not connected, and the participants' responses to the survey remained anonymous.

Data analysis

Data was coded and maintained in an Excel 2010 spreadsheet (Microsoft, Redmond, WA). The coding of the variables is detailed in Appendix D. The scores on the 7-point bipolar semantic differential scale were considered at an interval level for statistical analyses. The data was analyzed using SAS version 9.3 (SAS Institute Inc., Cary, NC). The *a priori* level of significance for all statistical analysis was $p < 0.05$. Descriptive statistics (frequencies, means, and standard deviations) were performed where appropriate. Scale reliabilities for direct measurements of A, SN, and PBC constructs were measured using Cronbach's alpha. Spearman's rank correlation was utilized to assess the relationship between A, SN, and PBC and behavioral intention because of non-normal distributions. Multiple linear regression was utilized to assess the prediction of intention by the TPB constructs A, SN, and PBC as well as past behavior. Additionally, multiple linear regression was utilized to assess the prediction of the TPB constructs A, SN, and PBC by their respective indirect measurements of specific beliefs. Demographic variables were not included in the multiple linear regression analysis because according to Ajzen and Fishbein the effects of the demographic variables are mediated in the TPB model. Despite recognizing the importance of factors like demographic variables, these factors are considered external variables and are thus excluded from the model (Ajzen et al., 1980). Exploratory analysis was conducted to further assess the prediction of intention by the TPB constructs A, SN, and PBC by dichotomizing intention into positive intention (mean > 0) and non-positive intention (mean ≤ 0). Multiple logistic regression was then utilized to assess the prediction of positive intention by the TPB constructs, past behavior, and demographics.

CHAPTER 3 RESULTS

In this chapter, we will discuss the results of the study beginning with the response rate. Second, descriptive statistics of the sample demographics and the frequency of past behavior will be examined. Third, we will discuss the results of the reliability analysis for each construct and the validity of the survey instrument. Next, the descriptive analysis for the direct measures of A, SN, PBC, and intention will be examined followed by each construct's correlation with intention. Similarly, the descriptive analysis of specific indirect belief measures will be assessed. Then, the results of the study objectives testing the predictive ability of each TPB construct and their respective specific indirect beliefs using multiple linear regression will be analyzed. Lastly, the results of the exploratory analysis using multiple logistic regression to predict positive intention by each TPB construct, past behavior, and demographics will be evaluated.

Response rate

The number of complete survey responses from each college during the two phases of data collection is shown in Table 2. Data collection was conducted during a one month period from March 12, 2015 through April 8, 2015. A total of 264 surveys were obtained at the end of data collection, out of which 13 surveys were partially filled out and had incomplete information on questions measuring important constructs of the TPB. Thus, these surveys were excluded. Of the 983 surveys assumed delivered through email list-servs, 251 completed surveys were received for a response rate of 25.5%.

Table 2. Number of responses per college by data collection stage

College of pharmacy	First email	Second email	Total response	Response rate (%)
University of Houston	59	24	83	39.7
Incarnate Word	26	10	36	18.5
University of Texas	54	31	85	34
Texas Tech	43	4	47	14.3
Total	182	69	251	25.5

Descriptive analysis of demographic characteristics

The demographic characteristics of respondents are presented in Table 3. The mean age of respondents was 25.3 (± 4.1 years), with a range between 20 and 46 years. The gender of respondents was predominantly female (72.1%) with less than one-third being male (27.9%). The race/ethnicity of the sample was primarily composed of white/Caucasian (43%), Asian/Pacific islander (35%), and Hispanic (12.8%) respondents. The University of Houston College of Pharmacy (33.1%) and the University of Texas College of Pharmacy (33.9%) composed about two-thirds of the sample population, while the Texas Tech University Health Sciences Center School of Pharmacy (18.7%) and the Incarnate Word Feik School of Pharmacy (14.3%) composed the remaining one-third. The respondents' year of school consisted of about half second-year (47.8%) and half third-year (52.2%) pharmacy students. Lastly, only about one-fifth of the respondents were married (20.3%).

Table 3. Sample demographics

Variable	Frequency (%)	Mean (\pm SD)
Age (years)		25.3 (\pm 4.1)
20 – 24	133 (53.4)	
25 – 29	91 (36.8)	
\geq 30	23 (9.2)	
Gender		
Male	70 (27.9)	
Female	181 (72.1)	
Race/ethnicity		
Black/African American	9 (3.6)	
White/Caucasian	108 (43)	
Asian/Pacific islander	88 (35)	
Hispanic	32 (12.8)	
Middle eastern	8 (3.2)	
Other	6 (2.4)	
College of Pharmacy		
University of Houston	83 (33.1)	
Incarnate Word	36 (14.3)	
University of Texas	85 (33.9)	
Texas Tech	47 (18.7)	
Year of School		
Second	120 (47.8)	
Third	131 (52.2)	
Marital Status		
Married	51 (20.3)	
Single	200 (79.7)	

n= 251

Descriptive analysis of past behavior

The past behaviors of respondents believed to help predict the intention to apply for a pharmacy residency are presented in Table 4. A majority of the students (79.3%) reported voluntarily attending an informational lecture about postgraduate pharmacy residency training. Meanwhile, 61% of students reported researching information about residency programs. Lastly, only about one-fifth of students (20.7%) reported attending ASHP's Midyear clinical meeting or other residency showcase.

Table 4. Frequency of past behavior

	Frequency (%)
1. Voluntarily attended an informational lecture	
Yes	199 (79.3)
No	52 (20.7)
2. Researched information on residency programs	
Yes	153 (61)
No	98 (39)
3. Attended ASHP's Midyear meeting or other residency showcase	
Yes	52 (20.7)
No	199 (79.3)

n= 251

Reliability and validity analysis of direct measures of A, SN, PBC, and intention

Reliability determines to what extent a measure is accurate and consistent, or the ability of the measures to yield the same results each time. Reliability of the direct item measures of the TPB constructs were assessed using Cronbach's alpha, which accounts for the variation from the true score of the underlying construct. The alpha score can range from 0 to 1 and it indicates the internal consistency of the scale (Santos, 1999). The higher the alpha score, the more reliable the scale is determined to be. For behavioral research, a value of 0.7 or above is considered acceptable. However, scales with a lower alpha value have been used in the literature (Nunnally, 1978).

Reliability was tested for the domains measuring A, SN, and PBC towards applying for pharmacy residency training. Intention was measured using a single item and therefore reliability analysis was not required for this domain. The correlation of direct item measures in a domain with the total score for the domain was also determined. The results of the reliability analysis for each domain are presented in Table 5. The standardized Cronbach's alpha for the attitude domain was 0.97, indicating good reliability. However, the standardized Cronbach's

alpha for the SN domain was 0.67, likely lower due to the second item measure having a low correlation (0.37). To increase the reliability of the SN domain, the second item was removed, increasing the standardized Cronbach's alpha to an acceptable 0.71. The standardized Cronbach's alpha for the PBC domain was very low at 0.47, made worse by the second item measure having a poor correlation (0.09). Upon removing the second item measure of the PBC domain, the standardized Cronbach's alpha increased to an acceptable 0.69. It is important to note this is slightly lower than the recommended value of 0.7 or above. Despite the lower than ideal alpha of the PBC domain, we consider each domain to be sufficiently reliable in measuring their respective construct. The final results of the adjusted reliability analysis after removal of poorly correlated items are presented in Table 6 and summarized in Table 7.

