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UNIVERSITY OF SAN DIEGO

Hahn School of Nursing and Health Science

DOCTOR OF PHILOSOPHY IN NURSING

A DESCRIPTION OF IMPOSTOR PHENOMENON IN CERTIFIED REGISTERED NURSE

ANESTHESIOLOGISTS

by

Jeffrey R. Darna

A dissertation presented to the

FACULTY OF THE HAHN SCHOOL OF NURSING AND HEALTH SCIENCE

UNIVERSITY OF SAN DIEGO

In partial fulfillment of the requirements for the degree

DOCTOR OF PHILOSOPHY IN NURSING

March 2022

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UNIVERSITY OF SAN DIEGO

Hahn School of Nursing and Health Science

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A Description of Impostor Phenomenon in Certified Registered
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Abstract

Background: Imposter Phenomenon (IP) is an evolving, multidimensional construct defined as self-perceived intellectual phoniness and professional ineptitude frequently experienced by individuals working in high performance or competitive environments. IP consequences include psychological distress, role under-optimization, and professional paralysis. Certified Registered Nurse Anesthesiologists (CRNAs) are at risk for impostorism; however, IP presence, intensity, and career effects are unknown.

Purpose: The study measured IP in CRNAs and determined the relationship between IP and select sociodemographic and practice variables.

Methods:

Design: A descriptive, cross-sectional correlation design measured IP using an Internet-based survey from a random sample of 170 members of the American Association of Nurse Anesthesiology (AANA).

Variables:

Dependent Variable: IP prevalence was measured.

Independent Variables: CRNA age, gender identity, race/ethnicity, education level, clinical experience, anesthesia practice model, select clinical skills, decision-making, and state scope of practice were analyzed for significant relationships.

Instrument: The Clance Imposter Phenomenon Scale (CIPS) is a 20-item instrument that measures IP presence and intensity. The instrument demonstrates good reliability (Cronbach's alpha range from 0.85 to 0.96) and content validity.

Data Analysis: Extensive descriptive statistics explored the relationships among the categorical independent and dependent variables

Results: Participants were mostly male (53.5%), White (93.5%), had a mean age of 55.5 years ($SD = 10.4$), and practiced for 18.3 mean years ($SD = 11.1$). These variables were significantly different from the AANA membership profile. IP prevalence was 55.9% with a mean CIPS score of 44.6 ($SD = 14.4$). Significant relationships were identified among race/ethnicity ($p = .044$), age ($p = .033$), and years of clinical practice ($p = .012$).

Conclusion: IP was highly prevalent in the CRNA sample and pervasive across multiple practice settings; however, significant relationships were only found between race/ethnicity, age, and practice years. IP antecedents were not elucidated but may include harmful messaging and other societal constructs involving nursing's role in health care. Identifying IP early in the CRNA's career and adopting healthy management strategies may help CRNAs optimize their health care role and lead to a more productive professional experience. Study limitations include the research design, small sample size, and divergent participant characteristics.

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Dedication

I dedicate this research to the millions of health care workers who, at some point during their careers, questioned their ability, knowledge, and influence. Your professional contributions have immeasurable value. Believe in yourself and push past the impostor feelings.

Acknowledgements

My first acknowledgment is to my husband, John T. Vaughan, III, who has supported my educational endeavors for nearly two decades. The transformation from clinician to research scientist was intense and required us to delay vacations, eat late-night dinners, and mute the television during Sunday NFL games. Today we begin a new chapter and earlier mealtimes. Olive and Henry are wagging their tails with excitement and await the next adventure.

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Finally, I recognize every nurse anesthesia resident who transitions from a bedside critical care nurse to a nurse anesthesiologist. You are not an impostor. You are a highly educated and skilled advanced practice nurse who will change lives through the excellence of

care you deliver daily. Believe in yourself, do not rest on your laurels, and always take your value with you everywhere you go.

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Chapter I

Introduction

Imposter Phenomenon (IP) has received renewed attention in the professional development and career advancement literature. Social science researchers consider IP to be an evolving, multidimensional construct and define the phenomenon as self-perceived intellectual phoniness, frequently experienced by high achieving individuals studying or working in professional or competitive environments (Bravata et al., 2019; Clance, 1985; Mak et al., 2019). Anxiety, depression, and low self-esteem are associated with impostorism and may interfere with job performance and career satisfaction (Haney et al., 2018). Threats to wellbeing, job burnout, and professional paralysis may develop in individuals with intense IP feelings (Barrow, 2019). Certified Registered Nurse Anesthesiologists (CRNAs) working in an Anesthesia Care Team (ACT) may be at risk for IP and its related career effects. The ACT model involves collaboration with a physician anesthesiologist who may exert unnecessary control over the CRNA's practice, a convention that limits full practice authority (FPA) and suppresses professional growth. Although IP has been well-studied in multiple specialized disciplines, the prevalence in CRNAs and its effects on practice setting, patient care decision-making, and advanced clinical skill utilization remains unknown. Measuring IP in CRNAs and describing the relationship between IP and select sociodemographic and practice variables will expand the IP literature and might provide insight into the effects of IP on the CRNA profession.

Background

Clance and Imes (1978) first described IP in 150 high-achieving women undergoing counseling in their psychotherapy practice. Individuals with IP tendencies consider themselves as intellectual frauds and attribute their success to external factors such as luck, chance, or an error

(Bravata et al., 2019; Clance, 1985). Despite their meritorious achievements, individuals with IP deem their accomplishments as insufficient and have difficulty internalizing positive feedback (Clance & O'Toole, 1987). Impostors believe they have deceived their colleagues and fear being discovered as an intellectual fraud (Clance & Imes, 1978; Henning et al., 1998). Despite an estimated prevalence of between 9 and 82% (Bravata et al., 2019), IP is not recognized as an official psychological disorder. Consequently, IP does not have standardized reporting or diagnostic criteria (Mak et al., 2019). Clinical practice guidelines have not been developed, and no professional organizations have established any evidence-based treatment. The phenomenon is associated with several comorbid conditions, including trait anxiety, depression, and low self-esteem (Bravata et al., 2019). Individuals with IP may experience psychological distress, which could produce feelings of inferiority and shame and eventually threaten individual wellbeing (Barrow, 2019). Ultimately, IP impedes professional development and career advancement through avoidance behavior and self-efficacy destabilization (Haney et al., 2018).

Since Clance & Imes (1978) first described IP, more than 300 studies have been conducted, with more than half of all investigations published within the last decade (Bravata et al., 2019; Mak et al., 2019). Social science researchers headed most of the early inquiries and often focused on the IP concept as well as the associated family and childrearing antecedents. More recent investigations have concentrated on IP in a specific population, or validation of a psychometric instrument. Despite the expansive volume of IP literature, the research describing IP in the nursing profession remains sparse. Few data exist on IP prevalence, intensity, or career effects among nurses. No research has been conducted to explore the dimensions of IP in CRNAs. Interestingly, no investigations have been performed on the economic consequences of IP in any population or setting.

Nurse anesthesiologists or CRNAs are advanced practice nurses educated and trained to provide perioperative evaluation and management services across the life span and in all clinical settings. In the United States (US), CRNAs administer 50 million anesthetics each year (American Association of Nurse Anesthesiology [AANA], 2021a). Nurse anesthesiologists have a distinguished history of more than 150 years and are the primary anesthesia professionals in rural America and the US military globally. In 1986, CRNAs became the first advanced practice nursing specialty to receive direct Medicare reimbursement (Hoyem et al., 2019). The CRNA role continues to progress towards FPA through improvements in state licensure, modernization of federal regulations, and expanded institutional clinical privileges.

In the US, anesthesiology services are delivered under different practice models. The ACT model involves CRNAs collaborating with physician anesthesiologists, while the independent practice model enables CRNAs complete autonomous decision-making. The ACT practice culture can become imbalanced with physician anesthesiologists holding a real or perceived power advantage. The dynamics contributing to the disparity are involved; however, inequality in decision-making and advanced clinical skill utilization may contribute to greater physician control. Excessive physician oversight can marginalize CRNAs, undervalue their contribution, and degrade nursing autonomy and professional growth (Cook et al., 2013; Lowery et al., 2016). A pernicious erosion of CRNA clinical responsibilities could negatively affect career fulfillment and professional development. Nurse anesthesiologists who report greater practice autonomy and utilization of advanced clinical skills also report higher job satisfaction (Negrusa et al., 2021).

Impostor tendencies might alter CRNA practice behaviors, professional opportunities, and organizational advancement. A CRNA with intense IP feelings may prefer the ACT model -

relinquishing decision-making and advanced clinical skills to the physician anesthesiologist. Conversely, CRNAs with infrequent IP tendencies may choose an independent practice setting where FPA is supported. While it is important to measure IP prevalence in the CRNA population, it is necessary to identify if a relationship exists between IP intensity and CRNA professional behaviors, clinical decision-making, and practice domain preferences.

Although there is little research involving the nursing profession, the existing evidence suggest IP intensity can lead to harmful career effects for advanced practice nurses. In one study of clinical nurse specialists (CNS), Ares (2018) measured IP prevalence using the Clance Impostor Phenomenon Scale (CIPS; Clance, 1985) and found IP tendencies were present in nearly 75% of study participants. Ares reported that nurses who practiced as a CNS had more intense IP feelings than nurses working in a non-advanced practice role. The research findings suggest that IP inclinations may dissuade nurses from pursuing advanced practice opportunities or fulfilling their professional goals. Additional data from the same study indicated the advanced practice nursing role might exacerbate underlying IP tendencies. Uncovering a high IP prevalence rate in CRNAs may offer insight into why some CRNAs elect to practice in an ACT model or relinquish advanced clinical skills or decision-making to physician anesthesiologists.

Impostorism appears to be ubiquitous among nursing students and is particularly prevalent at the transition between university graduation and professional nursing practice. Nurse educators have an important role in identifying IP in their students and discussing the career effects and management options. Aubeeluck et al. (2016) conducted a pilot study in graduate nurses and found 70% of participants reported IP feelings. Christensen et al. (2016) expanded on the research by studying the effects of IP in 223 Australian senior student nurses beginning their professional practice. Christensen et al. found mild to moderate IP tendencies among the study

participants and evidence of self-doubt and feelings of professional inadequacy. The researchers proposed using transition-to-practice programs to mitigate the effects of IP and facilitate a smooth transition into professional nursing practice. Haney et al. (2018) designed an interprofessional workshop on IP for advanced practice nurses, pharmacists, and medical students. In the one-day seminar, Haney and colleagues measured IP and discussed strategies to mitigate IP's adverse career effects. Although longitudinal data on workshop participants were not collected, some advanced practice nursing students later reported they pursued new employment opportunities, submitted manuscripts to peer-reviewed journals, and served on a state task force.

The difference in anesthesia care is insignificant between CRNAs and physician anesthesiologists. One standard of care exists in anesthesiology regardless of the professional's academic or licensing credentials. While their formative education pathways are different, primary anesthesia residency training is similar for CRNAs and physician anesthesiologists. Patient outcomes remain the same regardless of the anesthesia care delivery model (Dulisse & Cromwell, 2010). However, CRNAs working in an independent practice setting offer a substantial cost savings opportunity for health care systems - a significant consideration for policymakers (Hogan et al., 2010). Depending on the state and anesthesia practice model, Medicare supports physician involvement in anesthesia care services provided there is compliance with federal regulations and law, e.g., Tax Equity and Fiscal Responsibility Act (TEFRA) of 1982.

Unfortunately, the Medicare payment model discriminates against CRNAs by supporting physician anesthesiologist involvement, a regulation that may unjustly restrict the CRNA's practice opportunities. Moreover, the ACT model limits access to care, increases health care

costs, and underutilizes ACT member capabilities. Patient care quality and safety do not improve under an ACT model when compared with other anesthesia care models (Dulisse & Cromwell, 2010). Researching IP in the CRNA population will expand IP knowledge and potentially lead to new policies and treatment that liberate CRNA practice and promote FPA. Appendix A provides the operational definitions for the proposed study.

Operational Definitions

The following operational definitions will be used throughout the study.

Advanced Clinical Skills

CRNA clinical skills are defined by the *Scope of Nurse Anesthesia Practice* (AANA, 2020). For this study, advanced clinical skills will include CRNAs inserting central venous catheters, performing ultrasound-guided regional anesthesia, and using point-of-care ultrasound to evaluate patients.

Anesthesia Care Team

Anesthesia care and services led by a physician anesthesiologist who directs or supervises the care of qualified anesthesia personnel and meets the American Society of Anesthesiologists (ASA) *Guidelines for the Ethical Practice of Anesthesiology* (2018).

Autonomy

The CRNA's use of their experience, clinical judgment, and responsibility to practice without unnecessary restriction imposed by an institution or clinician (Peacock & Hernandez, 2020).

Certified Registered Nurse Anesthesiologist

A board-certified advanced practice registered nurse (APRN) who practices both autonomously and in collaboration with a variety of health providers on an interprofessional

team to deliver high-quality, holistic, evidence-based anesthesia and pain care services. The CRNA cares for patients at all acuity levels across the lifespan in various settings for procedures including, but not limited to, surgical, obstetrical, diagnostic, therapeutic, and pain management (AANA, 2019).

Clinical Decision-Making

Clinical decision making in advanced practice nursing is a dynamic, intricate process defined as a sequence of judgements and analyses based on practitioner knowledge, experience and subjective and objective data specific to a clinical context and the evaluation of that data to implement actions to attain a desired outcome (Johansen & O'Brien, 2016).

Full Practice Authority

The ability of the nurse anesthetist to practice to the complete extent of their education, skills, and competencies (AANA & Council on Accreditation [COA] of Nurse Anesthesia Educational Programs, 2020).

Impostor Phenomenon

Impostor Phenomenon is a subjective, inaccurate self-assessment involving feelings of intellectual and professional incompetence and fraudulence despite external evidence of success resulting in avoidance behaviors, professional under-development, and an elevated risk of psychological distress (Barrow, 2018).

Independent Practice

An independent CRNA who provides anesthesia services without reliance on or control by another anesthesia provider. (AANA & COA, 2020).

Medical Direction

A Medicare payment rule for physicians who medically direct qualified anesthesia personnel in a ratio not to exceed four concurrent anesthesia cases while complying with the seven physician activities required for each case as defined in the TEFRA of 1982 (Centers for Medicare & Medicaid, 2020). Under this model, physician anesthesiologists may claim 50% payment for each anesthesia case they medically direct, up to the maximum of four concurrent cases.

Medical Supervision

A Medicare payment rule for physicians who medically supervise qualified anesthesia personnel in a ratio that exceeds four concurrent anesthesia cases (Centers for Medicare & Medicaid, 2020). The medical supervision model offers physicians less remuneration.

Physician Anesthesiologist

A physician educated and licensed to practice medicine and anesthesia in the United States. The physician may or may not be board-certified in anesthesiology (AANA, 2019).

Specialty Anesthesia Practice

Specialty anesthesia practice means the consistent delivery of anesthesia services to one of the following patient populations: 1. Cardiac - patients requiring cardiac or open-heart procedures; 2. Pediatric - patients who are less than 18 years of age and require anesthesia service; and 3. Pain management - patients requiring pain management services for any condition classified as chronic pain.

Research Purpose

The current study measured the prevalence and intensity of IP in CRNAs using the CIPS instrument. The CIPS is a 20-item psychometric instrument with established reliability and

content validity and is the most frequently used instrument to measure IP in different populations and across multiple settings. Appendix B contains the CIPS instrument for the proposed study.

The study had a primary aim and two secondary aims. Each aim focused on an IP measurement, variable relationship, or variance in IP as accounted for by select participant variables. The data from this study answered the following research questions:

- What is the prevalence and intensity of IP in a random selection of CRNAs as measured by the CIPS instrument?
- What is the relationship between IP intensity and select sociodemographic and practice variables in a random selection of CRNAs?
- Do CIPS scores predict select CRNA practice behaviors and their preferred anesthesia care delivery model?

Primary Aim

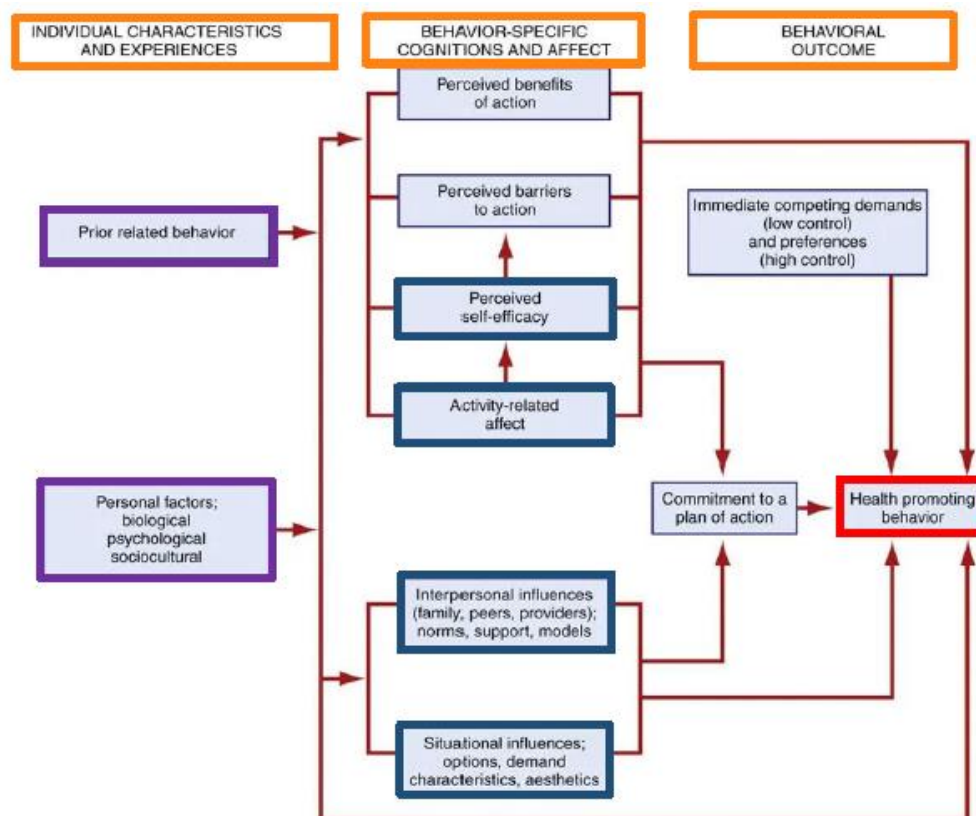
1. The primary aim described select sociodemographic variables, anesthesia practice model, CRNA practice behaviors, and IP in a random sample of CRNAs.

Secondary Aims

1. Secondary aim one described the relationship among select sociodemographic variables, anesthesia practice model, CRNA practice behaviors, and IP in a random sample of CRNAs.
2. Secondary aim two was designed to describe the variance in IP accounted for by select sociodemographic variables, anesthesia practice model, and CRNA practice behaviors in a random sample of CRNAs.

