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I, Bunnany C Pekar, hereby submit this original work as part of the requirements for the degree of Doctor of Philosophy in Nursing Research.

It is entitled:

The Development and Psychometric Testing of the CRNA-INTO DC Questionnaire

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The Development and Psychometric Testing of the CRNA-INTO DC Questionnaire

A dissertation submitted to the

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Doctor of Philosophy

in the College of Nursing

by

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Abstract

Fragmentation of care is a major issue affecting the care of surgical patients, especially those who reside in rural communities across the United States (US). Fragmented care increases morbidity and mortality, and drives up health care costs. Certified Registered Nurse Anesthetists (CRNA), who are also certified as Adult-Gero Acute Care Nurse Practitioners (AG-ACNP), may provide the solution to reduce fragmented care of surgical patients residing in rural US by providing continuum of care from decision to undergo surgical intervention to discharge. However, no current study exists assessing the intention of CRNAs, who are the main providers of anesthesia care in rural communities, to obtain AG-ACNP certification. The purpose of this study was to develop a psychometrically sound instrument that measures the Theory of Planned Behavior constructs regarding the intention to obtain an AG-ACNP certification by CRNAs who practice in rural communities. After development of the items and assessing content validity through an expert panel individuals, the 30-item Questionnaire underwent two rounds of pretesting before distribution to 3000-randomly sampled CRNAs across the contiguous 48 US via SurveyMonkey®. A total of 265 CRNAs gave implied consent by completing the Questionnaire. Eighty one of the 265 respondents met eligibility criteria. Respondents were mostly male (69%), between the ages of 55-64 (37%), with greater than 16 years of clinical experience (48%); earned Master's degree (72%), and practiced at a private not for profit institution (62%). Overall internal consistency of the final version of the composite Questionnaire with four items deleted from the original yielded a Cronbach's alpha of .96. The Subjective Norm, Attitude, Perceived Behavioral Control, and Intention subscales' Cronbach's alphas were .90, .88, .39, and .96, respectively. The findings of the theoretical prediction approach using multiple regression supported the Questionnaire's construct validity. Both standard and hierarchical multiple regression analyses found that attitude and subjective norm were significant predictors of intention ($R^2 = .654$, $p < .001$, standard; $R^2 = .681$, $p < .001$, hierarchical), but perceived behavioral control was not a significant predictor in either model. The findings supported the psychometric soundness of the CRNA-INTO DC Questionnaire. Of the four subscales, the only one not internally consistent was Perceived Behavioral Control and, therefore, should not be utilized independently. The findings of multiple regression analyses were consistent with the propositions of the Theory of Planned Behavior. In this study, attitude and subjective norm were significant predictors of CRNAs' intention to obtain the AG-ACNP certification in rural practice setting, while perceived behavioral control was not. Further research is needed to improve the internal consistency of the Perceived Behavioral Control subscale, and a larger sample size of rural practicing CRNAs is needed to conduct a confirmatory factor analysis to further support construct validity. Furthermore, since fragmentation of care is experienced in both rural and urban patient population, future research should be extended to urban practicing CRNAs so that the findings could be generalizable to both urban and rural CRNA practice settings.

Keywords: CRNA, AG-ACNP, fragmented care, Theory of Planned Behavior, scale development

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This dissertation is dedicated to my sons, Aaron, Ryan, and Jason Pekar. Thank you for being so understanding and supportive of my pursuit for knowledge.

"Education is the most powerful weapon which you can use to change the world"

-Nelson Mandela

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CHAPTER ONE

Purpose

The purpose of this study is to develop a psychometrically sound instrument that measures the Theory of Planned Behavior ([TPB], Ajzen, 1991), constructs, attitude toward a behavior, subjective norm, perceived behavioral control, and intention to obtain the adult-gero acute care nurse practitioner's (AG-ACNP) certification in certified registered nurse anesthetists practicing in rural health care facilities**.**

Background and Significance of the Study

The United States (US) health care system is facing a major crisis due to its inability in providing access to care for all of its citizens. Despite health care spending that is significantly higher than other industrialized nations, Americans experience disparity in access to care (Shi & Singh, 2012). Access to care could be referred to in terms of physical or effective availability (Roberts, Hsaio, Berman, & Reich, 2008). When either or both form of availability is not present, it can lead to fragmentation of care and increase in cost of care. Physical availability implies whether services are offered in certain areas; whereas effective availability concerns with the ease in which citizens can get care that is needed such as follow up on chronic illnesses or postoperative evaluations. When needed services are not available, patients will seek more expensive care such as the emergency room, rather than their usual provider for follow up care or they may not follow up on their care at all. This lack of availability could lead to costly treatments due to improper or lack of management of their disease state. Lack of access to care contributes to the economic burden of the US health care system in the form of waste. Health care waste, such as fragmentation of care, does not add value to health care recipients and drives up cost (Berwick & Hackbarth, 2012). Thus, one of the ways to decrease the health care expenditure is to reduce waste through the provision of seamless care (Berwick & Hackbarth,

2012; Bodenheimer & Grumbach, 2012; Shi & Singh, 2012). Fragmentation is defined as "focusing and acting on the parts without adequately appreciating their relation to the evolving whole" (Stange, 2009, p. 100). Serious patient-related issues can arise from fragmented care such as hospital-related complications, hospital readmissions, and worsening of chronic illness, of which the cost of this fragmented care is estimated to be around 24 to 45 billion dollars in wasteful spending (Berwick & Hackbarth, 2012). An example of where fragmented care contributes to an increase in morbidity and mortality and cost is in the care of surgical patients.

Surgical patients are at an increased risk for morbidity and mortality postoperatively (Smetana, 2009; Dimick et al, 2004). Surgical care accounts for approximately 65% of hospital expenses, and within each year, many patients suffer complications, including death during the perioperative periods of care (Szokol & Stead, 2014). Complications such as infections, respiratory and cardiac issues, and thromboembolic events are encountered by the surgical patient, which lead to an increase in hospital cost and the patient's risk for mortality (Dimick et al, 2004; Ghaferi et al, 2009). However, these complications can be decreased through coordinated care that is directed by anesthesiologists across the entire surgical period from decision to undergo surgical intervention through discharge ((ASA, 2014; Szokol & Stead, 2014). A model proposed by the American Society of Anesthesiologists ([ASA], 2014) called the Perioperative Surgical Home (PSH) developed to coordinate care across the entire patient's surgical experience in selected urban health care institutions has demonstrated positive patient outcomes such as improvement in quality care, decreasing morbidity and mortality, and improvement in patient satisfaction. Additionally, a decrease in total cost of surgical care was observed through care coordination under the PSH (Vetter, 2014).

Fragmentation of care is not experienced only in urban regions. Due to the geographic isolation of rural communities, lower socioeconomic status, and shortage of health care professionals, rural residents frequently encounter fragmentation in care delivery (Rural Policy Research Institute [RUPRI], 2011; National Rural Health Association [NRHA], 2014; United States Department of Agriculture [USDA], 2014). Rural residents experience lack of access to care in both physical and effective lack of availabilities. However, health care utilization in rural communities is just as great as urban residents. Rural residents utilized 12% of the 35 million total yearly hospitalizations and underwent 51 million (six percent) surgical and nonsurgical procedures annually (Center for Disease Control [CDC], 2014). Surgical patients in rural hospitals are at increased risk for complications due to fragmented care much like their urban counterparts, and may be more so due to the shortage of health care professionals, such as critical care physicians and anesthesia providers (National Research Council [NRC], 2005; American Hospital Association [AHA], 2014).

A model of care similar to the PSH may decrease fragmented care in rural surgical patients. This model of care, championed by certified registered nurse anesthetists (CRNA), may provide the continuity of care needed in surgical patients in rural communities. Currently, CRNAs are the main providers of anesthesia services in rural communities. However, the scope of practice and academic path of CRNAs do not include care of the patient once outside of the perioperative period, unless they are helping manage emergency situations such as respiratory or cardiac decompensations. In order to address these deficits, CRNAs can obtain further education to become a credentialed adult-gero acute care nurse practitioner (AG-ACNP). This dual certification would permit continuity of care throughout the phases of surgical care: from decision-making to undergo surgical intervention, to the intraoperative period, and through

discharge. However, there are no known studies currently that exist which address the intentions of CRNAs, who work with surgical patients in the rural areas, to pursue the AG-ACNP certification. Importantly, no psychometrically sound instrument to measure CRNAs' intention to obtain an AG-ACNP certification exists. Therefore, a psychometrically sound instrument is needed to measure the factors that influence CRNAs' intention to obtain the AG-ACNP certification. The Theory of Planned Behavior (Ajzen, 1991) may help explain the relationship between the factors that impede or enhance CRNAs' intention toward obtaining the AG-ACNP certification.

Research Questions

This study is designed to answer the following research questions:

1. Does the instrument demonstrate content validity?
2. Does the instrument demonstrate reliability?
3. Does the instrument demonstrate construct validity?

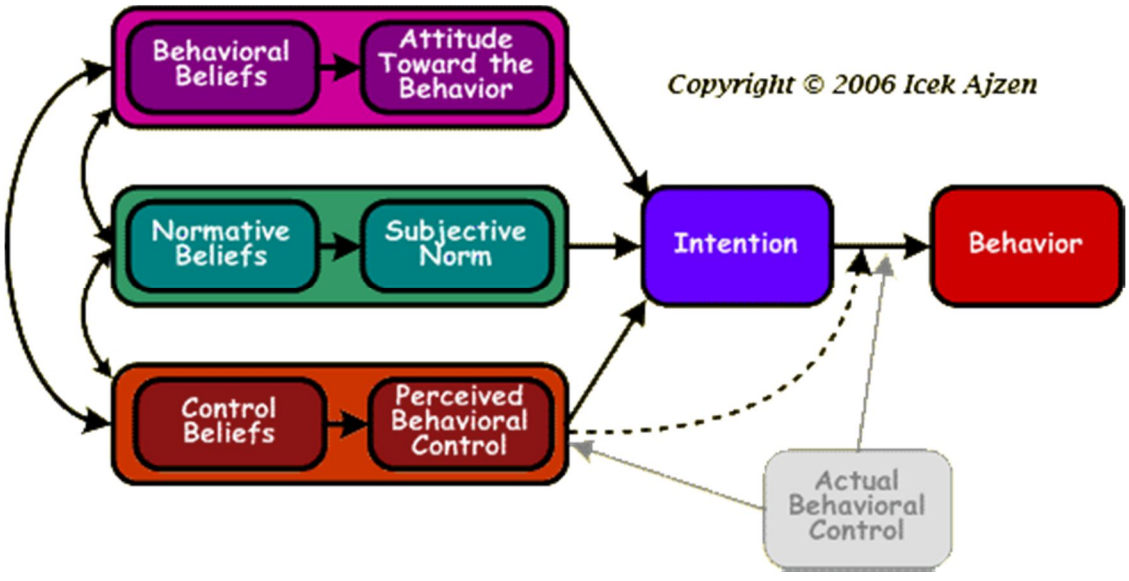
Theoretical Framework

The Theory of Planned Behavior (TPB), developed by Ajzen (1991, 2002), accounts for the process by which individuals decide on a particular course of action. The theory asserts that the probability of engaging in a given behavior is determined by one's intention to engage in the behavior. Intentions are assumed to capture the motivational factors that influence a behavior; thus, the stronger the intention to engage in the behavior, the more likely the behavior will be performed (Ajzen, 1991). The premise of TPB is that intention, thus in turn, human behavior, is influenced by positive attitude and subjective norms toward the behavior, along with a high degree of perceived behavioral control. According to Ajzen (1991), when behaviors do not exhibit problems with control, they can be predicted from intention with good accuracy. This

was illustrated by a study comparing one's voting intention and actual voting choice, in which the correlation was between 0.75 and 0.80 (Fishbein & Ajzen, 1981). Another example which indicated intention as a strong predictor of behavior was in the study regarding a mother's choice of feeding method for her newborn. The actual choice of feeding method, bottle versus breast, correlated at 0.82 with the mother's intention weeks prior to delivery (Manstead, Proffitt, & Smart, 1983). The TPB is very similar to the Theory of Reasoned Action (TRA, Fishbein & Ajzen, 2010). While the central factor in both theories is intention to perform a given behavior, changes were made to the TRA due to its limitations in dealing with behaviors over which an individual may not have volitional control (Ajzen & Fishbein, 1980; Ajzen, 1991). Thus, the construct of perceived behavior control was added to the TRA which then became the TPB. Figure 1 depicts the relationship between the constructs of TPB as proposed by Ajzen (1991).

Figure 1

The Theory of Planned Behavior



Source: Ajzen, I. (2006). Theory of planned behavior diagram. Retrieved from http://people.umass.edu/aizen/tpb.diag.html. Reprinted with permission.

The following discussion focuses on the constructs of the TPB and the relationship among the constructs. Additionally, the section addresses the application of the TPB to CRNAs' intentions to obtain the AG-ACNP certification.

Determinants of Intention

The Theory of Planned Behavior asserts that there are three global or direct measures of intention: attitude towards the behavior, subjective norm, and perceived behavioral control (Ajzen, 1991). A person's attitude towards a given behavior reflects the degree to which she or he views the behavior as favorable or unfavorable. This is known as affective attitude. Additionally, a person's attitude towards a behavior can be viewed instrumentally, that is whether the person believes the behavior is beneficial (Fishbein & Ajzen, 2010). If CRNAs perceived the dual role as favorable to rural surgical patients and that it increases continuity of care; then based on the TPB, CRNAs would have increased intentions to obtain the AG-ACNP certification.

Subjective norm involves an individual or a group in which the person views as important or influential and the pressure to perform the behavior as dictated by the individual or group (Ajzen, 1991). Subjective norm can be measured injunctively or descriptively. Injunctive norm refers to whether a behavior is approved by important others; whereas, descriptive norm measures whether the behavior that he or she feels is important to significant others (Fishbein & Ajzen, 2010). As an example, the American Association of Nurse Anesthetists (AANA) is the professional organization for CRNAs and is influential in shaping CRNA practice through establishment of practice standards and political advocacy (AANA, 2013). According to the TPB, the AANA's endorsement of this dual practice would influence CRNAs to want to obtain the AG-ACNP certification. Likewise, CRNAs, who are purposeful and goal-directed, would

injunctively perceive that obtaining the AG-ACNP as a means to enhance care delivery of surgical patients in rural communities would be approved by the AANA. According to TPB, the AANA's support of CRNAs to practice dually as an AG-ACNP/CRNA practice would increase CRNAs' intention to obtain the AG-ACNP credential.

Lastly, perceived behavioral control involves a person's perception of the ease or difficulty in achieving the behavior (Ajzen, 1991). This construct measures volitional controlled and can be divided into subconstructs: perceived controllability and self-efficacy. Perceived controllability is the extent that one has access to the means of control such as income or time (Ajzen). Self-efficacy measures an individual's self-confidence for engaging in the behavior (Fishbein & Ajzen, 2010). CRNAs may have the self-efficacy to obtain the AG-ACNP certification as they have already undergone a Master's or Doctorate level of training in Nurse Anesthesia. However, they may view the need for undergoing an AG-ACNP training program as an impediment to obtaining the AG-ACNP certification due to time or financial constraints. According to TPB, CRNAs may exhibit decreased intention to obtain the AG-ACNP certification because of these factors, and if their intention is decreased, then likelihood of actually obtaining the AG-ACNP certification is also decreased (Ajzen, 1991).

According to Ajzen (1991), behavior can be predicted from intention with considerable accuracy if the behavior is specific and stable at the time of measurement. Ajzen (1991) stated that a behavior such as "donating money" is nonspecific; however, "donating money" to a named organization described a specific behavior. Likewise, intention and behavioral control must be stable, as intervening variables could alter the accuracy of behavioral prediction (Ajzen). However, in this study, only intention will be predicted from measures of perceived behavioral control, subjective norm, and attitude. The attainment of the AG-ACNP certification would

involve at least two years of further education from the time of enrollment in the AG-ACNP program, thus, the temporal span may affect unforeseen circumstances experienced by CRNAs that would prohibit their volitional control over behavioral performance, thus affecting accurate prediction of behavior.

The Role of Beliefs

In addition to the three global determinants of intentions, there are also three antecedents to attitude, subjective norm, and perceived behavioral control (Ajzen, 1991). The goal of TPB is to explain human behavior, thus the theory postulates that human behavior is a function of important beliefs (Ajzen, 1991). While humans hold many salient beliefs, only some of them are addressed at any given time. It is these salient beliefs that are the determinants of one's intention and behavior. The three important beliefs are: behavioral, normative, and control beliefs, and are reflections of the indirect measures of intention. Behavioral beliefs can be viewed through an expectancy-value model of attitude (Fishbein & Ajzen, 1975). According to this framework, a person's beliefs about the behavior are linked to an expected outcome associated with the behavior. Behavioral beliefs are the subjective probability that the behavior will produce a certain outcome. A person's behavioral beliefs and the subjective values of the expected outcome will determine the prevailing attitude towards the behavior. The multiplicative aggregate of these beliefs towards the behavior determines the attitude as to whether the behavior will be viewed negatively or positively (Ajzen, 1991, 2006). As an example, CRNAs may perceive that the addition of the AG-ACNP role to their current practice will broaden their scope of practice, which result in better care for rural surgical patients. The evaluation of these beliefs is important as the summation of these specific beliefs multiplied by their evaluation results in CRNAs belief-based attitude.

Along the same line with behavioral beliefs, normative beliefs are the perceived expectations of some important or referent group such as the individual's professional organization or colleagues, thus is the perceived social pressure to perform or not perform the behavior. The strength of each normative belief multiplied by the person's motivation to comply with the referent individual or group's beliefs is directly proportional to the subjective norm (Ajzen, 1991; Ajzen, 2006). For instance, the AANA may support the dual CRNA/AG-ACNP role to enhance surgical care in rural health care institutions. Coupled with CRNAs wanting to provide safe, effective care for surgical patients, the support of the AANA or other organizations such as the American Hospital Association (AHA) would increase their normative beliefs and ultimately, form the basis of subjective beliefs that will lead to increased intention for CRNAs to obtain the AG-ACNP certification.

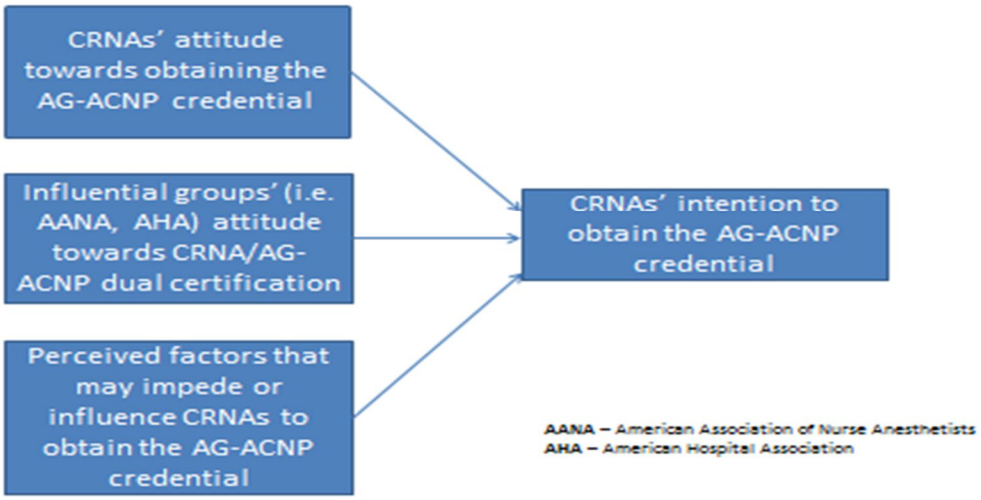
Lastly, control beliefs pertain to the presence of factors that may facilitate or impede the performance of a behavior, and that perceived behavioral control refers to the perception of their ability to perform the behavior (Ajzen & Klobas, 2011). The aggregate of the specific beliefs that could impede or facilitate the behavior are summed up and is directly proportional to one's perceived behavioral control. In general, the more resources and opportunities that a person perceives she or he possesses, and the fewer hindering factors, the greater the perceived behavioral control (Ajzen, 1991). CRNAs may view that in order to obtain the AG-ACNP certification, they need to undergo further education and the process for obtaining the certification such as applying to the program, time away from work and family, and the effort needed to address the academic demands of the AG-ACNP program may be too great. These beliefs serve as impediments which could negatively affect perceived behavior control, which in turn decrease CRNAs' intention to obtain the AG-ACNP certification.

Due to perceived behavioral control often reflecting actual control, it is typically treated as a direct predictor of intention and behavior (Zemore & Ajzen, 2014). Likewise, attitude towards the behavior contributes significantly to the prediction of intention. This suggests that for behaviors to be considered, personal considerations such as attitude towards the behavior and perceived behavioral control tend to have more influence on the behavior than the perceived social pressure (Ajzen, 1991). Regardless, people's beliefs form their attitudes towards the behavior, how much weight they place on the opinions of their referent group, and their perception of control over the behavior (Ajzen, 2011).

While the theory posits a significant relationship between attitudes, subjective norm, and perceived behavioral control to one's beliefs, the exact form of this relationship is not known (Ajzen, 1991). Despite optimizing evaluative scales for measuring these salient beliefs, only modest correlations have been observed between the belief-based measures and the more global measures of the constructs. However, researchers have utilized either the belief-based or global measures in studies to measure intentions and subsequently, behavior (Arnold et al., 2012; Oren, Carduri, & Tziner, 2013). Global and belief-based measures make different assumptions about the construct and either one or both can be utilized in the construction of a questionnaire (Francis et al., 2004). Various studies have found that the multiple correlations of the global measures in predicting intention ranged from 0.43 to 0.94, with an average correlation of 0.71 (as cited in Ajzen, 1991). For the purpose of this dissertation, the researcher utilized the global constructs to develop the CRNA- Intention to Obtain Dual Certification (CRNA-INTO DC) Questionnaire. Figure 2 reflects the global constructs of the Theory of Planned Behavior to obtain the AG-ACNP certification in CRNAs practicing in rural health care facilities.

Figure 2

The Theory of Planned Behavior as it relates to CRNAs' intention towards obtaining the AG-ACNP credential



Adapted from Ajzen's Theory of Planned Behavior (2006)

Theoretical Definitions

The theoretical definitions of terms used in this study follow:

1. *Attitude towards a behavior:* the degree in which the behavior is either positively or negatively viewed by the individual.
2. *Subjective norm:* the perceived social pressure to engage or not be engaged in a behavior.
3. *Perceived behavioral control:* the individual's perception of the ability to perform a given behavior through the individual's perception of his or her self-efficacy and controllability factors.

4. *Intention:* an indication of the individual's readiness to perform a behavior – viewed as the immediate antecedent to a behavior (Ajzen, 1991, 2006).

Operational Definitions

1) *Attitude towards obtaining the AG-ACNP credential:* the degree in which obtaining the AG-ACNP certification is either positively or negatively viewed by CRNAs as measured by CRNA-INTO DC Questionnaire.
2) *Subjective norm towards obtaining the AG-ACNP credential:* The social pressure that is perceived by CRNAs to engage or not be engaged in obtaining the AG-ACNP certification as measured by CRNA-INTO DC Questionnaire.
3) *Perceived control in obtaining the AG-ACNP credential:* CRNAs' perception of the factors that influence or impede their ability to obtain the AG-ACNP certification as measured by CRNA-INTO DC Questionnaire.
4) *Intention to obtain the AG-ACNP credential:* CRNAs' intention to obtain the AG-ACNP certification as measured by CRNA-INTO DC Questionnaire.

Assumptions

The assumptions of the study follow:

1. CRNAs value continuity of care in the patient's perioperative experience.
2. CRNAs are purposeful and goal-directed.
3. CRNAs are committed to serving the public's interest.
4. CRNAs value professional cohesiveness.

Limitations

The potential limitations of this study follow:

1. Though the sample is representative of the population, the result may not be generalizable as not all CRNAs who practice in rural communities are members of the AANA.
2. The participants in this study may be subjected to response bias as the instrument is self-reporting.
3. There is potential for self-selection bias among participants who return the questionnaire.

Summary

Postoperative complication is a major problem facing surgical patients. The main issue that contributes to surgical complications in postoperative patients is fragmentation of care. Fragmentation of care in surgical patients has been associated with an increase in morbidity, length of hospitalization, cost, and mortality. A model of care called the Perioperative Surgical Home (PSH) has been proposed by the ASA to reduce fragmentation of care in surgical patients. The PSH, led by anesthesiologists, have demonstrated improvement in postoperative complications of surgical patients through care coordination, starting from the time that surgical intervention has been decided between the surgeon and patient through discharge. The anesthesiologist coordinating the care under the PSH can interfaced with the patient's primary care doctor after hospital discharge to further enhance seamless care. Surgical patients in rural communities face similar complications; however, the majority of the anesthetics in rural medical facilities are provided by CRNAs. Thus, a model similar to the proposed PSH would promote care coordination of surgical patients and would include CRNAs that are also certified as an AG-ACNP to lead the care delivery. However, there is no known study that assesses CRNAs' intention to obtain the AG-ACNP certification. Furthermore, no instrument exists to

measure the factors that influence CRNAs' intention to obtain the AG-ACNP certification. Thus, a conceptually and psychometrically sound instrument that measured the TPB constructs regarding the intention to obtain the AG-ACNP certification in CRNAs practicing in rural health care facilities was needed. This chapter also presented a detail discussion of the theoretical framework and its application to CRNAs' intention to obtain such certification.