Validity analysis

Validity refers to how well a test measures what it intends to. All direct and indirect measure items for each domain were modeled from recommendations provided by Ajzen's guidelines (Ajzen, 2006) and Francis' instructions (Francis et al., 2004) on constructing a TPB questionnaire and modified to address the research question. Additionally, all specific indirect measure items were taken from the literature review and feedback from the pretest group. Finally, the questionnaire was pre-tested with ten fourth-year pharmacy students to ensure face validity and content validity. Therefore, the study instrument is assumed to be valid.

Descriptive analysis of direct measures A, SN, PBC, and intention

Additionally, descriptive analysis of the mean score for each direct item measure and the percent of respondents selecting a positive score (>0) is presented in Tables 5 and 6. Values greater than zero are considered positive, indicating agreement of the item statement toward

the positive semantic of the scale, and values less than zero are considered negative, indicating agreement of the item statement toward the negative semantic of the scale. A value of zero is considered neutral. For example, when describing the first item measure of attitude, the mean score was 2.0 ± 1.4 on a scale from believing pharmacy residency training is bad (-3) to good (+3). The closer the mean is to +3 the higher the agreement with the semantic on the positive side of the scale. Therefore, the study population has a moderate to strong agreement with pharmacy residency training being good. Also, 86.5% of respondents selected +1, +2, or +3 as an answer choice, meaning 86.5% of respondents agreed on some level that pharmacy residency training is good.

The summation of direct measures into a composite mean score and Cronbach's alpha for each domain is presented in Table 7. The single item measure of intention had a mean of 0.3 ± 2.2 , indicating a weak intention by pharmacy students to apply for a pharmacy residency. The composite mean score of 4 items for attitude was 2.0 ± 1.4 , indicating a strong positive attitude toward pharmacy residency training. The students' composite mean of 2 items for SN was 0.3 ± 1.6 , indicating a weak social influence on pharmacy students to apply for a pharmacy residency. Lastly, the composite mean score of 2 items measuring PBC was -0.2 ± 1.4 , indicating a weak confidence and low perceived difficulty towards applying for residency training. The Cronbach's alpha scores of each domain are discussed in detail above.

Table 5. Mean score and reliability coefficients of direct measures of A, SN, PBC, and intention

Item	Mean (\pm SD)	Percent (>0)	Correlation with Total	Alpha
Intention				
1. I intend to apply for a pharmacy residency [†]	0.3 (\pm 2.2)	43	--	--
Attitude				0.97
1. Pharmacy residency training is... bad/good	2.0 (\pm 1.4)	86.5	0.88	0.96
2. Pharmacy residency training is... harmful/beneficial	2.1 (\pm 1.5)	88.5	0.92	0.95
3. Pharmacy residency training is... worthless/valuable	2.0 (\pm 1.5)	88	0.93	0.95
4. Pharmacy residency training is... useless/useful	2.0 (\pm 1.5)	86.5	0.93	0.95
Subjective norm				0.67
1. Most people who are important to me think I should apply for a pharmacy residency [†]	0.8 (\pm 1.7)	59.8	0.53	0.51
2. The pharmacy students whose opinions I value would apply for a pharmacy residency [†]	1.1 (\pm 1.5)	71.7	0.37	0.71
3. It is expected of me to apply for a pharmacy residency [†]	-0.2 (\pm 1.9)	38.3	0.55	0.48
Perceived behavioral control				0.47
1. I am confident in my ability to apply for a pharmacy residency [†]	0.4 (\pm 1.7)	57	0.41	0.15
2. The decision to apply for a pharmacy residency is not entirely up to me ^{†§}	-1.2 (\pm 1.9)	21.1	0.09	0.69
3. For me, to apply for a pharmacy residency would be... difficult/easy	-0.8 (\pm 1.6)	23.5	0.41	0.15

[†] Scale: -3 = strongly disagree to +3 = strongly agree

[§] Reverse coded

Scale for all items: -3 to +3

Table 6. Mean score and adjusted reliability coefficients of direct measures

Item	Mean (± SD)	Percent (>0)	Correlation with Total	Alpha
Intention				
1. I intend to apply for a pharmacy residency [†]	0.3 (± 2.2)	43	--	--
Attitude				0.97
1. Pharmacy residency training is... bad/good	2.0 (± 1.4)	86.5	0.88	0.96
2. Pharmacy residency training is... harmful/beneficial	2.1 (± 1.5)	88.5	0.92	0.95
3. Pharmacy residency training is... worthless/valuable	2.0 (± 1.5)	88	0.93	0.95
4. Pharmacy residency training is... useless/useful	2.0 (± 1.5)	86.5	0.93	0.95
Subjective norm				0.71
1. Most people who are important to me think I should apply for a pharmacy residency [†]	0.8 (± 1.7)	59.8	0.55	--
2. It is expected of me to apply for a pharmacy residency [†]	-0.2 (± 1.9)	38.3	0.55	--
Perceived behavioral control				0.69
1. I am confident in my ability to apply for a pharmacy residency [†]	0.4 (± 1.7)	57	0.53	--
2. For me, to apply for a pharmacy residency would be... difficult/easy	-0.8 (± 1.6)	23.5	0.53	--

[†] Scale: -3 = strongly disagree to +3 = strongly agree
Scale for all items: -3 to +3

Table 7. Summary statistics of TPB constructs

Construct	Items	Mean (± SD)	Cronbach's alpha
Intention	1	0.3 (± 2.2)	--
Attitude	4	2.0 (± 1.4)	0.97
Subjective norm	2	0.3 (± 1.6)	0.71
Perceived behavioral control	2	-0.2 (± 1.4)	0.69

Correlations of TPB constructs

The Spearman's rho correlations of the TPB constructs with intention are presented in Table 8. Spearman's rho correlation is a non-parametric test used to determine the strength of association between ranked variables. The results showed all TPB constructs had a significant positive correlation with intention to apply for a pharmacy residency (A = 0.43, SN = 0.60, and

PBC = 0.44) at a significance level of $p < 0.001$. Therefore, a significant positive relationship exists between these constructs and intention, which can now be tested using regression models.

Table 8. Spearman's rho correlations of TPB constructs with intention

TPB construct	Intention	Attitude	Subjective norm	Perceived behavioral control
Intention	1.00			
Attitude	0.43*	1.00		
Subjective norm	0.60*	0.32*	1.00	
Perceived behavioral control	0.44*	0.10	0.29*	1.00

* Significant at $p < 0.001$

Descriptive analysis of indirect belief measures of A, SN, and PBC

The descriptive analysis showing the mean score for each indirect item measure of attitudinal *behavioral beliefs* and the percent of respondents selecting a positive score (>0) is presented in Table 9. These item measures are specific behavioral beliefs related to attitude towards applying for a residency. Analysis indicated that the sample had strongly favorable beliefs about residency training with the first five items each having a mean score of ≥ 1.9 and $\geq 85\%$ of respondents scoring greater than zero on the scale. Item number 6, asking if a pharmacy residency would help achieve a student's career goals, indicated a moderately favorable agreement with a mean score of 1.4 ± 1.6 and 73% of respondents agreeing on some level with the statement.