Theoretical Underpinning

Murdaugh et al. (2018) define Pender's Health Promotion Model (HPM) as a middle-range theory where health is considered a positive dynamic state. The HPM is based on a social cognitive theory, which holds that certain factors guide an individual's commitment to health-promoting behaviors. Health-promoting behaviors are the preferred actions that lead to improved wellbeing, personal satisfaction, and self-efficacy. Pender's model focuses on three areas: (1) individual characteristics and experiences; (2) behavior-specific cognitions and affect; and (3) behavioral outcomes. The theory considers individuals as complex biopsychosocial beings who interact with the environment and transform themselves and their surroundings over time. Nurses comprise the social-interactive setting, which affects the individual across the life span. The theory notes each person has unique personal characteristics and experiences that change ensuing decisions. Nurses facilitate knowledge transfer, individual motivation, and behavior modification through nursing actions. The altered behaviors progressively improve health, enhance functional ability, and promote a better quality of life.

Figure 1*Pender's Health Promotion Model (Adapted)*

Health Promotion Model (Pender, 1996) Adapted from <https://pmhealthnp.com/nola-pender-health-promotion-model/>

Conceptual Framework

The HPM had a contextual fit in the setting of IP measurement in CRNAs because antecedents and practice culture might contribute to intense IP feelings, resulting in psychological distress, threats to wellbeing, and an inability to achieve professional fulfillment. The HPM has been used to encourage independent nursing practice. Murdaugh et al. (2018) depict the HPM with three connected foci that align with the IP antecedents described by Barrow (2018) and Clance (1985). Individual characteristics from the CRNA include clinical experience, education, and age. The practice culture adds to IP by endorsing physician control over nursing, which, traditionally, has been a dependent role in health care. Activity-related effects correspond

to CRNA practice behaviors, while perceived self-efficacy correlates to an individual's difficulty internalizing positive feedback. Situational and interpersonal effects encompass the anesthesia care delivery model, scope of practice, and clinical setting. Finally, the behavioral outcome is achieved, which is decreased IP tendencies and frequency. Figure 2 provides a visual representation of the conceptual framework using Pender's HPM as the theoretical underpinning.

Figure 2

Conceptual Framework Based on Pender's (1996) Health Promotion Model



Study Significance

The study has implications for advanced practice nurses, health care policy, and, potentially, gender studies. The data obtained from the random sample of CRNAs was the first investigation to measure IP in CRNAs. Significant findings explain how the phenomenon affects CRNA practice and their preferred anesthesia care delivery model. A more diverse sample might be generalizable to the broader CRNA community. The results were compared to the current IP literature on advanced practice nurses and other health care professionals for similar patterns and

emerging themes. A change in CRNA practice could ensue. Future research might focus on longitudinal designs that measure the long-term effects of IP on CRNAs and the changing dimensions in their practice.

The investigation achieved several advancements in the nursing literature while enhancing the current IP research quality. This study's findings are valuable to the nursing profession because few studies exist that adequately describe IP in nurses. The investigation was also the first effort to document an IP effect size in CRNAs. Large effect sizes have been reported in the nursing and medical peer-reviewed literature (Bravata et al., 2019). A high prevalence rate with intense IP measurements was anticipated as the data were consistent with earlier research on advanced practice nurses.

Additionally, the investigation expanded on previous research designs by applying a more rigorous methodology, e.g., participant randomization and a priori sample size calculation. It was anticipated that randomly selected participants from different US regions and practice settings would create a more diverse, representative sample of present-day CRNA practice, improving external validity to the CRNA population. An a priori sample size calculation established a minimum number of participants required to detect a statistical significance under a moderate effect size assumption.

A positive correlation between intense IP measurements and select CRNA sociodemographic variables attempted to elucidate why some CRNAs prefer to practice in an ACT model, defer advanced clinical skills, or capitulate perioperative decision-making to physician anesthesiologists. A positive finding supported an avoidance behavior theme, which is commonly found in individuals with IP. In a concept analysis, Barrow (2018) identified three dominant themes related to IP. The first was a threat to wellbeing ending in psychological

distress, job burnout, and feelings of inferiority and shame. The second was fear, which often manifested as fear of engagement or fear of being discovered as an intellectual fraud. The final theme was avoidance behavior. Barrow concluded that nurses who are distressed by IP repeatedly circumvented challenging opportunities and leadership advancement.

While this study did not explore psychological distress or burnout in CRNAs, the investigation suggested other attributes commonly related to intense IP feelings should be studied further, e.g., low self-esteem and self-doubt. By decreasing the negative consequences of IP, more CRNAs might adopt advanced clinical skills into their practice, e.g., ultrasound-guided regional anesthesia, central venous catheterization, or transesophageal echocardiography. These advanced skills could increase their contribution value to the organization and foster new, expanded practice opportunities. Furthermore, CRNAs who learn to manage their IP feelings may be more likely to assert themselves into clinical decision-making or independent practice, ultimately achieving FPA and expanding access to anesthesia care services.

Education remains the cornerstone approach to mitigate the immediate and long-term effects of IP and is achievable with an introduction to the construct during academic training and continuing IP education into professional nursing practice. Nurse educators have an important role in identifying IP in their students and discussing the career effects and management options. From this research, nurse educators can facilitate IP discussions during undergraduate and advanced practice training. Measuring IP using the CIPS instrument during nurse anesthesia training is an essential first step in understanding the extent and potential effects of IP on a prospective nurse or CRNA entering into a conceivably long professional advanced practice nursing career. Educators can ameliorate the harmful effects of IP by creating supportive learning environments that foster professional development and better career transitions.

Employers might offer management workshops to facilitate a smooth transition into professional practice, reducing the erosion of CRNA advanced clinical skills and clinical decision-making. Finally, educators and employers should collaborate to research IP progression from training to professional practice in at-risk CRNAs.

Exploring the relationship between CRNA practice behaviors and IP tendencies could lead to revised power imbalances among CRNAs and physicians, enhance team collaboration, and promote FPA for all CRNAs. Additional research data might lead to IP management strategies tailored to CRNAs and other advanced practice nurses. Nurse anesthetologists may recognize their IP leanings and adopt new behaviors to reduce their tendencies. Newly controlled and managed IP feelings might encourage a CRNA to pursue organizational leadership, which could advance a cultural transformation and professional opportunity realignment. Career satisfaction and professional advancement may improve and achieve sustainability. Policymakers can harness the IP-liberated CRNA through new leadership appointments, FPA, and evidence-based anesthesia care delivery models. These changes could facilitate cost reductions in the health care system. Hogan et al. (2010) found a CRNA-only practice was the most cost-effective anesthesia care delivery model available to health care systems. In the same study, Hogan and colleagues found it was less expensive for the US health care system to educate and train CRNAs than physician anesthetologists; although, their model was based on masters-prepared nurse anesthetologists. A concluding and hopeful benefit from this research was stakeholders would finally recognize and decisively value nurse anesthetologists as essential health care specialists, leaders, and industry experts.

Conclusion

The multidimensional IP construct is frequently experienced by high-achieving professionals and associated with threats to wellbeing and professional development. Although IP has been established and researched for nearly 50 years, a significant gap exists in the nursing literature. The prevalence of IP in the CRNA population is unknown and may contribute to practice inequities, especially for CRNAs working in an ACT model. Describing IP in CRNAs and identifying a relationship among select variables improves the understanding of how the phenomenon affects CRNA practice. These findings expand the IP literature, broaden IP awareness in nurses, and support future research to improve education, treatment, and diagnostic instruments. Analyzing the data using the proposed conceptual framework and Pender's HPM (1996) might encourage an action-oriented power realignment within the ACT model, support IP education in nursing, and inspire healthy behaviors that mitigate IP risk factors. A transformative restructuring may persuade more CRNAs to pursue an independent practice, advance practice equality, and discourage excessive physician anesthesiologist control and oversight.

Chapter II

Review of Literature

Impostor Phenomenon (IP) was first recognized nearly 50 years ago and has been described as self-perceived intellectual phoniness frequently experienced by high-achieving individuals who study or work in professional or competitive environments despite clear evidence of their own merit (Clance, 1985). The construct has been researched within different populations and contexts with prevalence rates reaching more than 80% (Bravata et al., 2019). Despite its ubiquitous presence, IP is not officially acknowledged as a psychological disorder. Although reliable and validated psychometric instruments have been developed, debate exists about the construct's multiple dimensions, gradual evolution, and an instrument's continued ability to measure the phenomenon. The consequences of untreated IP are wide-ranging and include professional paralysis (Barrow, 2019; Haney et al., 2018), career non-advancement (Ares, 2018), and psychological distress (Barrow, 2019, Clance & Imes, 1978; Henning et al., 1998). The effect on an individual's professional development is particularly noteworthy with respect to career satisfaction and organizational performance (Arena & Page, 1992). The economic consequences of IP on individuals, systems (i.e., health care), and society have yet to be investigated.

Pauline Clance and Suzanne Imes (1978) established the IP construct during the second wave feminism period of the 1970s. The psychologists reported a case series from their psychotherapy experience counseling 150 professional women who self-identified as intellectual frauds despite their meritorious achievements. The researchers described women who, at a young age, considered themselves as intellectual phonies and embraced maladaptive behaviors to conceal their perceived intellectual inadequacy. The psychologists attributed IP behaviors to

common societal expectations, such as girls are not as smart as boys. Clance and Imes observed four common but different behavior patterns in women with IP tendencies. First, women were thorough and worked hard for fear of being discovered as an intellectual fraud. Second, women evaded conflict or expressing contrasting viewpoints for fear of being perceived as unintelligent. Third, women used charm and insightfulness to obtain support from their colleagues and superiors. Finally, women avoided the adverse societal effects that frequently emerge when women express confidence in their capabilities.

More than 300 studies have been conducted on the IP since the condition was first described in 1978 (Bravata et al., 2019; Mak et al., 2019). Most of the early, influential research on IP were published by psychology scientists and focused on antecedents in family and childrearing, IP prevalence in a focused population, or validation of a diagnostic instrument. These investigations described the relationship between IP and a specific population, e.g., students, women, or a professional discipline. More recently, IP has resurged in the peer-reviewed literature from numerous professional fields, with more than half of the investigations published within the last decade (Bravata et al., 2019).

Most of the investigations on IP in a specific population used a cross-sectional, correlational design and relied on convenience sampling, limiting generalizability. For example, Cozzarelli and Major (1990) measured IP, optimism, pessimism, and self-esteem in 137 undergraduate students enrolled in a social science class. Bernard et al. (2017) described IP and perceived racism in a convenience sample of 157 African American college students attending a predominately White institution. Clance and Imes (1978) formed conclusions on IP based on a case series of women they counseled during private psychotherapy sessions.

Some populations have only been tangentially studied. For example, few studies focus on IP prevalence, intensity, and career effects among nurses, and no data exist on Certified Registered Nurse Anesthesiologists (CRNAs). Nonetheless, there is sustained interest in IP with researchers investigating the multidimensional construct as a source of professional identity tension and an impediment to career advancement. This is especially true in at-risk populations such as underrepresented minorities, advanced practice nurses, and early career professionals.

Definition and Nomenclature

Clance and Imes (1978) introduced the IP construct in their seminal case series publication on high-achieving women with perceived intellectual phoniness. Subsequently, researchers have debated if IP is a dysfunctional personality type or psychological condition (Barrow, 2018). More recently, Mak et al. (2019) described IP as a dynamic and potentially evolving multidimensional construct. These viewpoints are essential to defining and classifying IP because a clinically accepted definition has not been established. For example, IP is not an official psychological disorder and therefore is not a diagnosis listed in the *International Classification of Diseases 10th Revision* (WHO, 1993) or the American Psychiatric Association's (2013) *Diagnostic and Statistical Manual of Mental Disorders, 5th edition* (Bravata et al., 2019). Further clarifications are required to determine a working clinical definition and diagnostic criteria.

Etymology

Impostor

Merriam-Webster (n.d.a) reports an impostor is "a person who deceives others by pretending to be someone else." A legal definition also by Merriam-Webster defines impostor as "an individual who assumes a false identity or title for the purpose of deception." The Online

Etymology Dictionary (n.d.a) reports the word impostor originated from the 16th-century French word imposteur, which indicates a cheat or swindler. In Late Latin, impostus was used to signify a deceiver. Impostor has a negative connotation, and in the IP context, it denotes a misleading or disingenuous position.

Phenomenon

Merriam-Webster (n.d.b) defines phenomenon as "an observable fact or event, or an aspect known through the senses rather than by thought." Britannica (2007) states a phenomenon is "any object, fact or occurrence perceived or observed." Historically, phenomenon was used in the 16th century to indicate a "fact directly observed" (Online Etymology Dictionary, n.d.b). The Online Etymology Dictionary (n.d.c) explains the present participle of phainesthai denotes something "seen or to appear." Using the Merriam-Webster and Britannica definitions, phenomenon has a contextual fit in IP as a self-perceived occurrence or event.

Impostor Syndrome

Impostor phenomenon does not appear in the Merriam-Webster dictionary (n.d.c); however, impostor syndrome has an entry. Merriam-Webster (n.d.c) defines impostor syndrome as "a psychological condition that is characterized by persistent doubt concerning one's abilities or accomplishments accompanied by the fear of being exposed as a fraud despite evidence of one's ongoing success." Impostor syndrome was first used in 1982. Impostor syndrome does not appear in the Online Etymology Dictionary.

Additional Variations

The term IP is frequently used in the professional literature, whereas impostor syndrome commonly appears in nonprofessional publications (Bravata et al., 2019). Impostor phenomenon will be used for this research study. The term impostor(s) has been used to denote an individual

with IP feelings, while impostorism applies to the IP construct itself. Finally, Bravata et al. (2019) noted different spellings for impostor. Most of the peer-reviewed literature employed the impostor spelling, while a few utilized imposters in their publications. The spelling variation could lead to missed publications during a literature search. The preferred spelling is impostor (P. Clance, personal communication March 23, 2021).

Concept Analysis

Most of the initial research on IP was conducted by psychology researchers who aimed to define the construct, understand the antecedents, or create a psychometric instrument to measure IP presence and intensity (Bravata et al. 2019). During the 1970s and 1980s, psychologists and IP co-developers Pauline Clance and Suzanne Imes popularized the construct with several mainstream publications, notably the book *The Impostor Phenomenon: When Success Makes You Feel Like a Fake* (Clance, 1985). Clance's book became a primary source of the concept development, antecedents, and career-related consequences. Elaboration on the concept and its antecedents has diminished in recent years with most of the research conducted more than 30 years ago. More recent investigations have shifted towards measuring IP in a focused population or exploring IP's association with other concepts, e.g., racism. The redirection is a clear limitation with respect to further exploration of the IP concept; however, some psychology researchers are interested in revisiting the antecedents. For example, in a perspective article Feenstra et al. (2020) opined that research should focus on the context and social structures that foster IP feelings rather than concentrate on the individual antecedents. The opinion is consistent with Mak et al. (2019) who describe IP as an evolving, multidimensional construct.

Barrow (2018) used Rogers' (Tofthagen & Fagerstrøm, 2010) evolutionary concept analysis method to examine IP in nursing and discovered researchers often disagreed on

psychological classification, phenomenon duration, and concept definition. Using a purposive sample of 46 publications, Barrow explained that persons with IP embraced a distorted self-assessment, perceived intellectual phoniness, professional ineptitude, and collegial deception feelings despite clear professional achievement. Barrow identified five dominant antecedent themes contributing to IP: personality, causal attribution, familial influence, employment, and sociodemographic elements. Barrow also outlined three consequential themes. The first theme was a threat to a person's wellbeing ending in psychological distress, emotional instability, decreased self-confidence, job burnout, and feelings of inferiority and shame. The second theme was fear, which often manifested as fear of engagement or fear of being discovered as an intellectual fraud. The final theme was avoidance behavior. Distressed individuals repeatedly shirked challenging opportunities, workplace advancement, or leadership promotion. Barrow determined additional research was needed to better elucidate a nurse's experience with IP in the workplace and, more specifically, determine how IP influences a nurse's decision to pursue professional advancement.

Defining Attributes

Clance and Imes (1978) first described the defining characteristics of IP in a sample of professional women receiving psychotherapy. Instead of a pathological illness, Clance (1985) viewed IP as persistent feelings of self-doubt and anxiety spawned from an inability to accept success as an outcome of one's ability. Impostor feelings and its associated behaviors threatened wellbeing with psychological distress and alterations in mental health. Clance identified six characteristic behaviors that define IP; although, Sakulu and Alexander (2011) argued these distinguishing attributes could be mixed and non-contemporaneous. Individuals diagnosed with IP may exhibit all of the defining characteristics and in any order; however, at a minimum, two

of the six distinguishing features should be present. Notably, while IP's essential components are consistent with Clance and Imes's original concept, evolving viewpoints have progressively advanced. Mak et al. (2019) contend that IP interpretation has evolved into a complex and dynamic multidimensional construct. This viewpoint should be considered in the context of how researchers define and explore IP in any population. Appendix D contains the conceptual relationship between the defining attributes, antecedents, and consequences of IP.

The Impostor Cycle

Clance (1985) designated the Impostor Cycle as a key attribute of IP. The cycle begins when an at-risk individual is assigned an achievement-based task. The assignment triggers IP fears manifested as anxiety-related symptoms (Chrisman et al., 1995). The individual responds to the anxiety-producing job by either over-preparing or procrastinating, followed by late, frantic preparation. The two dichotomous work habits are challenging to break, and impostors often restart the cycle with a newly-assigned task. Once the assignment has been completed, anxiety quells as relief and accomplishment are briefly experienced. Positive feedback is rejected as the individual denies their success was related to their own contribution and skill. Individuals who over-prepared credit hard work for their success, which they believe does not reflect their actual ability.

Conversely, the individual who procrastinates does so to avoid the assignment and the associated anxiety or uncomfortableness. Once the assignment is complete and deemed successful, the individual attributes the accomplishment to luck, chance, or an error (Henning et al., 1998). The cycle is fueled by an individual's perception the task was successful because either hard work or luck prevailed. The Impostor Cycle repeats with each new achievement-related job and a worsening fear the individual will be discovered as a fraud.

Desire to be Special and the Best

Persons with IP tendencies desire to be unique and the absolute best when compared to their peers. Clance (1985) explained individuals afflicted with IP tendencies are often the top of their class but struggle to maintain the lead position when competing with equally-skilled colleagues. In a competitive and academic or professional setting, the person no longer considers their talent and skills as special. Instead, individuals dismiss their laudable strengths and adopt the belief they are intellectually inferior to their peers.

Perfectionism

Perfectionism with intense goal setting is another significant characteristic commonly observed in IP. Persons with IP-associated perfectionism often overwork, overprepare, and set unrealistic expectations. Imes and Clance (1984) reported women with IP behavior frequently established high standards for themselves and near unattainable measures during reflection activities. Clance (1985) found persons with IP often are disappointed by their performance as they believe their flaws prevented them from accomplishing a key benchmark or achievement. Their inability to meet their ambitious, perfectionistic target frequently resulted in feeling overwhelmed and self-identifying as a failure.

Fear of Failure

Interestingly, while the individual with IP strives for perfection and self-labels as a failure when a goal is not achieved, the fear of failure prompts intense anxiety and psychological distress. The failed individual perseverates in shame and humiliation; the person with IP evades the psychological distress by situational avoidance or over engagement. The fear of failing provokes the individual with IP to over-prepare and work incessantly hard to decrease the risk of disappointment (Clance, 1985; Clance & O'Toole, 1987)

Denying Ability and Discounting Praise

Individuals with IP often dismiss positive feedback or reward. Impostors struggle with internalizing success and accepting respect and admiration as a true reflection of their accomplishments. According to Barrow (2019), Clance (1985), and Clance and O'Toole (1987), persons with IP deny their competence and credit their success to external factors, e.g., luck, chance, or a mistake. Clance (1985) discovered impostors discount positive feedback or reject evidence supporting their success. Instead, the individual with IP builds a narrative that disputes the praise and deflects the validation. Sakulu and Alexander (2011) emphasized the IP action of denying competence and discounting praise are distinct from false modesty behavior.