CHAPTER TWO

Review of Literature

This chapter presents a review of the literature that is relevant to understanding the issues within the US health care system and how certified registered nurse anesthetists (CRNA) are vital to improving the health of surgical patients in rural communities. The sections include a discussion on: (a) the fragmentation of care within the current US health care system, (b) the disparity of care in rural communities, (c) the history of health care reimbursement, (d) the need to transform the US' health care system, (e) the dual role of CRNAs and adult-gero acute care nurse practitioners (AG-ACNP) in transforming care in rural communities, and (f) the utilization of the Theory of Planned Behavior (TPB) to develop a psychometrically sound instrument to measure CRNAs' intention to obtain the AG-ACNP certification.

The US Health Care System

The aim of the United Sates (US) health care system is to improve the experience of care, improve population health, and reducing the national economic burden of health care (Berwick, Nolan, & Whittington, 2008). Despite the health care spending that is nearly double that of the next most costly nation, quality indicators such as infant mortality and life expectancy rates are much lower in comparison to other developed nations (Bodenheimer & Grumbach, 2012; World Health Organization [WHO], 2013; Organisation for Economic Co-operation and Development [OECD], 2010). When the health of US population is compared to the health of citizens in other countries, the picture is disappointing, given the high health care expenditure in the US compared to its gross domestic product (GDP). The World Health Organization ranked the US health care system 37th out of 191 nations in the world (WHO, 2000). While the US

outperforms many countries on a variety of health-related measures, but it is far from the best in many of the key measures used to gauge healthiness, lagging behind its peers in other developed countries (Commonwealth Fund, 2010). On nearly all indicators of mortality, survival, and life expectancy, the US ranks at or near the bottom of the chart among high-income countries (IOM [Institute of Medicine], 2013). Life expectancy is a measure that indicates the number of years a newborn is expected to live and is one of the measures utilized to assess the quality of a nation's health care system (Shi & Singh, 2012). Japan, San Marino, and Switzerland are the persistent leaders for developed countries in this measure, with an overall life expectancy of 83 years (WHO, 2013). With a life expectancy of 81 years for women and 76 years for men, the United States ranks 33rd among the 193 reporting nations (WHO, 2013). Life expectancy in the United States does not compare to most other developed countries, as US male life expectancy rates are on par with Chile and Cuba (WHO).

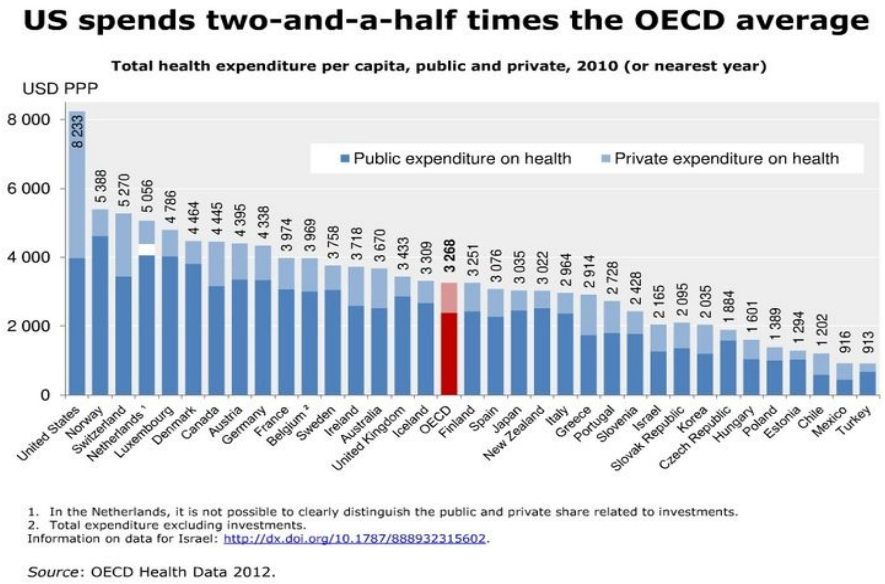
At the county level within US cities, life expectancy rates appear even worse when compared to other leading nations. While many US counties exceed the average life expectancy of the 10 leading nations, by far the majority of US counties lag behind these other nations (Kulkarni, 2011). In fact, there are 92 US counties where men, and two US counties where women, have life expectancy rates similar to those experienced by other leading nations dating back to 1957 or earlier. Life expectancy rates in 1,406 US counties are now further behind those of developing nations than they were 7 years earlier (Kulkarni). Premature death is a contributor in lowering life expectancies. For decades, the US has experienced the highest infant mortality rate among high-income countries (WHO, 2013). In 2011, the infant mortality rate in the United States was six deaths per 1,000 live births, ranking 40th among WHO nations (WHO). Infant

mortality rates, another indicator of the quality of a nation's health care system, in nations such as Finland, Japan, and Sweden are one third of the rate in the US.

Per capita, health care spending in the US continues to be the highest in the world. The median health expenditure among OECD countries is around $3,000 per person. In the US, it is more than $8,000 per person (OECD, 2012). Figure 1 provides a listing of various countries and their health care expenditure relative to the nation's GDP based on 2012 OECD data. The annual growth rate of spending in the United States from 2000 through 2010 was 4.3 percent, slightly under the average of 4.7 percent among OECD countries, but it is high in comparison to six other industrialized nations. The US spends the most on health care, but this does not necessarily translate into better care for everyone, as the United States has one of the highest inequalities in health compared to other developed countries (Commonwealth Fund, 2010).

Figure 3

Organisation for Economic Co-operation and Development (OECD) Comparison of Health Care Expenditure of OECD Countries



1. In the Netherlands, it is not possible to clearly distinguish the public and private share related to investments.
2. Total expenditure excluding investments.
Information on data for Israel: http://dx.doi.org/10.1787/888932315602.

Source: OECD Health Data 2012.

Despite health care spending that is expected to reach 20% of the GDP by 2020, health care disparity still exists as 47 million US residents do not have insurance coverage, affecting access to timely and consistent care (Keehan et al, 2012; Kaiser Family Foundation [KFF], 2014). The US health care system is the most costly in the world, with the rising cost attributed in part to the advances in expensive technology that help save lives (Bodenheimer & Grumbach, 2012; Shi & Singh, 2012). However, US residents continue to experience problems with access to care, either due to physical or effective lack of availability (Roberts, Hsaio, Berman, & Reich, 2008). While many of the developed nations such as the United Kingdom, Canada, Germany, and Japan are able to provide universal health care for its citizens, a large portion of US residents are either uninsured or underinsured, leading to decrease in health care access and health disparity (Sered & Fernadopulle, 2005; Shi & Singh). The US health care system has been described as a paradox of excess and deprivation, where some people receive too much but not necessarily coordinated care, while others have issues with access to too little care, creating health disparity among different groups of people (Bodenheimer & Grumbach).

With both extremes of care, excess and deprivation, fragmentation of care is observed across the US health care system (Berwick & Hackbarth, 2012). Fragmentation of care is an issue that plagues the US health care system and results in the reduction of quality of care rendered and drives up health expenditure (Berwick & Hackbarth; Bodenheimer & Grumbach, 2012; Shi & Singh, 2012). Lack of access to care creates fragmentation in the care rendered for health care recipients, especially those who reside in rural areas of the country. Due to the geographical isolation of rural communities and shortage of health care professionals, rural residents encounter lack of access to care due to both physical and effective lack of availability

(Rural Policy Research Institute [RUPRI], 2011; National Rural Health Association [NRHA], 2014; United Sates Department of Agriculture [USDA], 2014).

Disparity in Rural Health

Rural communities are a vital, diverse component of the US, representing nearly 20 percent of the nation's population (NRHA, 2014). The basic demographic feature of a rural area is that it is a place of low population density and small aggregate size. While there is not a standard definition of rural in terms of population statistics, the most long-standing US definition has been that of the US Census Bureau. The US Census Bureau defines rural as an open country and settlements of less than 2,500 residents, exclusive of embedded suburbs of urbanized areas of 50,000 or more population (US Census Bureau, 2013). However, this study will employ the US Department of Agriculture's definition of rural, as that is how the American Association of Nurse Anesthetists (AANA) classifies its members based on geographical practice region (AANA, 2014). The USDA (2014) defines a region as rural if it is: 1) an open countryside, 2) rural towns with less 2,500 people, or 3) urban areas with population that is greater than 2,500 and 49,999 that are not part of a larger metropolitan area. The obstacles that rural residents face to receiving quality care are more than the lack of geographical proximity to the nearest hospital.

Rural residents are less likely to have employer-provided health insurance, which impedes timely and consistent access to care, diagnostic tests, and prescriptions that can help avoid escalation in the morbidity of their health problems (NHRA, 2014). Additionally, they are less likely to engage in preventative care services and deferred care due to cost (Barnason & Morris, 2011). They tend to have lower socioeconomic status and more likely to live below the poverty level and subsist on federal Food Stamp Program (NRHA, 2014).

For rural residents, the disparities in income, education, and access to care create health status that is lower than that found in urban areas, thus health care needs are just as great or greater compared to urban communities (Shi & Stevens, 2010; Shi & Singh, 2012). More rural residents report poor or fair health, are likely to be obese, have diabetes, and limited physical activities than those who reside in urban region (Bennett, Olatosi, & Probst, 2008). Rural residents tend to be older and encounter higher death rates from accidents and myocardial infarctions (Barnason & Morris, 2011; Gorski, 2011; Shi & Singh). Rural residents are twice likely to die from unintentional injuries. In fact, the gap between rural and urban mortality rates is increasing (USDA, 2009). While only one-third of all motor vehicle accidents occur in rural areas, two-thirds of deaths attributed to these accidents occurs on rural roads. Likewise, the incidents of cerebrovascular disease and hypertension were also higher in rural residents (NHRA, 2014). Additionally, Medicare patients who suffered from an acute myocardial infarction who were treated in rural hospitals experience lower survival rates and are less likely than those who were treated in urban hospitals to received recommended treatments (Baldwin et al, 2010). Tables 1, 2, and 3 provide a comparison of population, income, poverty rate, educational level of urban versus rural residents.

Table 1

Comparison of rural to urban population

Year	Rural	Rural (approx. %)	Urban	Urban (approx. %)	Total
1980	40,936,013	18.7	183,955,010	81.2	226,542,204
1990	41,339,127	16.6	205,404,219	82.6	248,709,873
2000	44,775,350	15.9	236,649,250	84.1	281,424,600
2010	46,291,556	15.0	262,456,160	85.0	308,747,716
2013	46,217,597	14.6	263,911,242	85.4	316,128,839

Source: US Department of Agriculture (2014)

Table 2

Comparison of rural to urban income and poverty rate

Income	Rural	Urban	Total
Per-capita income (2012 dollars)			
2011	34,722	44,648	43,173
2212	35,324	45,188	43,735
Percent change	1.7	1.2	1.3
Poverty rate (%)			
1979	16.0	11.6	12.4
1989	17.5	12.3	13.1
1999	14.9	11.9	12.4
Poverty rate, latest model estimates (%)			
2012	18.4	15.5	15.9

Source: US Department of Agriculture Economic Research Service (2014)

Table 3

Comparison of education level in rural to urban population

Education (persons 25 years and older)	Rural	Urban	Total
Not completing high school			
1980	41.8	31.7	33.5
1990	31.6	23.4	24.8
2000	23.6	18.8	19.6
2008-2012	16.6	13.9	14.3
Completing high school only			
1980	35.3	34.4	34.6
1990	35.3	28.9	30.0
2000	36.1	27.2	28.6
2008-2012	36.4	26.8	28.2
Completing some college			
1980	12.4	16.4	15.7
1990	20.9	25.7	24.9
2000	25.4	27.8	27.4
2008-2012	29.4	28.9	29.0
Completing college			
1980	10.5	17.5	16.2
1990	12.3	21.9	20.3
2000	14.9	26.2	24.4
2008-2012	17.6	30.5	28.5

Source: US Department of Agriculture Economic Research Service (2014)

While it is apparent that health disparity exists for rural residents, the shortage of health care professionals serving in these areas compounds the issue of health care access for such communities, creating a major healthcare problem. There are 2157 Health Professional Shortage areas in rural and frontier communities compared to 910 in urban areas (NRHA, 2014). While approximately 20% of US population resides in rural areas, only about 10% of physicians practice in such communities (Health Resource and Service Administration [HRSA], 2014; Gorski, 2011). The gap is apparent in the number of specialists serving rural residents. There are approximately 40 specialists per 100,000 people in rural areas compared to 134 per 100,000 people in urban areas (Bodenheimer & Pham, 2006). Additionally, there are shortages of specialized health care providers to manage in-hospital acute patient care issues and emergency

situations and to provide anesthesia care (Association of American Medical Colleges [AAMC], 2010, 2014). Due to provider shortages and limited resources, rural hospitals may not always be able to hire separate providers for needed in-house patient care such as a hospitalist or a critical care physician, and anesthesia personnel. Additionally, care coordination may not be present due to provider shortages, resulting in an increase length of stay, cost, and risk for mortality (Epstein et al, 2010).

Rural hospitals are finding it difficult to retain these critical services because of inadequate funding and are unable to justify both of these providers on a full-time basis, as Medicare payments to rural hospitals and physicians are dramatically less than those of their urban counterparts for equivalent services, forcing about 500 rural hospitals to close in the past 25 years (NRHA, 2014). These shortages of specialized health care providers increase the vulnerability of rural communities by decreasing access to care and creating a fragmented rural health care system. Table 4 provides a national health snapshot comparison between rural and urban residents.

In order to sustain critical health care services, rural communities must actively pursue innovative strategies to recruit and retain health care professionals to provide local access to quality care (Burlingham, 2009). Additionally, cost is a concern due to decrease in federal funding to rural hospitals. This forces rural hospitals to pursue alternative modes of health delivery that will provide access, quality, and cost-effective care and embrace care redesign strategies that more effective and efficient in utilizing health care professionals (Burlingham). With health care expenditure increasing and funding to rural health care organizations decreasing (Shi & Singh, 2012), transformation of care delivery for rural residents is critical.

Table 4

National rural health snapshot

A national rural health snapshot	Rural	Urban
Percentage of USA population	Nearly 25%	75%
Percentage of USA physicians	10%	90%
Number of specialists/100,000 population	40.1	134.1
Population aged 65 years and older	18%	15%
Population below the poverty level	14%	11%
Average per capita income	$19k	$26k
Adults who describe their health status as fair/poor	28%	21%
Adolescents (12-17 years of age) who smoke	19%	11%
Male death rate/100,000 (1-24 years of age)	80	60
Female death rate (1-24 years of age)	40	30
Medicare beneficiaries without prescription coverage	45%	31%
Medicare spends per capita compared to US average	85%	106%
Medicare hospital payment-to-cost ratio	90%	100%
Percentage of poor covered by Medicaid	45%	49%

Adapted from "Rural Health Can Lead the Way"; Rural Wisconsin Health Cooperative (2002).

In order to understand the issues the US health care system is facing today and the urgent need to transform care delivery, it is important to examine why the nation's health care system is so fragmented.

The Fragmented US Health Care System

Patient care is significantly fragmented within the US health care system. The results of this fragmentation are evidenced by patients waiting weeks for routine appointments, using emergency rooms for primary care, driving miles between doctors' offices for a single condition, and having little understanding of their disease condition or their plan of care (IOM, 2000). The outcomes of this fragmented system include major defects in care, including 100 million medication errors per year, 100,000 or more unnecessary deaths per year, high costs of care as

compared to other Western countries, and poor population health outcomes (IOM). The healthcare system became fragmented as over time, the delivery of care has been designed around doctors and institutions, not around the patient's needs. Furthermore, doctors have splintered into specialties and subspecialties, and with the increase in technical skills, those doctors become more siloed and more highly compensated (Shi & Singh, 2012). While the level of technical skill has been rewarded, integration and team-based practice have not been valued. At the heart of this kind of system is the assumption that higher specialization leads to better health outcomes and quality of care (Baicker & Chandra, 2004).

The US healthcare delivery system is not a true system because care coordination is rare, specialist care is favored over primary care, quality of care is often poor, and costs are high and increasing at an unsustainable rate (Shi & Singh, 2012). Part of the problem is that the government's Medicare fee for service (FFS) payment system rewards more care, without regard to the value of that care. In addition, Medicare's payment system creates separate payment silos (e.g., inpatient hospitals, physicians, post-acute care providers) and does not encourage coordination among providers within a silo or across silos (American Hospital Association [AHA], 2013).

Health Care Reimbursement

With health care expenditure expected to reach 20% of GDP, it is important that health care cost be controlled (Shi & Singh, 2012). The Center for Medicare and Medicaid Services (CMS) called for new ideas on health care transformation models that will improve access and quality, while reducing cost (CMS, 2014). In order to comprehend the impetus for these innovative care model deliveries, it is important to understand the historical and current trend of health care reimbursement.

The history of payment for medical services. Traditionally, physicians were paid for health care services in a FFS reimbursement. FFS is based on the assumption that health care was provided in a set of individually distinct unit such as the anesthesia provided or the anesthesiologist's fee for that episode of care (Shi & Singh, 2012). Each of these services is itemized separately on a bill in which the patient may receive more than one bill from different providers or services (i.e. physician and hospital). The bill is then sent to a third party payer such as the patient's insurance company or the government in the case of those who are beneficiaries of Medicare. The third party payer will reimburse the charges based on the usual, customary, and reasonable amount, as set by the payer (Shi & Singh, 2012). The provider then passed the remaining amount to the patient in order to balance the bill. The problem with the FFS reimbursement is that providers have a financial incentive to deliver additional services that the patient may not need. The focus is not on delivering high quality care such as ensuring no complications from the service rendered, as providers can increase their reimbursement by increasing the volume (Shi & Singh, 2012, Bodenheimer & Grumbach, 2012). However, in order to improve the quality of the US health care system, it is important to not only focus on reducing cost but the overall health care quality, patient care experience, and improvement in population health. With that in mind, the Institute for Health Care Improvement (IHI) established three goals called the Triple Aim to improve the quality of the US health care system.

The Triple Aim – goal of the US health care system. In order to improve the value of the US health care system, new initiatives must be pursued. Thus, in October 2007 the IHI launched the Triple Aim initiative (Figure 4), designed to help health care organizations improve the health of a population and patients' experience of care (including quality, access, and reliability) while lowering, or at least reducing the rate of increase in the per capita cost of care

(IHI, 2014). Pursuing these three objectives at once allows health care organizations to identify and fix problems such as poor coordination of care and overuse of medical services. It also helps the health care organizations to focus their attention on and redirect resources to activities that have the greatest impact on the health of a population, where population is a defined group of people such as patients with diagnosis of heart failure, hypertension, or diabetes mellitus (Berwick, Nolan, & Whittington, 2008). The term population could be as specific as surgical patients residing in rural communities. Regardless of the population of focus, the same goals of improving the patient care experience through improvement in quality and patient satisfaction, improving population health, and reducing per capita cost expended on health care are pursued (Berwick, Nolan, Whittington, 2008).

Condition such as congestive heart failure is a common cause for hospital admissions. However, despite the health care expenditure to manage heart failure, about 40% of those patients are readmitted within 90 days of hospital discharge (Krumholz et al, 1997). Additionally, there are well-designed demonstration projects such as comprehensive failure management programs that have been shown to reduce readmission rates by 80% for this condition; yet, readmission rate is still a problem (Fonarow et al, 1997). Congestive heart failure is not the only condition that results in frequent readmission within 90 days post discharge, but it is a prime example of 1) poor patient care experience due to improper management requiring readmission in this define population, and 2) rising cost of care due to lack of disease management and readmission.

In order to pursue the Triple Aim, certain precondition need to be met such as having an integrator that accepts responsibility for all three components of the Triple Aim (Berwick, Nolan, & Whittington, 2008). The integrator is an entity that can pull together the resources to support a

defined population across the continuum of care (Levine et al, 2011). An example of an integrator is the large Health Maintenance Organization, Kaiser Permanente, with its financial resources and fully integrated health care system (Berwick, Nolan, & Whittington). Other integrators may be the Patient-Centered Medical Homes (PCHM), Accountable Care Organizations (ACO), and hospital organizations. Their specific functions are to provide the system with access to up-to-date medical knowledge and evidence about effectiveness of care and establish standard definitions and measures of quality and cost (Levine et al). Additionally, the integrator, in congruent with the goals of the Triple Aim, involves individuals and families to allow them to be better informed about their health status and be an advocate for those with chronic illnesses. The integrator is also responsible for population health management and deploying resources to effectively manage the health care needs of that defined population. Lastly, the integrator would find alternative care deliveries to reduce cost, while reserving quality of care.

Figure 4

Institute for Healthcare Improvement – The Triple Aim

Retrieved from http://healthcarereimagined.wordpress.com/2013/10/22/triple-aim-for-improving-healthcare/

The US health care system is plagued with waste that does not add value to patient care (Berwick & Hackbarth, 2012). Reducing waste in health care spending in the arena of overtreatment such as ordering excessive laboratory and imaging workups, failures in care delivery, and failures in care coordination that lead to fragmented care is paramount to improving the value of the US health care system (Berwick et al.). It is estimated that the amount of health care spending on these three wastes in health care is between 285 to 425 billion dollars (Berwick et al.). With health care spending expected to be about 20% of the GDP by 2020, new methods of health care delivery, utilizing the Triple Aim framework, need to be put in place to improve value through quality of care delivered, improvement in patient health care experience, and decrease cost. The Patient Protection and Affordable Care Act (ACA), in an effort in to improve the US health care scorecard and reduced cost, placed provisions for rewarding quality of care rather than quantity of care (Sebellius, 2013) One method aimed at reducing cost and improving value is through changing how health care is reimbursed. Rather than the traditional FFS payment, CMS and other third party payers are focusing on payment that reflects the quality of care rendered.

The changing tide of payment. The US health care delivery system is too disorganized and fragmented to meet the challenges at hand, with care delivery that is often overly complex and uncoordinated (IOM 2001). The complexity and lack of coordination within the health care system slows down care and decrease patient safety (IOM). These processes waste strengths of all health professionals involved to ensure that care is safe, effective, patient-centered, timely, efficient, and equitable (IOM). This fragmentation of care and lack of coordination is apparent in patients with chronic conditions. With approximately 40 percent of people with chronic illness have more than one such condition, the US health care system needs sophisticated mechanisms

to coordinate care to ensure that patients receive quality care. However, with the FFS payment system, follow up on the patient's outcome and care coordination is lacking, as that could reduce the volume of services rendered, and ultimately, reimbursement (AHA, 2013). Health care organizations, hospitals, and physician groups typically operate as separate silos, delivering care without the benefit of complete information about the patient's condition, medical history, services provided in other settings, or medications provided by other clinicians (IHI, 2014). These situations results in fragmentation of care and are associated with increase in cost of care, length of stay, and predisposes the patient to increase risk of mortality (Epstein et al, 2010).

With the U.S. spending roughly 30 percent or $700 billion on unnecessary health care services, consensus continues to build around the PCMHs and ACOs and their critical role in achieving the objectives of the Triple Aim: better care experience through improvement in patient satisfaction and quality of care rendered, better health of populations, and lower costs (Berwick, Nolan, & Whittington, 2008). In 2003, CMS launched a program entitled pay for performance (P4P) for 268 hospitals, where it measures certain quality data such as hospital readmission rates, infection rates, and management of selected diseases such as heart failure and pneumonia (CMS, 2013). Hospitals that perform high on these quality measures receive bonuses, while underperformers are subjected to penalties. From 2003 to 2008, participating hospitals realized an 18% improvement in their quality scores; however, that was only about two to four percent higher than nonparticipating hospital (Bodeheimer & Grumbach, 2012). Despite P4P, health care expenditure was still high with little improvement in quality. CMS instituted the Bundled Payment plan and announced that health care organizations can select to participate in the Bundled Payments for Care Improvement initiative, which includes four innovative new payment models (CMS, 2014). Under the Bundled Payments for Care Improvement initiative,

organizations will enter into payment arrangements that include financial and performance accountability for episodes of care. It is the hope that these models can lead to higher quality, more coordinated care at a lower cost to Medicare recipients. In the case of Model 4, which applies to acute care hospital stay, CMS will make a single, prospectively determined bundled payment to the hospital that encompasses all services furnished during the inpatient stay by the hospital, physicians, and other practitioners. Physicians and other practitioners will be paid by the hospital out of the bundled payment. All services furnished during related readmissions for 30 days after hospital discharge are also included in the bundled payment amount in an effort to improve the value of the health care (CMS, 2014). With reimbursement shifting from a fee for service to value-base, health care delivery is transformed from episodic care to keeping patients healthy by focusing on primary and preventive care.