Table 9. Descriptive analysis of indirect behavioral beliefs

Item	Mean (\pm SD)	Percent (>0)
1. Give me a competitive advantage in the job market	1.9 (\pm 1.3)	90
2. Provide professional networking opportunities	2.2 (\pm 1.0)	96
3. Help me gain additional knowledge and experience	2.6 (\pm 0.8)	96
4. Increase my confidence in practicing pharmacy	2.3 (\pm 1.1)	89
5. Fulfill my desire for specialized training	1.9 (\pm 1.3)	85
6. Help me achieve my career goals	1.4 (\pm 1.6)	73

Question: A pharmacy residency would....

Scale for all items: -3 = strongly disagree to $+3$ = strongly agree

The descriptive analysis showing the mean score for each indirect item measure of *normative beliefs* (question 1), *motivation to comply* (question 2), and the composite score (questions 1 and 2) as well as the percent of respondents selecting a positive value (>0) is presented in Table 10. These item measures are specific social beliefs related to the SN towards applying for a residency. Analysis of the composite score indicated that the sample had a moderate social influence towards pursuing residency training with the following mean scores: faculty members (1.7 ± 3.6), pharmacy residents (1.4 ± 3.4), pharmacists (1.6 ± 3.2), and family (1.3 ± 3.8). Both classmates (0.7 ± 3.1) and friends (0.9 ± 3.3) were found to have a weak social influence according to their composite scores.

Table 10. Descriptive analysis of indirect normative beliefs and motivation to comply

Item	Q1 mean (\pm SD)	Q2 mean (\pm SD)	Q1*Q2 mean (\pm SD)	Q1 percent (>0)	Q2 percent (>0)
1. Classmates	0.8 (\pm 1.3)	-0.2 (\pm 1.8)	0.7 (\pm 3.1)	63	40
2. Faculty Members	1.2 (\pm 1.4)	0.8 (\pm 1.8)	1.7 (\pm 3.6)	68	63
3. Pharmacy Residents	1.1 (\pm 1.4)	0.4 (\pm 1.9)	1.4 (\pm 3.4)	63	49
4. Pharmacists	0.8 (\pm 1.4)	0.8 (\pm 1.7)	1.6 (\pm 3.2)	58	63
5. Family	0.4 (\pm 1.6)	1.1 (\pm 1.7)	1.3 (\pm 3.8)	44	64
6. Friends	0.4 (\pm 1.5)	0.4 (\pm 1.7)	0.9 (\pm 3.3)	42	49

Question 1: These individuals or groups think I should apply for a residency

Question 2: I care what these individuals or groups think

Scale for all items: -3 = strongly disagree to $+3$ = strongly agree

The descriptive analysis showing the mean score for each indirect item measure of *control beliefs* and the percent of respondents selecting a positive score (>0) is presented in Table 11. These item measures are specific control beliefs related to the PBC towards applying for a residency. Analysis indicated that the sample had many moderate favorable control beliefs about factors making it more difficult to apply for a residency, including financial obligations (1.5 ± 1.6), family obligations (1.1 ± 1.9), a large student loan debt (1.3 ± 2.0), feeling afraid of the competition and/or not matching (1.3 ± 1.8), a job offer being available upon graduation (1.2 ± 1.7), and the lengthy application and/or interview process (1.1 ± 1.7). The control belief making it most difficult to apply for a residency is feeling “burned out,” with a moderate to strong control belief score of 1.9 ± 1.5. Item numbers 7 and 8 asked if needing to relocate and if a residency not being required for their desired job would make it more difficult to apply for a residency, respectively. Both mean scores indicated a weak favorable control belief with a mean score of 0.7 ± 2.0.

Table 11. Descriptive analysis of indirect control beliefs

Item	Mean (± SD)	Percent (>0)
1. Financial obligations	1.5 (± 1.6)	80
2. Family obligations	1.1 (± 1.9)	67
3. Large student loan debt	1.3 (± 2.0)	71
4. Feeling "burned out"	1.9 (± 1.5)	87
5. Feeling afraid of the competition/not matching	1.3 (± 1.8)	76
6. Job offer is available upon graduation	1.2 (± 1.7)	69
7. Needing to relocate	0.7 (± 2.0)	58
8. Not required for desired job	0.7 (± 2.0)	56
9. Lengthy application/interview process	1.1 (± 1.7)	70

Question: The following factors would make it more difficult to apply for a residency
 Scale for all items: -3 = strongly disagree to +3 = strongly agree

Analysis of the study objectives using multiple linear regression

Prediction of intention by A, SN, PBC, and past behavior

Multiple linear regression analysis was conducted to assess the prediction of intention by A, SN, PBC, and past behavior. The results are presented below in Table 12. The TPB model was found to explain 50% of the variance in intention to apply for a residency ($R^2 = 0.50$, $p < 0.001$). Attitude, SN, and PBC were significant predictors of intention ($\beta = 0.32$, 0.58 , and 0.36 , respectively, $p < 0.001$). The results of past behavior show that attending ASHP's Midyear meeting or other residency showcase is a significant predictor of intention ($\beta = 0.71$, $p = 0.006$), while voluntarily attending an informational lecture about residencies ($\beta = 0.24$, $p = 0.35$) or researching information on residency programs ($\beta = 0.23$, $p = 0.30$) were not significant predictors of intention.

Table 12. Multiple linear regression of TPB constructs and past behavior with intention

Independent predictor variable	β coefficient	P-value
Attitude	0.32	<0.001*
Subjective norm	0.58	<0.001*
Perceived behavioral control	0.36	<0.001*
Past Behavior		
Attended informational lecture	0.24	0.35
Researched information on residency programs	0.23	0.30
ASHP midyear or other residency showcase	0.71	0.006*

$R^2 = 0.50$ ($p < 0.001$)

* Significant at $p < 0.05$

Since the constructs A, SN, and PBC were found to be significant predictors of intention, we can determine which specific beliefs are indirect predictors of intention by determining which specific beliefs are significant predictors of their respective construct. For example, if PBC is a significant predictor of intention, and the control belief about financial obligations is a

significant predictor of PBC, then the control beliefs about financial obligations are an indirect predictor of intention. This analysis was conducted for each construct using multiple linear regression as described in detail below.