Fear and Guilt Around Success

Clance (1985) found persons with IP tendencies often displayed fear and guilt around their success. The feelings were often a consequence of a recent accomplishment. The fear and guilt are often exacerbated if an achievement is a distinguished or unique triumph, especially in families or among peers. Impostors eschew being recognized as standout performers and dread they will be rejected by their colleagues. They might be overwhelmed with guilt about being different. In addition, impostors fear their accomplishments could lead to greater anticipation and an inability to meet the imposed higher expectation. They hesitate to accept a new, more challenging opportunity, even at the risk of jeopardizing professional advancement. Impostors fear the higher demand will expose their perceived intellectual ineptitude, which causes them to avoid further difficult prospects.

Antecedents

Research exploring the antecedents to IP has burgeoned in recent decades, beginning with the seminal work by Clance and Imes (1978). Four broad antecedent themes have been

identified and found to have an association with IP development. Although causal relationships have not been established, the antecedents contributing to IP include various personality traits, attribution concepts, familial circumstances, professional settings, and sociodemographic factors (Barrow, 2018). Nonetheless, the data suggest some antecedents elevate the risk of IP feelings in specific populations. Conversely, a few antecedents appear to offer a protective mechanism to reduce an individual's IP risk.

Personality Antecedents

Researchers have explored potential relationships between IP development and the five key personality traits, i.e., openness to experience, conscientiousness, extroversion, agreeableness, and neuroticism (Barrow, 2018; Bernard et al., 2002; Sakulu & Alexander, 2011). Data show recognized stable personality traits such as perfectionism and neuroticism may promote the development and maintenance of IP tendencies (Sakulu & Alexander, 2011). Clance and Imes (1978) observed maladaptive perfectionism in high achieving women who sought psychological therapy for their IP. Chae et al. (1995) compared IP measurements and personality traits in 654 Koreans. The researchers found neuroticism strongly correlated with IP feelings in men ($r = .60, p < .001$) and women ($r = .63, p < .001$), and anxiety and depression had moderate correlation with IP ($r = .53, p < .001$). Chae et al. reported a weak, negative relationship between CIPS scores and conscientious measurements in men ($r = -.36, p < .001$) and women ($r = -.29, p < .001$), triggering the researchers to conclude lower conscientiousness reflected lower self-discipline when an individual is tasked with an achievement-based assignment, i.e., procrastination behavior. Bernard et al. (2002) corroborated these findings by showing correlation between individuals with IP and neuroticism ($r = .52, p < .001$) and low conscientiousness ($r = -.38, p < .001$).

Introversion may elevate the risk of developing IP feelings compared to individuals with extroversion personalities, although the data are inconsistent. Chae et al. (1995) found a statistically significant, albeit a low correlation, between CIPS scores and extroversion measurements in male ($r = -.13, p < .05$) and female ($r = -.15, p < .001$) Koreans. The same researchers also found a statistically significant negative correlation between CIPS scores and agreeableness in men ($r = -.14, p < .05$) and women ($r = -.18, p < .001$). Chae et al. concluded within their South Korean-based sample, impostors tend to be introspective, detached, and prefer seclusion and privacy. The investigators were uncertain if introversion intensifies IP behavior or IP feelings of intellectual ineptitude force individuals to be more introverted. However, Bernard et al. (2002) were unable to replicate the correlation findings between the CIPS scores and extroversion and agreeable measurements using a US collegiate sample. Interestingly, Bernard and colleagues found a statistically significant negative correlation between the Perceived Fraudulence Scale (Kolligian & Sternberg, 1991) and agreeableness ($r = -.23, p < .05$) in their sample of 190 American college students.

Family Antecedents

Some research suggests certain family circumstances and background might support IP development; however, the data are not convincingly vital. Some researchers made inferences based on clinical observations rather than empirical data. For instance, Clance and Imes (1978) and Clance and O'Toole (1987) proposed connections between family dynamics, child upbringing, and IP behavior based on observations from a case series of psychotherapy sessions. The researchers posited individual parental behavior during child upbringing encourages IP development. Clance (1985, Chapter 4) broadly suggested four family characteristics that enable IP behaviors: 1. The perception by impostors they possess unique talents; 2. Family messaging

on the significance of intellectual ability and effortless success; 3. Inconsistent feedback received from the family and other sources, and 4. No positive support. The lack of consistent positive reinforcement from parents often produces feelings of humiliation, embarrassment, and inauthenticity (Clance & O'Toole, 1987). In addition, IP may present in children whose parents had a high expectation for a child's intellectual achievement or possibly misled them to believe they possessed atypical talents or ability (Clance & Imes, 1978). Clance (1985) emphasized children have difficulty internalizing their success, primarily when inconsistent messages are delivered by the parent or invalidated by them.

Barrow (2018) wrote IP might progress in children where family conflict levels are elevated, or academic goals are under-supported. A quality parent-child bond with traditional child roles and activities appear to influence IP feelings and intensity later in life. Clance and Imes (1978) reported children who assumed a caregiver role at an early age were prone to IP feelings. They further discovered IP develops when a child perceives an absence of maternal care or is reared in a family that promotes unhealthy intellectual competition between siblings, e.g., academic performance. Sonnak and Towell (2001) studied the relationship between IP as measured by CIPS and parenteral rearing styles in 117 British university students. They found perceived parental care had a negative correlation with IP ($r = -.41, p < .0001$), while they discovered a weak correlation ($r = .27, p = .013$) between IP and perceived parental overprotection. Although not a strong relationship, the researchers concluded parental overprotection was a contributor to IP. These dynamics affect the achievement values and behaviors of the child and teach the child how to respond to success and failure.

Attribution Antecedents

Attribution theory was founded by Austrian psychologist Fritz Heider (1958) and later expanded by Weiner (1974). Fishman and Husman (2017) explain that attribution theory is principally concerned with how individuals interpret events and how the interpretation affects their reasoning and behavior. Achievements are attributed to a variety of causes, such as ability, effort, task difficulty, and luck. Attributions are typically assigned one of three causal dimensions: Locus, stability, and controllability. Locus is the location of a cause and if the source is internal or external. Stability denotes cause duration and if it is permanent (stable) or provisional (unstable). Controllability refers to the degree to which an individual can control through skill or cannot control, such as aptitude, luck, or other's actions.

Barrow (2018) notes impostors rely on external sources to validate their achievements because they have difficulty engaging in self-validation. The behavior leads to heightened self-awareness and a perpetuating need to satisfy others. Using a grounded theory approach, Lane (2015) discovered self-validation challenges were common among college students who identified as impostors. These impaired attribution behaviors perpetuate the Impostor Cycle described by Clance and Imes (1978). While Clance (1985), Clance and Imes (1978), and Clance and O'Toole (1987) observed impaired attribution behaviors in their clients who underwent psychotherapy, some researchers have been able to measure the variance and relationships between IP and attribution behavior.

Chae et al. (1995) found Korean men and women had a small, negative correlation between attribution ratings and CIPS scores in men ($r = -.27, p < .001$) and women ($r = -.18, p < .01$). The results indicated that impostors viewed their success had more to do with non-controllable external factors, e.g., luck, and less due to their internal efforts, i.e., low ability

ratings. Chae and associates showed that individuals with IP viewed their success as a consequence of mainly external, unstable dynamics rather than internal, stable ones. They do not believe in their capacity to repeat their successes.

Professional Setting Antecedents

Clance and Imes (1978) found IP tendencies were common in high achieving women with professional careers, including academia, medicine, law, and nursing. The milieu in these professional environments tends to be achievement-oriented and highly competitive. Professions with a peer review process might contribute to IP development in susceptible populations or exacerbate underlying symptoms. The peer-review process can be competitive and exposes an individual to evaluation by colleagues, which could stimulate IP tendencies in a susceptible individual. Chae et al. (1995) and Henning et al. (1998) reported service professionals had an increased risk of IP during their academic training. High rates of IP have been reported in physician residents (Oriel et al., 2004), clinical nurse specialists (Ares, 2018), and university faculty (Hutchins & Rainbolt, 2017). Rohmann et al. (2016) showed managers with IP feelings feared losing respect within their organizations and often postponed approaching professional duties and tasks because of those fears.

Transition points during professional development have been associated with increased IP tendencies (Ares, 2018; Clance, 1985; Clance & Imes, 1978). Lane (2015) used a grounded theory approach to examine IP feelings in academic and service professionals during transition points. Lane found that nearly 80% of participants described IP feelings and identity tensions during their transition from educational institutions to their professional careers. Arena and Page (1992) proposed the change to a new clinical environment or specialty practice increases the

probability of IP feelings, particularly in recently certified advanced practice nurses or seasoned staff nurses who begin a new specialty area in which they feel ill-prepared to practice.

Sociodemographic Antecedents

The data show mixed associations on sociodemographic variables as IP antecedents. Some sociodemographic characteristics have not been comprehensively studied or not examined at all. Gender (binary only), race, ethnicity, and age have been investigated for a relationship with IP, each showing a varied connection depending on the research. As an antecedent, the degree of their contribution is less specific. Other sociodemographic characteristics have not received any research attention. Education, socioeconomic status, sexual orientation, gender identity, and geographic location might have a contributory role in IP development; however, data are absent for these elements.

Gender as a dichotomous variable, i.e., female or male, has shown conflicting results, although most IP study participants have been women (Bravata et al., 2019). Through clinical observation, Clance and Imes (1978) posited IP behavior was primarily a condition exhibited by high-achieving women. However, Bravata et al. (2019) found IP tendencies occurred in men and women across different populations. Bravata and colleagues did not see a statistically significant difference in IP inclinations between women and men in 17 reviewed studies. Although men appear to be susceptible to IP tendencies, the research is unclear if the IP risk or intensity are the same for men and women or another gender identification category.

Research exploring impostorism in mixed, non-White populations has shown inconsistent results. Collectively, the data demonstrate persons of color are at-risk for IP and its associated psychological derangements (Bernard et al., 2018). Additional research data are needed to understand the depth of the relationship and if race or ethnicity function as an IP antecedent. The

current data suggest further IP screening and management options are needed for underrepresented minority populations. Cokley et al. (2017) investigated IP feelings using the CIPS instrument and compared the results with measurements in perceived discrimination. Using the researcher's categories, African American students reported significantly higher perceived discrimination than Asian American and Latino/a American students. With respect to IP, no significant differences across racial and/ or ethnic minority groups were found. However, Asian American students had higher, although not statistically significant, IP scores than Latino/a American and African American students. The results suggest among university students of color, perceived discrimination is harmful and may be exacerbated by IP. Larger samples are needed with more statistical power to examine differences reported by race/ethnicity.

Age appears to be associated with IP feelings; however, the majority of research has been conducted in student populations. Bravata et al. (2019) note the mean age of study participants was 30. Some research showed a negative correlation between IP tendencies and age. Brauer and Proyer (2017) explored the relationship between IP and age in working professionals and college psychology students. The scholars discovered a negative correlation between IP measurements and age in the working professional cohort but not the students ($r = -.34, p < .001$). It is unknown if IP tendencies diminish with age or some other factor associated with age affects IP, i.e., increased personal or professional experience, improved self-efficacy, or better self-assurance.

Protective Antecedents

Barrow (2018) proposed specific antecedents might exist that confer a protective mechanism against IP tendencies, although supporting data are sparse. Lane (2015) suggested group interaction and education on IP could reduce its frequency and intensity. Henning et al. (1998) found medical students who were married or had a long-term partner had a significantly

reduced rate of psychological distress; however, it remains unknown if marital status attenuates IP effects, onset, or progression. Oriel et al. (2004) did not find a significant correlation between IP feelings and marital status among physician residents, although the authors did not publish the correlation data. Bernard et al. (2018) found lower levels of IP in college students with positive racial identity. Interestingly, Brauer and Proyer (2017) discovered adult playfulness produced a resilience-strengthening factor to IP tendencies. Finally, Arena and Page (2018), Aubeeluck et al. (2016), Lane (2015) suggested IP feelings diminish as the individual assimilates more professional experience; although, this proposition remains controversial and has not been thoroughly studied.

Consequences

Sakulu and Alexander (2011) state impostors do not equate success with happiness. In contrast, individuals with IP experience fear, doubt, and general discomfort with their accomplishments. The inverse response could threaten psychological wellbeing, mental health, physical health, and professional fulfillment. Barrow (2018) contends an unbalanced sense of self-worth, decreased self-efficacy, feelings of inferiority and shame, and reduced confidence could trickle into the professional setting. Indeed, Barrow (2018), Chrisman et al. (1995), Clance (1985), and Clance and Imes (1978) all reported associations between IP and burnout, emotional exhaustion, and loss of intrinsic motivation. In general surgery faculty and physician residents, a logistic regression by Leach and colleagues (2018) showed burnout was significantly greater in study participants with high CIPS scores ($OR\ 3.95, p = .017$). Henning et al. (1998) and Thomas and Bigatti (2019) posited individuals with IP might have an increased risk of suicide, especially if psychological distress is present. These mental health threats were exacerbated by IP perfectionism and impostors endeavoring to meet unreasonable, self-imposed high standards.

In an attempt at self-protectionism, persons with IP frequently foster avoidance behaviors, which have been associated with achievement recognition, fear of a challenging professional opportunity, and discovery as an intellectual fraud or incompetent professional. Rohrmann et al., (2016) noted employees with IP frequently shunned promotion and career advancement. Some investigations found avoidance behavior resulted in professional paralysis, which limited afflicted individuals from attaining professional fulfillment (Clance & Imes, 1978; Haney et al., 2018). Chrisman et al. (1995) found impostors had difficulty pursuing leadership opportunities and avoided spotlight activities at work. Clance and O'Toole (1987) noted when IP feelings were intense, IP sufferers reduced their professional ambition and declined career advancement opportunities. Ares and colleagues (2018) found a weak positive association between career commitment as a CNS and IP that approached statistical significance ($r = .232, p = .067$). Barrow (2018) argued nurses with IP tendencies might avoid asking questions from superiors or practicing in a challenging clinical environment because they feared they would be discovered as a fraud. These behaviors could contribute to patient harm or clinical errors.

Individuals with IP may avoid seeking leadership positions; however, Rohrmann et al. (2016) found some individuals with IP inclinations still occupied leadership roles, although it is unclear if these individuals pursued the opportunity or were assigned to the position. Rohrmann et al. report these individuals had higher levels of anxiety, dysphoric moods, perfectionism, and generally negative self-evaluation. Impostors assigned to leadership positions might negatively affect the team's performance. Leaders with IP propensities have been shown to work excessively, be slow decision-makers, fear failure, and micromanage subordinates, which could negatively impact teams and demotivate high performers (Holmes et al., 1993).

Associated Conditions

Clance and Imes (1978) were the first to recognize coexisting emotional and psychological conditions in their case series on women with IP. Subsequent research reported statistically significant associations between IP tendencies and other psychological disorders, including anxiety, depression, psychological distress, and low self-esteem (Bernard et al. 2017; Bernard et al., 2018; Bravata et al., 2019; Clance, 1985; Clance & Imes, 1978; Clance & O'Toole, 1987; Haney et al., 2018; Henning et al., 1998; Oriel et al., 2004). The comorbidities might be exacerbated in individuals who are exposed to heightened performance pressure. In studies exploring the relationship between IP and mental health disorders, study participants frequently reported maladaptive coping mechanisms, somatic complaints, emotional and physical exhaustion, social dysfunction, and, disturbingly, an increased risk of suicide (Henning et al., 1998; Leach et al., 2019). Persons with IP require a careful assessment of comorbid conditions, risk stratification, and appropriate consultation for evaluation and management (Bravata et al., 2019).

Psychological Distress

Ridner (2004) defines psychological distress as an uncomfortable, emotional state experienced in response to specific stress resulting in permanent or temporary detriment to an individual. Psychological distress is negatively associated with academic performance and individual wellbeing and positively associated with minority status stress (Bernard et al., 2017; Henning et al., 1998; Peetet et al., 2015). Numerous studies have linked high IP levels to psychological distress (Chrisman et al., 1995; Cozzarelli & Major, 1990; Henning et al., 1998; Sonnak & Towell, 2001). Henning et al. (1998) explored psychological distress and IP in medical, dental, nursing, and pharmacy students and found IP was the strongest predictor of

psychological distress compared to other psychological and demographic variables (R^2 range = .36-.50, $p < .001$). Sullivan and Ryba (2020) corroborated these findings in a study of pharmacy residents with a history of mental health treatment who were more likely to report IP symptoms and exhibit psychological distress. Peetet et al. (2015) conducted a simple linear regression to show higher IP levels predict greater psychological distress in African American students (adjusted $R^2 = .27$, $\beta = .52$, $F(1, 110) = 41.44$, $p < .001$). Interestingly, Bernard et al. (2017) found African American college women with frequent reports of racial discrimination had lower levels of psychological distress but higher rates of IP. In a cross-sectional study of Korean students, Chae et al. (1995) reported higher IP scores correlated with more psychological distress. Psychological distress can be further subdivided into anxiety and depressive states.

Anxiety. A relationship exists between IP and anxiety, which has been identified as the most frequent threat to psychological wellbeing in individuals who identify as impostors. While a causal relationship has not been established, several researchers identified a moderate to strong correlation, depending on the psychometric instrument used and the type of anxiety (Bernard et al., 2002, Bravata et al., 2019; Chae et al., 1995; Henning et al., 1998; and Oriel et al., 2004). Clance and Imes (1978) noticed women who exhibited IP tendencies also frequently reported generalized anxiety symptoms. Consequently, Clance and Imes included anxiety as a component of their Impostor Cycle. Chae et al. (1995) discovered a strong correlation between CIPS scores and measured anxiety levels in Korean men ($r = .52$, $p < .001$) and women ($r = .53$, $p < .001$) and concluded anxiety plays a central role in IP. Bernard et al. (2002) replicated the research by Chae and colleagues and found a moderately strong and statistically significant correlation between measured anxiety levels and IP in 190 undergraduate psychology students at a large midwestern university ($r = .45$, $p < .001$). Additionally, Bernard et al. posited underlining anxiety may further

IP progression. These data were supported in a multivariate analysis conducted by Oriel et al. (2004), who found gender no longer predicted IP after controlling for trait anxiety.

Sakulku and Alexander (2011) suggested IP fears coupled with untreated subclinical anxiety symptoms may progress to clinically significant levels of generalized anxiety disorder. Impostors may experience uncontrollable anxiety if their fear of failure worsens. Oriel et al. (2004) assert anxiety is likely an underlying personality characteristic exacerbated during physician training rather than caused by the training process. LaDonna et al. (2018) elaborated on the connection between impostorism and anxiety, which appears to worsen when physicians commit errors.