While the PCMH is geared towards primary care and the maintenance of simple to chronic medical problems to keep patients healthy, another payment system is needed when the patient is undergoing surgical intervention (Patient-Centered Primary Care Collaborative [PCPCC], 2013). ACOs comprised of many PCMHs but also focus on the acute care needs of the patient where the specialized providers and hospital deliver their services. The key concepts of ACOs include decoupling from the volume and intensity of services performed, where the providers become accountable for the cost, quality, and hence, outcome of the population they serve. The payment reform reflects better value, improve outcome and quality, and reduce cost through collaboration and care coordination (Council of Accountable Physician Practice, 2013). While the provider and hospital receive one payment for the episode of periodic care rendered to keep patients healthy, patients who require surgical interventions are no longer considered healthy. In surgical cases, payment may be focused on an acute care episode, but there is no

coordination to improve the patient care experience and reduction of fragmentation of care (Szokol & Stead, 2014). Thus, a model of care is needed to coordinate the care of surgical patients to decrease postoperative morbidity and mortality and reduce readmission rate.

The Need to Transform Care in Surgical Patients

Surgical patients are at an increased risk for morbidity and mortality postoperatively (Smetana, 2009; Dimick et al., 2004). Thus, management of surgical patients requires health care providers that are familiar with both the surgical and medical history of the patient. Surgical care accounts for approximately 65% of hospital expenses, and within each year, many patients suffer complications, including death during the perioperative periods of care (Szokol & Stead, 2014). Complications such as infections, respiratory and cardiac issues, and thromboembolic events are encountered by the surgical patient and increase hospital costs and the patient's risk for mortality (Dimick; Ghaferi et al, 2009). However, these complications can be mitigated through coordinated care across the entire surgical period from decision to undergo surgical intervention through discharge (American Society of anesthesiologists [ASA], 2014; Szokol & Stead, 2014). A model, proposed by the ASA called the Perioperative Surgical Home (PSH), implemented in a few urban hospitals, has demonstrated promising results to improve the care experience of surgical patients and reflect the changing tide of episodic to continuum of care (ASA, 2014).

The Perioperative Surgical Home - How It Can Meet the Triple Aim

The PSH (Figure 5) is an umbrella health care model that is led by an anesthesiologist who directs the care of the surgical patient from the preoperative to the discharge stage of the surgical encounter. Realizing that many health care providers are involved in the different stages of the patient surgical experience and its association to medical errors from fragmentation of

care, the ASA proposed that a PSH model would result in continuity of care and improvement in quality of care by reducing failure to rescue events, optimization of comorbidities prior to surgical intervention, reduction of unnecessary medical and laboratory workup (ASA, 2014). The PSH, led by anesthesiologists and in collaboration with other health providers, involves the integration of three stages of the patient's surgical experience: preoperative, intraoperative, and postoperative phase.

In a typical case, a surgical patient encounters many different providers in the preoperative, intraoperative, and postoperative stages of the surgical case. This fragmentation of care potentially places the patient at an increased risk for medical errors or unnecessary procedures (ASA, 2014; Vetter et al., 2014; Kain et al., 2014). A method to reduce the variability in care is through transforming how the care is delivered and treating the episode as one continuum lead by one provider rather than as different stages of surgical care that would normally be managed by different specialties (Kain et al.). The quality of care is improved, while cost is reduced due to integration of care as (Garson et al, 2014). The PSH model of care is strikingly different from the traditional surgical care model. In the traditional surgical care model, the variable preoperative assessment and testing may lead to increase in cost of care and lack of medical optimization of the patient for surgery. In the postoperative phase of the traditional surgical care model, the surgeons would manage any complications or issues that may arise with variable postoperative follow up and support (Kain et al.). In the PSH model, however, there is shared decision making between the surgeon and the anesthesiologist, where the care rendered is patient-centered. Additionally, protocols for enhancing recovery are followed that includes perioperative pain and nausea/vomiting management, and goal directed

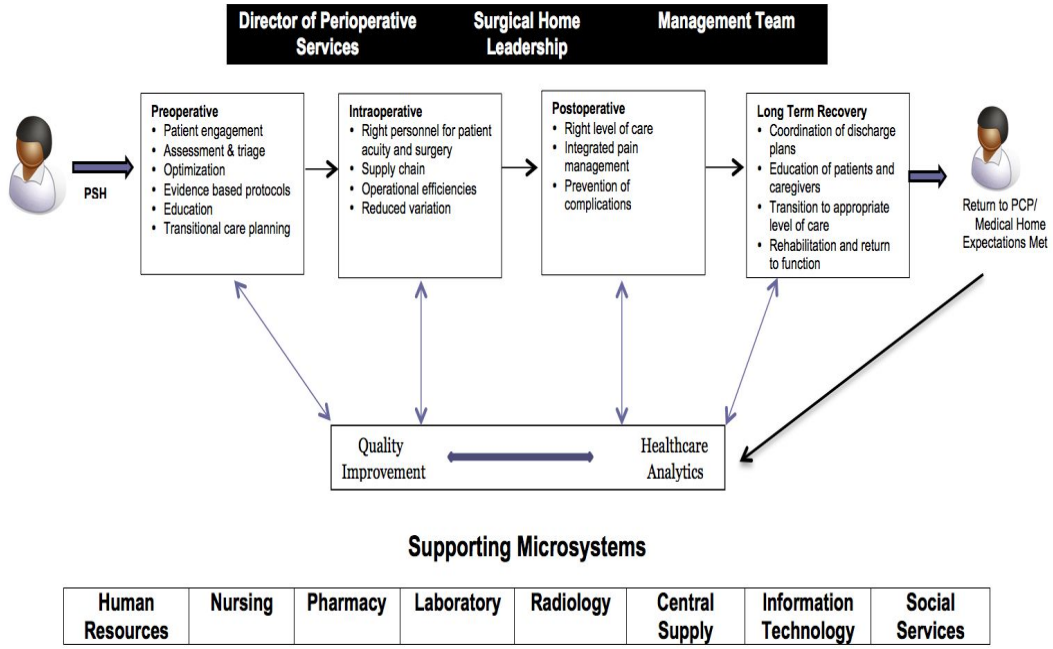
fluid administration (Kain et al.). The following section will describe the patient-focus care under the preoperative, intraoperative, and postoperative phase of the PSH.

The preoperative phase. Once a decision has been established by the patient and the surgeon that the patient needs surgical intervention, the patient will be referred by the surgeon to have a preoperative consultation with the anesthesiologist in the preoperative clinic. The purpose of the preoperative visit is for the performance of a comprehensive evaluation of the patient's medical problem and apply evidence-based for further preoperative testing and goal-directed medical optimization (Udeh & Brennan, 2009; Vetter et al, 2014). Additionally, the individualized anesthetic plan of care, along with the risks and benefits will be discussed with the patient. The consent for interventional pain treatment modality such as an epidural for postoperative pain management will be obtained. The main purpose of the preoperative consultation is to reduce case delays and cancellations due to inadequate medical optimization (ASA, 2014; Vetter et al., 2014)

The intraoperative phase. The anesthesiologist serves as the manager in the coordination of the operating room. While the anesthesiologist may not the person personally providing the anesthesia for the patient, she/he ensures communication between other anesthesia care team for optimal postoperative care management (Dexter & Wachtel, 2014). Likewise, scheduling of an appropriate anesthesia care team (certified registered nurse anesthetist [CRNA] and anesthesiologist) to best handle the care of the patient is critical to ensure quality care (Vetter et al, 2014). Quality of care is enhanced through the establishment of protocols such as the preferred anesthetic technique for a given procedure, multimodal pain management, and goal-directed fluid management (Garson et al., 2014).

Figure 5

The Perioperative Surgical Home (PSH) Model



Source: American Society of Anesthesiologists (2014). Retrieved from http://www.asahq.org/psh

The postoperative phase. The overseeing anesthesiologist is responsible for the coordination of the care that will span from the immediate postoperative phase to the patient's discharge from the hospital. The anesthesiologist will be working with nurse practitioners and the patient's surgical team so that potential postoperative complications can be timely addressed (Vetter et al., 2014). In academic centers, care of the surgical patients is delegated to junior surgical team members. Inadequate hand-offs and communications among health care providers are common etiologies of patient complications (Vetter). Additionally, the surgical issues that are addressed by the attending surgeon are handled early in the morning and later on in the day, thus timely attendance to issues cannot be addressed (Vetter). The goal of the postoperative phase is to recognize potential complications, manage postoperative pain, coordinate appropriate

discharge plans, and communicate with the patient's primary care team. Fragmentation of perioperative care exposes the patient to lapses in standards of care and potential adverse outcome, increase health care cost, and negative health care experience (Garson et al, 2014). The PSH creates seamless transition of care from the inpatient to the outpatient care setting and in cases where the patient has multiple co-morbidities; the anesthesiologist can interface with the patient's medical home (Vetter).

With coordination of care from the time that surgical intervention has been determined for the patient through discharge, the PSH can meet the Triple Aim. Preconditions for the pursuit of the Triple Aim includes: specifying a population of concern and having an integrator that will be responsible for all three components of the Triple Aim: improving the health care experience, improving population health, and reducing cost of care (Berwick, Nolan, & Whittington, 2008). Thus, the PSH will function as the integrator of the Triple Aim to 1) improve the individual's experience of surgical care from admission to discharge, 2) improve the health of surgical patient by reducing fragmentation of care, and 3) reduce the cost of care by utilization of standards of care, goal-directed therapy, care coordination to provide effective and timely interventions (Vetter et al, 2014). The following section provides a case study on a PSH for total joint replacement patients.

Total Joint Perioperative Surgical Home

Total joint arthroplasty (TA) is the largest expenditure per procedure in CMS-provided interventions and is expected to increase due to the rise in the number of "baby boomer" generation and incidence of obesity (Harms, Larson, Sahmoun, & Beal, 2007; Kaiser Permanente, 2012; American Academy of Orthopedic Surgeons, 2014). Additionally, with a decline in reimbursement, hospitals are struggling to maintain profitability for these types of

procedures. The costs for TA are driven by three major factors: 1) the cost of the joint implant, 2) hospital length of stay, and 3) cost of use of the operating room. Many approaches have been implemented to reduce TA expenditures, however, the savings have only been marginal, and none have address the broader issue of fragmented and inefficient perioperative system (Raphael et al, 2014). The transition of payment from a FFS to a performance-based bundle payment system has forced hospitals to adopt health care delivery model that focus on reducing fragmented care and increase efficiency of care delivered. The PSH model of care can address both the fragmented care and the inefficiency observed within the perioperative system. The following provides an example of the implementation of the Total Joint-PSH Program at the University of California-Irvine (UCI) Health System.

The Total Joint-PSH Program was established in 2012 with a multidisciplinary approach that included orthopedic surgeons, anesthesiologists, acute pain physicians, nurses, rehabilitation specialists, and hospital administrators. With all team members agreeing to the adhere to the standardization of care, the four phases of perioperative care, that included pre-operative, intra-operative, post-operative, and post discharge, were integrated. The pre-operative phase included expectant management, early discharge planning, protocol-driven health risk assessment, and medical optimization (Raphael et al, 2014). The purpose of the intra-operative phase is to standardize anesthetic, nursing, and surgical care protocols, and to provide goal-directed fluid therapy. Post-operative management includes the provision of multi-modal analgesia, a targeted recovery plan, early ambulation, nutritional management, and prompt intervention of surgical complications. Lastly, the goal of the post-discharge phase is to provide coordinated transition to an appropriate rehabilitation setting (Raphael et al).

A total of 206 patients underwent either a unilateral hip or knee total joint arthroplasty. UCI Health did not have an active TA program prior to implementation of the Total Joint-PSH Program, thus no prior cost comparison was made. However, the cost of the TA program under the PSH model was benchmarked to other nationwide programs that did not operate under the PSH model of care. The Total Joint-PSH Program's cost for a unilateral total hip and knee arthroplasty, not including the cost of implants, was approximately 7,000 and 6,000 dollars less than benchmark programs.

Despite a multidisciplinary team approach to the Total Joint-PSH Program, anesthesiologists have a leadership role in the PSH due their knowledge in the administration of anesthesia in the setting of coexisting diseases and understanding of surgical techniques. Thus, they are poised to led the PSH through reducing medical waste, improve efficiency throughout the operating room, utilize multi-modal techniques to enhance surgical recovery, and reduce length of stay (Dexter & Wachtel, 2014). The Total Joint-PSH Program has demonstrated improvement in efficiency and care coordination of the patient's surgical care experience in an urban hospital. Thus, a model like the Total-Joint-PSH may also enhance care delivery to surgical patients in rural health care institutions.

The Importance of Transforming Care in Rural Hospitals

In an effort to address the quality challenges faced by rural health care system, the National Research Council's (2005) report on *Quality through collaboration: The future of rural h*ealth developed a five-pronged strategy to address the quality challenges in rural communities. One of the strategy calls for the adoption of an integrated, prioritized approach to addressing both personal and population health needs at the community level. Thus, the recommendation is for Congress to provide the appropriate authority and resources to the Department of Health and

Human Services to support comprehensive health system reform demonstrations (IOM, 2002). These demonstrations should evaluate alternative models for achieving greater integration of personal and population health services and innovative approaches to the financing and delivery of health services, with the goal of meeting the six quality aims of the *Crossing the quality chasm* report (IOM 2001). In redesigned health systems, rural teams must have effective methods of providing supervision, expert consultation, and emergency backup to offer patients seamless care regardless of the setting or team member engaged with the patient at any given time (IOM, 2004).

The goal of rural health care system is to keep people healthy and to have a collection of providers each focused on providing specific services in their specific setting. It should be patient-centered and comprehensive in scope, making available services from pre-natal to geriatric care. While the goal is to treat illnesses, it should also focus on comprehensive wellness and support services (NRHA, 2013). Although rural communities face the reality that not all services can or should be provided locally, it does not diminish the need for these services to be reasonably accessible to all rural residents (National Research Council, 2005)

However, rural health care systems have been financially fragile, with many still have small operating margins, making it difficult for them to participate in innovative efforts intended to stimulate fundamental redesign of the delivery system. This financial fragility remains true as more than half of rural hospitals have difficulty controlling expenses relative to revenue, generating enough cash flow from inpatient services, and being able to repay their debt (NHRA, 2013). Medicare payments to rural hospitals and physicians are dramatically less than those to their urban counterparts for equivalent services. This correlates closely with the fact that at least 500 rural hospitals have closed within the last 25 years (NRHA, 2014). With rural residents

experiencing poorer health status than their urban counterpart, the need to sustain rural health care services cannot be overstated (NRHA, 2013; USDA, 2013). If current rural hospitals are forced to close due to financial reasons, the rural safety net infrastructure will deteriorate, thereby depriving local residents of crucial access to health care services.

Another problem that affects rural communities is the shortage of health care providers, as 65% of rural areas experienced health professional shortages. The redevelopment of providers in these affected rural areas may be nearly impossible considering the difficulty of recruiting physicians to some of these communities, thus one distinctive feature of many rural health care settings is the broader scope of practice for health care providers and the greater use of advanced practice nurses (Skillman, Kaplan, Fordyce, McMenamin, & Doescher, 2012). While it is critically important to sustain the rural safety net providers, it is also important to outline strategy that will link current payment system and patient care delivery model to health care systems of the future. Rural delivery systems are fragmented and inefficient (NRHA, 2013). Coupled with financial constraints due to changes from fee-for-service to quality-based payment, there is an urgent need to transform the rural health care system. With the payment changing to a value-based system, opportunities are emerging to change the organization, financing, and delivery of rural health care services in order to achieve the health reform in rural America.

The broad goal of rural health advocates should be to improve the health of rural citizens. Although many factors other than health services are fundamental to good health, there is also recognition of a need to provide the right services, to the right people, in the right places, at the right times as efficiently and less costly as possible (NRHA, 2013). Thus, the broad goal of rural health care redesign includes: balancing present concerns with future needs such as recognizing the need to provide a transition strategy from current silos of care to seamless patient-centered

care and provide appropriate incentives to encourage rural providers and urban systems to collaborate with one another in order to provide seamless, non-duplicative patient care services (NRHA, 2013). The federal government has supported a variety of programs addressing the Triple Aim in rural health care system. The ACOs have been given incentives from CMS to include both Federally Qualified Health Centers and Rural Health Clinics within their provider mix and advanced payment mechanism strategies have been added for small rural provider capacities to lessen capital needs and focus on care collaboration (CMS, 2014).

Care collaboration models are important in increasing value to rural health care and decreasing the cost associated with fragmentation of care. Care collaboration model should be designed like a rural ACO-like organization responsible for patient-centered care and shared responsibility. Care transformation should be built around assessing the needs of the community and specific interventions be based on utilization, cost, and health outcome goals (NRHA, 2013). An example where such care collaboration model would be beneficial in rural communities would be a perioperative surgical home to provide coordinated care to surgical patients, as access to surgical and obstetrical services is fundamental to rural communities (NRHA, 2013). Rural residents utilized eleven percent of total hospital days of care and underwent 51 million surgical and nonsurgical procedures annually (CDC, 2014). Surgical patients in rural hospitals are at increase risks for complications due to fragmented care much like their urban counterparts, and may be more so due to the shortage of health care professionals. An ACO-type of health care delivery for surgical patients, like the PSH, would reduce postoperative complications related to fragmented care. While such models are in place to provide coordinated care to surgical patients in selected urban hospital by anesthesiologists, greater than 60 percent of the anesthesia care in rural communities is provided by certified registered nurse anesthetists ([CRNA], Wilson, 2012;

AANA, 2013). In step with the IOM (2010) report on *The Future of Nursing: Leading Change, Advancing Health* that recommends nurses should be allow to practice to their full extent of their education and to be partners in the redesigning of health care, CRNAs are in good position to be a part of the care transformation for surgical patients in rural hospitals by championing this model in rural communities.

Certified Registered Nurse Anesthetists in Transforming Care

CRNAs have been a vital part of health care for more than 150 years. In addition to working side by side with anesthesiologists in an anesthesia care team model, CRNAs can also practice independently, providing all anesthetic techniques and pain care services on surgical, dental, and podiatric cases. Nurse anesthetists care for patients at all acuity levels across the lifespan in a variety of settings for procedures including surgical, obstetrical, diagnostic, therapeutic, and pain management (AANA, 2013).

Educational and Training Requirements for Nurse Anesthetists

The education and clinical experience to be considered admission to a nurse anesthetist training program includes a Bachelor of Science in Nursing, a current license in the state where one practices as a registered nurse, and have at least one year experience in a high acuity intensive care unit. Additionally, current certification as an advance cardiac life support provider and the critical care registered nurse credential is required prior to submission of application to the nurse anesthesia program (University of Cincinnati [UC], 2014). Many schools require a minimum science grade point average of 3.0 and a score of at least 150 each on the Revised Graduate Record Examination's verbal and quantitative reasoning portions of the examination. Additionally, there is a rigorous personal interviewing and peer review process prior to being selected as a candidate for admission to the CRNA training program (UC).

The nurse anesthesia training program awards each graduate with a minimum of a master's degree. The length of nurse anesthesia programs ranges between 24 to 36 months of intensive didactic and clinical training, depending on each university's requirements. As of August 2013, there are 113 accredited nurse anesthesia programs in the US, in which 16 of these programs award a clinical doctorate degree for entry into practice (Council on Accreditation [COA], 2013). Many more programs are planning transition to a doctorate path as an entry into practice, with all nurse anesthesia programs required to provide doctoral education by January 2022 (COA Standards, 2014). There are more than 2,200 clinical sites located in university-based or large community hospitals where nurse anesthesia students undergo their intensive training. After graduating from an accredited nurse anesthesia program, each student must pass the national certification exam and be credentialed as a CRNA (National Board of Certification and Recertification for Nurse Anesthetists [NBCRNA], 2013).

Nurse Anesthesia Scope of Practice

While there were many legal challenges to nurse anesthesia practice, the field of anesthesia is a recognized as both a nursing and a medical specialty that is unified by the same standard of care (AANA, 2013). Nurse anesthesia practice may include, but is not limited to, the performance of a comprehensive patient history and physical examination prior to procedure or surgical intervention, conductance of a pre-anesthetic evaluation, obtainment of an informed consent for anesthesia, and the development and initiation of a patient-specific anesthetic plan of care. Additionally, CRNAs are also responsible for the selection, ordering, and administration of pharmacologic agents during the perioperative phases of care. The selection and insertion of invasive and noninvasive monitoring modalities are also within the responsibilities and scope of practice of CRNAs (AANA, 2013).

Prior to the delivery of an anesthetic, CRNAs plan and initiate anesthetic techniques, including general, regional, local, and sedation that is appropriate for the medical condition of the patient and the surgical procedural needs of the case. In addition to providing anesthesia in the operating room and obstetrical units, CRNAs provide acute, chronic, and interventional pain management services (AANA, 2013). Nurse anesthetists also respond to emergency situations by performing airway management and other techniques in the operating room or other patient care areas, facilitate emergence and recovery from anesthesia, provide post-anesthesia care, conduct a post-anesthesia evaluation, and discharge patients from the post-anesthesia care unit or medical facility (AANA).

The History of Nurse Anesthesia Practice

Prior to the late 1800s, surgical procedures were met with high morbidity and mortality due to the high risks of infections and the problem with the lack of consistent anesthesia provider. However, in the 1880s, Joseph Lister and other German physicians introduced the concept of antisepsis through the use of germ killing agents (Pitt & Aubin, 2012). With the problem of infection greatly reduced, the issue of not having consistent anesthetists became the focal point of surgical morbidity and mortality (Gunn, in Nagelhout & Zaglaniczny, 2005).

Historically, many physicians did not choose the specialty of anesthesia due to the perception of limited prestige and low pay, and for those that did choose to enter anesthesiology, it was an effort to gain front row seat into the surgical theater. Thus, often times, the patient was not afforded the continuous vigilance that is needed for every anesthetic. In the 1880s, many surgeons began advocating for anesthesia providers who are devoted to the delivery of anesthetics, rather than the occasional anesthetist (Gunn, in Nagelhout & Zaglaniczny, 2005). While England developed a physician-only model for its anesthesia specialty, no particular

staffing model was chosen in the US. With surgeon advocating for trained anesthetists, many of them began to encourage new nursing graduates to enter the field of anesthesia.

In the US, the first evidence that nurses delivered anesthesia was during the civil war where a nurse was connected to the use of chloroform as documented by the military annals chronicling the war. However, in the 1880s, Sister Mary Bernard who was trained as a nurse took over the anesthesia duties of St. Vincent's Hospital in Erie, Pennsylvania. As such, she has been credited with being the first nurse anesthetist in the US. With news of this role spreading, many hospitals took on nurse anesthetists throughout the Midwest.

Surgeons' continued advocacy for the consistent anesthetist lead one nurse anesthetist to be named the "Mother of Anesthesia". Desired to achieve international fame for his surgical procedures, Doctor William Mayo, his sons, and other physicians took charge of the newly open St Mary's Hospital in 1889 in Rochester, Minnesota. The Catholic Sisters offered the job of anesthetists to two trained nurses. One of them was Alice Magaw, who through her accomplishments in the delivery of more than 14,000 anesthetic cases with zero mortality, lead Dr. Charles H. Mayo to title her "the Mother of Anesthesia" (Magaw, 1906; Koch, 1999).

With the success of utilizing nurses in anesthesia in Rochester, Minnesota, many other hospitals followed, employing nurses by their hospital administrator to ensure that the nurses' sole job is to provide anesthesia. Many surgeons also invited nurses to enter the field to become their private anesthetist. With the success of St. Mary's Hospital, Dr. George Crile hired Agatha Hodgins, a nurse, to be his private nurse anesthetist at Lakeside Hospital in Cleveland, Ohio. As with St. Mary's Hospital, Lakeside Hospital enjoyed international fame for surgical and anesthesia success and received many requests from physicians and nurses for anesthesia training. With the US entering World War I in 1908, Dr. Crile and Nurse Hodgins trained

English and French physicians and nurses in the art and science of anesthesia (Gunn, in Nagelhout & Zaglaniczny, 2005). In addition to her accomplishments as a nurse anesthetist, Agatha Hodgins was also the founder of the AANA. The AANA is the professional organization whose mission is to advance patient safety, practice excellence, and its members' profession. Currently, there are 47,000 CRNAs and nurse anesthetists students who are members of the AANA (AANA, 2014).