Prediction of attitude by specific indirect measures of behavioral beliefs

Multiple linear regression was utilized to assess the prediction of attitude by its indirect measurements of specific *behavioral beliefs*. The results are presented below in Table 13. The behavioral beliefs in the model were found to explain 31% of the variance in attitude towards applying for a residency ($R^2 = 0.31, p < 0.001$). Significant predictors of A were the beliefs a residency would increase confidence in practicing pharmacy ($\beta = 0.36, p < 0.001$) and help achieve career goals ($\beta = 0.16, p < 0.02$). It is worth noting that the belief a residency would provide a competitive advantage in the job market was very close to statistical significance ($\beta = 0.16, p = 0.06$) in predicting attitude. Specific indirect measures of behavioral beliefs not significant for predicting attitude include believing a residency would provide professional networking opportunities ($\beta = 0.004, p = 0.97$), help gain additional knowledge and experience ($\beta = 0.17, p = 0.22$), and fulfill the desire for specialized training ($\beta = -0.05, p = 0.57$).

Table 13. Multiple linear regression of behavioral beliefs with attitude

Independent predictor variable	β coefficient	P-value
Give me a competitive advantage in the job market	0.16	0.06
Provide professional networking opportunities	0.004	0.97
Help me gain additional knowledge and experience	0.17	0.22
Increase my confidence in practicing pharmacy	0.36	<0.001*
Fulfill my desire for specialized training	-0.05	0.57
Help me achieve my career goals	0.16	0.02*

$R^2 = 0.31 (p < 0.001)$

* Significant at $p < 0.05$

Prediction of SN by specific indirect measures of normative beliefs and motivation to comply

Multiple linear regression was utilized to assess the prediction of SN by the composite indirect measurements of the *normative beliefs* and *motivation to comply* of specific individuals or groups. The results are presented below in Table 14. The social influences of the individuals or groups included in the model were found to explain 18% of the variance in SN towards applying for a residency ($R^2 = 0.18, p < 0.001$). Significant predictors of SN were the social influence of faculty members ($\beta = 0.10, p = 0.003$) and family ($\beta = 0.08, p = 0.02$). Specific indirect measures of social influences not significant for predicting SN include sources from classmates ($\beta = -0.01, p = 0.07$), pharmacy residents ($\beta = 0.03, p = 0.39$), pharmacists ($\beta = 0.06, p = 0.10$), and friends ($\beta = -0.001, p = 0.97$).

Table 14. Multiple linear regression of normative beliefs and motivation to comply composite with SN

Independent predictor variable	β coefficient	P-value
Classmates	-0.06	0.07
Faculty Members	0.10	0.003*
Pharmacy Residents	0.03	0.39
Pharmacists	0.06	0.10
Family	0.08	0.02*
Friends	-0.001	0.97

$R^2 = 0.18 (p < 0.001)$

* Significant at $p < 0.05$

Prediction of PBC by specific indirect measures of control beliefs

Multiple linear regression was utilized to assess the prediction of PBC by its indirect measurements of specific *control beliefs*. All independent variables were reverse coded in order to match the direction of the direct PBC construct. For example, the more a respondent agrees financial obligations make it more difficult for them to apply for a residency, the less perceived

behavioral control they possess. If the scale was not reversed, this measure would negatively correlate with the direct PBC construct. The results are presented below in Table 15. The control beliefs in the model were found to explain 19% of the variance in PBC towards applying for a residency ($R^2 = 0.19, p < 0.001$). Significant predictors of PBC were the beliefs that financial obligations ($\beta = 0.20, p = 0.006$), feeling afraid of the competition and/or not matching ($\beta = 0.24, p < 0.001$), needing to relocate ($\beta = 0.09, p = 0.04$), and the lengthy application and/or interview process ($\beta = 0.12, p = 0.04$) would make it more difficult to apply for a residency. Specific indirect measures of control beliefs not significant for predicting PBC include the belief that family obligations ($\beta = -0.03, p = 0.62$), a large student loan debt ($\beta < 0.001, p = 0.93$), feeling “burned out” ($\beta = 0.02, p = 0.15$), a job offer available upon graduation ($\beta < 0.001, p = 0.93$), and a residency not being required for one’s desired job ($\beta < 0.001, p = 0.93$) would make it more difficult to apply for postgraduate residency training.

Table 15. Multiple linear regression of control beliefs with PBC

Independent predictor variable	β coefficient	P-value
Financial obligations	0.20	0.006*
Family obligations	-0.03	0.62
Large student loan debt	-0.02	0.70
Feeling "burned out"	-0.009	0.89
Feeling afraid of the competition/not matching	0.24	<0.001*
Job offer is available upon graduation	-0.08	0.13
Needing to relocate	0.09	0.04*
Not required for desired job	0.02	0.70
Lengthy application/interview process	0.12	0.04*

$R^2 = 0.19 (p < 0.001)$

* Significant at $p < 0.05$

Note: Scale for all items reverse coded for analysis

Exploratory analysis using multiple logistic regression to predict TPB constructs, past behavior, and demographics

Exploratory analysis was conducted to further assess the prediction of intention by the TPB constructs A, SN, and PBC by dichotomizing intention into positive intention (mean >0) and non-positive intention (mean ≤0). Multiple logistic regression was then utilized to assess the prediction of positive intention by the simultaneous effects of the TPB constructs, past behavior, and demographic variables. The results are presented below in Table 16. Similar to the results of the multiple linear regression analysis, the TPB constructs A, SN, and PBC were all significant predictors of positive intention to apply for a pharmacy residency. As the score for attitude increased by one unit, the odds of having positive intention increased 1.52 times (OR = 1.52, 95% CI = 1.11–2.09, $p = 0.01$). For every one unit increase in SN, the odds of having positive intention increased 2.59 times (OR = 2.59, 95% CI = 1.85–3.62, $p < 0.001$). For every one unit increase in PBC, the odds of having positive intention increased 2.02 times (OR = 2.02, 95% CI = 1.45–2.83, $p < 0.001$). In regards to past behavior, students attending ASHP's Midyear meeting or other residency showcase were 5.88 times more likely to have a positive intention to apply for a residency (OR = 5.88, 95% CI = 2.08–17.71, $p < 0.001$). No demographic variables were found to be a predictor of positive intention.

Table 16. Multiple logistic regression to predict positive intention by TPB constructs, past behavior, and demographics

Variable	Adjusted Odds Ratio	95% CI	P-value
Attitude	1.52	1.11 – 2.09	0.01*
Subjective norm	2.59	1.85 – 3.62	<0.001*
Perceived behavioral control	2.02	1.45 – 2.83	<0.001*
Past behavior			
Voluntarily attended an informational lecture			
No	Reference		
Yes	2.46	0.88 – 6.84	0.09
Researched information on residency programs			
No	Reference		
Yes	0.74	0.32 – 1.71	0.47
Attended ASHP’s Midyear or other residency showcase			
No	Reference		
Yes	5.88	2.08 – 16.62	<0.001*
Age			
20 – 24	Reference		
25 – 29	0.36	0.14 – 0.89	0.22
≥30	0.43	0.09 – 2.12	0.66
Gender			
Male	Reference		
Female	1.39	0.59 – 3.29	0.44
Race/ethnicity			
Black/African American	Reference		
White/Caucasian	0.64	0.03 – 12.67	0.31
Asian/Pacific islander	0.88	0.05 – 17.47	0.12
Hispanic	0.31	0.01 – 7.27	0.70
Middle eastern	0.13	0.003 – 6.28	0.35
Other	0.14	0.002 – 12.41	0.45
College of Pharmacy			
University of Houston	Reference		
Incarnate Word	2.26	0.59 – 8.68	0.79
University of Texas	1.90	0.74 – 4.90	0.87
Texas Tech	3.71	1.22 – 11.31	0.10
Year of School			
Second	Reference		
Third	0.54	0.24 – 1.22	0.14
Marital Status			
Single	Reference		
Married	0.85	0.29 – 2.46	0.76