Depression. Clance and Imes (1978) remarked on women with IP participating in their psychotherapy sessions frequently reported depression symptoms. Clance (1985) included depression because of IP feelings in her Impostor Cycle illustration. Depression was exacerbated when impostors believed they were unable to meet self-imposed standards or expectations set by others (Sakulku & Alexander, 2011). McGregor et al. (2008) hypothesized a relationship was present between IP and depression because of the similar overlay of negative thoughts and self-doubt. McGregor et al. examined the relationship between IP and depression in 186 college students and found a statistically significant positive correlation between CIPS scores and depression scale measurements ($r = .408, p < .01$). The investigators concluded persons exhibiting IP feelings might also struggle with depression, which could be masked by their IP symptoms and further impede their productivity. Bernard and colleagues (2002) measured a strong, statistically significant correlation between IP composite scores and measurements of neuroticism and depression ($r = .61, p < .001$); findings consistent with earlier research by Chae

et al. (1995) who reported a positive correlation ($r = .53, p < .001$) and Chrisman et al. (1995) who also found a statistically significant positive correlation ($r = .62, p < .01$).

Surprisingly, little research has been conducted to explore the relationship between IP and depression in health care trainees. The lack of scholarship in this domain is concerning as data show mental health tends to decline in medical students and residents over time while IP feelings are omnipresent (Villwock et al., 2016). In one study on family practice physician residents, Oriel and colleagues (2004) found IP measurements had a moderate, positive correlation with depressive symptoms ($R^2 = .45, p < .0001$). This datum indicates depression is an area in need of further research in the setting of IP.

Low Self-Esteem. Numerous studies demonstrated a relationship between low self-esteem and IP (Bravata et al., 2019; Chrisman et al., 1995; Cozzarelli & Major, 1990; Kolligian & Sternberg, 1991). Self-esteem originates from self-analysis based on perceived judgments made by others (Leary et al., 2000). Peteet et al. (2015) noted individual assessments of self-esteem are often based on situational perceptions and misaligned with reality, which worsens IP tendencies. Clance and Imes (1978) observed pervasive negative self-views in their clients often supported the diagnosis of low self-esteem.

The observations were supported by empirical data measuring the relationship between IP and low self-esteem. Cozzarelli and Major (1990) explained initial self-esteem levels in college students accounted for subsequent lower self-esteem and IP feelings following a subjective failure on an exam. Chrisman et al. (1995) reported a strong negative correlation between IP scores and two different self-esteem instruments, the Rosenberg Self-Esteem Scale (Silber & Tippett, 1965) and the Self-Esteem Scale (Phinney & Gough, 1985). The Rosenberg Self-Esteem Scale showed a statistically significant negative correlation with IP scores ($r = -.59$,

$p < .01$), and the Self-Esteem Scale measurement also showed a negative correlation with IP scores ($r = -.53, p < .01$). Leary et al. (2000) described a significant negative correlation between IP and low self-esteem, $F(1, 62) = 4.33; r = -.31; p < .05$. Leary and colleagues commented that IP presents a unique paradox in the setting of low self-esteem as impostors view themselves as incompetent and fear public exposures could improve their self-esteem.

The strong relationship between the two constructs has raised questions about the role and effect size low self-esteem has on IP. Cozzarelli and Major (1990) suggested IP has a better fit as an extension of low self-esteem rather than as an independent construct. However, Chrisman et al. (1990) found evidence of discriminant validity between the IP construct and the self-esteem construct. Sonnak and Towell (2001) measured the relationship between IP and self-esteem in British university students and found a statistically significant negative correlation, $r = -.671; p < .001$. In a multiple regression on the same data, the researchers found low self-esteem was the strongest variable to predict IP, $R^2 = .496; F(7,62) = 10.72; p < .001$. While the model suggested intense IP feelings could result in lower self-esteem with poor mental health, Sonnak and Towell expressed concern about possible construct overlap obfuscating other potentially important relationships with IP. Of note, tolerance statistics were adequate, and multicollinearity was not present.

In certain populations, low self-esteem was tightly associated with IP measurements and concerning because professional success could be hindered without appropriate management. For example, Oriel et al. (2004) found physician residents who scored highest on the CIPS instrument had the lowest self-esteem as measured by the Rosenberg Self-Esteem Scale (Silber & Tippett, 1965) ($r = -.63, p < .0001$). Peteet and colleagues (2015) noted high IP and low self-esteem in African American students attending predominantly White universities. Similar to

findings by other researchers, Peteet et al. discovered a statistically significant negative correlation between IP and self-esteem ($r = -.65, p < .01$).

Playfulness

Brauer and Proyer (2017) explored the relationship between IP tendencies and adult playfulness, which contributes to positive psychological functioning. They described playful adults as being emotionally stable, more extroverted, and high in culture but having lower conscientiousness. The researchers studied two independent convenience samples, 244 psychology students enrolled at a university in Germany and 222 employed professionals. Students had higher IP measurements than working professionals. In a stepwise linear regression gender predicted IP feelings in students, whereas in working professional age predicted IP ($R^2 = .19, \beta = -.35, f^2 = .24, p < .001$). Students with higher measures of lighthearted playfulness were less likely to report IP tendencies, which suggests better emotional stability and healthier coping strategies. The findings support playfulness conferring a protective mechanism against IP development.

Psychometric Instruments

Divergent perspectives on IP as a multidimensional construct led researchers to develop different psychometric instruments for clinical and research use (Mak et al., 2019). At present, seven instruments are available for research application. In their seminal study, Clance and Imes (1978) did not use a diagnostic instrument to establish IP presence or capacity. Instead, Clance and Imes developed conclusions from group therapy sessions conducted over four years. The first instrument to measure IP was the 14-item Harvey Imposter Phenomenon Scale (HIPS), which was tested in undergraduate and graduate student populations (Bravata et al., 2019; Hellman & Caselman, 2004; Mak et al., 2019). Reliability data showed the HIPS had low

internal consistency and inaccuracies with participant self-reporting, particularly when items used negative wording (Chrisman et al., 1995). Helman and Caselman recommended not using the HIPS to diagnose IP. To address the HIPS limitations, Clance (1985) developed the CIPS, a 20-item instrument using a five-point Likert-style response for each item. Although less common, additional IP instruments have been developed, including the Leary Imposter Scale (Leary et al., 2000) and the Perceived Fraudulence Scale (Kolligian & Sternberg, 1991). The Young Imposter Scale has been used to measure IP in American medical students in a single study by Villwock and colleagues (2016); however, the authors did not report the instrument's psychometric properties or reliability and validity data. Furthermore, the instrument's development history was not found anywhere in the professional literature.

Mak and colleagues (2019) analyzed four common IP instruments' psychometric properties using quality appraisal criteria established by Terwee et al. (2007). The analysis compared previous reliability and validity data to improve measurement interpretation and utilization. The researchers found significant variability in the methodological quality used to measure instrument reliability. Mak et al. reported that researchers used inconsistent IP definitions and diagnostic parameters, and no one psychometric IP instrument effectively captured the evolving, multidimensional construct. The authors concluded a diagnostic gold standard has not been established and recommended concept clarity and improved reliability and validity data. Mak et al. could not determine criterion validity, reproducibility (agreement), reproducibility (reliability), or responsiveness.

Clance Impostor Phenomenon Scale

The CIPS is a 20-item, self-administered psychometric instrument designed to measure IP presence and frequency of IP feelings (Clance, 1985). Each positively worded item uses a 5-

point Likert scale response. The instrument generates a total score between 20 to 100; the higher the score, the more frequent the IP tendency. Clance set a score of greater than 40 to indicate moderate IP feelings; however, subsequent researchers applied inconsistent scoring methods. For example, Holmes et al. (1993) established a cutoff score of 62 based on one false positive and no false negatives in a sample of 62 participants with and without confirmed IP. Cozzarelli and Major (1990) used a median split procedure to transform the ordinal level CIPS scores into categorical data but did not report the median value, IP mean score, 65.71; and non-IP mean score, 48.17. Both scoring approaches have been replicated but distort the IP intensity scale established by Clance. The instrument has subscales that measure three IP factors: fake, discount, and luck (Chrisman et al., 1995; Clance, 1985; French et al., 2008; Simon & Choi, 2018). Clance defined the three factors as feeling like a fake, discounting achievement, and attributing success to luck.

Mak et al. (2019) reported the total CIPS score's internal consistency was good; Cronbach's alpha ranged from 0.85 to 0.96. The coefficient alpha for the three subscales were also acceptable (fake = 0.84, discount = 0.79, luck = 0.70). French and colleagues (2008) found moderate to high discrimination indices ($M = 0.61$, range 0.50–0.75), suggesting the CIPS can distinguish between low and high IP levels. Of the 11 reviewed CIPS studies, Mak et al. noted sufficient content validity in each investigation (e.g., measurement aims, focused populations, and IP concept); however, construct validity was analyzed differently by different researchers. For example, Chrisman et al. (1995) performed an exploratory factor analysis but assumed perfect reliability, uncorrelated factors, and continuous level data. Exercising a more rigorous approach, French et al. completed a confirmatory factor analysis (CFA) and found the factor intercorrelations were high (i.e., LuckFake = 0.79; LuckDiscount = 0.77, DiscountFake = 0.97).

Model stability was suspicious when DiscountFake was collapsed into a second model. Simon and Choi (2018) also performed a CFA and concluded a one-factor model with correlated residuals best explained the CIPS factor structure. These investigators reported the Cronbach alpha for their preferred one-factor model was 0.85, which was greater than the recommended reliability coefficient of 0.75. Overall, these data suggest no best-fitting model exists to represent the CIPS factor structure best. While IP subcategory presence was indeterminate, the findings indicate individual impostors might not equally manifest all IP characteristics. French et al. recommended using the total CIPS score to identify impostors rather than the subscales.

German Clance Impostor Phenomenon Scale. A German Clance Impostor Phenomenon Scale (GCIPS) (Clance, 1988) was developed from a translated version of Clance's (1985) published work on IP. The GCIPS is a 20-item psychometric instrument that uses a five-point Likert style scale for each item. Brauer and Wolf (2016) examined the GCIPS's psychometric properties and performed the instrument's first validity testing. The researchers employed two independent samples ($n = 151; 149$) and found the GCIPS had good reliability ($\alpha = .87; .89$) and item-total correlations (.47; .51). In addition, Brauer and Wolf reported construct validity was supported by IP correlations with depression, fear of a negative evaluation, and self-esteem. An exploratory factor analysis on the first sample's data showed three factors (Fake, Luck, and Discount) accounted for 44% of the variance, a finding consistent with research by Chrisman et al. (1995). A CFA using data from the second sample was performed to support the three-factor model. All items showed statistically significant ($p < .001$) loadings on their corresponding factors, with the three-factor model (Fake, Luck, and Discount) demonstrating the best fit. Brauer and Wolf's CFA findings were similar to the English version. Though, the authors noted using subscales to split IP core features into smaller components does not add

value or clinical practicality. Instead, the researchers recommend using the total GCIPS score for diagnostic purposes.

Treatment

The data are mixed on IP management; treatment effectiveness and duration have not been extensively studied or validated. No IP clinical position statements or best practices have been developed. Nearly all the treatment suggestions were borne from the seminal research by Clance and Imes (1978), who described their experience counseling high-achieving women with IP tendencies who worked in professional disciplines such as academia or science. Their multimodal management approach was anecdotal and lacked an in-depth evaluation. While the psychologists touted the benefits of group therapy, weekly homework assignments, and role-playing, they did not discuss treatment results or provide longitudinal follow-up. Bravata et al. (2019) confirmed few treatment strategies had been based on research data. Bravata et al. (2020) encouraged clinicians to rigorously screen patients presenting with IP for depression and anxiety and offer evidence-based therapies for those conditions. Bernard et al. (2002) advised therapists treating IP to first consider depression and anxiety either by focusing on the broader level in treatment or by including assessments of such IP traits over the course of treatment.

A few investigators described seminars or training sessions to address IP. In one example, Haney and colleagues (2018) implemented an interprofessional workshop on IP for health care graduate students. After screening for IP, the faculty provided a six-step plan to manage IP inclinations based on evidence and professional opinion. Their recommendations included naming the IP feelings, finding a mentor, and accepting imperfection. Haney et al. did not report the workshop effectiveness nor student follow-up.

Qualitative Literature

Few qualitative inquiries have examined IP in any specific population. However, the findings are rich and informative regarding the antecedents and consequences of impostorism. A qualitative review by Arena and Page (1992) explored IP in the clinical nurse specialist (CNS). The authors noted a general absence of IP evidence in the nursing literature and formed conclusions based on psychology-based investigations. Arena and Page described the precipitating factors for IP, including a heightened expectation of the CNS as a health care specialist and professional assumed to possess and project expert knowledge. The researchers offered several non-research-based management strategies, i.e., strengthening knowledge in vulnerable areas and reviewing thank you notes from former patients.

Hutchins and Rainbolt (2017) used descriptive phenomenology to understand the antecedents, coping strategies, and development opportunities in male and female academic faculty at two major United States (US)-based universities. The researchers used identity theories fashioned by Kegan (1982) and Erickson (1994) to explore how faculty develop their professional selves in the context of IP. Using semi-structured interviews and bracketing, Hutchins and Rainbolt discovered four common trigger events faculty experience while creating an academic identity, i.e., questioning expertise or professional legitimacy, scholarship productivity, colleague comparisons, and internalizing success. The faculty described frequent IP-associated symptoms perceived as anxiety, stress, and physiologic discomforts. Interestingly, four broad coping mechanisms emerged to mitigate IP feelings. These approaches include seeking social support, correcting cognitive distortions through validation of success, using positive affirmation and self-talk, and engaging in maladaptive behaviors such as excessive alcohol consumption. More often than men, women faculty reported adopting healthy coping

strategies. This study's findings provided a deeper understanding of IP antecedents in academic faculty and the potentially harmful effects IP could have on physiological and psychological wellbeing.

Lane (2015) explored IP among 29 young adults who were transitioning into professional careers. The researcher used an emergent grounded theory design to describe IP, the internal and external factors surrounding impostorism, and the consequences of IP in the context of the participant's professional transition and career expectations. Lane recruited participants from a medium-sized, suburban university in the Midwest. The majority of participants were women ($n = 20, 68.9\%$). The first part of the study involved an online, 19-item qualitative survey focusing on the IP construct and personal experience with IP. The second portion of the study involved individual interviews centered on how the IP construct resonated with the participant's journey. Lane described three shared experiences among the participants: perceived fraudulence, discrediting evidence of competence, and self-doubt. The participants further described internal factors congruent with the IP construct, including perfectionism, an inability to self-validate, and being high achievement oriented. Lane found participants often yearned for external praise to feel confident; however, they expressed trepidation about receiving a performance review or being compared to a colleague. Remarkably, acquiring experience appeared to diminish IP feelings. Participants often attributed their accomplishments to luck, good fortune, or some other external factor. Lane concluded that individuals with IP would benefit from learning to self-validate their achievements and normalize their IP tendencies through group therapy and education on the multidimensional construct.

More recently, LaDonna and colleagues (2018) used a constructivist grounded theory to explore perceived underperformance in a 28-physician cohort. Sixty-three percent of the

participants were male, and 82% had more than ten years of clinical practice. Twelve medical specialties were represented in the study cohort, with pediatrics (21.4%) and neurology (17.9%) having the most presence. All participants reported having a self-identified underperformance or failure in clinical practice. During semi-structured interviews, a few participants introduced the IP construct to explain their views on performance, failings, and feelings of self-doubt. Using a grounded theory lens, the researchers discovered IP feelings were more common at the extreme spectrum of self-doubt and surfaced most frequently during residency and essential career transitions. During clinical training, IP tendencies were often counterbalanced by trainees who displayed overconfidence or arrogance; two extremes discouraged during physician residency training. LaDonna and colleagues suggested the self-doubt and IP triggers for physician learners might be different from experienced physicians. Furthermore, the research team noted that physicians with IP behaviors might be afflicted by persistent, career-long effects associated with IP, e.g., avoid behavior or professional paralysis. LaDonna et al. blamed a medical culture that incorrectly assumes high-performing physicians always know what they are doing, while young physicians who request help are underachievers and inadequately prepared. LaDonna et al. recommended medical educators create a space for physician learners to express IP feelings and called for a cultural transformation to address physician struggles.

Application of IP in Quantitative Literature

Most of the published quantitative research employed cross-sectional observational designs to measure IP prevalence in a specific population using a validated instrument. A few investigations simultaneously evaluated the presence of a coexisting psychological disorder using a condition-specific psychometric instrument, e.g., depression. Remarkably, no randomized control trials have ever been performed to measure IP or compare the construct

against normative population data. Of note, no investigation, to date, has used randomization to select study participants, which may have contributed to a selection bias pervasive in the peer-reviewed literature and subsequently limited study findings. Nevertheless, some researchers attempted more rigorous approaches to explore IP under a longitudinal design on student performance (Cozzarelli & Major, 1990) or analyze the existing IP literature using a systematic review (Bravata et al., 2019; Thomas & Bigatti, 2020), although the varied study designs prevented the researchers from conducting a metaanalysis.

Population Data

Investigators have described IP in different sociodemographic populations according to age, employment profession, and country of residence. Originally, Clance and Imes (1978) posited IP was ubiquitously present in high achieving women and less frequent in men. Their hypothesis was later challenged by subsequent investigations, which showed a mixed prevalence; some research reported statistically significant higher rates in women (Henning et al., 1998; Oriel et al., 2004), while other inquiries indicated no differences based on gender (Cozzarelli & Major, 1990). Similarly, age and IP tendencies showed inconsistent associations. Bravata et al. (2019) reported conflicting evidence suggesting increased age was associated with decreased IP symptoms, whereas other studies found no relationship. The majority of the studies were conducted in US-based populations, although some research focused on populations in Austria, Australia, Iran, and Korea.

Bravata et al. (2019) found more than half of the published investigations involved students. A majority of these investigations were conducted with undergraduates; others examined IP in elementary and high school students. Cozzarelli and Major (1990) reported students with IP tended to be negative, perfectionistic, and possessed low self-esteem.

Interestingly, the researchers found no difference in grades between those with and without IP tendencies. Several studies focused on the peer-reviewed professions, including academia, engineering, medicine, and nursing, as well as the psychotherapy sessions in high-achieving professional women conducted by Clance and Imes (1978). These inquiries used population samples from academia, business, and health care, although limited investigations involved medicine or nursing.

Prevalence

The reported prevalence of IP fluctuated by study population and data source. Bravata et al. (2019) noted IP prevalence varied extensively from 9% to 82%. The researchers attributed the broad range to different IP psychometric instruments, IP scoring parameters, and populations. Only one study described the prevalence of IP in nurses. Ares (2018) discovered IP tendencies as measured by the CIPS (Clance, 1985) were present in 74.6% of nurses employed as a CNS. However, in physician samples, IP prevalence ranged from 22.5% to 46.6%, according to Thomas and Bigatti (2020). Additionally, Bravata et al. suggested IP prevalence data may have been subject to publication bias. The authors noted all published IP research indicated at least some participants endorsed IP tendencies.

Male and Female Participants

The evolving concept of gender and its relationship with IP has not been formally studied. The majority of researchers used the dichotomous term sex to distinguish male and female participants. While the use of the word sex in the reviewed IP publications is contextual and represents an earlier research period where the term defined a male/female binary classification, in the present day, it is inappropriate to apply or supplant the more encompassing

word gender with the term sex. The effects of IP on gender are presently unknown and under-researched.