There were other nurse anesthetists that served on the battle field in World War I. Anne Penland, a nurse anesthetist from the Presbyterian Hospital in New York, served as the first US nurse anesthetist on the British front. Having won the confidence from British medical officers, she trained their own nurses in anesthesia. The reputation gained by US nurse anesthetists during World War I led to a proliferation of nurse anesthesia programs across the nations (Gunn, in Nagelhout & Zaglaniczny, 2005). However, the climate for expansion of this nursing specialty and demand for its graduates was temporarily suspended due to legal challenges brought forth by some physicians as to whether the administration of anesthesia is under the scope of nursing practice.

Legal Challenges to Nurse Anesthesia Practice

Although a few physicians enter the field of anesthesia, Dr. Francis Hoeffer McMechan began a crusade in 1911 to claim the field of anesthesia solely for physicians. Though he was disable and could no longer practice medicine, he and his wife took on the mission to stop nurses from practicing anesthesia. The legal challenge was directed towards Lakeside Hospital, where the nurse anesthesia training program had to be suspended. It went all the way to the Ohio Board of Medicine, alleging that nurses administering anesthesia was illegal, as that constituted the practice of medicine. Dr. George Crile and Lakeside hospital persuaded the Ohio Board of

Medicine to lift its order, thus allowing for the continuance of the nurse anesthesia training program. Dr. Crile and other physicians went on to the Ohio legislature and amended the language in the state's Medical Practice Act to ensure the legality of nurse anesthesia practice (Gunn, in Nagelhout & Zaglaniczny, 2005).

Many other challenges to nurse anesthesia practice brought forth by the state's medical association realized the same fate. In Kentucky, the court of appeals confirmed through its opinion that the administration of anesthesia does not solely belong to the practice of medicine and that nurse anesthetists properly exercise judgment when performing such in the *Frank v. South* case (Blumenreich, 1984; AANA, 2014). Undeterred by the Kentucky Appellate Court's ruling, a small group of anesthesiologists in California challenged Dagmar Nelson, a nurse anesthetist, with the practice of medicine. The California Supreme Court ruled in favor of Dagmar Nelson, citing that the administration of anesthetic is a function of the nurse anesthetist under the supervision and in the presence of a physician or the physician's assistants (Van Nest, 2006)

Nurse Anesthetists and Quality of Care

Since the Dagmar Nelson case, there have not been challenges as to the legality of nurses providing anesthesia. However, there have been allegations brought forth by organized medicine to challenge the quality of care that nurse anesthetists provide. The ASA, founded in 1936, declared its intention to make anesthesia an all-physician specialty. Changing the title from "physician anesthetist" to "anesthesiologist" to eliminate the confusion with the term "anesthetists" in reference to all anesthesia providers, physicians and nurses included. In the wake of its campaign, the ASA established ethical guidelines for its members declaring that members who trained nurse anesthetists are engaging in unethical practice. Despite the ethical

guideline, many members continue to train nurse anesthetists due to the insufficient number of anesthesia providers to meet the nation's needs. However, because of its campaign to make anesthesia an all physician specialty, some of the leaders in the field of anesthesiology set out to destroy the public trusts in nurse anesthetists through series of articles that were published mainly in women's magazines, questioning the competence of CRNAs and advocating the use of anesthesiologists. For surgeons and hospital administrators who had long experienced the achievements of nurse anesthetists, along with the some organized medicine group and the American Hospital Associations, decry the actions of some of these anesthesiologists and affirmed their continued support for CRNAs (Gunn, in Nagelhout & Zaglaniczny, 2005).

To support the ASA's position to make anesthesia an all-physician specialty, Beecher and Todd (1954) conducted the first anesthesia outcome study in the US. Their five year multicenter prospective study found that CRNAs experienced one half the mortality rates as compared to anesthesiologists, which had shocked and dismayed many physician anesthetists (Beecher & Todd, 1954). Furthermore, there was no difference in the physical status of the patients across groups of providers. However, the result of this outcome study had no effect on the continued campaign to claim this specialty practice solely for physicians and to discredit CRNAs.

Despite challenges to the disciplinary turf of anesthesia practice and the ASA's continued campaign to claim their sole rights to this specialty, there have been many regulatory changes to CRNA practice. The AANA and its members have persistently fought off challenges from organized medicine. In the 1985 case of Bahn v NME Hospitals, the court of appeals ruled in favor of CRNAs who work with other physicians to compete with anesthesiologists and that CRNAs could bring forth federal antitrust suit against parties that did not allow competition of anesthesia providers (AANA, 2014). Another lawsuit brought forth by the Minnesota

Association for Nurse Anesthetists in 2004, with support from the AANA, against hospitals and anesthesiologists for wrongful termination of CRNAs, antitrust violations, and Medicare fraud brought substantial regulatory changes as to how CRNAs were being reimbursed (Wilson, 2012). Between these two cases and federal legislative efforts brought forth by the AANA, Medicare Part B reimbursement (for physician services) legislation for CRNAs was signed into law in 1986 and granted nurse anesthesia the first nursing specialty to be accorded direct reimbursement rights under the Center for Medicare Medicaid Services (Bruton-Maree, in Foster & Callahan, 2011; 2011; Wilson).

However, there are certain conditions that must be met in order to obtain reimbursement in the Medicare Program, one of which is physician supervision of CRNAs. The original Medicare regulations required that physician supervision of CRNAs is a requirement for hospitals, ambulatory surgery centers, and critical access hospitals in order to receive Medicare payment. However, these regulations do not require that the supervising physician be an anesthesiologist (Bruton-Maree, in Callahan & Foster, 2011). Thus, the AANA pursued legislation that would remove the physician supervision requirement and deferring to the state to make such decision. The ASA opposed the proposal and called for a national study comparing anesthesia outcomes between CRNAs and anesthesiologists. However, the CDC rejected this study, as poor anesthesia outcomes were so rare and that it would cost an unnecessary 15 million dollars of government money to conduct such study (Bruton-Maree, in Foster & Callahan). While it took four years of legislative efforts by the AANA, Center for Medicare and Medicaid Service (CMS) ruled in 2001 that states can opt-out of the federal physician-supervisory requirement and that each state's governor must send a letter of attestation to CMS if it wants to opt-out of this federal requirement (AANA, 2010). Within one month of this regulation, Iowa

became the first state to opt out of this federal requirement. Since then, 16 other states have followed (AANA, 2014).

When the final ruling was published, CMS expressed interest in a study to compare anesthesia safety in states where physician supervision was required versus those who have opted out. The landmark study *"No harm found when nurse anesthetists work without supervision by physicians"* concluded that there were no differences in outcome between the three model of anesthesia care delivery: CRNAs practicing solo, CRNA practicing in an anesthesia care team with an anesthesiologist, and anesthesiologist solo practice (Dullisse & Cromwell, 2010). In opt-out states, the complication rates for the CRNA solo group were essentially identical to those for the anesthesiologist solo group. The difference between complication rates for nurse anesthetist solo and anesthesia care team was also not statistically different in opt-out states. Anesthesiologists practicing solo explained about one-third of the decline in anesthesia care team, and CRNA practicing solo accounted for the other two-thirds. Despite the shift to more anesthetics performed by nurse anesthetists, no increase in adverse outcomes was found in either opt-out or non-opt-out states, with declining mortality observed to be the norm. Moreover, the mortality rate for the nurse anesthetist solo group was lower than for the anesthesiologist solo group in opt-out states both before and after opting out, although the difference was statistically significant only before the state opted out (Dulisse & Cromwell). These results of this landmark study do not support the hypothesis that allowing states to opt out of the federal supervision requirement resulted in increased surgical risks to patients, nor does it support the claim that patients will be exposed to increased risk as a consequence of more CRNAs practicing without physician supervision (Dulisse & Cromwell).

Another study published by the Lewin Group determined that CRNAs acting as the sole anesthesia provider is the most cost-effective model (Hogan, Siefert, Moore, & Simonson, 2010). While anesthesiologists and CRNAs provide high quality care to US population, the Lewin Group concluded that CRNAs are less costly to train than anesthesiologists, and can perform the same set of anesthesia services, including relatively rare and difficult procedures such as open heart surgeries and organ transplantations, pediatric procedures, and others without measureable differences in the quality of care between CRNAs and anesthesiologists or by anesthesia delivery care model ((Hogan, Siefert, Moore, & Simonson, 2010).

Other research on CRNA quality of care prior to the above two studies have concluded similar results. While anesthesia-related deaths are as low as 1 in 200, 000 to 300, 000 cases, questions remain as to surgical patient's safety and the type of anesthesia providers. Pine, Holt, & Lou (2003) concluded that there was no statistically significant difference in surgical mortality of over 400,000 surgical cases spanning eight different operations and the type of anesthesia provider. Hospitals that do not have anesthesiologists supervising CRNAs had similar results to hospitals where anesthesiologist provided or directed care. Likewise, Needleman & Minnick (2006) concluded that complication rates between CRNAs and anesthesiologists were similar with respect to maternal outcomes. Hospitals that utilize only CRNAs, or a combination of CRNAs and anesthesiologists, do not have systematically poorer maternal outcomes compared with hospitals using anesthesiologist-only models (Needleman & Minnick).

Contribution of Nurse Anesthetists to the Science of Anesthesia

Nurse anesthetists have an impact to the field of anesthesia not only through the provision of safe, effective anesthesia care but also have fine-tuned anesthetic techniques for various surgical cases and developed innovations in the anesthesia machine that delivers the volatile

anesthetics. Alice Magaw, through her observations, recording, and analysis of her findings of more than 14,000 anesthetics published her work in various journals such as *The Lancet*, *St. Paul Medical Journal*, and *Surgery, Oncology, and Obstetrics* (American Association for the History of Nursing, 2007). Magaw not only reported her experiences with different anesthetic techniques, she advocated for selected techniques and cited their advantages. Other nurse anesthetists such as Alice Maude Hunt and Agatha Hodgins fine-tuned the technique of nitrous-oxide/oxygen as an anesthetic modality for thyroid surgery (Koch, 2015).

The anesthesia machine is a vital part of anesthesia practice that delivers breaths and anesthesia gas for the patients and monitors the patient's vital signs. Agatha Hodgins, Margaret Boise, Helen Lamb, along with their surgical colleagues were instrumental in the development of the early anesthesia machines. Helen Lamb, Olive Berger, and Betty Lank pioneered various techniques that allowed for the evolution of pulmonary, cardiac, and congenital cardiac surgery. The technique of control mechanical ventilation was perfected at Lakeside Hospital by Gertrude Fife and her surgical colleagues (Gunn, in Nagelhout & Zaglaniczny, 2005)

In addition to serving as clinicians, CRNAs are also researchers, educators, mentors, advocates, and administrators (AANA, 2014). CRNAs are vital to the US health care system, especially in rural communities where they are, in most instances, the sole provider of anesthesia services allowing hospitals to offer surgical, obstetrical, and trauma stabilization services (AANA, 2014).

The Role of Nurse Anesthetists in the Perioperative Surgical Home

Rural communities confront a different mix of health and health care needs than do urban areas, as this population tends to be older than urban counterpart and experience higher rates of limitations in daily activities as a result of chronic illnesses. Rural populations exhibit poorer

health behaviors (i.e., higher rates of smoking, obesity, and lower rates of physical activities) relative to most urban populations (NRHA, 2014). Coupled with the problem of health professional shortage, transformation of care delivery is critical. Unless action is taken, the future burden of chronic disease in many rural communities will be enormous (IOM, 2004). However, it is not just simply providing basic care as certain core services such as surgical and obstetrical services should be available to rural residents, as health care has technical, cultural, social, and emotional dimensions. Patients are best served when they receive quality health care in their home environment, therefore requiring patients to travel long distances to receive their health care not only raises the cost and complexity of care, but also may impair outcomes by increasing the patient's physical and emotional stress, reducing the likelihood of seeking follow-up care, and limiting proximate family support. CRNAs recognize such needs as evidence by the fact that more than 60 percent of anesthesia provided in rural communities are performed by nurse anesthetists (Wilson, 2012; AANA, 2013). With surgical patients in rural health care institutions experiencing fragmented care, CRNAs need to adopt models of care delivery to address this crisis. The PSH model has demonstrated that it can achieve the Triple Aim in urban hospitals. Thus, the PSH may be effective in reducing fragmentation of care in rural communities. Since CRNAs are mainly the sole provider of anesthesia services in rural communities, it seems likely that they should take the leadership and implement such a model to reduce fragmentation of care for rural surgical patients.

While their main role is to provide anesthesia care in the operating room, CRNAs also perform anesthesia-related care upon request to facilitate diagnostic, therapeutic, and surgical procedures. Additional, they may be requested to provide consultation for pain management associated with obstetrical labor and delivery, management of emergency situations, or

management of acute and chronic pain (AANA, 2010). Other than responding to request for expertise in airway management of a patient in respiratory or cardiovascular collapse, CRNAs' practice does not extend outside of the post-anesthesia care or obstetrical care units.

The PSH model is a means to improve access to quality, cost effective care for rural residents, not a removal from the traditional intraoperative role where anesthesiologists and CRNAs usually function at. Anesthesiologists have extensive training in preoperative evaluation, intraoperative management, postoperative, critical care medicine, and acute and chronic pain management, allowing them to care for the patients across the lifespan and the spectrum of co-existing illnesses (Vetter, 2014). While CRNAs have extensive training in the provision of perioperative anesthesia care, the addition of the scope of practice and skill sets of an adult-gero acute care nurse practitioner (AG-ACNP) would enhance CRNAs' ability to function with greater independence and across the continuum of care in the PSH model in rural health care institutions.

The Adult-Gero Acute Care Nurse Practitioner

While some of the curriculum for CRNAs is similar to AG-ACNPs, CRNAs' training focuses on the provision of anesthesia care. On the contrary, AG-ACNPs' curriculum allows for the provision of care across all settings but not the delivery of anesthesia. Due to the all-encompassing in-patient care needs of the rural hospitals, attainment of the AG-ACNP credential would allow dual practice for CRNAs such that care of the patient occurs across the continuum, not just in the perioperative phase.

AG-ACNPs are also registered nurses who are prepared, through advanced education at the Master's or Doctorate level and clinical training, to provide a wide range of preventive and acute health care services to individuals aged thirteen and older (American Association of

Critical-Care Nurses [AACN], 2012). With the shortage of critical care physicians and the increasing need for more acute care services, AG-ACNPs have emerged to fulfill that need due to their unique aptitude and skills to manage a patient's care across the full continuum of acute care (AACN). Their education and training qualifies the AG-ACNP to independently perform comprehensive health assessments, order and interpret the full spectrum of diagnostic tests and procedures, utilize a differential diagnosis approach to reach a medical diagnosis in addition to ordering, providing, and evaluating the outcomes of interventions (AACN). The role of the AG-ACNP is to provide "advanced nursing care across the spectrum of health care services to meet the specialized physiologic and psychological needs of patients with acute, critical, and/or complex chronic health conditions" (AACN, p.6). AG-ACNPs are also involved in the provision of restorative, curative, rehabilitative, palliative, and/or supportive end-of-life care as determined by patient needs (AACN, 2012).

The goals of treatment provided by the AG-ACNPs include patient stabilization for acute and life- threatening conditions, minimizing or preventing complications, attending to comorbidities, and promoting physical and psychological well-being. Additionally, AG-ACNPs work to restore patients to their maximum health potential or providing palliative, supportive, and end-of-life care, and evaluating risk factors in achieving these outcomes (AACN, 2012). AG-ACNPs have the skill sets to assess, educate, and provide referrals for the patient, family, and caregiver and implement transition of care level. In addition to managing patient care needs, the AG-ACNP utilizes "invasive and noninvasive technologies, interventions, and procedures to assess, diagnose, monitor, and promote physiologic stability" (AACN, p. 7).

Like CRNAs, AG-ACNPs are independent advanced practice nurses that provide quality, safe, and cost-effective care, and also practice in in rural settings. No studies have

shown that there were differences in patient outcomes such as health status, physiologic measures, satisfaction, and use of specialists, emergency room, or inpatient services (O'Grady, 2008).

Nurse practitioners (NP) have been integral in the critical care units for over 25 years (Sherry, 2012). With the shortage of critical care physicians, NPs play a vital role in the staffing of intensive care units (ICU) and are involved in the daily management of critically ill patients (Sherry). Some of their patient care activities include rounding on critically ill patients, admitting/discharging of patients from the ICU, placement of invasive monitoring devices, and performing procedures such as intubation, chest tubes placement, and bronchoscopy. Comparing outcomes between services provided by NPs versus residents in the medical intensive care units, numerous studies concluded that there were no measurable differences between mortality rates, length of stay in the ICU and hospital, and post-hospital discharge destination (Hoffman et al, 2005; Gershengorn et al, 2011).

The utilization of AG-ACNPs in Level I trauma centers can result in an increase in patient and staff satisfaction, as patient care needs are addressed in a timely fashion, thus decreasing overall trauma service's length of stay, resulting in a reduction of significant hospital charges (Collins et al, 2013). Surgical residents and attending physicians' accessibility have been a longstanding problem in Level I Trauma centers, as they are involved with all aspects of the patient's care in addition to evaluating new admissions in the emergency department. As a result of this, patient care needs and handoffs are delayed. The addition of the AG-ACNP allows for patient care goals to be addressed more timely as they are always accessible to patients, their families, and other health professionals caring for the patient (Collins et al).

Currently, there are 339 NP training programs of which 89 offering the AG-ACNP credential. NPS that are trained in critical care, such as the AG-ACNP, are valuable in hospitals due to their expertise in the management of critically ill patients. Utilized in 62% of academic medical centers, AG-ACNPs provide efficient, quality care; with units that utilized AG-ACNPS demonstrating an increase adherence to clinical guidelines (McCarthy, O'Rourke, & Madison, 2013).

Adult-Gero Acute Care nurse practitioners, like CRNAs, are vital to the US health system through the provision of quality and cost effective care (Bauer, 2010). The dual certification practice of a CRNA and an AG-ACNP would be an asset to rural health care institutions. Rural hospitals face budgetary constraints; thus having one practitioner who is dually certified as both an AG-ACNP and a CRNA mean that these hospitals would not need to compensate two separate providers to 1) provide anesthesia care, and 2) to manage the patient from admission to discharge. O'Neal et al (unpublished) found that over 77% of rural hospital administrators perceived that the addition of a dually certified CRNA/AG-ACNP would improve or significantly improve the overall quality of care in rural hospitals (n= 188). Additionally, the top four needs of rural hospitals are to: 1) manage acute care patients, 2) manage emergent situations, 3) provide anesthesia care, and 4) manage critical care admits (O'Neal et al.). The majority of hospital administrators also perceived that having dual CRNA/AG-ACNP competencies would enhance patient care by collaboration with emergency and intensive care physicians and other medical providers. Additionally, the dually certified CRNA/AG-ACNP could also optimize the patient for surgery through evidence-based preoperative evaluation and testing, thus potentially reducing surgical cancellation. Patients can also be followed postoperatively through discharge. With these patient care activities, the dually certified AG-

ACNP/CRNA is incorporating the PSH model of care. Thus, adoption of the PSH for the care of surgical patients in rural hospitals would formalize that care delivery and reduce fragmentation of care. Additionally, the dual AG-ACNP/CRNA role would fulfill the IOM's recommendation for nursing to practice to the full extent of their education and be a partner in the redesigning of care delivery.

While the addition of the AG-ACNP certification into CRNA practice would seem to transform the care of rural surgical patients, no current study exists that examines CRNAs' intention to obtain the AG-ACNP certification. Importantly, there is no available instrument to measure such. Thus, the purpose of this study is to develop and validate an instrument that measures the constructs of the Theory of Planned Behavior, attitude, subjective norm, perceived behavioral controls, and intention, of CRNAs who work with surgical patients in rural health care institutions, to obtain the AG-ACNP certification.

The Theory of Planned Behavior

The Theory of Planned Behavior (TPB), developed by Ajzen (1991, 2002), accounts for the process by which individuals decide on a particular course of action. The theory asserts that the probability of engaging in a given behavior is determined by one's intention to engage in the behavior. The premise of TPB is that intention, thus in turn, human behavior, is influenced by three determinants: attitude and subjective norm toward the behavior, along with the degree of perceived behavioral control. Intention is assumed to capture the motivational factors that influence a behavior; thus, the stronger the intention to engage in the behavior, the more likely the behavior in question will be performed (Ajzen, 1991). According to Ajzen, when behaviors do not exhibit problems with control, they can be predicted from intention with good accuracy.

While all three constructs contribute to the prediction of intention, the relative importance of attitude, subjective norm, and perceived behavioral control in the prediction of intention is expected to vary across behaviors and situations (Ajzen, 1991). Previous studies revealed that a considerable amount of variance in intentions can be accounted for by these three predictors, with an average multiple correlation of 0.71 for various behaviors such as searching for a job, participating in an election, exercising after birth, and attending class (as cited in Ajzen). The addition of the construct, perceived behavioral control, to the prediction model led to considerable improvements in the prediction of intention as the regression coefficients of perceived behavioral control were significant in every study across various disciplines (Ajzen). Additionally, with only one exception, attitudes toward the various behaviors made significant contributions to the prediction of intentions. However, the results for subjective norms were mixed, with no clearly discernible pattern. Thus, according to Ajzen, for the behaviors studied personal considerations such as attitude and perceived behavior control tended to overshadow the influence of perceived social pressure.

While not all behaviors have been studied, Ajzen (1991) advised that in some behavior, it may be found that only attitudes have a significant impact on intention. However, in other behavior, attitudes and perceived behavioral control are sufficient to account for intentions. Lastly, all three predictors make independent contribution to intention, depending on the behavior in question. Recent studies have demonstrated similar results in the prediction of intention from the attitude, perceived behavior control, and subjective norm. Since its inception almost 30 years ago, the TPB has been one of the most frequently cited and influential model in the prediction of the human social behavior (Ajzen, 2011). The following section discussed three recent studies utilizing the TPB to explain intention of various social behaviors.

Predicting Choice of Online Versus Traditional Course

The TPB was utilized to explain students' choices in learning environment through measurements of their attitude, perceived behavioral control, and subjective norms and their intentions to enroll in either a traditional versus and online course (Robinson & Doverspike, 2006). The result of the study indicated that attitude and subjective norm were unique predictors ($p<.01$) in the students' intention to enroll in an online course, while perceived behavioral control was not ($p>.05$) (Robinson & Doverspike).

Intentions to Work with Individuals with Dual Disability

The purpose of this study was to examine various health professional's intention to work specifically with those individuals with intellectual disability and mental illness (dual diagnosis). Through structural equation modeling, a path diagram model was developed which indicated that subjective norm, followed by attitude provided the strongest direct path to intentions in working with individuals with dual diagnosis (Werner, 2012). Perceived behavioral component, which was subdivided into controllability and self-efficacy, was not a significant predictor on intention to work with those with dual diagnosis of intellectual disability and mental illness (Werner, 2012).

Utilizing TPB as a Framework for Evaluation of Professional Development Workshop

The purpose of the study was measure the intention of participants to implement instructional strategies presented at the Microbial Discovery Workshop (Patterson, 2001). The study revealed that while all three direct measures, attitude, perceived behavioral control, and subjective norm correlated significantly to intention, attitude was most highly favorable (Patterson, 2001). Consistent with other studies that applied the TPB to science education with

laboratory learning in particular, attitude towards the behavior was the most important predictor of behavioral intention (Patterson, 2001).

The previously described three studies indicated that the TPB can be utilized to explain human social behavior. While the behavior may not be measured at the time of study, intention is predicted to be the determinant of the behavior. Consistent with theoretical propositions, all three constructs contribute to the prediction of intention to some degree. Like the previous three studies discussed above, the TPB is expected to be able to predict the intention of CRNAs to obtain the AG-ACNP certification through assessing their attitude, perceived behavioral control, and subjective norm. Since there is no current instrument available that measure CRNAs' intention to obtain the AG-ACNP certification, the TPB will be utilized as a framework to capture CRNAs' attitude, perceived behavioral control, and subjective norm on their intention to obtain such certification. Thus, the purpose of this research is to develop and validate the CRNA-**In**tention **T**o **O**btain **D**ual **C**ertification (CRNA-INTO DC) Questionnaire for the purpose of assessing CRNAs' intention to obtain the AG-ACNP certification.

Summary

This chapter presented an overview of the US health care system. Despite the health care spending that surpassed that of other industrialized nations, access and fragmentation of care persist that decrease the overall quality and value of US health care system. A segment of US population that experiences an increase in lack of access and fragmented care is rural residents. The shift in reimbursement from fee for service to payment for the quality of care rendered brought forth innovative models of care delivery that focused on improving the patient care experience, improving population health, and reducing health care cost. One such model that has been proposed by the ASA is the PSH to provide coordinated care for surgical patients across the

continuum of care in urban hospitals However, in rural communities, CRNAs are mainly the sole providers of anesthesia care, thus could potentially implement this model to provide coordinated care for surgical patients from time of decision to undergo surgical intervention through discharge. However, CRNAs' training in the provision of care across the continuum for surgical patients and scope of service may impede their ability to champion this model in rural community health care organizations, as they are experts in the provision of anesthesia and anesthesia-related care. Thus, CRNAs who also have the skillsets of an AG-ANCP may be equipped to incorporate the PSH model for rural surgical patients. However, there are no current studies that examine CRNAs' intention to obtain such certification, nor is there an instrument that assesses their attitude and perceived subjective norm and behavioral controls as it relates to their intentions to obtaining the AG-ACNP certification. Therefore, there is a need for a reliable and valid instrument to measure the constructs of the theory of planned behavior and CRNAs' intention to obtain such certification.