* Significant at $p < 0.05$

CHAPTER 4 DISCUSSION

Today, there is an ongoing debate about mandatory postgraduate training for the next generation of pharmacists (Bright et al., 2010). Despite the large push for residency training by pharmacy stakeholders, a study of every United States pharmacy school graduating class from 2008 to 2011 revealed that only 14.2% of graduates match with a residency program (Morton et al., 2013). Although many factors discussed in this study may provide insight into the student's decision process, it remains predominantly uncertain why the vast majority of pharmacy students do not pursue residency training after graduation. The current literature has found many motivating factors and barriers influencing pharmacy students' decisions to apply for residency training, but this is the first known study to use a validated behavioral theory to examine these factors. This study examined the motivating factors and barriers to pursuing residency training using the Theory of Planned Behavior (TPB) framework to determine the contribution of constructs like attitude (A), subjective norm (SN), and perceived behavioral control (PBC) on the intention to apply for a pharmacy residency. Additionally, this study identified past behaviors and specific beliefs found to indirectly predict pharmacy students' intention to apply for a postgraduate residency program.

TPB constructs as predictors of intention

The TPB model was useful in predicting pharmacy students' intention to apply for a residency. Attitude, SN, and PBC constructs were found to be predictors of intention to apply for a pharmacy residency, with SN being the strongest predictor of intention. Thus, interventions that target students' A, SN, and PBC may be valuable to increase their intention. In the exploratory analysis, all TPB constructs were also found to be significant predictors of

positive intention, further confirming the study findings. Furthermore, no demographic variables were found to be a significant predictor of intention. This finding contradicts the study by McCollum et al, which found that whites were more likely than non-whites to enter a residency program (McCollum et al., 2005). However, the sample in McCollum's study was limited to two graduating classes of a single college of pharmacy. The results of our study indicate that the pursuit of residency training is independent of demographic characteristics and is primarily motivated by the beliefs, social influences, and perceived barriers of individual students.

Past behavior and intention

The results also indicate that attending ASHP's Midyear Clinical Meeting or other residency showcase is a significant predictor of intention. This finding is similar to a study which reported that residents who attended the ASHP Midyear Clinical Meeting found it encouraged them to apply for residency programs (Fit et al., 2005). In the same study, most of the residents found that experiences such as residency presentations at their school encouraged them to pursue residency training. However, in our study voluntarily attending an informational lecture about residency training was not found to predict intention to apply for a residency. The exploratory analysis found similar results, with attending the ASHP's Midyear Clinical Meeting or other residency showcase found to be the only past behavior significantly predicting positive intention.

Specific indirect predictors of intention

Significant positive predictors of A were the beliefs that a residency would increase confidence in practicing pharmacy and help to achieve career goals. Both of these measures therefore indirectly predict the intention to apply for a pharmacy residency. The belief a

residency would provide a competitive advantage in the job market was close to statistical significance, and thus could also be suggested to influence A. The findings are similar to the results of previous studies, in which pharmacy students and residents have listed these measures as motivating factors which influenced them to apply for a residency (Baker et al., 2005; Fit et al., 2005; McCollum et al., 2005; Bernhardt et al., 2012; McCarthy et al., 2013). Although previous studies found certain motivating factors to influence students' decisions, our study did not find these beliefs to predict intention to apply for a residency, including the belief a residency would provide a competitive advantage in the job market, provide professional networking opportunities, help to gain additional knowledge and experience, and fulfill the desire for specialized training. Despite these factors being widely recognized advantages of residency training, they may not have the proposed influence on pharmacy students' decisions as once speculated. Thus, from these findings we recommend pharmacy stakeholders to continue the promotion of the recognized advantages of residency training with an emphasis on the motivating factors that a residency will increase one's confidence in practicing pharmacy and help achieve one's career goals.

Significant positive predictors of SN were the social influence of faculty members and family. Both of these measures therefore indirectly influence the intention to apply for a pharmacy residency. The means by which social influence of family plays a role in a student's decision process is likely to have a great deal of individual variability, and has not been studied in the literature. During their coursework students have a lot of interaction with faculty members, many of whom are licensed pharmacists who have completed residency training prior to entering academia. Previous studies have also shown faculty members to be an important influence in students' decisions to pursue residency training (Fit et al., 2005; Bernhardt et al.,

2012; McCarthy et al., 2013). Surprisingly, classmates, pharmacy residents, and pharmacists were not found to be predictors of SN and intention, although a previous study did find that interaction with residents encouraged students to pursue residency training (Fit et al., 2005). Despite the expected influence of peers and the recognized mentoring of pharmacy students by residents and pharmacists, these individuals may not have as big of an influence on pharmacy students' decisions as once speculated. Thus, from these findings we recommend that faculty members and family should continue to encourage students to apply for postgraduate residency training.

Significant positive predictors of PBC were the beliefs that financial obligations, feeling afraid of the competition and/or not matching, and the lengthy application and/or interview process would make it more difficult to apply for a residency. This means the less difficult a student perceives these barriers to be, the more likely they are to feel in control and capable of applying for a residency. These findings are similar to the results of previous studies, in which pharmacy residents listed financial obligation and feeling afraid of the competition as perceived barriers to pursuing residency training (Bucci et al., 1995; Baker et al., 2005; Fit et al., 2005; McCollum et al., 2005; McCarthy et al., 2013). This is the first time in the literature the effects of the lengthy application and/or interview process of applying to residency programs has been studied. Although previous studies found certain barriers to influence a student's decision, our study did not find these beliefs to predict intention to apply for a residency, including the belief that family obligations, a large student loan debt, feeling "burned out," a job offer being available upon graduation, needing to relocate, and a residency not being required for a desired job would each make it more difficult to apply for a pharmacy residency. Despite these factors being widely recognized barriers to pursuing residency training, they may not have the proposed

influence on pharmacy students' decisions as once speculated. Thus, from these findings we recommend that future interventions by pharmacy stakeholders focus on alleviating students' financial worries, fears about the competition and/or not matching, and concern about the lengthy application and/or interview process associated with the pursuit of residency training.