Most participants in IP research have been women (Bravata et al., 2019). The imbalanced male to female ratio in the literature might stem from the seminal, nascent research by Clance and Imes (1978), who hypothesized IP behavior was exclusively manifested by high-achieving women and likely absent in men. The researchers' assertions should be considered with historical context because the IP construct emerged during the 1970s women's liberation movement, which sought equal rights and opportunities for women. The cultural transformation efforts may have influenced the researcher's conclusions, which were based on the researchers' psychotherapy practice. According to Bravata et al. (2019), subsequent research has demonstrated mixed results with IP tendencies occurring in both men and women and across different populations and decades. Of the 64 studies reviewed by Bravata and colleagues, 16 studies showed statistically significantly higher rates of IP in women. Conversely, the same investigators found no statistical difference in IP inclinations between women and men in 17 reviewed studies. While men are reported to be susceptible to IP, and the diverging literature does not indicate if women have a higher risk for IP tendencies than men.

Significantly higher rates of IP in women have been reported by different investigators, in several populations, and across various research settings. Some investigators considered the higher IP rate in women could be related to selection bias, unjust societal expectations placed on women, or the higher prevalence of mental health alterations in women. Bernard et al. (2017) and Bernard et al. (2018) explored IP in African-American students and found higher rates of IP among female participants. However, nearly 70% of their convenience sample were women who may have enrolled in the study because of interest in IP or had self-identified IP tendencies. In

addition, anxiety has been shown to parallel IP direction (Henning et al., 1998), although a causal relationship has not been established. Bandelow and Michaelis (2015) noted anxiety disorders in women are approximately twice as high as in men. Oriol et al. (2004) measured IP, anxiety, and depression in 185 family medicine physician residents. More women (41%) identified as an impostor compared to men (24%, $p = .02$). Women also had higher mean CIPS scores compared to men ($M = 54.3$ v. 58.5 , $p = .03$). The IP scores did not vary with the year of training, residency program, age, or marital status. Oriol et al. reported IP scores had a statistically significant correlation with depressive symptoms ($r^2 = .45$, $p < .0001$), with Trait Anxiety ($r^2 = .65$, $p < .0001$), and State Anxiety ($r^2 = .39$, $p < .0001$). The authors were uncertain why the data showed greater IP intensity and prevalence in women; however, they contend negative societal messages on gender might contribute to higher IP tendencies in women who train in professional leadership roles such as medicine.

Henning and colleagues (1998) found more women reported impostor tendencies than men in a study of perfectionism, IP, and psychological adjustment in 464 medical, dental, nursing, and pharmacy students. Across all health care disciplines, more women participants scored above the CIPS score cutoff of 62 compared to men (37.8% vs. 22%), $X^2 = 13.62$, $p < .001$. The mean CIPS scores for women ($M = 57.8$, $SD = 14.9$) were statistically significantly higher compared to men ($M = 52.1$, $SD = 13.0$, $F(1, 463) = 19.4$, $p < .001$). The results indicate a high percentage of health care discipline students experience IP tendencies, and this is especially prevalent in women. Henning et al. suggested the increased visible presence of women leaders, faculty, and students in health professional educational programs might result in lower IP propensities for women. Consistent with Henning et al., Brauer and Proyer (2017) found higher IP rates and CIPS scores in female students compared to either male students or female

professionals, suggesting professional employment might moderate IP tendencies in women over time.

Since the inception of the IP construct, research on men and women has shown IP occurs independent of gender (Salkulu & Alexander, 2011). Men and women have an ostensible equivalent risk for developing IP feelings (Clance & O'Toole, 1987; Holmes et al., 1993). Cozzareli and Major (1990) measured the presence and intensity of IP in 137 undergraduate psychology students. A median split score based on measurements derived from the CIPS instrument was used to denote IP. The mean CIPS score for IP positive individuals was 65.71, and for IP negative individuals, the mean CIPS score was 48.17. Women had marginally higher mean scores ($M = 59.44$) than men ($M = 55.64$); however, statistical significance was not achieved ($F(1, 104) = 2.99, p = .09$). Nevertheless, the authors stated their findings were consistent with previous research supporting greater IP intensity in women. In a study exploring the relationship between IP feelings, wellbeing, and gender roles, September et al. (2001) measured IP feelings using the CIPS instrument in 379 Canadian university students. Students (68.1% women) were recruited from classes in science, engineering, social sciences, and health care. A chi-square analysis discovered no statistically significant differences on IP scores ($N = 377$) based on biological gender ($X^2 = 0.31, p > .05$). Leach et al. (2018) reported female general surgery faculty and trainees were just as likely as males to project characteristics of IP ($p = .086$).

Some research suggests gender might shape how IP feelings are generated and mitigated. Hutchins and Rainbolt (2017) explored IP antecedents and coping efforts in 16 academic faculty. The investigators found different IP triggers and coping mechanisms based on male or female identification. Men, more than women, explained their IP was prompted by implied or explicit comments made by colleagues who questioned their area of professional training or expertise. In

contrast, women reported their IP frequently emerged following a scholarship submission, receiving a negative performance review, or having a publication rejected. Additionally, women faculty often doubted their professional legitimacy and described detrimental symptoms associated with their IP, i.e., anxiety, stress, physical discomfort, and persistent worry. Women faculty were more likely to pursue healthy, active coping mechanisms and rely on social support as a way to mitigate IP feelings. In comparison, men were reluctant to adopt mitigation behaviors to alleviate IP concerns. Instead, men indicated they relied more often on substance use, working harder, or ignoring their IP tendencies. Consequently, the researchers suggest men might be at a higher risk for physiologic, psychologic, and professional harm related to their avoidance behaviors beyond what the literature reports.

Age

The research is mixed on the effects of age on IP development. Some investigations showed no relationship, while other research demonstrated statistical significance (Bravata et al., 2019). For instance, Sonnak and Towel (2001) found no significant relationship between CIPS scores and age ($r = 0.136$; $p = .252$). However, Brauer and Proyer (2017) reported a statistically significant negative correlation between age and GCIPS scores ($r = -.34$, $p < .001$) in a cohort of 222 working professionals in Germany with a mean age of 36.7 ($SD = 12.4$) years, suggesting increased age conferred a protective quality against IP. In the same study with the student cohort ($N = 244$) with a mean age of 22.5 ($SD = 3.4$) years, the researchers did not find a statistically significant correlation between GCIPS scores and age ($r = -.06$, $p = .319$). The larger standard deviation in the age in the professional worker group suggests that older participants might have had a more significant effect on the data analysis than the younger cohort.

Chae et al. (1995) examined IP and the five-factor model of personality in 654 Korean men and women with a combined mean age of 34 ($SD = 10.7$) years. Chae et al. reported age and IP did not correlate in 319 male participants ($r = -.10, p = ns$). The data showed a statistically significant negative correlation in 332 female participants ($r = -.15, p < .01$). Chae et al. determined younger women had an increased risk for IP, which suggested an age-related feature of IP. In analyzing their results, the researchers did not separate age effects by male or female classification.

Overall, the data suggest younger individuals who are new to their professional roles or beginning to position themselves on a career path might experience IP tendencies with their new responsibility and career transitions. As an individual gains more experience with their role, IP feelings may subside. While researchers have only measured a mild to moderate effect, age remains an exciting variable in IP investigations, as it is a potentially more influential factor than the static research suggests. A longitudinal study could provide better insight and more clarity.

Race and Ethnicity

Few studies adequately explored IP through a cultural lens. Bravata et al. (2020) reported efforts to homogenize IP assessment instruments resulted in few minorities participating in study samples, possibly limiting an instrument's validity for a minority population. Bravata et al. (2019) found a lack of studies focused on minority groups. Interestingly, Bravata et al. (2020) asserted underrepresented minorities are at an elevated risk for IP and psychological distress during their college education because of pervasive socioeconomic stressors, including inadequate financial aid, racial discrimination, negative stereotypes, and being the first family generation to pursue advanced education.

Most of the current research on race and ethnicity drew conclusions based on undergraduate students enrolled at a university where the research team was established. The literature showed IP was common among specific racial and ethnic populations, e.g., African American, Asian American, and Latino/a American. However, most of the research studied students enrolled at predominately White universities and had underrepresented minorities as part of the aggregated sample, i.e., students who identified as a person of color. Data from at least four investigations (Austin et al., 2009; Bernard et al., 2017; Bernard et al., 2018; Peteet et al., 2015) specifically explored IP in African American college students using homogenous samples. While Peteet et al. did not include White students in their study or compare their findings using normative data, the researchers suggested IP in African American college students was similar to White college students and proposed IP was a ubiquitous construct present among different races and ethnicities.

An association between IP intensity, perceived racial discrimination, and mental health has been reported in college students who identify as African American. Austin et al. (2009) showed a relationship among African American college students and IP, depression, and survivor guilt. Bernard et al. (2017) and Bernard et al. (2018) explored a longitudinal relationship with IP, perceived racial discrimination, and mental health in 157 African American young adults. However, the study contained a disproportionate number of female participants (67.9% Cohort 1 and 68.5% Cohort 2), which limited external validity. While IP did not uniformly predict more negative mental health outcomes in the full study cohort, an association was found between IP, mental health wellness, perceived racial discrimination frequency, and female identity. Interestingly, those who reported frequent racial discrimination but low levels of psychological distress from racial discrimination had higher levels of IP than those who reported high levels of

psychological distress from racial discrimination. Peteet et al. (2015) examined the association between IP, psychological distress, and self-esteem in 112 undergraduate African American students enrolled in multiple universities throughout the US; the research team did not specifically focus on historically Black colleges and universities. Peteet et al. found IP was positively associated with psychological distress and negatively associated with self-esteem. Using a simple linear regression model, Peteet et al. reported high IP scores obtained from the CIPS instrument predicted higher psychological distress (adjusted $R^2 = .27$, $\beta = .52$, $F(1, 110) = 41.44$, $p = .000$). In a second linear regression analysis, higher IP values predicted lower self-esteem scores (adjusted $R^2 = .42$, $\beta = -.65$, $F(1, 110) = 80.71$, $p = .000$).

Research exploring impostorism in mixed non-White student samples has shown inconsistent results. Cokley et al. (2017) examined the moderating and mediating effects of IP between perceived discrimination and depression and anxiety in students of color. The cross-sectional study enrolled African American, Latino/a American, and Asian American students from a large urban university in the Southwestern US. The investigators measured IP feelings using the CIPS instrument and compared the results with measurements in perceived discrimination and mental health. African American students reported significantly higher perceived discrimination than Asian American and Latino/a American students. With respect to IP, no significant differences across racial/ethnic minority groups were found. However, Asian American students reported higher IP scores than Latino/a American and African American students. The findings suggest, among university students of color, perceived discrimination is harmful to mental health, and IP may exacerbate the relationship. In addition, the authors recommended mental health assessments for ethnic minority college students should include

factors related to environmental and academic stressors such as impostorism and perceived discrimination.

Collectively, the data show underrepresented minorities are at-risk for IP and its associated psychological derangements. However, additional research is needed to elucidate the depth of the relationship and the effect size on academic performance and minority student wellbeing. The paucity of data further suggests additional IP screening and management options are needed for underrepresented minority populations.

Students

A majority of published research focused on IP tendencies and implications in a student population. Most of the student research was conducted at the undergraduate level and usually as a course deliverable or broader university exercise. Bravata et al. (2019) reported some student populations included elementary, high school, or university levels. Bravata et al. emphasized the contributors to IP development include the importance to students to uphold their social standing and to avoid demonstrations of inadequacy or failure in a group setting. Cozzarelli and Major (1990) found IP tendencies in students were associated with higher rates of pessimism and perfectionism and lower self-esteem measurements. Context, social support, and friendships appear to have a decisive effect on the degree and magnitude of IP tendencies in the student population.

Caselman et al. (2006) examined attributes contributing to IP in 136 high school students using the Harvey Impostor Phenomenon Scale (HIPS) (Hellman & Caselman, 2004). Caselman et al. discovered 40% of the variance in HIPS scores was accounted for by the variables encompassing global self-worth, social support, and self-concept (adjusted $R^2 = .40$, $F[1,136] = 12.30$, $p < .001$). Among the variables, friendship support ($\beta = -.279$; $t = -3.516$, $p < .01$) and

competence ($\beta = -.181, t = -2.056, p < .05$) were found to be significant predictors of HIPS scores. The regression analysis examining social support predictability of IP tendencies indicated that both adolescent females and males require support from their friends to reduce IP development and progression.

Some data suggested a difference between students and professionals in the variables associated with IP tendencies. For instance, Brauer and Proyer (2017) found that German psychology students had higher mean German CIPS (GCIPS) scores than working professionals, $M=56.94$ vs. 50.85 . However, in the student sample, the women had a statistically significant negative correlation with higher GCIPS scores ($r = -.21, p < .01$), while working professional age had a statistically significant negative correlation with GCIPS scores ($r = -.34, p < .001$).

Professionals

Professionals who doubt their capabilities, question their value, or perceive themselves as intellectual frauds are at an elevated risk for adverse psychological outcomes with implications to career retention, job advancement, and job performance (Arena & Page, 1992; Ares, 2018; Barrow, 2018). Research exploring IP in professionals has grown and piqued the interest of business intelligence and talent management groups, especially as the harmful consequences of IP have become better understood and more ubiquitous across industries. There is no research examining the economic impact of IP on businesses.

Clance and Imes (1978) counseled professional women with IP. The psychologists reported the women considered themselves to be intellectual phonies and their achievements to be unmeritorious. The women indicated they avoid challenging opportunities and peer recognition for their work. Professionals afflicted with IP feelings experience increased

psychological distress and physiological symptoms, leading to maladaptive coping and harmful behaviors such as substance use disorders (Hutchins & Rainbolt, 2017).

One investigation reported managers with IP were more likely to delegate tasks to subordinates while employees with IP frequently shunned promotion and career advancement (Rohrman et al., 2016). Some research showed avoidance behavior resulted in professional paralysis, which prevented individuals with IP from attaining professional fulfillment (Clance & Imes, 1978; Haney et al., 2018). Clance and O'Toole (1987) noted that IP sufferers had reduced professional ambition and declined career advancement opportunities when IP feelings were intense.

Chrisman et al. (1995) found impostors had difficulty pursuing leadership opportunities and avoided attention-producing activities at work. Although some professionals with IP may avoid leadership opportunities, Rohrman et al. (2016) found individuals with IP held leadership positions. However, these individuals reported higher levels of anxiety, dysphoric moods, and negative self-evaluation. Impostors assigned to leadership positions could negatively influence the team's performance. Holmes et al. (1993) reported leaders with IP were inclined to work excessively, were slow decision-makers, feared failure, and micromanaged subordinates; management styles known to constrain high performance teams and demotivate high achievers.

Nurses. The literature examining IP in the nursing profession is remarkably sparse. Few data exist that describe IP in nurses, and no IP research has been conducted in the CRNA population, although a few investigations described impostorism in advanced practice nurses (Ares, 2018). A majority of the nursing literature on IP was sourced from the psychology field and primarily focused on background significance, associated symptoms, and occupational consequences. Some nursing research offered treatment recommendations, which were only

partially research based. Several studies concentrated on undergraduate and graduate nursing students during a professional transition point. Aubeeluck et al. (2016) and Christensen et al. (2016) found nursing students frequently had IP tendencies and possessed trait anxiety, self-doubt, and avoidance behavior, which could destabilize a graduate's preparedness to practice. However, these studies were performed outside of the US, making it difficult to generalize to US-based nursing education models. Aubeeluck et al. further argued anti-intellectualism in nursing created a culture that fostered IP in graduate entry nurses.

Of the available non-student nursing research, only a few studies exist. The investigations primarily centered on the CNS role and used a validated instrument to measure IP prevalence and intensity. The results have been mixed, which could be attributed to different research methods and study design. Ares (2018) conducted a longitudinal study to determine IP prevalence and influence in the early career CNS. Although the overall prevalence was 74.6%, Ares found no differences in those employed in the CNS role than those who functioned in a different nursing capacity. Ares speculated IP was a personal experience, which occurred regardless of academic preparation, clinical competence, or professional achievement. Interestingly, IP severity was more intense for those committed to practicing in the CNS role than those who served in a different nursing position, suggesting avoidance behavior could influence a nurse's decision to pursue an advanced practice position. The lack of IP investigations in the nursing profession demonstrates the need for additional inquiry.

Physicians. There are limited data on IP prevalence and symptoms in physicians. Similar to research on other peer-reviewed professions, most research designs were cross-sectional and employed a validated screening instrument to detect IP prevalence and intensity. Some researchers pursued IP to explain gender differences in medicine and surgery (Leach et al.,

2019). Armstrong & Shulman (2019) remarked on an IP focus during residency training was an essential step in addressing gender disparities in neurology. Other physician studies looked for correlations between IP and psychological distress. Oriel and colleagues (2004) studied 255 family medicine residents using the CIPS instrument. Oriel et al. measured IP and correlated the findings with physician resident anxiety and depression scores. The research team found IP symptoms were present in 41% of women and 24% of men. Depressive symptoms, Trait Anxiety, and State Anxiety instruments all significantly correlated to greater IP intensity, as did low self-esteem as measured by the Rosenberg Self-Esteem Scale (Silber & Tippett, 1965).

Additional research compared IP prevalence and intensity with workplace performance. Leach et al. (2018) measured IP and burnout in general surgeons and general surgery residents practicing in university and community-based hospitals. The researchers found trainees had higher IP scores than attending surgeons; however, they discovered no difference in burnout rates between the groups. Logistic regression showed work tension was the only significant finding associated with IP symptoms. No study offered research-based treatments; however, a call was made for greater IP awareness, especially among resident mentors and academic medical educators. A noteworthy commentary by Mullangi and Jagsi (2019) suggested IP was merely a symptom of a larger systemic problem - specific to women and underrepresented minorities in medicine - and call for the health care system to undertake transformational efforts to support diversity and equity.

Research Limitations

This literature review noted several research limitations involving the IP construct. Specifically, researchers employed different methods to study IP and its consequences on specific populations or association with coexisting mental health conditions. Because diagnostic

criteria have not been defined, investigators inconsistently established IP parameters and described the associated characteristics. External validity was sharply limited because no normative data have been determined for a baseline comparison. Interestingly, a random participant selection approach has never been performed. Convenience samples were the primary recruitment method. Most of the studied populations involved undergraduate students, and some participated as a condition of a psychology course or area of study. Given most of the studies involved student populations, most participants were young or at an early transition point in their nascent professional careers.

Additionally, few data exist that measured the IP construct in a nursing population, and no research explored IP presence or intensity in CRNAs. Nearly all of the reviewed literature derived conclusions from investigations that employed lower quality research methods and designs, limiting external validity. None of the reviewed studies reported performing a power analysis ahead of participant recruitment, and most of the response rates were either not reported or significantly low. Of note, only a few studies discussed Institutional Review Board approval and safeguarding of human subjects.

At least five different IP psychometric instruments have been developed and used in various populations, each measuring a different IP subdimension with mixed reliability and validity data. One instrument was used, albeit in a single study, without any known psychometric testing. Several researchers adjusted the established IP scoring thresholds to increase their capture rate, which resulted in questionable findings. Longitudinal studies and trends on the duration and intensity of IP have yet to be performed, limiting the ability to measure treatment effectiveness. Additionally, while some researchers expressed concern for potential biases and external validity threats, most went unaddressed in subsequent investigations. For example,

selection bias may have occurred in several university-based studies (participants prone to IP were recruited or self-enrolled into the study), which might have overestimated the study population's effect size. In another example, Bravata et al. (2019) found nearly all published investigations reported IP tendencies in their study participants, suggesting a potential publication bias.