CHAPTER THREE

Methods

This chapter focuses on the design of the study, sampling plan, human subject protection, and the process of instrument development and psychometric testing. The process of instrument development and testing involved four components of survey psychometrics: validity, reliability, acceptability, and efficiency (Squires et al, 2013; Polit & Beck, 2012).

Design

The current study employed a nonexperimental descriptive correlational approach. The purpose of this study was to develop a psychometrically sound instrument that measured the theoretical constructs of the Theory of Planned Behavior as it related to certified registered nurse anesthetists (CRNA) obtaining the adult-gero-acute care nurse practitioner (AG-ACNP) certification. According to Portney & Watkins (2000), nonexperimental correlational research studies involve data collection that occurred in the natural state rather than through manipulations of the variables as in experimental studies, with the intent of describing relationship among variables. This study assessed the internal reliability and content and construct validity of the CRNA-Intention to Obtain Dual Certification (CRNA-INTO DC) Questionnaire.

Population and Sample

The population of this study was CRNAs who are (a) a member of the American Association of Nurse Anesthetists (AANA), (b) certified or recertified status by the National Board of Certification and Recertification of Nurse Anesthetists (NBCRNA), (c) currently practicing in rural communities as defined by the United Sates Department of Agriculture (USDA), (d) not currently practicing as an AG-ACNP, (e) live in the 48 contiguous United

States, and (f) able to read and write in English. Recertified status implies the CRNA is currently practicing nurse anesthesia for over two years, while certifications status denotes that the CRNA has only been in practice less than 2 years (AANA, 2014). There are approximately 31, 600 recertified and 5,200 certified CRNAs (AANA). The AANA Research Division assisted in the electronic distribution of the Questionnaire that has been uploaded onto SurveyMonkey® to 3,000 randomly selected members. The AANA does not have data base on CRNAs who practice in USDA-defined rural area. Therefore, the demographic portion of the CRNA-INTO DC Questionnaire included the selection for urban or rural practice, where participants were asked to select one that most described his or her practice. The distribution size of 3,000 was selected to meet the sample size of around 300, as return rate on surveys is expected to be around 10% (AANA). The AANA employed random selection of all CRNAs, based on computer generated numbers with uniform distribution of members (AANA). Members, who opted out of mass email communication from the AANA, were included in the selection process.

Sample Size for Data Analysis.

A sample of 300-500 subjects was deemed appropriate for assessing the reliability and validity of the instrument. While Nunnally and Bernstein (1994) recommend that at least 200 subjects is sufficient to provide stability in analysis, a sample of at least 400 to 500 is recommended for construct validation with confirmatory factor analysis (Hox & Bechger, 1998; Munro, 2005). A common method for estimating the parameters in CFA is maximum likelihood (ML), where sample size of at least 500 will not likely result in models that generate negative variances. Additionally, large sample size of 500 or more decreases the effects of non-normality on model fitness and parameter estimates. Lastly, sample size of 500 or more decreases the

variance of a parameter's standard error when testing for competing factor models of an instrument (Munro).

Human Subject Protection

The affiliated University's Institutional Review Board (IRB) was sought for approval of this study. As email addresses and other private information of AANA members were not available to the researcher, the pilot questionnaire, uploaded onto SurveyMonkey®, was sent by email to the AANA, who then sent it to randomly selected CRNAs that met eligibility criteria. The AANA sent two emails to all of the participants with the first one serving as an invitation to participate in the study, followed by a second email as a reminder of the study. All participants received both reminders, even if participants have already completed the questionnaire. A letter and consent form accompanied the Questionnaire which explained the purpose of the study. Consent is implied, which was stated on the consent form, if the CRNA returned the completed pilot questionnaire. Anonymity was maintained throughout the study as the researcher had no access to participant's email address or other private information in this study. The data obtained from the SurveyMonkey® was uploaded to a password protected research drive that only the researcher and her dissertation committee had access to. Data storage was in compliance with the IRB policy and procedures for data storage (University of Cincinnati Office of Research Integrity, 2013). This study posed very little risk to the participants as the goal of this research is to develop a questionnaire which assesses CRNAs' intention to obtain the AG-ACNP certification.

Instrument Development and Testing

The development of the CRNA-INTO DC Questionnaire was based on Ajzen's (1991) Theory of Planned Behavior (TPB) which states that a person's intention to perform a behavior

is dependent on the individual's attitude toward, social pressure, and the perceived control over the behavior. The Questionnaire was developed through three phases. Phase one involved the item generation and designing of the format of the questionnaire. Phase two involved the assessment of the content validity and conduction of the pretest. Lastly, phase three included the assessment of the Questionnaire's construct validity, reliability, and acceptability and efficiency.

Phase One

Three objectives provided direction for item generation of the CRNA-INTO DC Questionnaire: (a) development of items that reflected CRNA's attitude, perceived social pressure, perceived behavioral control, and intention to obtain the AG-ACNP certification, (b) development of the scaling technique recommended by Ajzen (1991), and (c) assessment of items and instructions for clarity and appropriate reading level for CRNAs.

Ajzen & Fishbein (2010) recommend that five to six items should be constructed to assess each of the constructs of TPB. However, while it is impossible to specify the number of items that should be included in the initial pool, the more items that are included allows for more discrimination of items by the content validity panel and potentially better assessment of the scale's internal consistency (DeVellis, 2012). Thus, the goal of item generation for this study was to generate items that are three to four times as many as the final scale for each of the constructs (DeVellis). Ajzen (1991) recommends that the constructs of attitude towards behavior, subjective norm, perceived behavioral control, and intention be measured on a seven-point bipolar adjective scale. Participants were asked to rate the number that best describes their personal opinion on the items. Fishbein and Ajzen (2010) recommend that the item formulated be compatible with the construct and to be self-directed. After the items were developed for each of the constructs, they were assessed for clarity and readability during pretesting.

Phase Two

The second phase of the CRNA-INTO DC Questionnaire involved the assessment of its content validity and the conduction of the pretest. Validity is the degree in which an indicator measures what it is intended to measure (Carmines & Zeller, 1979; Polit & Beck, 2012). While it is difficult to assess a scale's validity, multiple approaches must be utilized as this adds more evidence to which the scale's validity can be inferred. Phase two of instrument development focused on assessing content validity.

Content validity. Content validity is the "extent to which a specific set of items reflects a content domain" (DeVellis, 2012, p.59). Content validity concerns with an instrument's sampling adequacy and is intimately linked to the definition of the constructs that are being measured. In this phase, five content expert panel ("the panel") who are doctoral-prepared were asked to assess the content validity of the questionnaire. A large envelope that consisted of a letter that provided directions for this phase of the study and two envelopes, labeled "A" and "B", were sent by mail to each of the panel (Appendix A, B, and C). Envelope A contained information on the Theory of Planned Behavior, the global constructs, and their associated definition. Envelope B contained the items, randomly arranged to avoid grouping of items with their associated construct, for the CRNA-INTO DC Questionnaire.

The panel was asked to read the theoretical definition of the constructs of the TPB in envelope A before envelope B. Afterwards, the panel was asked to read each of the items enclosed in envelope B and identify which construct (attitude, perceived behavior control, subjective norms, and intentions) the item is mostly aligned with by placing an "X" under the column of the respective construct. In the event that the panel believed the item does not belong

to any of the constructs, the panel was asked to check the "Not Applicable" box. For an item to be retained, four out of five (0.8) content experts must agree that the item aligned with the corresponding construct (Polit & Beck, 2012). The panel was also asked to provide input to improve the wording or relevancy of the item or to suggest new items that would potentially be included in the questionnaire.

Pretest. The items retained from the recommendation by the panel were placed onto a questionnaire format associating the items with the construct. Additionally, demographic information such as years of experience, highest educational attainment, and other data were included in the Questionnaire to assess sample representativeness and potential correlation with the constructs. A purposive sample of ten CRNAs that fit the inclusion criteria were asked by the researcher to participate in the pretesting of the paper version of the CRNA-INTO DC Questionnaire. In addition to completing the Questionnaire, the participants were asked to complete an evaluation of the questionnaire. The purpose of pretesting was to assess time for survey completion and problems with clarity of items and language, scale administration, scale format, and scoring difficulties, and to illicit recommendations to enhance the quality of the Questionnaire. After receiving the mailed Questionnaire from the pretesting participants, the Questionnaire was revised based on their recommendations and then uploaded onto SurveyMonkey®. A second round of pretesting was performed with a purposive sample of five CRNAs to ensure that there were no problems with verbiage, opening of the survey link, etc. The electronic version of the Questionnaire was then sent to the AANA. The AANA distributed an invitation to participate in this study and the survey link to CRNAs that met eligibility criteria.

Phase Three

This phase of instrument development involved the assessment of the CRNA-INTO DC Questionnaire's construct validity, reliability, and acceptability and efficiency, with data collected by SurveyMonkey® from study participants.

Construct validity. Validity and reliability are not independent qualities of an instrument, as a scale that has low reliability cannot be valid (Polit & Beck, 2012). Validity can be inferred from generation of sufficient evidence-building. In phase two of the instrument development, methods were described to generate content validity. This portion of the paper described evidence-building of the construct validity. Construct validity is a major criterion for assessing the quality of the scale, i.e. - does the scale measure what it is supposed to measure (Polit & Beck). While there are multiple methods to assess construct validity, the plan was to perform a confirmatory factor analysis (CFA) if enough sample size was obtained. However, the theoretical prediction approach through standard and hierarchical multiple regression analyses was employed to predict the relationship between attitude, subjective norm, and perceived behavioral control on intention. Below is a description of CFA as it relates to construct validation, although that technique was not employed in statistical analysis due to the sample size obtained.

Confirmatory factor analysis (CFA). CFA is a method that allows a researcher to assign the items of the scale to their respective factors according to the theoretical expectations (Munro, 2005). CFA is a subset of structural equation modeling (SEM) that allows a set of relationship between one or more independent variables (IV) and one or more dependent variables (DV) to be examined (Tabachnik & Fidell, 2007). The construct validation of scores will be derived from the CRNA-INTO DC Questionnaire. Establishment of a measurement

model specifies a statistical means to interpret scores and each factor that represent a construct, measured by multiple indicators. By fitting the scores of the factor structure to the measurement model, CFA can evaluate two aspects of construct validity: discriminant – the distinctiveness of the factors measured by different sets of indicators, and convergent – the cohesiveness of a set of indicators in measuring their underlying factors.

The relationships between the theoretical constructs are represented by a path diagram. In the path diagram, a line with an arrow represents a hypothesized direct relationship between two variables (variable pointing to its DV), whereas a double arrow indicates an unanalyzed relationship (a covariance between the two variables with no implied direction of effect). The hypothesized factors or latent variables (constructs) are assumed to cause the variation and covariation between the observed variables. This confirmatory model is imposed on the data with two purposes: to obtain estimates of the parameters of the model (factor loading) and to assess the fit of the model to the data.

The construct validation of the CRNA-INTO DC scale via CFA will employ four steps: specification of the model, estimation of the model, assessment of model fitness, and model modification (Tabachnik & Fidell, 2007). The latest version of Statistical Package for the Social Sciences (SPSS) will be utilized to conduct confirmatory factor analysis. The following will discuss each step in detail.

Specification of the model. Specification of the model involves two parts. The first part involves the specification of a model, which is the hypothesized set of relationship, between the items from the CRNA-INTO DC Questionnaire and the constructs of attitude, perceived subjective norms, perceived behavioral control, and intentions. A path diagram will be drawn to add clarity to the hypothesized relation according to theoretical expectations.

Part two involves the evaluation of the hypothesized model by calculation of the Chi-square statistics, based on the hypothesized model's degrees of freedom. The Chi-square statistics should be nonsignificant as that indicates the model fit the data and that the model should be retained. The Chi-square statistics can be calculated by counting the number of data points and number of parameters to be estimated in the hypothesized model. The number of data points can be calculated as:

$$\text{Number of data points} = [p(p+1)] /2$$

The number of parameters to be estimated is equal to the number of regression coefficients, number of covariance, and number of variances. Next, subtract the number of parameters to be estimated from the number of data points. This is the degrees of freedom for the model, which is the number of distinct items in the sample covariance matrix.

Model estimation. The second step in CFA is estimating the model. Model estimation will employ the maximum likelihood method. However, maximum likelihood requires data that does not violate bivariate assumptions. Violation of bivariate assumptions can lead to an inflated Type I error (Curran, West, & Finch, 1996). Prior to utilizing the maximum likelihood method for model estimation, the researcher will test for satisfaction of bivariate assumptions through the evaluation of normality, linearity, and homoscedasticity. Normality will be assessed through evaluation of the data's skewedness and kurtosis. Linearity and homoscedasticity will be evaluated through the bivariate scatter plots. Calculation of the Mahalanobis distance can detect outlying data (Tabachnik & Fidell, 2007). Outlying data can be deleted, due to large sample size. Violation of the assumptions of bivariate normality can be overcome through increasing sample size. While Munro (2005) recommended that a sample size of 500 for estimation of the

model through the maximum likelihood method, Hox & Bechger (1998) recommended that a sample size of 400 can overcome the violations of the assumption of nonnormality.

In the event that nonnomality is encountered, the Sattora-Bentler chi-square correction estimation will be utilized. Based on a series of Monte Carlo computer simulations to study the effects of sample size, nonnormality, and model specification on the computation of the Chi-square statistics, the Sattora-Bentler Chi-square correction proved to be the best method for parameter estimation in where data does not meet assumption of multivariate normality (Curran, West, & Fincher, 1996)

Model goodness of fit. The third step of construct validation involves the assessment of the fitness of hypothesized model. While there is no one fitness test that is deemed the gold standard for assessing model fitness, assessment of model adequacy should be evaluated on multiple criteria (Sun, 2005). The first fitness of the model test is the Chi square goodness of fit, where the desired result is a nonsignificant test, which indicates that the hypothesized model should be retained (Tabachnik & Fidell, 2007). However, because the Chi-square is based on sample size, large sample size tends to inflate Type I error (rejection of the null hypothesis, when one should not). Thus, model fitness should be evaluated utilizing multiple criteria. For their application to CFA, Sun (2005) recommended that characteristics of fit indices such as availability of cutoff criteria, sensitivity to sample size, sensitivity to model misspecification and estimation methods to be taken into account when making decisions as to which goodness of fit criteria to use in construct validation. Thus, in addition to the Chi-square goodness of fit test, the Comparative Fit Index, Root Mean Square Area of Approximation, and Tucker-Lewis Index fitness criteria will be utilized in assessing the construct validation of the CRNA-INTO DC Questionnaire.

The Comparative Fit Index (CFI) assesses model fitness and employs a comparison of a noncentral Chi-square distribution with noncentral parameters. The larger the noncentral parameter is, the greater the model misspecification. Thus, a CFI value that is greater than 0.95 is indicative of a good-fitting model (Tabachnik & Fiddel, 2007).

The Root Mean Square Area of Approximation (RMSEA) estimates the lack of fit in a model compare to a perfect model. A value that is greater than 0.10 is indicative of a poor-fitting model. Thus, the value of the RMSEA should be as close to zero as possible (Sun, 2005).

The Tucker-Lewis Index (TLI) evaluates the estimated model by comparing the Chi-square value of the model to the Chi-square of the independence model, where the result should be between 0 and 1 (Sun, 2005). A value that is greater than 0.95 is desirable, as that indicates that the model is good-fitting (Tabachnik & Fidell, 2007).

If the model fit is acceptable, as determined by the fit indices, the parameter estimates are examined. The ratio of each parameter estimate to its standard error is calculated as a z-statistics. The level of significant is at 0.05 if the value of the z-statistics exceeds 1.96. A z-statistic value greater than 2.56 indicates that the level of significant is at 0.01 (Tabachnik & Fidell, 2007). For a model to be considered well-fitting, most or all of the parameters should be significant. If any of the parameter is not significant, then model modification should be performed.

Model modification. If the model does not display goodness of fit or produce inconsistent fit as reported by various fit indices, the model may need to be modified by either adding parameters or deleting parameters that are not significant to improve the fit. The Lagrange Multiplier and the Wald tests are techniques that will be utilized to aid in improving model fitness.

The LaGrange Multiplier test, analogous to forward stepwise regression, evaluates whether addition of parameters to the model would improve fitness of the model. The Wald test, also known as critical ratio, evaluates which parameters are not necessary in the model. This process is similar to the backward deletion of variables in stepwise regression. A nonsignificant test is desired as that indicates the parameter was not needed.

Theoretical prediction

Multiple regression was utilized to predict intention from attitude, subjective norm, and perceived behavior control constructs. Previous studies utilizing the global constructs of the TPB to predict intentions revealed that there is a considerable amount of variance in intention, as demonstrated by the wide range in the multiple correlation values of 0.43 to 0.94 (as cited in Ajzen, 1991). According to Ajzen, the addition of perceived behavioral control to the model led to considerable improvement in predictions, while subjective norm revealed mixed results. The regression coefficients of perceived behavioral control were significant in every study performed across various disciplines (Ajzen). Attitude towards various behaviors also made significant contribution to the prediction of intentions. Consistent with the propositions of the TPB, the researcher predicted that the subjective norm and attitude will account for the most variance in predicting intention. Prior to performance of multiple regression, the assumptions of multiple regression must first be satisfied. The assumptions are:

1) The dependent variable is on a continuous scale,

2) There are two or more predictor variables,

3) There is independence of observation,

4) There is linear relationship between the dependent variable and each predictor variable,

5) The data shows homoscedasticity,

6) There is no multicollinearity among independent variables,

7) There are no significant outliers, and

8) The residuals are normally distributed (Pallant, 2013).

Reliability

A scale's reliability indicates that the score produced by the scale is stable unless the variable being measured has changed (DeVellis, 2012). Thus, a reliable instrument is one that performs in a consistent and predictable way and that the items have a strong relationship to one another. The more reliable the scale, the higher the statistical power for a given sample size (DeVellis). Reliability also concerns with the scale's accuracy, in that it measures the true scores. A reliable instrument maximizes the true score and minimizes the error of the measurement (Polit & Beck, 2012). The reliability of the CRNA-INTO DC Questionnaire and its respective subscales was assessed through the internal consistency of the items. Internal consistency, measured by coefficient alpha or Cronbach's alpha, is the most widely used method to evaluate a scale's reliability. Cronbach's alpha was used to estimate the extent the sub-items of the CRNA-INTO DC Questionnaire are reliably measuring the constructs, attitude, perceived behavior control, perceived subjective norms, and intentions, of the TPB. A Cronbach's alpha value of 0.80 or greater is considered to be a demonstration of good internal consistency (Polit & Beck, 2012). However, for the purpose of this research, an acceptable Cronbach's alpha level is 0.7 for a newly developed scale (Squires et al, 2013).

Acceptability/ Efficiency

The acceptability of an instrument was addressed through analysis of the data cleanup prior to data analysis and assessment of the time it took to complete survey. Treatment of

missing data (estimation versus deletion of data) will be contingent on the analysis of the quantity and pattern/distribution of the missing data, along with assessing its relationship to the sample size (Tabachnick & Fidell, 2007). After the CRNA-INTO DC Questionnaire has undergone construct validity assessment; the Questionnaire was assessed to determine if a more efficient, parsimonious instrument can be generated without sacrificing its internal consistency. The Questionnaire was analyzed with fewer items to determine if its internal consistency has decreased (Polit & Beck, 2012). If the new Cronbach's alpha on the shorten Questionnaire did not greatly changed, those items would be deleted to create a more efficient and parsimonious questionnaire that will capture the attributes as intended.

Summary

This chapter focused on the methods for the CRNA-INTO DC Questionnaire development and psychometric assessment. The intent of a scale is to capture a construct that is accurate, truthful, and sensitive. However, measurement of an attribute is not without flaws. While researchers cannot prove that an instrument is completely valid and reliable, reliability and validity is an evidence building process. Thus, the psychometric soundness of the CRNA-INTO DC Questionnaire was assessed by analyzing its internal consistency, content validity, and construct validity using the theoretical prediction approach by multiple regression analysis. An adequate sample size was not obtained to perform a confirmatory factor analysis. Additionally, the acceptability and efficiency of the survey was addressed by analysis and management of missing data and assessment of the length of scale to generate a more parsimonious questionnaire without sacrificing its reliability.

CHAPTER FOUR

Results

This chapter describes the results of the CRNA-INTO DC Questionnaire item development and psychometric assessment specifically, content and construct validity, and reliability. The results addressed the following research questions: 1) does the questionnaire demonstrate content validity, 2) does the questionnaire demonstrate reliability, and 3) does the questionnaire demonstrate construct validity.

Sample Characteristics

Congruent with eligibility criteria except for location of practice, the American Association of Nurse Anesthetists Research Division (AANA) randomly emailed 3000 CRNAs to participate in the study during the month of December 2015. Of the 3000 CRNAs, 265 gave implied consent by completing the Questionnaire. This is approximately a nine percent return rate, which is close to the usual 10% completion rate of online surveys (AANA, 2015). Of the 265 who completed the Questionnaire, 87 participants met all eligibility. However, six of the 87 were excluded due to completing the demographic section only. Thus, the total sample was 81. The sample consisted of mostly male, between the ages of 55-64 years of age, and have >16 years of CRNA experience. Seventy-two percent reported having completed a Master's degree, and 62% reported working for a private not for profit institution (Table 5).

Table 5

Demographic Characteristics of Rural Practicing CRNAs (n= 81)

Category	Frequency	Percentage (%) [a]
Sex		
Male	55	68
Female	25	31
Unanswered	1	1
Age (Years)		
<30	0	0
30-34	6	7
35-39	11	14
40-44	10	12
45-49	8	10
50-54	11	14
55-59	15	18.5
60-64	15	18.5
>65	5	6
Experience (Years)		
<2	0	0
2-5	8	10
6-10	22	27
11-15	12	15
>16	39	48
Highest Educational Level		
Diploma	9	11
Bachelor's Degree	3	4
Master's Degree	58	72
Clinical Doctorate	8	10
Research Doctorate	2	2
Other	1	1
Practice Setting		
Academic Institution	2	2.5
Private - Not for Profit	50	62
Private – For Profit	18	22
Military/VA	2	2.5
Office Based/Surgery Center	7	9
Other	2	2.5

Note: CRNA: Certified Registered Nurse Anesthetists. VA: Veteran's Affair. Diploma: Diploma Certification in Anesthesia.

Questionnaire Layout

The CRNA-INTO DC Questionnaire was developed based on the constructs of the Theory of Planned Behavior: intention, subjective norm, attitude, and perceived behavioral control. The Questionnaire was divided into two sections, I and II. Section I consisted of 12 demographic items that addressed gender, age, location of practice (rural or urban), years of CRNA experience, highest educational level, practice settings, patient population, anesthesia practice model, level of medical direction by an Anesthesiologist, and whether the state in which the CRNA practice in has opted out of the federal requirement for physician supervision. Participants were also asked if they have credentialed in another area of advanced nursing practice. If they responded "yes", participants were asked to select the type of advanced practice specialty.

Section II of the CRNA-INTO DC Questionnaire contained four subscales that addressed the respective constructs: intention, subjective norm, attitude, and perceived behavioral control. The items were arranged randomly such that the items reflecting the constructs were not clustered together.

Research Questions

Research Question One: Does the CRNA-INTO DC Questionnaire (Version III) Demonstrate Content Validity?

Content validity. The preliminary Questionnaire (Version I) consisted of 46 randomly arranged items that were developed to reflect the TPB constructs: Intention, Attitude, Subjective Norm, and Perceived Behavior Control (Appendix C). The preliminary Questionnaire was sent by mail to five doctoral-prepared individuals for assessment of content validity. The panel

consisted of two nurse anesthetists, a statistician with experience in psychometrics, a nursing professor, and an expert in the Theory of Planned Behavior and psychometrics. Twenty-six items were retained from the panel's assessment of the item to construct association, with an additional six items revised based on suggestions from the panel to improve item construct association. The new version of the CRNA-INTO DC Questionnaire (Version II) contained 32 items (Appendix D).