Limitations and strengths

The results of this study must be interpreted while considering several limitations. First, the study has a relatively small sample size. Four of the six colleges of pharmacy within the state of Texas (excluding the newly accredited University of North Texas) were surveyed of the nearly 130 accredited programs nationwide (Preaccredited and Accredited Programs, 2015). This limits the ability to extrapolate these findings to other Texas schools and to pharmacy students outside the state of Texas. Second, with our low response rate, non-response bias is possible. For example, if survey respondents were those whom were more likely to have a stronger interest in residency training, they would therefore have a higher intention of applying for a residency. Also, limitations exist in the TPB framework, such as the temporal distance between the measurement of intention and actual observation of the behavior. The TPB assumes that behavior is the result of a linear decision-making process, and does not consider that intention can change over time. Thus, the cross-sectional study design does not allow for measuring any changes in pharmacy students intention, or in the constructs influencing intention over time. In this case, pharmacy students will be surveyed 1-2 years prior to submitting their residency applications. Additionally, changes in the environment or economic factors are not considered and may influence intention to perform a behavior. Finally, certain limitations exist due to variation from Ajzen's guidelines (Ajzen, 2006) and Francis' instructions (Francis et al., 2004) on constructing a TPB questionnaire. Although our reasoning is clearly stated in the process of

composing the survey instrument, the study did not utilize the second weighted part of measuring indirect measures for A (*outcome evaluations*) and PBC (*influence of control beliefs*). Furthermore, an elicitation study using a focus group was not used to determine the motivating factors and barriers included in the study. However, we consider the literature review including more than a thousand responses from pharmacy students and residents, along with the use of a pretest group composed of fourth-year pharmacy students, to overcome this limitation. Strengths of the study include the utilization of a validated behavioral theory and that the main findings are generally consistent with previous studies.

Conclusion

The TPB model among our study sample was useful in predicting pharmacy students' intention to apply for a residency. All TPB constructs were significant predictors of intention, with SN being the strongest predictor. Therefore, interventions that target students' A, SN, and PBC may be valuable to increase their intention, especially the specific beliefs found to indirectly influence intention. The findings of the study are predominantly consistent with the current literature examining the factors influencing pharmacy students to pursue residency training. These findings can be used by pharmacy stakeholders to assist pharmacy schools in preparing students for residency training, assist residency program directors in the recruitment process, and assist major pharmacy organizations in the promotion of residency training. Future research into ways in which these motivating factors can be encouraged and perceived barriers can be addressed will increase interest and participation in postgraduate residencies, and thus promote the completion of residency training as the professional norm for pharmacists. Additionally, future studies assessing whether intention translates into students completing the residency application process are needed to strengthen these findings.

Appendix A. Consent to assist in data collection

Consent to Assist in Data Collection

Dr. Sujit Sansgiry, PhD
Associate Professor
University of Houston College of Pharmacy
1441 Moursund St. Houston, Texas 77030

Stephen Hickerson
PharmD Candidate Class of 2015
MS Pharmacy Administration Class of 2015

To Dr. Sansgiry:

I would be glad to assist you and your student in collecting data for your project entitled, "The Pursuit of Pharmacy Residency Training and the Theory of Planned Behavior" by forwarding the link to your online questionnaire to the second and third-year pharmacy student's email list-serv of my college of pharmacy. I understand the data collected will not include any participant's names or identification markers.

Sincerely,

Name: _____

Title: _____

College of Pharmacy: _____

Signature: _____

Date: _____

Appendix B. Cover Letter



Consent to Participate in the Research Study

Dear Participant,

We are requesting your participation in a research project entitled—"The Pursuit of Pharmacy Residency Training and the Theory of Planned Behavior." The purpose of this study is to examine the motivating factors and barriers influencing Pharm.D. students to pursue a pharmacy residency using the Theory of Planned Behavior framework. This project is conducted by a Pharm.D./M.S. graduate student at the University of Houston College of Pharmacy as a Master's thesis project. The questionnaire will be distributed to approximately 1,000 second and third-year Pharm.D. students in the State of Texas attending an accredited college of pharmacy. It will take approximately 5-10 minutes of your time to complete the information requested

There are no foreseeable risks associated with your participation in this project. Although there are no direct benefits to you, the results of this study could be used to assist pharmacy schools in preparing students for residency training, assist prospective resident applicants in their decision-making, and assist residency program directors in the recruitment process.

Participation in this study is voluntary. You may decide to withdraw your participation at any time, even while filling out the questionnaire. You are assured of anonymity, and please do not indicate your name or identity in any way on this questionnaire. Data from this project will be used for educational and publication purposes only. All data will be analyzed in aggregated form and no individual subject will be identified. If you have any questions about this research, you may contact Stephen Hickerson at (281)-787-2695. You may also call the faculty sponsor for this project, Dr. Sujit S. Sangsiry, Associate Professor, Department of Clinical Sciences and Administration, University of Houston, College of Pharmacy, at (832)-842-8392. **Any questions regarding your rights as a research subject may be addressed to the University of Houston Committee for the Protection of Human Subjects at 713-743-9204. All research projects that are carried out by investigators at the University of Houston are governed by requirements of the University and the Federal Government.**

Please note that the survey is anonymous. Thank you for your time and consideration.

If you agree to participate, please click on the forward arrow below to begin the questionnaire.

Sincerely,

Stephen Hickerson
Pharm.D. Candidate Class of 2015
M.S. Pharmacy Administration Student
University of Houston College of Pharmacy

Sujit S. Sangsiry, PhD
Associate Professor
University of Houston College of Pharmacy

Appendix C. Questionnaire

Part 1: Instructions: For each item below please select the number that corresponds to your choice using the scale listed.

1. Pharmacy residency training is...

	-3	-2	-1	0	+1	+2	+3
Bad:Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Harmful:Beneficial	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Worthless:Valuable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Useless:Useful	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Most people who are important to me think I should apply for a pharmacy residency.

	-3	-2	-1	0	+1	+2	+3
Strongly Disagree: Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. The pharmacy students whose opinions I value would apply for a pharmacy residency.

	-3	-2	-1	0	+1	+2	+3
Strongly Disagree: Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

4. It is expected of me to apply for a pharmacy residency.

	-3	-2	-1	0	+1	+2	+3
Strongly Disagree: Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. I am confident in my ability to apply for a pharmacy residency.

	-3	-2	-1	0	+1	+2	+3
Strongly Disagree: Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

6. The decision to apply for a pharmacy residency is not entirely up to me.

	-3	-2	-1	0	+1	+2	+3
Strongly Disagree: Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

7. For me, to apply for a pharmacy residency would be...

	-3	-2	-1	0	+1	+2	+3
Difficult:Easy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. I intend to apply for a pharmacy residency.

	-3	-2	-1	0	+1	+2	+3
Strongly Disagree: Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part 2: Instructions: In this section, we would like to determine your beliefs about pharmacy residency training. For each item below please select the number that corresponds to your choice using the scale listed.

9. A pharmacy residency would give me a competitive advantage in the job market.

	-3	-2	-1	0	+1	+2	+3
Strongly Disagree: Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

10. A pharmacy residency would provide professional networking opportunities.

	-3	-2	-1	0	+1	+2	+3
Strongly Disagree: Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. A pharmacy residency would help me gain additional knowledge and experience.

	-3	-2	-1	0	+1	+2	+3
Strongly Disagree: Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

12. A pharmacy residency would increase my confidence in practicing pharmacy.

	-3	-2	-1	0	+1	+2	+3
Strongly Disagree: Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. A pharmacy residency would fulfill my desire for specialized training.

	-3	-2	-1	0	+1	+2	+3
Strongly Disagree: Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. A pharmacy residency would help me achieve my career goals.