Conclusion

The IP construct has been described as self-perceived intellectual phoniness frequently experienced by high-achieving individuals in competitive settings despite clear evidence of the individual's merit. While IP has been researched for nearly 50 years across different populations and contexts; a broadly accepted clinical definition with firm diagnostic criteria remains elusive. Most of the research on IP has employed observational methods, has limited generalizability, or potentially contain selection or publication biases. No research-based treatments have been formally studied. More recently, the construct has been viewed as multidimensional and evolving, making static diagnostic parameters challenging. Interestingly, psychology researchers are reconsidering social context as an influential IP antecedent, a thought that could shape how IP is perceived in certain populations or professions. Additional research interests center on the personal and professional consequences of IP, which include psychological distress, professional paralysis, and career non-advancement.

The nursing profession has not been adequately studied with respect to IP, and, consequently, little is known about the professional effects IP has on nurses. As advanced practice nurses working in dynamic, high-performance settings, CRNAs are at-risk for IP. The career-related effects on CRNAs could be far-reaching and contribute to job burnout, career apathy, and professional stagnation. As nursing's role in health care continues to expand,

undiagnosed and non-managed IP could threaten the profession's growth and advancement.

Nurses with intense IP thoughts may feel uninspired, devalued, and avoid independent practice, autonomous clinical decision-making, or employment settings where they compete or perform on par with physician colleagues, e.g., anesthesiology and perioperative services. It is unknown how IP in CRNAs affects patient care or patient outcomes but should be studied to determine if IP has persuasive implications in the care delivered by nurse anesthesiologists. Researching IP in CRNAs and the associated consequences will expand the literature and may provide a better understanding about the career effects in CRNAs. The study findings may encourage practice equality for CRNAs through a more balanced relationship with physician anesthesiologists and an improved work culture that fosters respect and opportunity.

Chapter III

Methodology

This chapter details the study plan, research design, human subjects protection, data collection, and completed data analysis. The purpose of the research study was to measure the prevalence and intensity of Impostor Phenomenon (IP) in Certified Registered Nurse Anesthesiologists (CRNAs) using the Clance Impostor Phenomenon Scale (CIPS) instrument. The study also attempted to describe the relationship among select CRNA sociodemographic and practice variables with IP as well as determine the variance in IP measurements.

Research Questions

This study examined three interrelated research questions quantifying IP in the CRNA population. The study attempted to answer the following research questions:

- What is the prevalence and intensity of IP in a random selection of CRNAs as measured by the CIPS instrument?
- What is the relationship between IP intensity and select sociodemographic and practice variables in a random selection of CRNAs?
- Do CIPS scores predict select CRNA practice behaviors and preferred anesthesia care delivery model?

Primary Aim

The primary aim was to describe select sociodemographic variables, anesthesia practice model, CRNA practice behaviors, and IP in a random sample of CRNAs.

Secondary Aims

1. Secondary aim one described the relationship among select sociodemographic variables, anesthesia practice model, CRNA practice behaviors, and IP in a random sample of CRNAs.
2. Secondary aim two was designed to describe the variance the variance in IP accounted for by select sociodemographic variables, anesthesia practice model, and CRNA practice behaviors in a random sample of CRNAs.

Research Design

The research study measured IP prevalence and intensity in the CRNA population using a cross-sectional, descriptive correlation design. The study surveyed a random sample of CRNAs from the American Association of Nurse Anesthesiology (AANA) membership database. The CIPS instrument measured IP presence and intensity. An accompanying survey collected select sociodemographic and CRNA practice variables.

Setting

The study was an Internet-based investigation administered through the AANA communication network. The AANA is a professional trade organization representing approximately 59,000 CRNAs and students in the United States (US) and US territories (AANA, 2021a). The AANA Research Survey service facilitated access to the membership databank and circulated the study invitations. Participants were randomly selected and invited through their registered email address on file with the AANA. A hyperlink embedded in the email connected the participants to the CIPS instrument and sociodemographic and practice surveys, which were transcribed to the Research Electronic Data Capture (REDCap) platform (Harris et al., 2009).

The designated research institution was the University of San Diego, Hahn School of Nursing, and Health Science, San Diego, California.

Study Population

The study population were CRNAs actively engaged in the clinical delivery of anesthesia services. CRNAs were defined as advanced practice nurses educated and trained to provide perioperative evaluation and management services across the life span and in all clinical settings. In the US, CRNAs administer approximately 50 million anesthetics each year and deliver anesthesia, pain management, and related services across the lifespan and in all clinical settings (AANA, 2021a).

Participant Recruitment

Participants were recruited through the AANA Research Survey service. The AANA Research Survey service filtered the membership databank to generate a random list of active CRNA members who met the study's inclusion criteria and represented the AANA membership in social and practice demographics. Study participant invitations were delivered using the member's email address registered with the AANA. The principal researcher was neither involved in the random selection process nor had access to any invited AANA member name, demographic, or contact information. The AANA Electronic Survey Policy (2020a) limits researchers to a maximum of 3,000 email addresses, although rarely granted, policy exemptions can be obtained with appropriate justification. The AANA (2020a) reported their email survey response rate was approximately 5-7% and advise researchers to estimate a sufficient sample size based on the response rate. Although this national study was unique and required an *a priori* sample size of 348 participants, the researchers did not request a policy exemption.

Participant Inclusion Criteria

The following inclusion criteria were established for study participation: (1) active certification or recertification through the National Board of Certification and Recertification of Nurse Anesthetists (NBCRNA), (2) active membership in the AANA, (3) active clinical practice in any setting and any patient population as a CRNA in the US or a US territory.

Participant Exclusion Criteria

The exclusion criteria for the study were (1) student registered nurse anesthesiologist or nurse anesthesia resident status, (2) inactive nurse anesthesiology practice, and (3) non-membership with the AANA. The AANA applied the sample selection filters to exclude members who do not meet study recruitment criteria.

Data Collection Instrument

The study used the CIPS instrument to measure IP in the study population. The instrument was transcribed to the REDCap platform for electronic distribution through the AANA. French and colleagues (2008) recommend using the total CIPS score rather than the instrument's three subscales to determine IP presence. The principal researcher obtained written permission to use the CIPS instrument from the original author (P. Clance, personal communication, March 27, 2021). The investigation also collected non-identifiable sociodemographic information from each participant, which included select sociodemographic data and certain nurse anesthesia practice information. Appendix A contains the operational definitions used for the study.

Clance Impostor Phenomenon Scale

The CIPS is a 20-item, self-administered psychometric instrument designed to measure IP presence and frequency of impostor feelings (Clance, 1985). Each positively worded item

uses a 5-point Likert scale response. The instrument generates a total score between 20 to 100. The higher the score, the more frequent the IP tendency and intensity. Clance (1985) defined IP presence as a score greater than 40 as measured by the CIPS instrument. The instrument has subscales that measure three IP factors: fake, discount, and luck (Chrisman et al., 1995; Clance, 1985; French et al., 2008; Simon & Choi, 2018). Clance defined the three factors as feeling like a fake, discounting achievement, and attributing their success to luck. Appendix B shows the CIPS instrument for this study.

Sociodemographic Variables

The survey collected the following participant sociodemographic variables: age, gender identity, race/ethnicity, education level, and years of professional experience as a CRNA. No identifiable participant information was collected, such as names, home addresses, email addresses, or Internet Protocol addresses. Appendix C shows the sociodemographic survey.

Clinical Practice Variables

The CRNA practice variables gathered were the anesthesia practice model, type and frequency of select advanced clinical skills, clinical decision-making frequency, and the state scope of practice. Participants were queried on the frequency in which they exclusively generated the anesthesia plan of care and made clinical decisions outside the control of a physician anesthesiologist. Participants estimated the occurrence of their independent decision-making capacity using a frequency scale in 25% intervals. Zero and 100% were available options to indicate an absolute difference. The fields were programmed to force a response from all study participants to reduce missing data.

The advanced clinical skills were defined as performing ultrasound-guided regional anesthesia, central venous catheter placement, point-of-care ultrasound (PoCUS), and a specialty

anesthesia focus, i.e., cardiac (open heart), pediatric (focused population), and pain management services. Participants were asked to estimate the frequency with which they exclusively deliver the select advanced clinical skills outside the control of a physician anesthesiologist using a frequency scale in 25% intervals. Zero and 100% were options representing an absolute difference. CRNAs who did not engage in the itemized advanced clinical skills were categorized as not applicable, e.g., CRNAs practicing in a free-standing endoscopy center. To reduce missing data, the data fields were required from all study participants.

Study participants selected one of four anesthesia care delivery models that best represented their primary clinical practice. The four options were: (1) anesthesia care team (ACT) model under medical direction as defined by the Centers for Medicare & Medicaid Services (2020) and the Conditions for Payment: Medically Directed Anesthesia Services 42 C.F.R. § 415.110 (2014); (2) ACT model following medical supervision as determined by Centers for Medicare & Medicaid Services (2020) and the Conditions for Payment: Medically Directed Anesthesia Services 42 C.F.R. § 415.110 (2014); (3) independent CRNA practice in a group (multiple anesthesia professionals) setting; and (4) independent CRNA practice in a solo setting (no additional anesthesia professional present). Participants indexed their scope of practice data to the state where most of their anesthesia services were delivered since some CRNAs provide anesthesia services in multiple states. Finally, participants were asked to identify the primary anesthesia practice setting. The seven choices were: (1) academic medical center, (2) community hospital, (3) critical access hospital, (4) Veteran's Administration, (4) military, (5) freestanding surgery center, (6) office, and (7) other. These data fields were required from all study participants to reduce missing data. Appendix C presents the CRNA practice variable survey.

Research Protocols

The principal researcher submitted the study proposal for Institutional Review Board (IRB) approval before initiating the research. The AANA Research Survey service reviewed the IRB ahead of submission but did not request any modifications. The principal researcher created an exact replica in digital format of the CIPS instrument and demographic and practice data fields using the REDCap platform. The electronic instruments were beta tested with five CRNAs not affiliated with the study to ensure each data collection instrument operated correctly and study directions were clear. The beta testers completed the CIPS instrument and sociodemographic and practice surveys between five and seven minutes. Data migration between REDCap and IBM SPSS Statistics, Version 28 (IBM, 2021) was tested and found to be seamless. The principal researcher developed an invitation email template describing the research purpose and study design. Informed consent language was included in the template and followed the guidelines established by the University of San Diego Office for Human Research Protections.

The AANA Research Survey service received the participant informed consent template, a copy of the IRB approval letter, and a non-traceable secure hyperlink to the REDCap platform on June 25, 2021. A sample invitation email with the informed consent template language and with the AANA header was drafted and approved by the principal researcher. On September 2, 2021, the AANA Research Survey service randomly selected 3,000 CRNA profiles who met the study eligibility and contacted them using the email address on file with the AANA. Email recipients could opt-out of the study and further email communications. The survey order was: (1) study description and information; (2) participant informed consent; (3) the non-traceable link to the demographic and practice survey; and (4) the CIPS instrument. The study was accessible to participants for 25 days. One email reminder was disseminated 14 days after the

study commenced. The reminder email resulted in a second surge of participants. The REDCap study link was active until September 27, 2021.

Protection of Human Subjects

The study received an IRB evaluation through the University of San Diego Office for Human Research Protections. The IRB approval was submitted to the AANA Research Survey service when the study application was submitted. The email invitation detailed the research purpose and study protocol. Informed consent was provided, and participants had the right to withdraw from the study at any time without consequence. As a condition of the AANA Research Survey service use, the principal researcher did not have access to participant names, contact information, workplace locations, or Internet Protocol addresses. All survey responses were anonymous and aggregated for data analysis and presentation. The researchers stored all data in an electronically secure format. Appendix E details the approval of IRB-2021-359 on June 4, 2021.

Data Analysis

Data were migrated from the REDCap platform to IBM SPSS Statistics for Macintosh, Version 28 (IBM, 2021). The analysis plan was modified to reflect collected data characteristics. The study participant's characteristics were quantified using descriptive statistics. The study's primary aim, measuring IP prevalence and intensity in CRNAs, was examined using descriptive statistics, including central tendency and spread. CIPS scores were transformed into categorical data and analyzed using either three categories of CIPS scores, or CIPS scores ≤ 40 vs. > 40 , or CIPS scores ≤ 60 vs. > 60 . For secondary aim one, covariate relationships were analyzed using either Fisher's Exact test, a One-way ANOVA, a 2-sample t-test, a Kruskal-Wallis test, or a Wilcoxon Rank Sum. For secondary aim two, regression models could not be constructed

because significant associations were not found between covariates. Appendix F describes the independent and dependent variables for each specific aim with the proposed data analysis plan.

A Priori Sample Calculation

An *a priori* sample calculation was performed with an estimated a sample size of 348 participants needed to achieve adequate study power. The sample calculation was obtained using OpenEpi.com Sample Size Calculator (Version 3) with the following assumptions: 59,000 CRNAs (total AANA membership), 35% IP prevalence (estimated effect size), and a 95% confidence interval. The AANA (2020a) reported the response rate for Internet-based surveys was 5-7% suggesting 6,000 email invitations should be circulated to obtain the requisite number of participants; however, only 3,000 invites were distributed as the principal researcher did not request a policy exemption to the email cap established by the AANA Research Survey services.

Chapter IV

Results

This chapter describes the study findings and data analysis. The purpose of the research was to measure the prevalence and intensity of Impostor Phenomenon (IP) in Certified Registered Nurse Anesthesiologists (CRNAs) using the Clance Impostor Phenomenon Scale (CIPS) instrument. The study was also designed to describe the relationship among select CRNA sociodemographic and practice variables with IP as well as determine the variance in IP measurements accounted for by these select variables.

Research Questions

The study examined three interrelated research questions quantifying IP in the CRNA population. The following research questions were addressed by the research:

1. What is the prevalence and intensity of IP in a random selection of CRNAs as measured by the CIPS instrument?
2. What is the relationship among IP intensity and select sociodemographic and practice variables in a random selection of CRNAs?
3. Do CIPS scores predict select CRNA practice behaviors and preferred anesthesia care delivery model?

Primary Aim

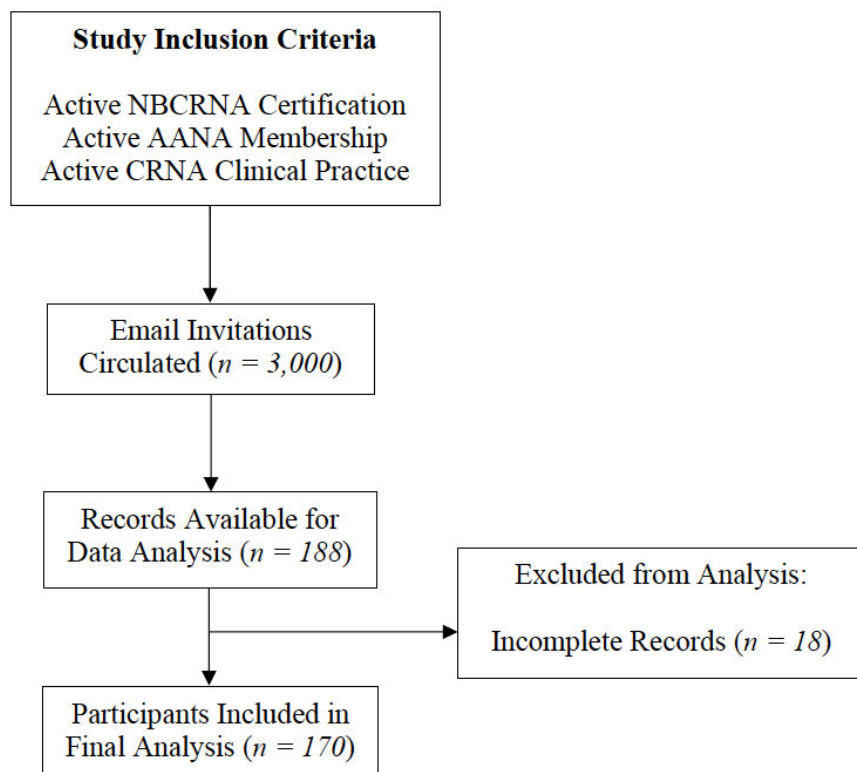
1. The primary aim described select sociodemographic variables, anesthesia practice model, CRNA practice behaviors, and IP in a random sample of CRNAs.

Secondary Aims

1. Secondary aim one described the relationship among select sociodemographic variables, anesthesia practice model, CRNA practice behaviors, and IP in a random sample of CRNAs.
2. Secondary aim two was designed to describe the variance in IP accounted for by select sociodemographic variables, anesthesia practice model, and CRNA practice behaviors in a random sample of CRNAs.

Study Sample

The AANA Research Survey services selected 3,000 names who met the research inclusion criteria at random from the AANA membership databank. An email invitation was circulated to each prospective participant with a description of the research, informed consent, and a link to the REDCap platform (Harris et al., 2009). The study was accessible to participants for 30 days. One email reminder was disseminated 14 days after the study commenced. All data were collected using the REDCap platform and transferred to IBM SPSS Statistics, Version 28 (IBM, 2021) for analysis. A total of 188 (6.3% of emailed study invitations) entries were recorded in the REDCap platform. Eighteen files (9.6%) were excluded from the final analysis because the records were incomplete and determined to be unusable. The final data analysis was performed on 170 participants, which represented a study completion response rate of 5.7%. Figure 3 explains the record filtering process applied for the data analysis.

Figure 3*Participant Responses Included in Data Analysis*

Note. NBCRNA = National Board of Certification and Recertification of Nurse Anesthetists; AANA = American Association of Nurse Anesthesiology; CRNA = Certified Registered Nurse Anesthesiologist.

Participant Sociodemographic Variables

The mean age of the participants was 51.5 years ($SD = 10.4$). The majority of participants (53.5%) identified as male. Most CRNAs (93.5%) described their race as White, Non-Hispanic with five (2.9%) respondents identifying as Black, and the remaining participants categorized themselves as Asian two (1.2%), Latinx two (1.2%), or other two (1.2%) (race or ethnicity not entered by the participant). More than 74% of participants reported their highest education level as a master's degree, while just under 16% indicated they had a practice doctorate, e.g., Doctor

of Nursing Practice (DNP) or Doctor of Nurse Anesthesia Practice (DNAP). Two respondents (1.2%) listed other as their highest education level; however, neither CRNA provided further details. Table 1 describes the participant's sociodemographic information.