Pre-testing. The CRNA-INTO DC Questionnaire (Version II) was sent to a purposive sample of ten CRNAs via mail who met eligibility criteria. A 12-item demographic questionnaire was attached to the CRNA-INTO DC Questionnaire (Version II) to assess sample characteristics. The pre-testing panel was also asked to complete an evaluation form, which assessed the time it took to complete Questionnaire, its readability, and clarity, and whether they had experienced any discomfort while completing the Questionnaire (Appendix E) . Based on feedback from the pre-testing panel, two items were excluded due to redundancy with another item. Pre-testing panel reported that the Questionnaire took approximately 5-10 minutes to complete and the items were readable and clear. There were no reports of feelings of discomfort while completing the items on Section I or Section II of the Questionnaire. The revised 30-item CRNA-INTO DC Questionnaire (Version III) along with 12 item demographic questions (Appendix F), was transferred onto SurveyMonkey® and then distributed to a purposive sample of five CRNAs to complete. The second pretesting panel did not recommend changes to the CRNA-INTO DC Questionnaire (Version III) and the survey was sent to the AANA Research Division for distribution to CRNAs who met eligibility criteria. The data received from respondents were exported to the SPSS version 23 for data analysis.

The CRNA-INTO DC Questionnaire (Version III) contains 30 items which reflected the constructs of the TPB: intention, attitude, subjective norm, and perceived behavioral control. With the addition of 12 demographic questions, the CRNA-INTO DC Questionnaire, items pertaining to the constructs of the TPB were arranged randomly within the Section II to prevent items clustering with their associated construct. Some items required the researcher to reverse code the responses such that high scores reflect high levels of intention, attitude, etc. (Pallant, 2013). In total, three questions required reverse coding; one item each from Intention, Perceived Behavioral Control, and Attitude subscales (Table 6).

Research Question Two: Does the CRNA-INTO DC Questionnaire (Version III) Demonstrate Reliability?

The CRNA-INTO DC Questionnaire (Version III) consisted of four subscales: Attitude, Subjective Norm, Perceived Behavioral Control, and Intention. The internal consistency-reliability of the subscales and the composite scale was assessed. A widely utilized method for evaluating a scale's internal consistency is Coefficient alpha or also known as Cronbach's alpha (Polit & Beck, 2012). For a scale to be considered reliable, its Cronbach's alpha should be greater than 0.70. However, a Cronbach's alpha greater than 0.8 is more desirable, reflecting a scale's ability to consistently measure the critical attribute in question (Polit &Beck). Additionally, each subscale that assesses the TPB construct in question should contain at least three items (Francis et al, 2004). Intention can be a single statement, unless it is utilized to predict a behavior that its subscale needs to contain at least three items (Ajzen, 200). The three-item Intention subscale demonstrated internal consistency with a Cronbach's alpha of .90. No items were deleted as Cronbach's alpha already reflected a subscale that was highly reliable.

The Attitude subscale demonstrated internal consistency with a Cronbach's alpha of 0.97. There are 15 items on this subscale, with one item requiring reverse coding (number 25). Based on SPSS output of the inter-item statistics, item number 43 could be deleted to improve the subscale; however, the Cronbach's alpha is already consistently high (range is from 0.93 to 0.94); even if each items were to be deleted separately from the subscale.

Table 6

Items and Construct Key for CRNA-INTO DC Questionnaire (Version III)

Item	Response format	Item number that required reverse coding	Construct
15, 17, 19-28, 33, 41, 43	1-7	25	Attitude
14, 18, 30, 31, 33-35, 39, 40	1-7	____	Subjective Norm
16, 38, 42	1-7	16	Perceived Behavior Control
29, 36, 37	1-7	29	Intention

Note: CRNA-INTO DC Questionnaire: Certified Registered Nurse Anesthetist Intention To Obtain Dual Certification Questionnaire

The Subjective Norm subscale demonstrated internal consistency with the Cronbach's alpha of 0.88. There are a total of 9 items that reflected the perceived social pressure to obtain the AG-ACNP certification. There were no items that required reverse coding. One item (number 40) could be deleted from the subscale based on SPSS' output of its inter-item statistics; however, given that the Cronbach's alpha ranging from 0.87 to 0.90 in the inter-item statistics output, the subscale would not improve much if each of the items were to be deleted separately from the subscale.

The Perceived Behavioral Control subscale consisted to 3 items, with one item requiring reverse coding. The subscale did not demonstrate internal consistency as the Cronbach's alpha is 0.40. Examination of the inter-item statistics showed that if item number 38 was to be eliminated from the subscale, the Cronbach's alpha would increase to .52. Since there were only 3 items on this subscale, no item was deleted. With its low Cronbach's alpha, this subscale does not demonstrate internal consistency and should not be utilized independently to assess CRNA's perceived behavior control to obtain the AG-ACNP certification.

Overall, the CRNA-INTO DC Questionnaire (Version III) demonstrated internal consistency as the Cronbach's alpha was 0.73 (Table 7). However, if the Perceived Behavioral Control subscale was to be deleted from the overall scale, the internal consistency would improve to 0.91. The Attitude, Subjective Norm, and Intention subscales all demonstrated internal consistency and can be utilized independently to measure rural practicing CRNAs' intention to obtain the AG-ACNP credential.

Table 7

Cronbach's alpha for CRNA-INTO DC Questionnaire (Version III) and Subscales

Construct	Cronbach's alpha
Subscale	
Intention	0.90
Attitude	0.97
Subjective Norm	0.88
Perceived Behavior Control	0.40
CRNA-INTO DC Questionnaire	0.73

Research Question Three: Does the CRNA-INTO DC Questionnaire (Version III) Demonstrate Construct Validity?

With a final sample size of 81, construct validity assessed using confirmatory factor analysis (CFA) was not possible. Thus, construct validity was assessed using the theoretical

prediction approach through standard and hierarchical multiple regression analyses with the goal of assessing the predictive power of the constructs, subjective norm, attitude, and perceived behavior control, on intention.

Assessment of Data/Statistical Analysis

In assessing the overall response to the survey, there were a few missing data points that appear to be missing at random. In surveying the responses, some of the questions were not answered by participants. Thus, some of the items in the analyses contain 77 responses instead of 81.

Assumption numbers one, two, and three (page 75-76) were met based on the design of the Questionnaire. The response on the Questionnaire is on a "1" through "7" rating, which coincided with the participants rating a "1" being strongly disagreeing and "7" being strongly agreeing with the item statement. Three items, numbers 16, 25, and 29 were reversed coded to minimize response bias. The mean for each item was calculated for each respondent. The CRNA-INTO DC Questionnaire (Version III) contains three predictor variables of intention; attitude, subjective norm, and perceived behavioral control. Examination of the scatter plots of these constructs revealed that there is a linear relationship between attitude, subjective norm, and perceived behavioral control and the dependent variable, intention. The assumption of independence of observation was met as each participant was sent an invitation to complete the Questionnaire anonymously. This implied that the completion of the Questionnaire was performed independently.

Assessment of multicollinearity. The Subjective Norm and Attitude Subscales demonstrated strong relationships with the Intention Subscale. Pearson's correlations were 0.77 ($p < .001$) for both subscales. The Perceived Behavioral Control subscale did not demonstrated

any relationship with Intention subscale ($r = -0.04$, $p > .05$), nor the Subjective Norm and Attitude subscales. Its correlations with the Subjective Norm and Attitude subscales were .09 and -.16 ($p > .05$), respectively

The Pearson correlation for Subjective Norm and Attitude subscales was 0.82 ($p < .001$), suggesting these two constructs are highly correlated. However, the assumption of multicollinearity had not been violated as the Tolerance and Variance Inflation Factor (VIF) for both constructs are approximately 0.3 and 3, respectively (Subjective Norm Subscale = 0.3, 3.2; Attitude subscale = 0.3, 3.3). The Perceived Behavioral Controlled subscale did not demonstrate any multicollinearity with the SN and Attitude subscales (Tolerance = 0.91, VIF = 1.09). Tolerance and VIF cutoff points for the determination of the presence of multicollinearity are less than 0.1 and 10, respectively (Pallant, 2013).

Assessment of outliers. The Mahalanobis distances that were produced by multiple regression analysis were used to check for the presence of outliers. The critical chi-square value using three independent variables as the degrees of freedom is 16.27 (Pallant, 2013). Assessment of the Mahalanobis distances for all four subscales revealed that only one data point was an outlier, exceeding the critical value of 16.27. Furthermore, assessment of Cook's distance revealed that all data points were less than 1. Values that are larger than "1" indicate the outlier is having an influence on the result of the model as a whole (Pallant).

Assessment of normality. The assumption of normality was found to be violated, as demonstrated by significant results ($p < .05$) on both Shapiro-Wilk and Kolmorogov-Smirnov tests for all subscales. The null hypothesis of these tests states that the population of interest is normally distributed. Thus, the goal is to achieve a nonsignificant test such that the null hypothesis is accepted. However, a significant test would indicate that the population is not

normally distributed and the null hypothesis is rejected (Pallant, 2013). The sample size that is required for performing a multiple regression analysis with three predictor variables is 45 (Stevens, 1996). With the Intention subscale skewed to the right, a larger sample size is needed. The sample size obtained for this research is 81.

While a larger sample size is desired, too large of a sample size will create multiple correlations that will depart from zero, even those ones that predicts little variances in the dependent variable (Tabachnick & Fidell, 2007). Thus, Tabachnick and Fidell advised that for both statistical and practical reasons, the researcher needs to measure the smallest number of cases such that there is a chance that a relationship can be revealed. According to their recommendation, the sample size required for performing multiple regression with three predictor variables is 74, based on the formula $N>50+8m$, where m is the number of predictor variables (Tabachnick & Fidell). A post-hoc analysis of sample size required for a power of 0.80, alpha at 0.05, three predictor variables, and a moderate effect size $R^2 = .13$ revealed the sample size of 77 is required to achieve a 5% chance of a Type I error and a 20% chance of Type II error (Polit & Beck, 2012).

While violation of the normality assumption does not contribute to bias or inefficiency in regression models, it is important in the calculation of p values for significance testing, but this is only important when the sample size is very small. When the distribution of the disturbance term is found to deviate from normality, the best solution would be to use a more conservative p value (.01 rather than .05) for conducting significance tests and constructing confidence intervals (Statistics Solution, 2013).

Assumption of homoscedasticity. The assumption for homoscedasticity was met with examination of the residual scatterplots. The assumption of homoscedasticity is that the

residuals are about the predicted scores and that residuals have a straight line relationship with the dependent variable scores. Additionally, the variance of the residuals about the predicted dependent variable scores are the same across predicted scores (Tabachnik & Fidell, 2007). Examination of the residual scatterplot revealed that the residuals were nearly distributed in a rectangular fashion with a concentration of scores along the center of the scatterplot graph.

Standard multiple regression analysis. The standard regression analysis indicates the predictor variables, subjective norm, attitude, and perceived behavior control explained 65% of the variability in CRNA's intention to obtain the AG-ACNP certification ($R^2 = .654$, $F(3, 77) = 46.7$, $p < .001$). However, only subjective norm and attitude contribute significantly to the model in explaining CRNA's intention to obtain the AG-ACNP certification. The standardized regression coefficient for subjective norm against intention is $\beta = 0.393$ with $p < .01$, demonstrating it as a significant predictor of intention. Likewise, the standardized regression coefficient for attitude against intention is $\beta = .457$, $p < .001$. Perceived behavior control did not contribute significantly as a predictor of intention, with $\beta = .033$, $p = .642$ (Table 8). Figure 5 represents the models for the prediction of intention, including the regression coefficients found in the regression analysis. From the standardize regression analysis, CRNAs' perceived social pressure to obtain the AG-ACNP also contributes significantly to the model but behind attitude.

Hierarchical multiple regression analysis. Hierarchical multiple regression was used to assess the predictive ability of subjective norm, attitude, and perceived behavior control on intention, after controlling for the influence of five demographic factors: sex, age, CRNA's level of experience (in years), highest educational level obtained, and practice setting. Table 9 provides a correlation matrix of demographic variables and the constructs of the TPB. As expected, subjective norm, attitude, and intention are all highly correlated. Perceived behavioral

control did not demonstrate any correlation with the other TPB constructs or demographic variables. CRNA's age and years of experience is highly and significantly correlated (r = .74, p < .001). There is a significant negative correlation between age and highest educational level attained (r = -.425, p < .05). There is a statistically significant but low correlation between sex and educational level, and a negative moderate correlation between CRNAs' education level and experience.

Table 8

Summary of Standard Regression Analysis

	R^2	Adj. R^2	S.E	F	B	S.E.B	β
Model	.654	.640	.98	46.65			
SN					.548	.171	**.393***
Attitude					.529	.143	**.457****
PBC					.051	.108	.033

Note: *Correlation significant at p< .01
** Correlation significant at p <.001

R^2: R square; S.E: standard error of the estimate, B: unstandardized coefficient, S.E.B: standard error of B, β: Beta, standardized coefficient; SN: Subjective Norm; PBC: Perceived Behavior Control

The five demographic items, entered at Step 1 of the hierarchical multiple regression analysis, explained 1.7% of the variance in intention. After entry of Subjective Norm, Attitude, and Perceived Behavioral Control subscales in Step 2, the total variance explained by the model as a whole was 68%, F(3, 69) = 47.85, p <.001. The three subscales explained an additional 66% of the variance in intention after controlling for the five above mentioned demographic factors, R square change =.66, F (8, 69) = 18.40, p < .01. Like the standard regression model, only subjective norm and attitude contributed significantly to the variance in intention. However,

both subjective norm and attitude contribute almost equally to the final model, with β= .435 and .454, respectively, p < .01 (Table 10).

Figure 6

Diagram of the TPB Model of CRNAs' Intention to Obtain AG-ACNP Credential

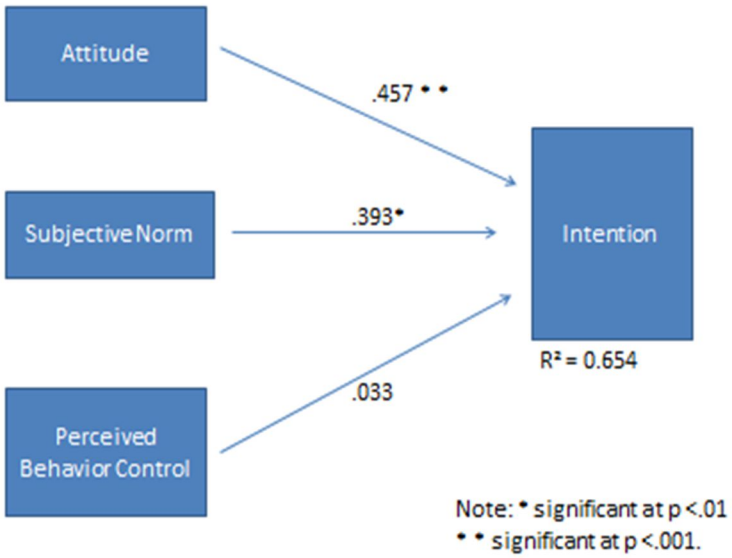


Table 9

Correlation Matrix of Demographics and TPB Constructs

Variable	I	Sex	Age	Exp.	Educ.	Setting	SN	Attitude	PBC
I	1								
Sex	.073	1							
Age	-.105	-.037	1						
Exp.	-.101	-.101	**.739****	1					
Educ.	.047	**.226***	**-.425***	**-.337***	1				
Setting	-.103	-.075	.045	.026	-.161	1			
SN	**.767****	.126	-.067	-.174	.133	.088	1		
Attitude	**.773****	.151	-.124	-.209	.161	-.039	**.817****	1	
PBC	-.037	-.128	-.097	-.013	.116	.061	.009	-.161	1

Note: *Correlation significant at p <.05
** Correlation significant at p <.01

TPB: Theory of Planned Behavior; I: Intention; Exp: CRNA experience (years); Educ: highest CRNA educational level; Setting: CRNA practice setting; SN: Subjective Norm, PBC: Perceived Behavior Control

Table 10

Summary of Hierarchical Regression Analysis

	R^2	Adj. R^2	S.E	F	B	S.E.B	β
Model	.681	.644	.98	47.85			
Sex					-.047	.250	-.103
Age					-.150	.083	-.193
Exp.					.264	.157	.174
Educ.					-.213	.145	-.116
Setting					-.077	.107	-.051
SN					.607	.175	**.435****
Attitude					.525	.147	**.454****
PBC					..047	.111	.031

** Correlation significant at p <.01
Sex: "0" = male; "1" = female

Summary

This chapter provided the results to the research questions that pertain to the psychometric properties of scale development: content and construct validity, and reliability. Overall, the CRNA-INTO DC Questionnaire (Version III) demonstrated content validity through the process of content validation and pretesting resulted in a more parsimonious scale at the time of dissemination to participants. The composite CRNA-INTO DC Question (Version III) demonstrated internal consistency with a Cronbach's alpha of 0.73. The subscales, Attitude, Subjective Norm, and Intention demonstrated internal consistency, while the Perceived Behavioral Control subscale did not. With a sample size of 81, construct validity using confirmatory factor analysis was not performed. Thus, the subscales of the predictor constructs were analyzed through standard and hierarchical multiple regression to determine their predictive power on intention. Subjective norm and attitude contributed significantly to the variance in intention, while perceived behavioral control did not. Demographic factors played a nonsignificant role in the variance of intention.

CHAPTER 5

Discussion

This chapter provides a discussion on the psychometric interpretation of the CRNA-INTO DC Questionnaire (Version III). The content and construct validity, reliability, and efficiency will be addressed, in addition to the limitations and future research for this study.

Interpretation of Findings

The CRNA-INTO DC Questionnaire (Version III) demonstrated content and construct validity, and reliability. The preliminary Questionnaire (Version I), beginning with 46 items that were generated based on the constructs; intention, attitude, subjective norm, and perceived behavior control, had been reduced to 30 items, consisting of four subscales. The composite questionnaire, as measured by the scale's Cronbach's alpha was 0.73, was deemed to be internally consistent. The Cronbach's alpha for the Subjective Norm, Attitude, Perceived Behavioral Control, and Intention subscales were .88, .96, .39, and .90, respectively. The Subjective Norm, Attitude, and Intention subscales can be utilized independently due to its demonstration of internal consistency. However, due to the low Cronbach's alpha of the Perceived Behavioral Control subscale, it should not be utilized independently to predict CRNAs' perceived behavioral control on their intention to obtain the AG-ACNP certification.

In assessing the inter-item correlations of the items on their respective subscale, one item per subscale for a total of four items (numbers 29, 38, 40, and 43) were eliminated based on re-calculation of the Cronbach's alpha if that item was to be removed from the subscale. In eliminating these four items, the CRNA-INTO DC Questionnaire (Final Version) contains 26 items, with a Cronbach's alpha of .96. Elimination of items number 40, 43, and 29 from their respective subscale, the Subjective Norm, Attitude, and Intention subscales will realize a higher

Cronbach's alpha, although the increase is not large (.02 to .05). However, the Cronbach's alpha for the Perceived Behavioral Control subscale improved from .39 to .52 with elimination of item number 38 from its subscale. Additionally, elimination of the four aforementioned items would improve the overall questionnaire by 0.23. Thus, the 26-item CRNA-INTO DC Questionnaire (Final Version) demonstrates improved internal consistency as a whole with a Cronbach's alpha of .96. Feedback from pretesting participants stated that it took about five to 10 minutes to complete the entire questionnaire. Establishing a more parsimonious and efficient scale should be the goal as a long survey could lead to a low response rate. The 26-item CRNA-INTO DC Questionnaire (Final Version) demonstrated a parsimonious and efficient survey with respect to its length and time to complete, in addition to a much improved Cronbach's alpha of 0.96 from 0.73.

While the plan to conduct construct validity was through confirmatory factor analysis (CFA), not enough sample size was obtained. However, a sample size of 81 was more than adequate to assess construct validity through theoretical prediction approach with multiple regression analysis. With three predictor variables, a sample size of 45 to 74 was required to achieve a power of 0.80 and a moderate effect size (Stevens, 1996; Tabachnick & Fidell, 2007).

The framework for the Theory of Planned Behavior states that intention to perform a behavior can be predicted by three global constructs: the perceived social pressure and barriers to perform a behavior and the attitude towards the behavior. Intention to perform a behavior, which is context specific, can be predicted with a high degree of accuracy and is supported by empirical evidence (Ajzen, 1991). A person with a high intention to perform a behavior will more likely perform the behavior in question. Likewise, it is predicted that a person with a good attitude about the behavior and a high social pressure to perform the behavior will likely have high

intention to perform said behavior. According to Ajzen, the relative importance of one's attitude, subjective norm, and perceived behavioral control in the prediction of intention will vary across situations and behavior. That is, in some cases, attitude will account for the largest variance in intention. Other times, perceived behavioral control, subjective norm, or all three will have a significant impact on intention.

This research utilized multiple regression to predict CRNAs' intention to obtain the AG-ACNP certification using subjective norm, attitude, and perceived behavioral control as independent predictors. In the standard multiple regression analysis, subjective norm, attitude, and perceived behavioral control accounted for 65 percent of the variance in intention. Subjective norm and attitude were statistically significant predictors, while perceived behavioral control was not. The findings of the standardized regression analysis suggest that CRNAs' intention to obtain the AG-ACNP certification can be predicted by his or her attitude about obtaining the certification and the perceived social pressure to obtain such. The perceived behavioral control over factors that affect the attainment of the AG-ACNP certification did not predict CRNAs' intention to obtain the certification.

Additionally, a hierarchical multiple regression was utilized to predict the effect of subjective norm, attitude, and perceived behavioral control on intention after controlling for sex, age, experience, educational level, and practice setting. In the hierarchical multiple regression analysis, subjective norm, attitude, and perceived behavioral control accounted for 66% of the variance in intention. As in the standard multiple regression analysis, perceived behavioral control was not a significant predictor in intention, while subjective norm and attitude were. The aforementioned demographic variables were not statistically significant in the overall prediction of intention, accounting for only 1.7% of the variance.

However, some demographic factors revealed significant relationship with one another. CRNA's age and years of experience is highly and significantly correlated ($r = .74$, $p < .001$). This is expected as demographic data demonstrated a high proportion of CRNAs' age in the range 55-64 years (total of 37%) with a high proportion of those who have greater than 16 years of clinical practice (48%). There is a significant negative correlation between age and highest educational level attained ($r = -.425$, $p < .05$). This is consistent with the mandatory change in educational requirement set forth by the Council on Accreditation of Nurse Anesthetists requiring a minimum of a Master's degree as entry level into the practice of Nurse Anesthesia in 1998 (Council on Accreditation, 2015). Therefore, CRNAs who have >16 years of experience are more likely to have either a Diploma in Nurse Anesthesia or a Bachelor's degree. There is a statistically significant but low correlation between sex and educational level, and a negative moderate correlation between CRNAs' education level and experience.

The findings from the standardized and hierarchical multiple regression are consistent with theoretical proposition, as the relative importance of the predictor construct varies across situations (Ajzen, 1991). In predicting rural CRNAs' intention to obtain the AG-ACNP certification, CRNAs' attitude was the largest predictor of intention, followed by their subjective norms. Perceived behavioral control was not a significant predictor of intention, which is consistent with the finding of other researchers. Patterson (2001) did not find perceived behavioral control to be significant in the prediction of Microbial Discovery Workshop participants to incorporate the coursework from the workshop into their curricula, while participants' attitude was the principle predictor. Likewise, Robinson and Doverspike (2006) found no predictive relationship between perceived behavioral control and intention in the prediction of choice between online and traditional classroom setting. Consistent with Patterson,

Robinson and Doverspike found that participants' attitude was the largest predictor of intention for choosing classroom setting. However, in assessing physicians' intention to counsel patients on physical activity, Behrens and Harbour (2014) found that subjective norm was the only predictor of intention, accounting for 51% of the variance. Thus, across disciplines, the TPB proved to be a model that can provide predictive validity for assessing one's intention to perform a specific behavior. Consistent with theoretical propositions, different constructs provided their relative importance in the prediction of intention of various behaviors in question.

Limitations

The study was limited by its sample size. Though the total response rate was approximately nine percent (n=265), only 87 of the 265 met the eligibility criteria. After further excluding those that did not complete Section II of the Questionnaire, the sample size was 81. As a consequence of the smaller sample size, construct validity assessment through CFA was not performed, which would allow for confirmation of items' inclusion in a construct.

The findings of this study can only be generalizable to rural practicing CRNAs within the contiguous 48 Unites States. Thus, sample representativeness should be taken into account when interpreting the findings of this study.

Self-selection bias may affect the results of this study as those CRNAs who are interested in this area of study completed the Questionnaire, thus affecting sample representativeness. Response bias may affect the data, as this study had asked participants to self-rate their opinion on the statements on the Questionnaire. Participants may under or over rate their opinions on each items asked, thus affecting the result. A solution to address response bias was the insertion of three items that were negatively worded into the Questionnaire. Negatively worded items were then reverse coded prior to data analysis.