	-3	-2	-1	0	+1	+2	+3
Strongly Disagree: Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part 3: Instructions: Next, we are interested in what individuals or groups would influence your intention to apply for pharmacy residency training. For each item below please select the number that corresponds to your choice using the scale listed.

15. The following individuals or groups that I know would think that I should apply for a pharmacy residency.

	-3	-2	-1	0	+1	+2	+3
A. Classmates Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. Faculty Members Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C. Pharmacy Residents Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D. Pharmacists Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E. Family Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F. Friends Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. Generally speaking, I care what the following individuals or groups think about whether or not I should apply for a pharmacy residency.

	-3	-2	-1	0	+1	+2	+3
A. Classmates Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. Faculty Members Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C. Pharmacy Residents Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D. Pharmacists Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E. Family Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F. Friends Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part 4: Instructions: Next, we are interested in what factors would make it easy or difficult for you to apply for a pharmacy residency. For each item below please select the number that corresponds to your choice using the scale listed.

17. For me, the following factors would make it more difficult to apply for a pharmacy residency.

	-3	-2	-1	0	+1	+2	+3
A. Financial obligations Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
B. Family obligations Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
C. Large student loan debt Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
D. Feeling “burned out” Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
E. Feeling afraid of the competition/not matching Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
F. Job offer is available upon graduation Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
G. Needing to relocate Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
H. Not required for desired job Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I. Lengthy application/interview process Strongly Disagree:Strongly Agree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part 5: Instructions: For each item below please select the circle that corresponds to your choice.

18. I have voluntarily attended an informational lecture about pharmacy residency training.

- Yes
- No

19. I have researched information on pharmacy residency programs.

- Yes
- No

20. I have attended ASHP's Midyear meeting or other residency showcase.

- Yes
- No

Part 6: Instructions: For each item below please select the circle that corresponds to your answer choice or fill in the blank.

21. Please enter your current age (e.g., 27).

22. Please select your gender.

- Male
- Female

23. Please select your marital status.

- Married
- Single

24. Please select the race/ethnicity that best describes you.

- African American / Black
- Caucasian / White (non-Hispanic)
- Asian/Pacific Islander
- Hispanic
- Middle Eastern
- Other

25. Please select your College of Pharmacy.

- University of Houston
- University of the Incarnate Word
- University of Texas - Austin
- Texas A&M Irma Lerma Rangel
- Texas Southern University
- Texas Tech University

26. Please select your current year of pharmacy school.

- Second year
- Third year

Appendix D. Coding of Variables

Variable	Description	Coding
PART 1: Direct Measures		
	[D= direct measure; A= attitude; 1= first DA item]	
DA1	Pharmacy residency training is...	-3 = Bad -2 -1 0 = Neutral +1 +2 +3 = Good
DA2	Pharmacy residency training is...	-3 = Harmful -2 -1 0 = Neutral +1 +2 +3 = Beneficial
DA3	Pharmacy residency training is...	-3 = Worthless -2 -1 0 = Neutral +1 +2 +3 = Valuable
DA4	Pharmacy residency training is...	-3 = Useless -2 -1 0 = Neutral +1 +2 +3 = Useful
DSN1	Most people who are important to me think I should apply for a pharmacy residency.	-3 = Strongly Disagree -2 -1 0 = Neutral +1 +2 +3 = Strongly Agree
DSN2	The pharmacy students whose opinions I value would apply for a pharmacy residency.	Same as above
DPC1	I am confident in my ability to apply for a pharmacy residency.	Same as above
DPC2	The decision to apply for a pharmacy residency is not	Same as above

	entirely up to me.	
DPC3	For me, to apply for a pharmacy residency would be...	-3 = Difficult -2 -1 0 = Neutral +1 +2 +3 = Easy
Intention	I intend to apply for a pharmacy residency.	-3 = Strongly Disagree -2 -1 0 = Neutral +1 +2 +3 = Strongly Agree
PART 2: Attitude		
	[Att= attitude]	
Att_adv	A pharmacy residency would give me a competitive advantage in the job market.	-3 = Strongly Disagree -2 -1 0 = Neutral +1 +2 +3 = Strongly Agree
Att_network	A pharmacy residency would provide professional networking opportunities.	Same as above
Att_know	A pharmacy residency would help me gain additional knowledge and experience.	Same as above
Att_conf	A pharmacy residency would increase my confidence in practicing pharmacy.	Same as above
Att_spltr	A pharmacy residency would fulfill my desire for specialized training.	Same as above
Att_goals	A pharmacy residency would help me achieve my career goals.	Same as above
PART 3.1: Subjective Norm (normative beliefs)		
Question: The following individuals or groups that I know would think that I should apply for a pharmacy residency.		
	[SN= subjective norm]	
SN_classmt	Classmates	-3 = Strongly Disagree -2 -1 0 = Neutral +1 +2 +3 = Strongly Agree

SN_faculty	Faculty members	Same as above
SN_resd	Pharmacy Residents	Same as above
SN_pcist	Pharmacists	Same as above
SN_fam	Family	Same as above
SN_friends	Friends	Same as above
<p>PART 3.2: Subjective Norm (motivation to comply) Question: Generally speaking, I care what the following individuals or groups think about whether or not I should apply for a pharmacy residency.</p>		
	[SN= subjective norm; c= care]	-3 = Strongly Disagree -2 -1 0 = Neutral +1 +2 +3 = Strongly Agree
SNC_classmt	Classmates	
SNC_faculty	Faculty members	Same as above
SNC_resd	Pharmacy residents	Same as above
SNC_pcist	Pharmacists	Same as above
SNC_fam	Family	Same as above
SNC_friends	Friends	Same as above
<p>PART 4: Perceived Behavioral Control Question: For me, the following factors would make it more difficult to apply for a pharmacy residency.</p>		
	[PBC= perceived behavioral control]	-3 = Strongly Disagree -2 -1 0 = Neutral +1 +2 +3 = Strongly Agree
PBC_money	Financial obligations	
PBC_fam	Family obligations	Same as above
PBC_loan	Large student loan debt	Same as above
PBC_burn	Feeling “burned out”	Same as above
PBC_compete	Feeling afraid of the competition/not matching	Same as above
PBC_offer	Job offer is available upon graduation	Same as above
PBC_relocate	Needing to relocate	Same as above
PBC_job	Not required for desired job	Same as above
PBC_lengthy	Lengthy application/interview process	Same as above
<p>PART 5: Past Behavior</p>		

Past_rec	I have voluntarily attended an informational lecture about pharmacy residency training.	1 = Yes 2 = No
Past_res	I have researched information on pharmacy residency programs.	1 = Yes 2 = No
Past_ashp	I have attended ASHP's Midyear meeting or other residency showcase.	1 = Yes 2 = No
PART 6: Demographics		
Age	Please enter your current age (e.g., 27).	N/A
Gender	Please select your gender.	1 = Male 2 = Female
Marital_stat	Please select your marital status.	1 = Married 2 = Single
Race	Please select the race/ethnicity that best describes you.	1 = African American / Black 2 = Caucasian / White (non-Hispanic) 3 = Asian/Pacific Islander 4 = Hispanic 5 = Middle Eastern 6 = Other
College	Please select your College of Pharmacy.	1 = University of Houston 2 = University of the Incarnate Word 3 = University of Texas – Austin 4 = Texas A&M Irma Lerma Rangel 5 = Texas Southern University
P_year	Please select your current year of pharmacy school.	1 = Second year 2 = Third year

References

About the College. Irma Lerma Rangel College of Pharmacy at Texas A&M Health Science Center. Web. Retrieved April 26, 2015 from <http://pharmacy.tamhsc.edu/about>

Academic Pharmacy's Vital Statistics. AACP. Web. Retrieved March 2, 2015 from <http://www.aacp.org/about/pages/vitalstats.aspx>

Aggregate Demand Index. Pharmacy Workforce Center Inc. Web. Retrieved April 23, 2015 from <http://pharmacymanpower.com/index.jsp>

Ajzen I, Fishbein M. *Understanding Attitudes and Predicting Social Behavior*. Prentice-Hall; 1980.