Table 1

Participant Sociodemographic Information (n = 170)

Sociodemographic Variables	
<i>Age</i>	<i>M (SD)</i>
	51.5 (10.4)
<i>Gender Identity</i>	<i>n (%)</i>
Female	78 (45.9%)
Male	91 (53.5%)
Non-binary	0 (0%)
Not disclosed	1 (0.6%)
<i>Race/Ethnicity</i>	<i>n (%)</i>
AI/AN	0 (0%)
Asian	2 (1.2%)
Black	5 (2.9%)
Latinx	2 (1.2%)
White	159 (93.5%)
Other: (List)	2 (1.2%)
<i>Highest Education Level</i>	<i>n (%)</i>
Certificate/Diploma	3 (1.8%)
Associate Degree	2 (1.2%)

Bachelor's Degree	9 (5.3%)
Master's Degree	126 (74.1%)
Practice Doctorate	27 (15.9%)
Research Doctorate	1 (0.6%)
Other:	2 (1.2%)

Participant Practice Demographics

The participants reported slightly fewer than two decades of clinical practice as a CRNA ($M = 18.3$ years; $SD = 11.1$ years). More than half (55.3%) of the respondents indicated the ACT was their primary anesthesia practice model, of which, 59.6% of these CRNAs indicated they practiced under medical supervision as defined by the Centers of Medicare and Medicaid (2020). Seventy-six individuals listed independent practice as their primary anesthesia practice model, of which, 22 (12.9%) noted they practiced in a solo setting. The participant's practice setting was largely based in a community hospital setting (45.3%) while 22.4% of CRNAs listed an academic medical center as their principal practice location. Five (2.9%) CRNAs reported the military as their primary setting and 11 (6.5%) participants indicated they provided anesthesia services mostly in a critical access hospital. Most respondents reported they practiced in a state with physician supervision while 51 (30%) of CRNAs stated they delivered anesthesia care in a state that allows full practice authority. Twenty-seven CRNAs in the study reported they regularly provided specialty care for cardiac 9 (5.3%), pediatric 11 (6.5%), or pain management 7 (4.1%) services. Table 2 shows the distribution of practice variables for the study sample.

Table 2*Participant Practice Demographics (n = 170)*

Practice Variables	
<i>Years of CRNA Practice</i>	<i>M (SD)</i>
	18.3 (11.1)
<i>Primary Anesthesia Practice Model</i>	<i>n (%)</i>
ACT - Medicare Medical Direction	38 (22.4%)
ACT - Medicare Medical Supervision	56 (32.9%)
Independent - Group	54 (31.8%)
Independent - Solo	22 (12.9%)
<i>Primary Anesthesia Practice Setting</i>	<i>n (%)</i>
Academic Medical Center	38 (22.4%)
Community Hospital	77 (45.3%)
Critical Access Hospital	11 (6.5%)
Veterans Administration	7 (4.1%)
Military	5 (2.9%)
Surgical Center	20 (11.8%)
Office-based	8 (4.7%)
Other	4 (2.4%)
<i>State Scope of Practice</i>	<i>n (%)</i>
Physician Supervision	56 (32.9%)
Physician Collaboration	22 (12.9%)
Independent Practice	41 (24.1%)
Full Practice Authority	51 (30.0%)

<i>Specialty Practice</i>	<i>n (%)</i>
Cardiac	9 (5.3%)
Pediatric	11 (6.5%)
Pain Management	7 (4.1%)

Note. CRNA = Certified Registered Nurse Anesthesiologist; ACT = Anesthesia Care Team.

Participant Characteristics Compared with AANA Membership Data

Select participant characteristics were compared with the most recent AANA Membership Survey Report (AANA, 2021b). Age, gender, race/ethnicity, and years of practice as a CRNA were available for comparison and analyzed using the Chi-Square Goodness-of-Fit test. The study's participant characteristics were statistically significantly different from the AANA Membership profile data. All *p* values were < .05. Table 3 shows the *p* values from the Chi-Square Goodness-of-Fit test.

Table 3

Select Participants Characteristics Compared with 2021 AANA Membership Data

	<i>p</i> value
Age	.001
Gender	.048
Race/Ethnicity	.025
Years of Practice	< .001

Note. Chi-square Goodness-of-Fit test.

Primary Aim Results

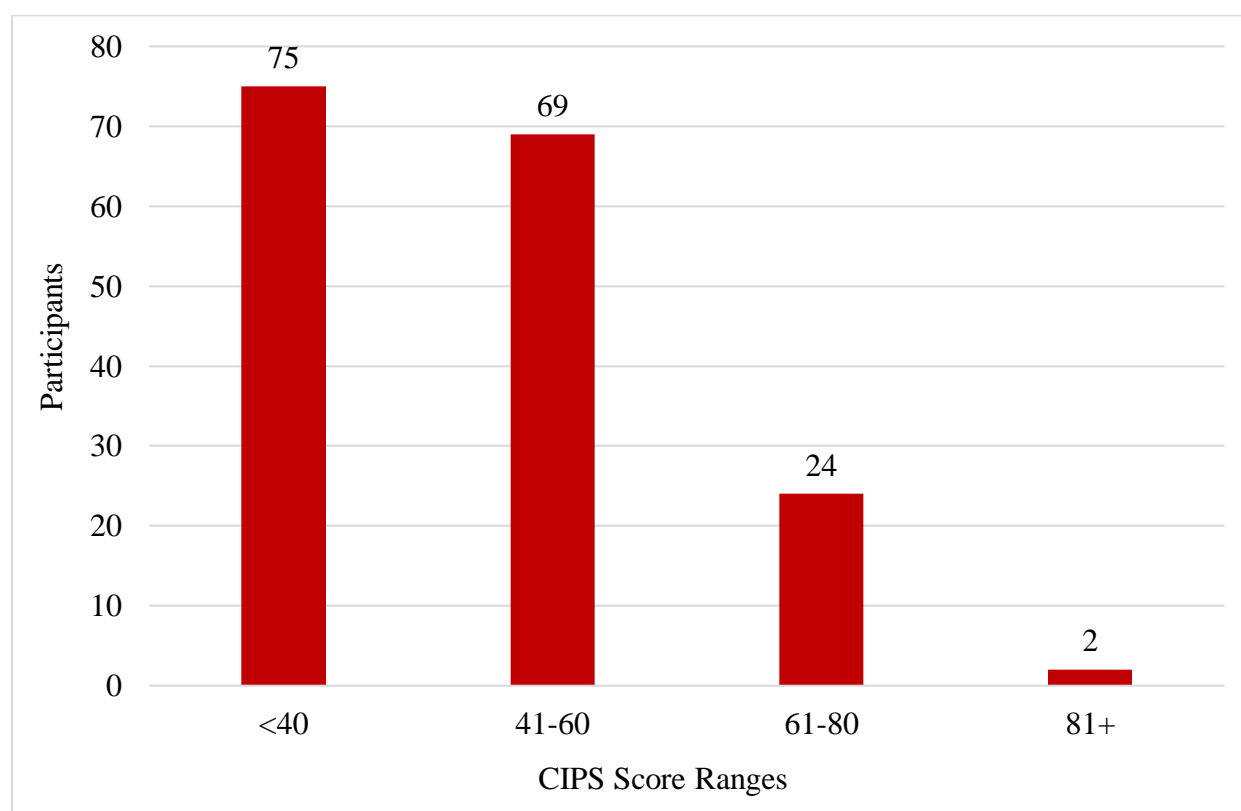
Prevalence

The prevalence of moderate or greater IP feelings in this study was 55.9% as measured by the CIPS instrument with a total score of 41 or greater signifying moderate IP as designated

by Clance (1985). Impostorism was found throughout all the strata of participant sociodemographic variables and practice settings. The mean CIPS score was 44.6 ($SD = 14.4$). The IP measurements ranged from 20 to 93. Seventy-five (44.1%) individuals indicated few IP feelings with scores less than 40 on the CIPS instrument. Ninety-three (54.5%) participants had CIPS scores between 41 and 80, suggesting moderate to frequent IP feelings. Two (1.2%) respondents had CIPS measurements greater than 81 representing intense IP feelings. Figure 4 shows the distribution of CIPS score ranges.

Figure 4

Distribution of CIPS Scores



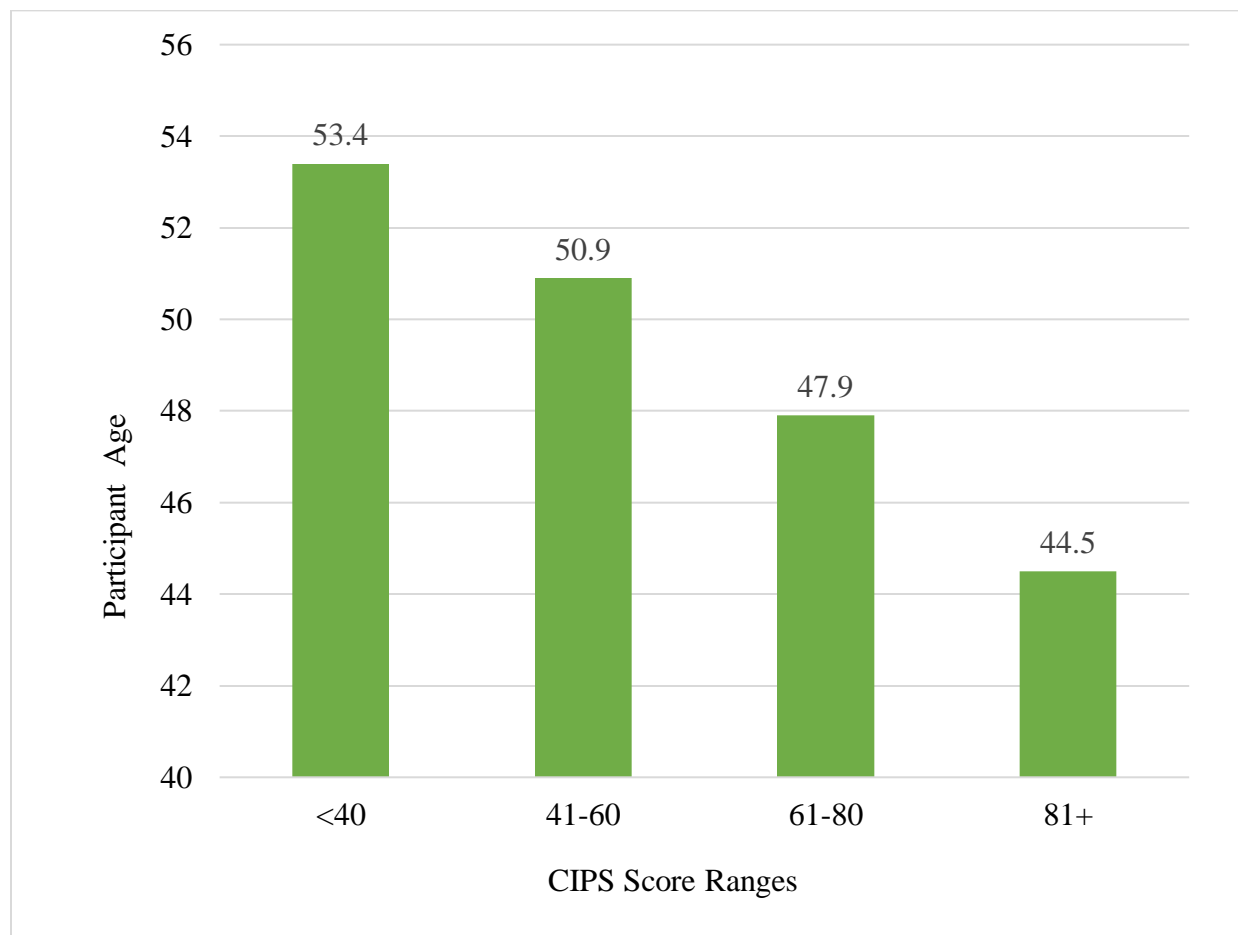
Participant Age

CIPS score ranges showed an inverse relationship with age. The mean age of the participant declined as the CIPS score range increased. The mean age of the participants with

few IP feelings was 53.4 years compared to a mean age of 44.5 years in participants who reported intense impostor tendencies. Figure 5 shows the CIPS score distribution by mean age.

Figure 5

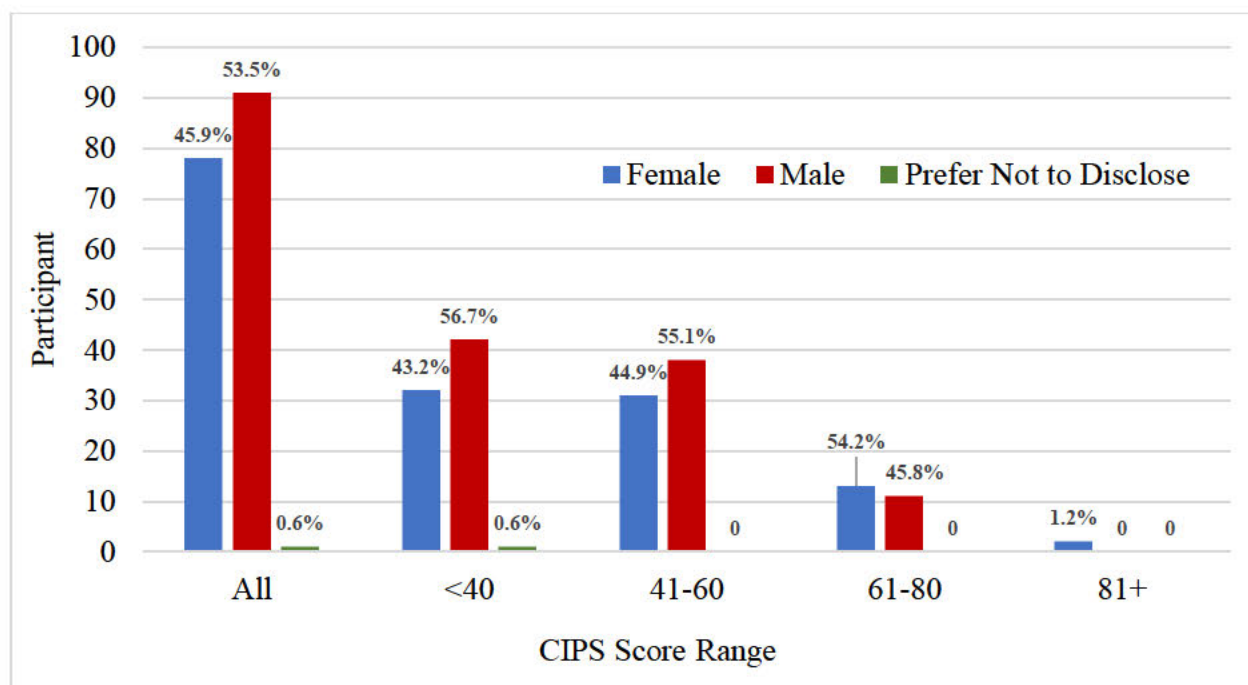
CIPS Score Distribution by Mean Age



Gender Identity

Impostorism was found in 49 (53.8%) participants who identified as a male and 46 (59.1%) participants who identified as female. One participant did not disclose their gender and had a CIPS score less than 40. More male participants (87.9%) reported mild to moderate IP tendencies, while more female participants (19.2%) reported frequent to intense IP scores.

Figure 6 shows the CIPS score range distribution by participant gender.

Figure 6*CIPS Score Distribution by Gender Identity***Race/Ethnicity**

Ninety-three (58.5%) White participants reported CIPS measurements greater than 41. Five CRNAs identified as Black with two (1.6%) of these respondents demonstrating moderate IP feeling with CIPS scores greater than 41. Only two (1.6%) Asian and two (1.6%) Latinx CRNAs participated in the study. Two participants (1.6%) listed Other as their race and/or ethnicity but who did not further specify their identification scored fewer than 40 on the CIPS instrument. Table 4 shows the distribution of CIPS score range by race/ethnicity.

Education

The distribution of CIPS scores according to education level demonstrated that 72 (57.1%) CRNAs with a master's degree reported moderate to intense IP feelings. Nearly 67% of CRNAs with a practice doctorate described moderate to intense IP feelings. Two participants (1.6%) listed Other as their highest education but did not disclose the degree type. Those

individuals scored fewer than 40 on the CIPS instrument. Table 4 contains the distribution of CIPS score range by highest level of education.

Table 4

Distribution of Select Participant Characteristics by CIPS Score Range.

	All	<40	41-60	61-80	81+
	(n = 170)	(n = 75)	(n = 69)	(n = 24)	(n = 2)
<i>Race/Ethnicity:</i>	<i>n (%)</i>				
Asian	2 (1.2%)	2 (2.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Black	5 (2.9%)	3 (4.0%)	2 (2.9%)	0 (0.0%)	0 (0.0%)
Latinx	2 (1.2%)	2 (2.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
White (Non-Hispanic)	159 (93.5%)	66 (88.0%)	67 (97.1%)	24 (100.0%)	2 (100.0%)
Other	2 (1.2%)	2 (2.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
<i>Education Level:</i>	<i>n (%)</i>				
Certificate/ Diploma	3 (1.8%)	2 (2.7%)	0 (0.0%)	1 (4.2%)	0 (0.0%)
Associates Degree	2 (1.2%)	1 (1.3%)	1 (1.4%)	0 (0.0%)	0 (0.0%)
Bachelor's Degree	9 (5.3%)	7 (9.3%)	2 (2.9%)	0 (0.0%)	0 (0.0%)
Master's Degree	126 (74.1%)	54 (72.0%)	51 (73.9%)	19 (79.2%)	2 (100.0%)
Practice Doctorate	27 (15.9%)	9 (12.0%)	15 (21.7%)	3 (12.5%)	0 (0.0%)
Research Doctorate	1 (0.6%)	1 (1.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Other	2 (1.2%)	1 (1.3%)	0 (0.0%)	1 (4.2%)	0 (0.0%)

Note. CIPS = Clance Impostor Phenomenon Scale.

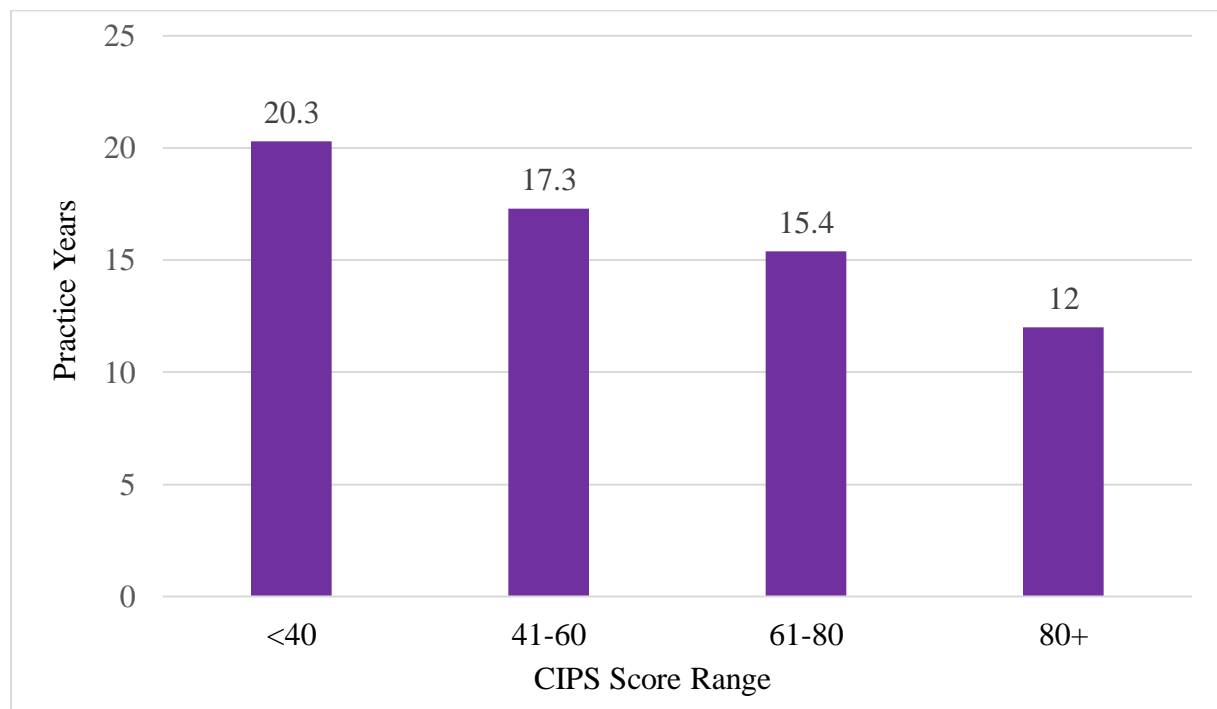
Practice Years

The data showed a decline in CIPS score ranges when plotted against mean practice years. CRNAs with few IP feelings reported they had been in clinical practice for a mean of 20.3

years. Conversely, participants with intense impostorism reported they had practiced for 12 mean years. Figure 7 shows the CIPS score distribution by mean practice years.