Recommendation for Future Research

While the relative importance of the predictor constructs on intention varies across situations, empirical evidence found that the addition of perceived behavioral control contributed significantly to the prediction of intention, with the regression coefficient being significant in all 16 studies that were conducted across different disciplines (Ajzen, 1991). However, Patterson (2001) and Robinson and Doverspike (2006) found that perceived behavioral control was not a significant predictor of intention in their studies. Thus, it is not an unexpected result in this study that perceived behavioral control was not found to be a significant contributor in predicting intention.

Perceived behavioral control is defined as the relative ease or difficulty in performing the behavior of interest and includes a person's self-efficacy to perform the behavior and the controllability of factors that could impede behavioral performance (Ajzen). Perceived behavioral control involves the resource and opportunities available, which dictates a person's likelihood of behavioral achievement. It includes one's volitional control, and the performance of some behaviors may depend on some degree of non-motivational factors such as time, money, skills, or cooperation of others. Collectively, these factors represent the actual control over the behavior such that when these factors are controlled, it could serve as a proxy for the prediction of the behavioral achievement. With respect to rural CRNAs, there are multiple non-motivational factors that could impede their intention to obtain the AG-ACNP certification, in which the academic program could take over two years to complete, such as full time employment, family commitment, and financial cost. While their self-efficacy in completing the AG-ACNP training program may be high, the controllability of multiple non-motivational factors could be low, such that the overall perceived controllability is low. The items that reflect

the construct of Perceived Behavioral Control subscale should reflect both sub-constructs of self-efficacy and controllability. The CRNA-INTO DC Questionnaire assessed only the self-efficacy sub-construct. Future research will focus on refining the Perceived Behavioral Control subscale by the development of items that also address the controllability sub-construct. Furthermore, items that address both self-efficacy and controllability factors could potentially improve the internal consistency of the Perceived Behavioral Control subscale. If a scale is not found to be internally consistent, then it is not valid in measuring the attributes of interest (Polit & Beck, 2012). Thus, with its lack of internal consistency, the Perceived Behavioral Control subscale is not valid in its independent prediction of intention. It is not known at this time if perceived behavioral control truly does not contribute significantly to the prediction of intention, or an effect of the quality of the subscale.

This study provided the psychometric tool to assess CRNAs' intention to obtain the AG-ACNP certification and maybe utilized to support future research on CRNA/AG-ACNP dual practice. However, its construct validity can be strengthened through conduction of CFA to assess the item's inclusion to the construct. This could be achieved by increasing the sample size. Additionally, a larger sample size will allow for cross validation of the psychometric properties between rural and urban CRNA population so that the scope of the CRNA-INTO DC Questionnaire can be expanded to both rural and urban practicing CRNAs.

Summary

This chapter provided a detailed discussion on the psychometric properties of the CRNA-INTO DC Questionnaire. The composite CRNA-INTO DC Questionnaire demonstrated content validity, internal consistency, and construct validity. The Attitude, Subjective Norm, and Intention subscales demonstrated internal consistency, while the Perceived Behavioral Control

did not. Future research will focus on refining the Perceived Behavioral Control subscale, enhancing construct validity through confirmatory factor analysis, and expanding the scope of the Questionnaire to include CRNAs who practice in urban health care setting.

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Appendix A

Bunnany C. Pekar, CRNA, MSN

Researcher Address

Content Validation Panel
Address

Dear Dr. _____,

I would like to take this opportunity to thank you in advance for your help in the content validation of my instrument, the CRNA-INTO DC (Certified Registered Nurse Anesthetist –Intention To Obtain Dual Certification) Questionnaire. Your role is critical to the development of this questionnaire that will be utilized to assess CRNAs; intention to obtain the Adult-Gero Acute Care Nurse Practitioner certification with the goal of providing continuity of care for surgical patients residing in rural communities.

Enclosed you will find two envelopes that are labeled "A" and "B" and one that you will use to return the completed questionnaire to me. After you have read this letter, please open envelope "A", where you will have a brief synopsis of Dr. Icek Azjen's Theory of Planned Behavior, its main global constructs, along with the theoretical definition of the constructs. After you have read the content of envelope "A", please open envelope "B". Please read each item and then check the box under the construct the item belongs to. If you believe that the item does not align with any of the constructs, please check the box "N/A". Please feel free to provide comments as to how an item can be improved to better align with the construct or provide additional items for the questionnaire. Once you have completed this, please place the questionnaire in the addressed pre-paid envelope and sent it back to me.

I would really appreciate if you could return the instrument to me within a week of receipt of the packet. Also, please send me an email when you send it so I will know to expect it. If you have any questions, please feel free to call me at (513) 288-1582 or email me at pekarby@ucmail.uc.edu.

Sincerely,

Bunnany C. Pekar, CRNA, MSN
6/15/2015

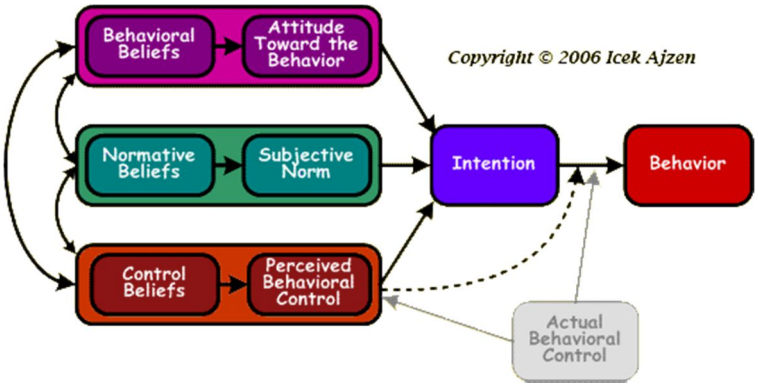
Appendix B

The Theory of Planned Behavior

The Theory of Planned Behavior (TPB), developed by Ajzen (1991, 2002), accounts for the process by which individuals decide on a particular course of action. The theory asserts that the probability of engaging in a given behavior is determined by one's intention to engage in the behavior. Intentions are assumed to capture the motivational factors that influence a behavior; thus, the stronger the intention to engage in the behavior, the more likely the behavior will be performed (Azjen, 1991).

The premise of TPB is that intention, thus in turn, human behavior, is influenced by positive attitude and subjective norms toward the behavior, along with a high degree of perceived behavioral control. According to Azjen, when behaviors do not exhibit problems with control, they can be predicted from intention with good accuracy. This was illustrated by a study comparing one's voting intention and actual voting choice, in which the correlation was between 0.75 and 0.80 (Fishbein & Azjen, 1981). Another example which indicated intention as a strong predictor of behavior was in the study regarding a mother's choice of feeding method for her newborn. The actual choice of feeding method, bottle versus breast, correlated at 0.82 with the mother's intention weeks prior to delivery (Manstead, Proffitt, & Smart, 1983).

The TPB is very similar to the Theory of Reasoned Action (TRA). While the central factor in both theories is intention to perform a given behavior, changes were made to the TRA due to its limitations in dealing with behaviors over which an individual may not have volitional control (Azjen & Fishbein, 1980; Azjen, 1991). Thus, the construct of perceived behavior control was added to the TRA which then became the TPB. Figure 1 depicts the relationship between the constructs of TPB as proposed by Azjen.



The Theory of Planned Behavior. Source: Ajzen, I. (2006). Theory of Planned Behavior diagram. Retrieved from http://people.umass.edu/aizen/tpb.diag.html. Reprinted with permission

Summary

To predict whether a person intends to do something, one needs to know:

1) Whether a person is in favor of doing it - "ATTITUDE"
2) How much a person feels the social pressure to do it - "SUBJECTIVE NORM"
3) Whether a person feels in control of the action in question - "PERCEIVED BEHAVORIAL CONTROL"

The Direct (Global) Constructs:

1) **Attitude towards the behavior -** The degree to which a person views the behavioral as favorable or unfavorable or whether the behavior is beneficial

2) **Perceived Behavioral Control of the behavior -** The individual's self-confidence for engaging in the behavior (how difficult it is to perform the behavior and how confident the person is in performing the behavior and the extent that one has access to the means of control (whether performing the behavior is up to the individual and whether factors beyond a person's control determine his/her behavior)

3) **Subjective Norm about the behavior -** Whether the behavior is approved by important others (what important people think a person should do and whether a person feels that the behavior is important to significant others, what important people actually do

4) **Intention to perform the behavior** – A person's motivation in the senses of his/her conscious plan to carry out a behavior

Appendix C

Preliminary Items for the CRNA-INTO DC Questionnaire (Version I)

Please read each item carefully and check the appropriate box below the construct which you believe the item most align with. If you believe the item does not align with any of the constructs, please check "Not Applicable". Please provide any additional comments or add items to the questionnaire.

1. My family wants me to obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

2. Obtaining the AG-ACNP credential is the right thing to do for patient care

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

3. **For me, obtaining the AG-ACNP credential would be difficult**

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

4. For me, obtaining the AG-ACNP credential would be useful for patient care

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

5. My nurse anesthesia colleagues want me to obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

6. I believe that I can provide continuity of care with the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

7. I am confident that I can obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

8. Whether I obtain the AG-ACNP credential is entirely up to me

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

9. It is easy for me to obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

10. The patient will receive continuity of care if I have the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

11. It would benefit my employer if I obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

12. My patients would benefit from the care provided if I obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

13. The care that I provide for my patients will improve if I obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

13. For me, obtaining the AG-ACNP credential is not useful

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

14. I am certain that having the AG-ACNP will have a positive impact on the care that I provide for my patients

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

15. I believe there is a need for CRNA/AG-ACNP dual practice

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

16. For me, obtaining the AG-ACNP credential would not be useful for patient care

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

17. I will be able to provide continuity of care if I have my AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

18. CRNAs would have expanded scope of practice if they obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

19. The AG-ACNP credential would allow me to provide full scope of patient care

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

20. There is a need at my current health care institution for the CRNA/AG-ACNP dual practice

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

21. It is hard for me to attend the required didactic and clinical training to obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

22. The care that I provide for my patients will not improve if I obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

23. I have no interest in obtaining the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

24. I would recommend recently graduated CRNAs to obtain their AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

25. I would pursue the AG-ACNP credential if there was a training program that would allow me to combine the AG-ACNP training with my CRNA training

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

26. Obtaining the AG-ACNP credential in addition to my CRNA credential would fulfill my social obligation to provide the best patient care possible

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

27. Hospitals administrators view CRNA/AG-ACNP practice as beneficial for their institutions

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

28. Obtaining the AG-ACNP credential would enhance my scope of practice

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

29. Obtaining the AG-ACNP credential would be beneficial for the institution that I practice at

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

30. Obtaining the AG-ACNP would be beneficial for the patients that I care for

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

31. Clinical nurses that I work with want me to obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

32. Anesthesiologists that I practice with would be supportive of CRNA/AG-ACNP dual practice

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

33. Other professionals that I work with want me to obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

34. I believe that the CRNA/AG-ACNP dual practice would improve the care of surgical patients

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

35. In the future, I intend to obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

36. I intend to extend my care for patients beyond the peri-operative setting

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

37. I believe it is important to provide continuity of care for surgical

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

38. Obtaining the AG-ACNP credential would not limit me to the care of the patient to the operative settings

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

39. I believe that surgical patients have better outcome if the care provided is not fragmented

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

40. If I choose to, I am capable of obtaining the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

41. I am certain that I possess the capacity to obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

42. If the AANA support the CRNA/AG-ACNP dual practice, I would obtain the AG-ACNP credential

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

43. I would enroll in a CRNA/AG-ACNP combine program

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

44. I am confident that the CRNA/AG-ACNP dual practice would enhance the care for surgical patients

Attitude	Subjective Norm	Perceived Behavioral Control	Intention	Not Applicable

Comment:

46. I believe that it is a social obligation to provide continuity of care for my patients

Attitude	**Subjective Norm**	**Perceived Behavioral Control**	**Intention**	**Not Applicable**

Comment:

Appendix D

CRNA-INTO DC Questionnaire (Version II)

SECTION 1: DEMOGRAPHICS – Please complete all questions

1. Sex A. MALE B. FEMALE

2. Age:

A. Under 30

B. 30-34

C. 35-39

D. 40-44

E. 45-49

F. 50-54

G. 55-59

H. 60-64

I. >65

3. Location of Practice A. URBAN B. RURAL

4. Years of Practice as a CRNA:

A. <2 years

B. 2-5 years

C. 6-10 years

D. 11-15 years

E. >16 years

5. Highest Level of Education Completed:

A. Diploma Certification in Anesthesia

B. Bachelors

C. Masters

E. Clinical Doctorate (DNP/DNAP)

F. Research Doctorate (PhD/DNS/DNSc)

6. Are you credentialed in another area of advanced practice nursing?

A. YES

B. NO (proceed to question 8)

7. If "YES" to question 6, check the following area that *closely* matches your specialty:

A. Acute Care NP/Adult-Gero Acute Care NP

B. Adult Ambulatory NP

C. Family NP

D. Pediatric NP

E. Neonatal NP

8. Age of patient that you care for:

A. Adults (>13 years of age)

B. Pediatrics (<13 years of age)

C. Both pediatrics and adults

9. Clinical Practice Setting:

A. Academic Institution

B. Private – Not For Profit Institution

C. Private – For Profit Institution

D. Military/Government/VA

E. Office Base

10. Anesthesia Practice: A. Anesthesia Care Team B. CRNA-Only

11. In your primary practice, please indicate the frequency of cases Medically Directed by an Anesthesiologist:

A. Always (100%)

B. Almost Always (75-100%)

C. About half (50%)

D. Less than half

E. Never

12. Is your state opted-out of the federal-mandated physician supervision?

A. YES

B. NO

SECTION 2: Each question in this section refers to you OBTAINING THE ADULT-GERO ACUTE CARE NURSE PRACTITIONER (AG-ACNP) CREDENTIAL. Please rate the value that best reflects your opinion to the below statements. A rating of **1** indicates that you **STRONGLY DISAGREE** with the statement and a **7** indicates that you **STRONGLY AGREE** with the statement

1. My family wants me to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

2. Obtaining the AG-ACNP credential is the right thing to do for patient care

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

3. For me, obtaining the AG-ACNP credential would be difficult

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

4. For me, obtaining the AG-ACNP credential would be useful for patient care

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

5. My nurse anesthesia colleagues want me to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

6. Obtaining the AG-ACNP credential would allow me to provide continuity of care for my patients.

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

7. My patients would benefit from the care provided if I obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

8. The care that I provide for my patients will improve if I obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

9. To me, obtaining the AG-ACNP credential is useful

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

10. I am certain that having the AG-ACNP will have a positive impact on the care that I provide for my patients

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

11. There is a need for CRNA/AG-ACNP dual practice

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

12. For me, obtaining the AG-ACNP credential would not be useful for patient care

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

13. I will be able to provide continuity of care if I have my AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

14. Obtaining the AG-ACNP credential would advance my scope of practice

Strongly Disagree- - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

15. There is a need at my current health care institution for the CRNA/AG-ACNP dual practice

Strongly Disagree- - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

16. I have no interest in obtaining the AG-ACNP credential

Strongly Disagree- - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

17. Obtaining the AG-ACNP credential in addition to my CRNA credential would fulfill my social obligation to provide the best patient care possible

Strongly Disagree- - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

18. Hospitals administrators view CRNA/AG-ACNP practice as beneficial for their institutions

Strongly Disagree- - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

19. Obtaining the AG-ACNP credential would be beneficial for the institution that I practice at

Strongly Disagree- - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

20. It would be difficult for me to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

21. Obtaining the AG-ACNP would be beneficial for the patients that I care for

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

22. Clinical nurses that I work with want me to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

23. Anesthesiologists that I practice with would be supportive of CRNA/AG-ACNP dual practice

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

24. Other professionals that I work with want me to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

25. In the future, I intend to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

26. I intend to extend my care for patients beyond the peri-operative setting by obtaining the AG-ACNP credential

Strongly Disagree- - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

27. Obtaining the AG-ACNP credential would not limit me to the care of the patient to the operative settings

Strongly Disagree- - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

28. I am certain that I possess the capacity to obtain the AG-ACNP credential

Strongly Disagree- - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

29. If the AANA supports the CRNA/AG-ACNP dual practice, I would obtain the AG-ACNP credential

Strongly Disagree- - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

30. I am confident that the CRNA/AG-ACNP dual practice would enhance the care for surgical patients

Strongly Disagree- - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

31. I believe that it is a social obligation to provide continuity of care for my patients

Strongly Disagree- - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

32. I am confident that I can obtain the AG-ACNP credential

Strongly Disagree- - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

Appendix E

Evaluation of Pilot Questionnaire

1) How long did it take for you to complete questionnaire? _____

2) Pertaining to Sections 1 and 2, were the directions clearly stated?

   Comments:

3) Did you find any items on the questionnaire difficult to understand or ambiguous?

   Comments:

4) Did you find the reading level of the items appropriate for the population of interest (CRNAs)?

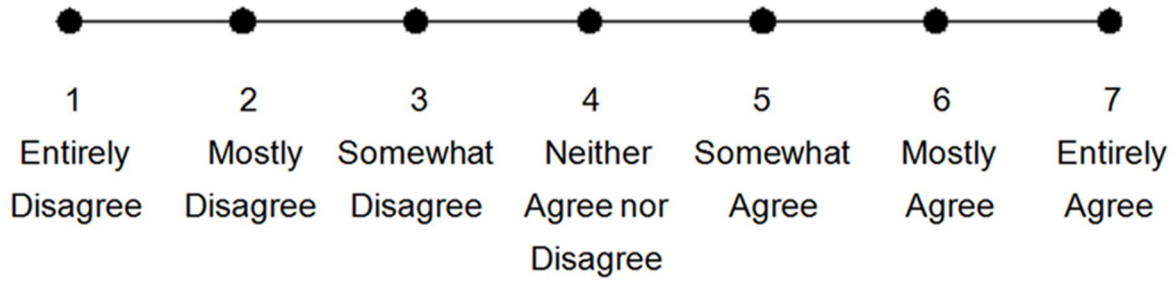
   Comments:

5) Did you experienced any discomfort pertaining to the items asked on the questionnaire?

   Comments:

6) For the rating of each item on the questionnaire, which of the below scale format do you believe is most fitting? **(Please circle one option only)**

Option 1:



Option 2:

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

Option 3:

1 Strongly Disagree	**2 Disagree**	**3 Disagree Somewhat**	**4 Undecided**	**5 Agree Somewhat**	**6 Agree**	**7 Strongly Agree**

7. Please provide any additional feedback or add items you believe would add to the quality of the questionnaire.

Thank you very much for your participation in the piloting of the CRNA-Intention To Obtain Dual Certification (CRNA-INTO DC) Questionnaire.

If you have any questions or comments, please feel free to call me at 513-288-1582 or email me at pekarby@mail.uc.edu.

Appendix F

CRNA-INTO DC Questionnaire (Version III)

SECTION 1: DEMOGRAPHICS – Please complete all questions. Select the best fitting choice for each question.

1. **Do you consent to participate in study**

   O Yes
   O No

2. **Please state your sex**

   O MALE

   O FEMALE

   O Other (please specify)

3. **Please state your age**

   O < 30 years of age

   O 30-34 years of age

   O 35-39 years of age

   O 40-44 years of age

   O 45-49 years of age

   O 50-54 years of age

   O 55-59 years of age

   O 60-64 years of age

   O > 65 years of age

4. **Please describe your location of practice**

- **O** Urban
- **O** Rural

5. **How many years have you practice as a CRNA**

- **O** <2 years
- **O** 2-5 years
- **O** 6-10 years
- **O** 11-15 years
- **O** >16 years

6. **Please select your highest level of education**

- **O** Diploma Certification in Anesthesia
- **O** Bachelor's Degree
- **O** Master's Degree
- **O** Clinical Doctorate (DNP/DNAP)
- **O** Research Doctorate (PhD/DNS/DNSc)
- **O** Other

7. **Are you credentialed in another area of advanced practice nursing?**

- **O** YES
- **O** NO (proceed to question 9)

8. If "YES" to question 7, please select the following area that *closely* matches your specialty:

O Acute Care NP/Adult-Gero Acute Care NP

O Adult Ambulatory NP

O Family NP

O Pediatric NP

O Neonatal NP

9. Please select the population that you care for

O Adults (>13 years of age)

O Pediatrics (<13 years of age)

O Both pediatric and adults

10. Please select the clinical setting that you mostly practice at

O Academic Institution

O Private – Not For Profit Institution

O Private – For Profit Institution

O Military/Government/VA

O Office Base/Ambulatory Surgery Center

O Other

11. Please select the anesthesia model that you practice in

O Anesthesia Care Team

O CRNA-Only

12. Please indicate the percentage of time that you are medically directed by an Anesthesiologist

- **O** Always (100%)
- **O** Almost Always (>50 to 99%)
- **O** About half (50%)
- **O** Less than half of time
- **O** Never

13. Is the state in which you practice an opt-out state?

- **O** YES
- **O** NO

SECTION 2: Each question in this section refers to you OBTAINING THE ADULT-GERO ACUTE CARE NURSE PRACTITIONER (AG-ACNP) CREDENTIAL. Please rate the value that best reflects your opinion to the below statements. A rating of **1** indicates that you **STRONGLY DISAGREE** with the statement and a **7** indicates that you **STRONGLY AGREE** with the statement

14. My family wants me to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

15. Obtaining the AG-ACNP credential is the right thing to do for patient care

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

16. For me, obtaining the AG-ACNP credential would be difficult

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

17. For me, obtaining the AG-ACNP credential would be useful for patient care

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

18. My nurse anesthesia colleagues want me to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

19. Obtaining the AG-ACNP credential would allow me to provide continuity of care for my patients

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

20. My patients would benefit from the care I provided if I obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

21. The care that I provide for my patients will improve if I obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

22. For me, obtaining the AG-ACNP credential is useful

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

23. I am certain that having the AG-ACNP credential will have a positive impact on the care that I provide for my patients

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

24. I believe there is a need for CRNA/AG-ACNP dual practice

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

25. For me, obtaining the AG-ACNP credential would NOT be useful for patient care

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

26. I will be able to provide continuity of care if I have my AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

27. Obtaining the AG-ACNP credential would broaden my scope of practice

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

28. There is a need at my current health care institution for the CRNA/AG-ACNP dual practice

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

29. I have no interest in obtaining the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

30. Obtaining the AG-ACNP credential in addition to my CRNA credential would fulfill my social obligation to provide the best patient care possible

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

31. Hospital administrators view CRNA/AG-ACNP practice as beneficial for their institutions

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

32. Obtaining the AG-ACNP credential would be beneficial for the institution where I am practicing

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

33. Clinical nurses that I work with want me to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

34. Anesthesiologists that I practice with would be supportive of CRNA/AG-ACNP dual practice

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

35. Other professionals that I work with want me to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

36. In the future, I intend to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

37. I intend to extend my care for patients beyond the peri-operative setting by obtaining the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

38. I am certain that I possess the capacity to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

39. If the AANA supports the CRNA/AG-ACNP dual practice, I would obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

40. I believe that providing continuity of care for my patients is a social obligation

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

41. I believe the CRNA/AG-ACNP dual practice would improve the continuity of care for surgical patients

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

42. I am confident that I can obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

43. Obtaining the AG-ACNP credential would not limit me to the care of the patients to the operative settings

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

Appendix G

CRNA-INTO DC Questionnaire (Final Version)

SECTION 1: DEMOGRAPHICS – Please complete all questions. Select the best fitting choice for each question.