Ajzen I. Constructing a Theory of Planned Behavior Questionnaire. 2006. Web. Retrieved April 26, 2015 from <http://people.umass.edu/aizen/pdf/tpb.measurement.pdf>

Ajzen I. The theory of planned behavior. *Organizational Behavior and Human Decision processes*. 1991;50(2):179-211

Ajzen I. The theory of planned behaviour: Reactions and reflections. *Psychology & Health*. 2011; 26(9): 1113-1127

American Association of College of Pharmacy Graduating Student Survey 2014 National Summary Report. July 2014. Retrieved March 2, 2015 from http://www.aacp.org/resources/research/institutionalresearch/Documents/2014_GSS_Final%20Summary%20Report_All%20Schools_117_for%20web.pdf

ASHP Policy Positions 2009–2014 (with Rationales): Education and Training. 2014. Web. Retrieved April 23, 2015 from <http://www.ashp.org/DocLibrary/BestPractices/EducationPositions.aspx>

Baker E, Chrymko M. Impact of a Lecture on Pharmacy Students' Interests in and Perceived Barriers to Residency Training. *Am J Pharm Educ*. 2005; 69(4):article 65.

Ben and Maytee Fisch College of Pharmacy, The. The University of Texas at Tyler. Web. Retrieved April 26, 2015 from <https://www.uttyler.edu/pharmacy>

Bernhardt B, Stearns A, Sansgiry S. Motivators of Pharmacy Residency Training. *TSHP Journal*. 2012; 13(2).

Bright D, Adams A, Black C, Powers M. The mandatory residency dilemma: parallels to historical transitions in pharmacy education. *The Annals Of Pharmacotherapy* [serial online]. November 2010;44(11):1793-1799.

Brown D. A looming joblessness crisis for new pharmacy graduates and the implications it holds for the academy. *American Journal Of Pharmaceutical Education* [serial online]. June 2013;77(5):90.

Bucci KK, Knapp KK, Ohri LK et al. Factors motivating pharmacy students to pursue residency and fellowship training. *Am J Health-Syst Pharm*. 1995; 52:2696-701.

Cain J, Campbell T, Evans R, et al. Pharmacy student debt and return on investment of a pharmacy education. *American Journal Of Pharmaceutical Education* [serial online]. February 2014;78(1):5.

Fall 2013 Profile of Pharmacy Students: Degrees Conferred. AACP Office of Institutional Research and Effectiveness. Web. Retrieved March 2, 2015 from http://www.aacp.org/resources/research/institutionalresearch/Documents/Fall_13_DegsConferred.pdf

Fit K, Padiyara R, Rabi S, Burkiewicz J. Factors influencing pursuit of residency training. *American Journal Of Health-System Pharmacy: AJHP: Official Journal Of The American Society Of Health-System Pharmacists* [serial online]. November 2005;62(21):2226.

Francis JJ, Eccles MP, Johnston M, Walker A, Grimshaw J, Foy R, et al. Constructing questionnaires based on the theory of planned behavior: a manual for health services researchers. University of Newcastle, UK: Centre for Health Services Research. 2004.

Godin G, Kok G. The theory of planned behavior: a review of its applications to health-related behaviors. *American Journal Of Health Promotion: AJHP* [serial online]. November 1996;11(2):87-98.

Knapp D, Knapp D. Attributes of colleges and schools of pharmacy in the United States. *American Journal Of Pharmaceutical Education* [serial online]. August 2009;73(5):96.

Match statistics: ASHP residency matching program. National Matching Services Inc. 2015. Web. Retrieved April 23, 2015 from <https://natmatch.com/ashprmp/aboutstats.html>

McCarthy B, Weber L. Update on factors motivating pharmacy students to pursue residency and fellowship training. *American Journal Of Health-System Pharmacy: AJHP: Official Journal Of The American Society Of Health-System Pharmacists* [serial online]. August 2013;70(16):1397-1403.

McCollum M, Hansen L. Characteristics of Doctor of Pharmacy Graduates Entering and Not Entering Residency Training Upon Graduation. *Am J Pharm Educ.* 2005; 69 (3):article 42.

Morton J, Koval P, Gal P. Pharmacy residency match rates and predictors. *American Journal Of Pharmaceutical Education* [serial online]. December 2013;77(10):212.

Murphy J, Nappi J, Witkowski P, et al. American College of Clinical Pharmacy's vision of the future: postgraduate pharmacy residency training as a prerequisite for direct patient care practice. *Pharmacotherapy* [serial online]. May 2006; 26(5):722-733.

Nunnally J. *Psychometric theory.* NY: McGraw-Hill Inc. 1978.

Occupational Employment Statistics: Pharmacists. Bureau of Labor Statistics. Web. Retrieved April 23, 2015 from <http://www.bls.gov/oes/current/oes291051.htm>

Occupational Outlook Handbook 2014-15 Edition, Pharmacists. Bureau of Labor Statistics, U.S. Department of Labor. Web. Retrieved April 23, 2015 from <http://www.bls.gov/ooh/healthcare/pharmacists.htm>

Ouellette J, Wood W. Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin.* American Psychological Association, Inc. January 1998; 124(1): 54-74.

Our History. UNT Health Science Center. Web. Retrieved April 26, 2015 from <http://www.hsc.unt.edu/history.cfm>

Pharmacy degrees conferred. American Association of Colleges of Pharmacy. Web. Retrieved April 23, 2015 from http://www.aacp.org/resources/research/institutionalresearch/Documents/Fall_13_DegsConferred.pdf

Preaccredited and accredited professional programs of colleges and schools of pharmacy. Accreditation Council for Pharmacy Education. Web. Retrieved April 23, 2015 from https://www.acpe-accredit.org/shared_info/programsSecure.asp?sortBy=status#Accredited

Santos J. Cronbach's alpha: A tool for assessing the reliability of scales. *Journal of Extension.* 1999; 37: 1-5.

Teeters JL, Brueckl M, Burns A, Flynn A. Pharmacy residency training in the future: a stakeholder's roundtable discussion. *Am J Health Syst Pharm* 2005;62:1817-20