1. **Do you consent to participate in study**

   O Yes
   O No

2. **Please state your sex**

   O MALE

   O FEMALE

   O Other (please specify)

3. **Please state your age**

   O < 30 years of age

   O 30-34 years of age

   O 35-39 years of age

   O 40-44 years of age

   O 45-49 years of age

   O 50-54 years of age

   O 55-59 years of age

   O 60-64 years of age

   O > 65 years of age

4. **Please describe your location of practice**

- **O** Urban
- **O** Rural

5. **How many years have you practice as a CRNA**

- **O** <2 years
- **O** 2-5 years
- **O** 6-10 years
- **O** 11-15 years
- **O** >16 years

6. **Please select your highest level of education**

- **O** Diploma Certification in Anesthesia
- **O** Bachelor's Degree
- **O** Master's Degree
- **O** Clinical Doctorate (DNP/DNAP)
- **O** Research Doctorate (PhD/DNS/DNSc)
- **O** Other

7. **Are you credentialed in another area of advanced practice nursing?**

- **O** YES
- **O** NO (proceed to question 9)

8. If "YES" to question 7, please select the following area that *closely* matches your specialty:

O Acute Care NP/Adult-Gero Acute Care NP

O Adult Ambulatory NP

O Family NP

O Pediatric NP

O Neonatal NP

9. Please select the population that you care for

O Adults (>13 years of age)

O Pediatrics (<13 years of age)

O Both pediatric and adults

10. Please select the clinical setting that you mostly practice at

O Academic Institution

O Private – Not For Profit Institution

O Private – For Profit Institution

O Military/Government/VA

O Office Base/Ambulatory Surgery Center

O Other

11. Please select the anesthesia model that you practice in

O Anesthesia Care Team

O CRNA-Only

12. Please indicate the percentage of time that you are medically directed by an Anesthesiologist

- **O** Always (100%)
- **O** Almost Always (>50 to 99%)
- **O** About half (50%)
- **O** Less than half of time
- **O** Never

13. Is the state in which you practice an opt-out state?

- **O** YES
- **O** NO

SECTION 2: Each question in this section refers to you OBTAINING THE ADULT-GERO ACUTE CARE NURSE PRACTITIONER (AG-ACNP) CREDENTIAL. Please rate the value that best reflects your opinion to the below statements. A rating of **1** indicates that you **STRONGLY DISAGREE** with the statement and a **7** indicates that you **STRONGLY AGREE** with the statement

14. My family wants me to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

15. Obtaining the AG-ACNP credential is the right thing to do for patient care

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

16. For me, obtaining the AG-ACNP credential would be difficult

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

17. For me, obtaining the AG-ACNP credential would be useful for patient care

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

18. My nurse anesthesia colleagues want me to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

19. Obtaining the AG-ACNP credential would allow me to provide continuity of care for my patients

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

20. My patients would benefit from the care I provided if I obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

21. The care that I provide for my patients will improve if I obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

22. For me, obtaining the AG-ACNP credential is useful

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

23. I am certain that having the AG-ACNP credential will have a positive impact on the care that I provide for my patients

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

24. I believe there is a need for CRNA/AG-ACNP dual practice

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

25. For me, obtaining the AG-ACNP credential would NOT be useful for patient care

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

26. I will be able to provide continuity of care if I have my AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

27. Obtaining the AG-ACNP credential would broaden my scope of practice

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

28. There is a need at my current health care institution for the CRNA/AG-ACNP dual practice

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

29. Obtaining the AG-ACNP credential in addition to my CRNA credential would fulfill my social obligation to provide the best patient care possible

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

30. Hospital administrators view CRNA/AG-ACNP practice as beneficial for their institutions

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

31. Obtaining the AG-ACNP credential would be beneficial for the institution where I am practicing

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

32. Clinical nurses that I work with want me to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

33. Anesthesiologists that I practice with would be supportive of CRNA/AG-ACNP dual practice

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

34. Other professionals that I work with want me to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

35. In the future, I intend to obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

36. I intend to extend my care for patients beyond the peri-operative setting by obtaining the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

37. If the AANA supports the CRNA/AG-ACNP dual practice, I would obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

38. I believe the CRNA/AG-ACNP dual practice would improve the continuity of care for surgical patients

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

39. I am confident that I can obtain the AG-ACNP credential

Strongly Disagree- - - - 1 - - - - 2 - - - - 3 - - - - 4 - - - - 5 - - - - 6 - - - - 7 - - - -**Strongly Agree**

Appendix H

Demographics (SPSS Output)

Statistics

		Sex	Age (years)	CRNA Experience (years)	Highest Education level	Practice Setting
N	Valid	80	81	81	81	81
	Missing	1	0	0	0	0

Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	55	67.9	68.8	68.8
	Female	25	30.9	31.3	100.0
	Total	80	98.8	100.0	
Missing	99.00	1	1.2		
Total		81	100.0		

Age (years)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	30-34 years of age	6	7.4	7.4	7.4
	35-39 years of age	11	13.6	13.6	21.0
	40-44 years of age	10	12.3	12.3	33.3
	45-49 years of age	8	9.9	9.9	43.2
	50-54 years of age	11	13.6	13.6	56.8
	55-59 years of age	15	18.5	18.5	75.3
	60-64 years of age	15	18.5	18.5	93.8
	>65 years of age	5	6.2	6.2	100.0
	Total	81	100.0	100.0	

CRNA Experience (years)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2-5 years	8	9.9	9.9	9.9
	6-10 years	22	27.2	27.2	37.0
	11-15 years	12	14.8	14.8	51.9
	>/=16 years	39	48.1	48.1	100.0
	Total	81	100.0	100.0	

Highest Education level

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma Certification in Anesthesia	9	11.1	11.1	11.1
	Bachelor's Degree	3	3.7	3.7	14.8
	Master's Degree	58	71.6	71.6	86.4
	Clinical Doctorate (DNP/DNAP)	8	9.9	9.9	96.3
	Research Doctorate (PhD/DNS/DNSc)	2	2.5	2.5	98.8
	Other	1	1.2	1.2	100.0
	Total	81	100.0	100.0	

Appendix I

Reliability (SPSS Output)

Intention Subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.900	.912	3

Item Statistics

	Mean	Std. Deviation	N
ReverseCodeQ29	2.6500	2.09943	80
SM_Q36	2.1500	1.61559	80
SM_Q37	2.0875	1.60847	80

Inter-Item Correlation Matrix

	ReverseCodeQ29	SM_Q36	SM_Q37
ReverseCodeQ29	1.000	.773	.703
SM_Q36	.773	1.000	.852
SM_Q37	.703	.852	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ReverseCodeQ29	4.2375	9.626	.767	.605	.920
SM_Q36	4.7375	11.740	.874	.786	.808
SM_Q37	4.8000	12.263	.814	.731	.855

Subjective Norm Subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.883	.890	9

Item Statistics

	Mean	Std. Deviation	N
SM_Q14	2.2025	1.59631	79
SM_Q18	2.2911	1.57831	79
SM_Q30	2.7215	1.70171	79
SM_Q31	2.8987	1.51569	79
SM_Q33	2.1772	1.47422	79
SM_Q34	2.7468	1.51462	79
SM_Q35	2.3165	1.48966	79
SM_Q39	3.0886	1.81299	79
SM_Q40	4.3165	1.93844	79

Inter-Item Correlation Matrix

	SM_Q14	SM_Q18	SM_Q30	SM_Q31	SM_Q33	SM_Q34	SM_Q35	SM_Q39	SM_Q40
SM_Q14	1.000	.724	.526	.464	.666	.488	.733	.357	.103
SM_Q18	.724	1.000	.570	.613	.837	.492	.849	.452	.288
SM_Q30	.526	.570	1.000	.476	.541	.549	.592	.523	.319
SM_Q31	.464	.613	.476	1.000	.513	.413	.520	.484	.321
SM_Q33	.666	.837	.541	.513	1.000	.428	.751	.378	.227
SM_Q34	.488	.492	.549	.413	.428	1.000	.559	.270	.115
SM_Q35	.733	.849	.592	.520	.751	.559	1.000	.374	.222
SM_Q39	.357	.452	.523	.484	.378	.270	.374	1.000	.338
SM_Q40	.103	.288	.319	.321	.227	.115	.222	.338	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SM_Q14	22.5570	88.301	.681	.605	.866
SM_Q18	22.4684	84.560	.835	.841	.853
SM_Q30	22.0380	86.140	.704	.540	.863
SM_Q31	21.8608	90.275	.650	.455	.869
SM_Q33	22.5823	88.554	.741	.715	.862
SM_Q34	22.0127	92.961	.549	.411	.876
SM_Q35	22.4430	87.122	.789	.774	.858
SM_Q39	21.6709	89.557	.537	.378	.879
SM_Q40	20.4430	95.506	.317	.204	.901

Attitude Subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.965	.964	15

Item Statistics

	Mean	Std. Deviation	N
ReverseCodeQ25	3.2468	1.83644	77
SM_Q15	3.0000	1.62221	77
SM_Q17	3.2857	1.94569	77
SM_Q19	3.0000	1.82814	77
SM_Q20	3.3377	1.83970	77
SM_Q21	2.8961	1.73648	77
SM_Q22	2.9221	1.85505	77
SM_Q23	3.0519	1.78367	77
SM_Q24	2.9481	1.76140	77
SM_Q26	3.4416	1.61810	77
SM_Q27	3.6883	1.90055	77
SM_Q28	2.5584	1.61810	77
SM_Q32	3.0909	1.73343	77
SM_Q41	3.4416	1.68970	77
SM_Q43	4.3766	1.45131	77

Inter-Item Correlation Matrix

	ReverseCodeQ25	SM_Q15	SM_Q17	SM_Q19	SM_Q20	SM_Q21	SM_Q22	SM_Q23	SM_Q24	SM_Q26	SM_Q27	SM_Q28	SM_Q32	SM_Q41	SM_Q43
ReverseCodeQ25	1.000	.490	.683	.619	.680	.652	.682	.639	.590	.552	.539	.515	.588	.643	.177
SM_Q15	.490	1.000	.738	.723	.727	.724	.669	.782	.723	.591	.610	.637	.693	.715	.235
SM_Q17	.683	.738	1.000	.744	.803	.776	.743	.758	.669	.557	.668	.676	.616	.710	.316
SM_Q19	.619	.723	.744	1.000	.892	.846	.737	.823	.756	.729	.613	.738	.668	.750	.293
SM_Q20	.680	.727	.803	.892	1.000	.888	.752	.853	.728	.714	.610	.714	.696	.764	.252
SM_Q21	.652	.724	.776	.846	.888	1.000	.782	.864	.755	.705	.600	.784	.746	.760	.339
SM_Q22	.682	.669	.743	.737	.752	.782	1.000	.805	.687	.638	.586	.720	.817	.704	.309
SM_Q23	.639	.782	.758	.823	.853	.864	.805	1.000	.797	.694	.649	.728	.743	.800	.282
SM_Q24	.590	.723	.669	.756	.728	.755	.687	.797	1.000	.687	.659	.684	.665	.715	.250
SM_Q26	.552	.591	.557	.729	.714	.705	.638	.694	.687	1.000	.520	.618	.656	.736	.253
SM_Q27	.539	.610	.668	.613	.610	.600	.586	.649	.659	.520	1.000	.502	.580	.699	.525
SM_Q28	.515	.637	.676	.738	.714	.784	.720	.728	.684	.618	.502	1.000	.751	.727	.223
SM_Q32	.588	.693	.616	.668	.696	.746	.817	.743	.665	.656	.580	.751	1.000	.714	.258
SM_Q41	.643	.715	.710	.750	.764	.760	.704	.800	.715	.736	.699	.727	.714	1.000	.344
SM_Q43	.177	.235	.316	.293	.252	.339	.309	.282	.250	.253	.525	.223	.258	.344	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ReverseCodeQ25	45.0390	408.880	.702	.628	.964
SM_Q15	45.2857	409.654	.793	.738	.963
SM_Q17	45.0000	396.263	.831	.797	.962
SM_Q19	45.2857	397.338	.874	.846	.961
SM_Q20	44.9481	395.892	.889	.889	.961
SM_Q21	45.3896	398.846	.902	.872	.961
SM_Q22	45.3636	398.313	.846	.805	.962
SM_Q23	45.2338	397.103	.902	.857	.961
SM_Q24	45.3377	403.227	.821	.737	.962
SM_Q26	44.8442	412.265	.753	.663	.963
SM_Q27	44.5974	405.375	.724	.691	.964
SM_Q28	45.7273	410.096	.789	.749	.963
SM_Q32	45.1948	405.317	.803	.787	.962
SM_Q41	44.8442	403.265	.859	.787	.962
SM_Q43	43.9091	441.321	.344	.387	.970

Perceived Behavioral Control Subscale

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.389	.375	3

Item Statistics

	Mean	Std. Deviation	N
ReverseCodeQ16	3.3875	1.78243	80
SM_Q38	5.8750	1.36294	80
SM_Q42	5.2500	1.65736	80

Inter-Item Correlation Matrix

	ReverseCodeQ16	SM_Q38	SM_Q42
ReverseCodeQ16	1.000	-.053	.348
SM_Q38	-.053	1.000	.205
SM_Q42	.348	.205	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ReverseCodeQ16	11.1250	5.528	.215	.137	.334
SM_Q38	8.6375	7.981	.087	.059	.515
SM_Q42	9.2625	4.778	.411	.171	-.107[a]

a. The value is negative due to a negative average covariance among items. This violates reliability model assumptions. You may want to check item codings.

CRNA-INTO DC Questionnaire (Version III)

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.731	.694	4

Item Statistics

	Mean	Std. Deviation	N
Subscale_SubjectiveNorm	2.7403	1.18382	77
Subscale_Attitude	3.2296	1.44640	77
Subscale_PBC	4.8745	1.05137	77
Subscale_Intention	2.3117	1.66345	77

Inter-Item Correlation Matrix

	Subscale_SubjectiveNorm	Subscale_Attitude	Subscale_PBC	Subscale_Intention
Subscale_SubjectiveNorm	1.000	.817	.011	.771
Subscale_Attitude	.817	1.000	-.170	.776
Subscale_PBC	.011	-.170	1.000	-.037
Subscale_Intention	.771	.776	-.037	1.000

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Correlations	.361	-.170	.817	.987	-4.797	.202	4

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Subscale_SubjectiveNorm	10.4158	9.053	.823	.729	.512
Subscale_Attitude	9.9264	8.210	.726	.746	.536
Subscale_PBC	8.2816	15.831	-.074	.100	.907
Subscale_Intention	10.8443	6.904	.760	.661	.501

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
13.1560	16.316	4.03936	4

Appendix J

New Reliability Coefficient with 4 Items Excluded

Questionnaire, Final Version

Items excluded - ReverseCodeQ29, 38, 40, 43

Case Processing Summary

		N	%
Cases	Valid	75	92.6
	Excluded[a]	6	7.4
	Total	81	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.964	.964	26

Item Statistics

	Mean	Std. Deviation	N
SM_Q14	2.1067	1.58177	75
SM_Q15	3.0000	1.63575	75
SM_Q17	3.3333	1.94751	75
SM_Q18	2.2000	1.56827	75
SM_Q19	3.0267	1.84518	75
SM_Q20	3.3467	1.85628	75
SM_Q21	2.8933	1.75201	75
SM_Q22	2.9200	1.87271	75
SM_Q23	3.0533	1.80010	75
SM_Q24	2.9467	1.77744	75
SM_Q26	3.4533	1.62990	75
SM_Q27	3.6800	1.92536	75
SM_Q28	2.5467	1.62990	75
SM_Q30	2.6800	1.72548	75
SM_Q31	2.8667	1.53635	75
SM_Q32	3.0667	1.75016	75
SM_Q33	2.1333	1.48263	75
SM_Q34	2.7333	1.53635	75
SM_Q35	2.2533	1.48954	75
SM_Q36	2.1333	1.65491	75
SM_Q37	2.0667	1.64673	75
SM_Q39	3.0533	1.83725	75
SM_Q41	3.4533	1.70289	75
SM_Q42	5.2400	1.68330	75
ReverseCodeQ25	3.2267	1.85686	75
ReverseCodeQ16	3.3467	1.80460	75

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
SM_Q14	74.6533	981.121	.635	.755	.963
SM_Q15	73.7600	963.888	.788	.831	.962
SM_Q17	73.4267	946.005	.808	.878	.961
SM_Q18	74.5600	972.925	.728	.899	.962
SM_Q19	73.7333	945.874	.857	.891	.961
SM_Q20	73.4133	946.300	.848	.937	.961
SM_Q21	73.8667	950.631	.860	.912	.961
SM_Q22	73.8400	942.758	.872	.882	.961
SM_Q23	73.7067	945.480	.884	.908	.961
SM_Q24	73.8133	957.208	.784	.835	.962
SM_Q26	73.3067	969.837	.730	.707	.962
SM_Q27	73.0800	960.804	.688	.704	.963
SM_Q28	74.2133	961.143	.819	.858	.961
SM_Q30	74.0800	950.480	.875	.919	.961
SM_Q31	73.8933	983.691	.628	.649	.963
SM_Q32	73.6933	952.918	.839	.859	.961
SM_Q33	74.6267	980.588	.687	.828	.963
SM_Q34	74.0267	991.918	.541	.663	.964
SM_Q35	74.5067	977.253	.721	.871	.962
SM_Q36	74.6267	961.588	.802	.905	.962
SM_Q37	74.6933	959.702	.825	.908	.961
SM_Q39	73.7067	973.102	.612	.673	.963
SM_Q41	73.3067	956.459	.828	.845	.961
SM_Q42	71.5200	1051.496	-.071	.562	.968
ReverseCodeQ25	73.5333	966.252	.666	.702	.963
ReverseCodeQ16	73.4133	1045.462	-.018	.401	.968

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
76.7600	1046.590	32.35105	26

Appendix K

Standard Multiple Regression (SPSS Output)

Descriptive Statistics

	Mean	Std. Deviation	N
Subscale_Intention	2.2958	1.63385	80
Subscale_SubjectiveNorm	2.7511	1.17214	79
Subscale_Attitude	3.2338	1.41191	81
Subscale_PBC	4.8375	1.08044	80

Correlations

		Subscale_Intention	Subscale_SubjectiveNorm	Subscale_Attitude	Subscale_PBC
Pearson Correlation	Subscale_Intention	1.000	.767	.773	-.037
	Subscale_SubjectiveNorm	.767	1.000	.817	.009
	Subscale_Attitude	.773	.817	1.000	-.161
	Subscale_PBC	-.037	.009	-.161	1.000
Sig. (1-tailed)	Subscale_Intention	.	.000	.000	.374
	Subscale_SubjectiveNorm	.000	.	.000	.469
	Subscale_Attitude	.000	.000	.	.076
	Subscale_PBC	.374	.469	.076	.
N	Subscale_Intention	80	78	80	79
	Subscale_SubjectiveNorm	78	79	79	78
	Subscale_Attitude	80	79	81	80
	Subscale_PBC	79	78	80	80

Model Summary[b]

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.809[a]	.654	.640	.98015	.654	46.652	3	74	.000

a. Predictors: (Constant), Subscale_PBC, Subscale_SubjectiveNorm, Subscale_Attitude

b. Dependent Variable: Subscale_Intention

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	134.457	3	44.819	46.652	.000[b]
	Residual	71.092	74	.961		
	Total	205.549	77			

a. Dependent Variable: Subscale_Intention

b. Predictors: (Constant), Subscale_PBC, Subscale_SubjectiveNorm, Subscale_Attitude

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Correlations			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	-1.168	.617		-1.893	.062					
	Subscale_SubjectiveNorm	.548	.171	.393	3.214	.002	.767	.350	.220	.312	3.204
	Subscale_Attitude	.529	.143	.457	3.688	.000	.773	.394	.252	.304	3.290
	Subscale_PBC	.051	.108	.033	.468	.642	-.037	.054	.032	.914	1.094

a. Dependent Variable: Subscale_Intention

Appendix L

Hierarchical Multiple Regression (SPSS Output)

Descriptive Statistics

	Mean	Std. Deviation	N
Subscale_Intention	2.2958	1.63385	80
Sex	1.3125	.46644	80
Age (years)	5.6914	2.10738	81
CRNA Experience (years)	4.0123	1.07812	81
Highest Education level	2.9259	.89132	81
Practice Setting	2.6049	1.08027	81
Subscale_SubjectiveNorm	2.7511	1.17214	79
Subscale_Attitude	3.2338	1.41191	81
Subscale_PBC	4.8375	1.08044	80

Correlations

		Subscale_Intention	Sex	Age (years)	CRNA Experience (years)	Highest Education level	Practice Setting	Subscale_SubjectiveNorm	Subscale_Attitude	Subscale_PBC
Pearson Correlation	Subscale_Intention	1.000	.073	-.105	-.101	.047	-.013	.767	.773	-.037
	Sex	.073	1.000	-.037	-.101	.226	-.075	.126	.151	-.128
	Age (years)	-.105	-.037	1.000	.739	-.425	.045	-.067	-.124	-.097
	CRNA Experience (years)	-.101	-.101	.739	1.000	-.337	.026	-.174	-.209	-.013
	Highest Education level	.047	.226	-.425	-.337	1.000	-.161	.133	.161	.116
	Practice Setting	-.013	-.075	.045	.026	-.161	1.000	.088	-.039	.061
	Subscale_SubjectiveNorm	.767	.126	-.067	-.174	.133	.088	1.000	.817	.009
	Subscale_Attitude	.773	.151	-.124	-.209	.161	-.039	.817	1.000	-.161
	Subscale_PBC	-.037	-.128	-.097	-.013	.116	.061	.009	-.161	1.000
Sig. (1-tailed)	Subscale_Intention	.	.261	.176	.188	.339	.453	.000	.000	.374
	Sex	.261	.	.373	.187	.022	.254	.136	.090	.130
	Age (years)	.176	.373	.	.000	.000	.346	.279	.136	.196
	CRNA Experience (years)	.188	.187	.000	.	.001	.410	.062	.031	.456
	Highest Education level	.339	.022	.000	.001	.	.076	.121	.075	.152
	Practice Setting	.453	.254	.346	.410	.076	.	.221	.364	.296
	Subscale_SubjectiveNorm	.000	.136	.279	.062	.121	.221	.	.000	.469
	Subscale_Attitude	.000	.090	.136	.031	.075	.364	.000	.	.076
	Subscale_PBC	.374	.130	.196	.456	.152	.296	.469	.076	.
N	Subscale_Intention	80	79	80	80	80	80	78	80	79
	Sex	79	80	80	80	80	80	78	80	79
	Age (years)	80	80	81	81	81	81	79	81	80
	CRNA Experience (years)	80	80	81	81	81	81	79	81	80
	Highest Education level	80	80	81	81	81	81	79	81	80
	Practice Setting	80	80	81	81	81	81	79	81	80

Subscale_SubjectiveNorm	78	78	79	79	79	79	79	79	78
Subscale_Attitude	80	80	81	81	81	81	79	81	80
Subscale_PBC	79	79	80	80	80	80	78	80	80

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.130[a]	.017	-.051	1.67534	.017	.247	5	72	.940
2	.825[b]	.681	.644	.97510	.664	47.847	3	69	.000

a. Predictors: (Constant), Practice Setting, CRNA Experience (years), Sex, Highest Education level, Age (years)

b. Predictors: (Constant), Practice Setting, CRNA Experience (years), Sex, Highest Education level, Age (years), Subscale_PBC, Subscale_SubjectiveNorm, Subscale_Attitude

c. Dependent Variable: Subscale_Intention

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.461	5	.692	.247	.940[b]
	Residual	202.088	72	2.807		
	Total	205.549	77			
2	Regression	139.942	8	17.493	18.398	.000[c]
	Residual	65.606	69	.951		
	Total	205.549	77			

a. Dependent Variable: Subscale_Intention

b. Predictors: (Constant), Practice Setting, CRNA Experience (years), Sex, Highest Education level, Age (years)

c. Predictors: (Constant), Practice Setting, CRNA Experience (years), Sex, Highest Education level, Age (years), Subscale_PBC, Subscale_SubjectiveNorm, Subscale_Attitude

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Correlations			Collinearity Statistics	
		B	Std. Error	Beta			Zero-order	Partial	Part	Tolerance	VIF
1	(Constant)	2.690	1.413		1.904	.061					
	Sex	.244	.424	.070	.576	.567	.073	.068	.067	.933	1.072
	Age (years)	-.062	.141	-.081	-.443	.659	-.105	-.052	-.052	.413	2.421
	CRNA Experience (years)	-.060	.264	-.040	-.227	.821	-.101	-.027	-.027	.448	2.231
	Highest Education level	-.032	.246	-.017	-.129	.897	.047	-.015	-.015	.759	1.318
	Practice Setting	-.009	.179	-.006	-.053	.958	-.013	-.006	-.006	.972	1.029
2	(Constant)	-.613	1.019		-.602	.549					
	Sex	-.047	.250	-.013	-.188	.851	.073	-.023	-.013	.905	1.104
	Age (years)	-.150	.083	-.193	-1.803	.076	-.105	-.212	-.123	.403	2.483
	CRNA Experience (years)	.264	.157	.174	1.681	.097	-.101	.198	.114	.432	2.314
	Highest Education level	-.213	.145	-.116	-1.470	.146	.047	-.174	-.100	.737	1.357
	Practice Setting	-.077	.107	-.051	-.725	.471	-.013	-.087	-.049	.927	1.079
	Subscale_SubjectiveNorm	.607	.175	.435	3.471	.001	.767	.386	.236	.294	3.399
	Subscale_Attitude	.525	.147	.454	3.572	.001	.773	.395	.243	.286	3.490
	Subscale_PBC	.047	.111	.031	.422	.675	-.037	.051	.029	.864	1.157

a. Dependent Variable: Subscale_Intention

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics		
						Tolerance	VIF	Minimum Tolerance
1	Subscale_SubjectiveNorm	.805[b]	10.610	.000	.783	.931	1.075	.408
	Subscale_Attitude	.803[b]	10.542	.000	.781	.930	1.075	.411
	Subscale_PBC	-.036[b]	-.295	.769	-.035	.948	1.055	.410

a. Dependent Variable: Subscale_Intention

b. Predictors in the Model: (Constant), Practice Setting, CRNA Experience (years), Sex, Highest Education level, Age (years)