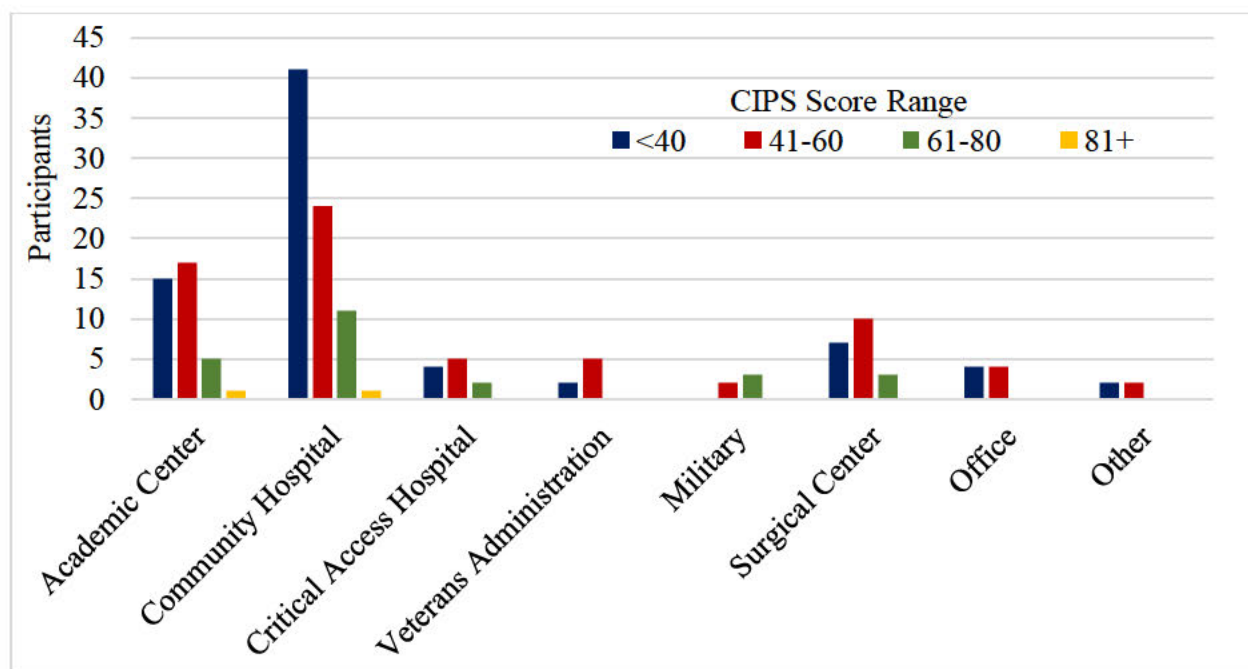
Figure 7

CIPS Score Distribution by Mean Practice Years



Practice Setting

Moderate to severe impostorism was reported by 31 (55.3%) CRNAs who practiced in an ACT model under medical supervision, while 33 (61.1%) CRNAs in independent practice in a group setting also had moderate to severe IP tendencies. In a community hospital setting, 36 (46.8%) CRNAs were positive for moderate to severe impostorism whereas 23 (60.5%) participants in an academic medical center reported the same CIPS score range. Figure 8 shows the CIPS score distribution by primary practice setting.

Figure 8**CIPS Score Distribution by Primary Practice Setting****Anesthesia Delivery Model**

Most participants (55.3%) reported they practiced in an ACT model under medical direction or medical supervision. Nearly half (48.9%) of those who worked in an ACT model had CIPS scores lower than 40 while the remaining participants in the ACT model reported moderate to severe impostorism. Nearly 45% of study participants reported they delivered anesthesia care in an independent setting either in a group (31.8%) or solo (12.9%) practice. Most CRNAs (61.8%) practicing as independent anesthesia providers described moderate to intense IP tendencies. Table 5 shows the distribution of CIPS scores according to anesthesia delivery model.

Clinical Decision-Making

Fifty (58.8%) CRNAs had moderate to severe impostorism also indicated they plan and execute clinical decisions completely independent of physician control or influence. Table 5

provides the distribution of CIPS score range according to independent clinical decision-making (free from physician influence or control).

Table 5

Distribution of Select Practice Characteristics by CIPS Score Range.

	All	<40	41-60	61-80	81+
	(n = 170)	(n = 75)	(n = 69)	(n = 24)	(n = 2)
<i>Anesthesia Model:</i>					
	<i>n (%)</i>				
ACT Medical Direction	38 (22.4%)	21 (28.0%)	12 (17.4%)	5 (20.8%)	0 (0.0%)
ACT Medical Supervision	56 (32.9%)	25 (33.3%)	25 (36.2%)	4 (16.7%)	2 (100.0%)
Independent Group	54 (31.8%)	21 (28.0%)	23 (33.3%)	10 (41.7%)	0 (0.0%)
Independent Solo	22 (12.9%)	8 (10.7%)	9 (13.0%)	5 (20.8%)	0 (0.0%)
<i>Planning & Decision-</i>					
	<i>n (%)</i>				
<i>Making Frequency:</i>					
Not Applicable	1 (0.6%)	1 (1.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Zero Percent	10 (5.9%)	3 (4.0%)	5 (7.2%)	1 (4.2%)	1 (50.0%)
1 to 25%	13 (7.6%)	7 (9.3%)	5 (7.2%)	1 (4.2%)	0 (0.0%)
26 to 50%	10 (5.9%)	4 (5.3%)	3 (4.3%)	3 (12.5%)	0 (0.0%)
51 to 75%	15 (8.8%)	6 (8.0%)	7 (10.1%)	2 (8.3%)	0 (0.0%)
76 to 99%	36 (21.2%)	19 (25.3%)	14 (20.3%)	2 (8.3%)	1 (50.0%)
100%	85 (50.0%)	35 (46.7%)	35 (50.7%)	15 (62.5%)	0 (0.0%)

Note. CIPS = Clance Impostor Phenomenon Scale; ACT = Anesthesia Care Team.

Secondary Aim One

Correlations were explored between CIPS scores and CRNA sociodemographic and practice variables. Statistical significance was determined by p values < .05. Participant

sociodemographic groups with inadequate representation were excluded from the analysis, e.g., gender identity, prefer not to disclose ($n = 1$). CIPS scores were transformed from continuous data into categorical data. Categories were arranged according to the CIPS scoring recommendations established by Clance (1985): CIPS score <40 = few IP feelings; 41-60 = moderate IP feelings; 61-80 = frequent IP feelings; and >80 = intense IP feelings. Intense IP feelings were collapsed into the 61-100 category because of insufficient quantity, i.e., $n = 2$. Independent variables with more than one category were analyzed communally or collapsed into aggregated subcategories with broader CIPS score ranges, or, in practice-related variables, dichotomized as either present or absent, e.g., central line placement frequency: zero percent vs. 1 to 100 percent.

The first analysis compared sociodemographic and practice variables with CIPS scores arranged into three different categories. The groupings were CIPS scores <40 , 41-60, and 61-100. Few variables demonstrated statistical significance despite collapsing the independent variables into broader categories. One exception was race/ethnicity. A Fisher's Exact test was performed on race/ethnicity using five categories, but statistical significance was not found based on aggregated CIPS scores ($p = 0.538$). Statistical significance was noted when race/ethnicity was dichotomized into White, Non-Hispanic compared with Non-White ($p = .044$). CRNA age was analyzed as a continuous variable across the three categories using a One-way ANOVA ($p = .041$). CRNA years of clinical practice also were analyzed as a continuous variable using the Kruskal-Wallis test with a statistically significant finding between the three CIPS categories, ($p = .018$). No additional variables showed statistically significant relationships in the three-category analysis.

The second analysis dichotomized CIPS scores categories as either ≤ 40 or > 40 . Using a Fisher's Exact test, a statistically significant correlation was found between CIPS scores and race/ethnicity (five categories) ($p = .045$). Statistical significance also was found when race/ethnicity was dichotomized into White, Non-Hispanic compared with the four remaining classifications ($p = .012$). An independent t -test of CRNA age as a continuous variable demonstrated statistical significance between CIPS scores ≤ 40 compared to > 40 ($p = .033$). CRNA years of clinical practice were analyzed as a continuous variables using the Wilcoxon Rank Sum. A statistically significant difference was found in CRNAs with few IP feelings compared those CRNAs with moderate to frequent IP tendencies ($p = .012$). Further analyses in the remaining variables did not reveal any additional statistically significant relationships.

A third analysis was performed with CIPS scores dichotomized to ≤ 60 vs. > 60 category. An independent t -test of CRNA age as a continuous variable demonstrated statistical significance between CIPS scores ≤ 60 compared to > 60 ($p = .039$). CRNA years of clinical practice were examined as a continuous variables using the Wilcoxon Rank Sum. A statistically significant difference was found in CRNAs with moderate or few IP feelings compared those CRNAs with frequent to intense IP tendencies ($p = .031$). No additional statistically significant relationships were identified amongst the remaining categories. Table 6 describes the associations between participants characteristics and CIPS score categories.

Table 6

Associations Between Participant Characteristics and CIPS Score (n = 170)

	3 Categories	≤ 40 vs > 40	≤ 60 vs > 60
	p value	p value	p value
Gender Identity (Male/Female) ($n = 169$)	.430	.503	.199

Race/Ethnicity (5 Categories)	.538 ^A	.045^A	>.999 ^A
Race/Ethnicity (Non-Hispanic White/Other)	.044^A	.012^A	.219 ^A
Education Level (7 Categories)	.234 ^A	.179 ^A	.410 ^A
Age (Continuous)	.041^B	.033^C	.039^C
Years of Practice (Continuous)	.018^D	.012^E	.031^E
Anesthesia Model (4 Categories)	.571	.383	.491
Anesthesia Practice Setting (8 Categories)	.265 ^A	.277 ^A	.259 ^A
State Scope of Practice (4 Categories)	.237	.106	.347
Regional Anesthesia Frequency (6 Categories) (<i>n</i> = 142)	.473 ^A	.553 ^A	.303 ^A
Central Line Placements (6 Categories) (<i>n</i> = 139)	.892 ^A	.921 ^A	.721 ^A
PoCUS Frequency (6 categories) (<i>n</i> = 123)	.622 ^A	.757 ^A	.368 ^A
Anesthesia Planning & Decision-Making Frequency (6 Categories) (<i>n</i> = 169)	.841 ^A	.720	.508 ^A
Anesthesia Specialty Practice/Focus (3 Categories) (<i>n</i> = 27)	.360 ^A	.494 ^A	.134 ^A

Note. CIPS = Clance Impostor Phenomenon Scale; PoCUS = Point-of-Care Ultrasound. A.

Fisher's Exact *p* value; B. One-way ANOVA *p* value; C. 2-sample *t*-test *p* value; D. Kruskal-Wallis *p* value; E. Wilcoxon Rank Sum *p* value.

Secondary Aim Two

Multivariate analyses to describe the variance in IP accounted for by select sociodemographic variables, anesthesia practice model, and CRNA practice behaviors were not performed because statistically significant relationships were not found among the CIPS scores and these independent variables.

Conclusion

The prevalence of IP was 55.9% as measured by the CIPS instrument in a sample of 170 CRNAs invited to participate in the study by randomization. Study participants were mostly male (53.5%), White (93.5%) and had a mean age of 51.5 years ($SD = 10.4$). The mean clinical practice years were 18.3 years ($SD = 11.1$). Select study participant characteristics were statistically significantly different from the AANA Membership profile. The mean CIPS score was 44.6 ($SD = 14.4$). After collapsing data into categories, statistically significant relationships identified were among race/ethnicity, age, and years of clinical practice. Multivariate analyses were not performed because of lack statistical power. Therefore, the study did not determine the variance in IP accounted for by select sociodemographic variables, anesthesia practice model, or select CRNA practice behaviors.

Chapter V

Discussion

The purpose of this study was to measure the prevalence and intensity of Impostor Phenomenon (IP) in Certified Registered Nurse Anesthesiologists (CRNAs) using the Clance Impostor Phenomenon Scale (CIPS) instrument. The study endeavored to describe the relationship among select CRNA sociodemographic and practice variables with IP and determine the variance in IP measurements. One hundred seventy CRNAs participated in the study after being recruited through a randomized email invitation administered through the American Association of Nurse Anesthesiology (AANA) Research Survey services. Invited participants accessed the Internet-based survey for 30 days using the REDCap platform (Harris et al., 2009). The study was the first research to measure and describe IP in the nurse anesthesia profession.

Study Sample

Sample Size

The study recruited 188 CRNAs through the AANA Research Survey services. One hundred seventy CRNAs completed the study survey and were included in the final analysis. The response rate was 5.7% and was consistent with the 5-7% response range published by the AANA (2020a). An *a priori* calculation determined 348 CRNAs were needed to achieve statistical significance; however, the study enrolled less than half (48.9%) of the participants required. The AANA Research Survey services limit participant recruitment to 3,000 email invitations, and exemptions to the policy are rarely granted (L. Jordan, personal communication, April 19, 2021). Leeper (2019) reported the email-based survey response rate has been declining in the US for decades due to changes in population demographics, email usage, and over-

extraction of databases. Indeed, the participants in this study were older and may have been more reliant on email as the primary communication vehicle over newer communication tools.

Nonetheless, the study attained a practical sample through the randomized invitation process, which differed from previous research that relied on convenience sampling or less rigorous recruitment methods. The study recruitment efforts adhered to the inclusion and exclusion criteria and aimed for a representative sample of the AANA membership.

Participant Characteristics

Age

The mean age of the study participants was 51.5 years ($SD = 10.4$), a significant difference from the mean age of 30 years in much of the published IP research reported by Bravata et al. (2019). The age difference was likely a recruitment process effect. The current study employed a randomized invitation process to nurse anesthesiologists who were part of a national trade organization where the mean age is 48.1 years (AANA, 2021b). Interestingly, Bravata and colleagues found most IP research relied on convenience sampling of college students or measured IP as a class assignment for an undergraduate psychology course. The current study's participants were also older than other study samples of working professionals. For example, Brauer and Proyer (2017) measured IP in a cohort of 222 working professionals in Germany with a mean age of 36.7 ($SD = 12.4$) years, and Chae et al. (1995) explored IP in 654 Korean men and women with a combined mean age of 34 ($SD = 10.7$) years.

The significantly older sample in the present study may have attenuated the measurements for IP prevalence and CIPS score intensity. Research, however, is mixed on the relationship between age and IP development. Some investigations showed no correlation, while other research demonstrated statistical significance (Bravata et al., 2019). For example, Sonnak

and Towel (2001) found no statistically significant relationship between CIPS scores and age ($r = .136$; $p = .252$). Conversely, Brauer and Proyer (2017) reported a significant negative correlation between age and the German Clance Impostor Phenomenon Scale results ($r = -.34$, $p < .001$) in a cohort of 222 working professionals with a mean age of 36.7 ($SD = 12.4$) years. Brauer and Proyer suggested increased age may confer a protective feature against IP tendencies.

Since the present investigation had an older CRNA sample, the study may not have captured the full extent of IP on a younger person at the beginning of their professional career. Generally, the research suggests younger individuals who are new to a professional role or transitioning to a new job are at-risk for IP. As individuals gain more experience with their roles and responsibilities, IP feelings diminish. While researchers have only measured a mild to moderate effect, age remains an exciting variable for future IP investigations, as it is a potentially more influential factor than earlier research suggests. A longitudinal study might provide better clarity about the long-term relationship between IP and age.

Gender

Most of participating CRNAs (53.5%) identified as male. The gender division was a fascinating development and a finding different from other studies that tended to recruit more female participants. Bravata et al. (2019) noted that most IP research participants were female; although, most of these studies utilized different enrollment methods that favored female enrollees. Furthermore, selection bias may have influenced a participant's decision to join the IP investigation. The study may have recruited more male CRNAs because of a personal interest in impostorism. Additionally, IP recently resurged in the lay and professional literature and might have attracted more male CRNAs who have been exposed to the construct and believed they possessed IP risk factors and predispositions.

Race/Ethnicity

The current study's sample was predominantly White (93.1%). The sample's disproportionately low representation of minorities likely reflects the overall AANA membership, a primarily homogenous population. The underrepresentation of racial and ethnic diversity in the present study was common in other IP investigations that recruited participants from mostly homogenous populations. Bravata et al. (2019) stated that efforts to homogenize IP assessment instruments resulted in fewer minorities participating in IP research, possibly reducing an instrument's validity for a minority population.

Education

Most CRNAs (74.1%) in the study reported they held a master's degree as the highest education level attained, an anticipated finding. From 1998 until 2021, the Council on Accreditation (COA) of Nurse Anesthesia Educational Programs (2021) required nurse anesthesia programs to confer a graduate degree for entry-to-practice. In January 2022, all nurse anesthesia curricula transitioned to a practice doctorate as the minimum entry-to-practice degree, a movement initiated in 2004, and an accreditation standard commenced in 2014 (COA, 2021). In the present study, 27 (15.9%) CRNAs indicated they had earned a practice doctorate. CRNAs with certificates, diplomas, associate degrees, and bachelor's degrees represent a crucial but declining CRNA workforce.

While previous research examined IP tendencies between students and professionals, no study has examined the effects of degree status on IP development. More research is needed to determine if a relationship exists between higher education and impostorism. This could be difficult to fully explore in nurses who follow a nonlinear pathway in advanced education. Unlike physicians who earn a medical doctorate as an entry-to-practice requirement, professional

nurses begin their clinical practice immediately following undergraduate degree conferral. Nurses may continue to advance their education while contemporaneously engaging in clinical activities, sometimes completing their doctoral education after 20 or 30 years of clinical practice. The current study sample did not differentiate when a CRNA obtained their practice doctorate. Some CRNAs may have returned to school years after completing their nurse anesthesia training, while other CRNAs received their doctorate as an entry-to-practice requirement. The added clinical practice coupled with the advanced education may have influenced IP measurements in unanticipated ways. It may be difficult to discern if time, professional experience, or higher education significantly affected IP development.

Practice

The CRNA participants documented 18.3 ($SD = 11.1$) mean practice years. More than half (55.3%) of the participants reported their primary anesthesia practice model complied with Medicare Direction (22.4%) or Medicare Supervision (32.9%) billing models (Centers for Medicare & Medicaid, 2020). Interestingly, the study participants indicated their practices followed a Medicare Supervision model rate nearly 60 times the rate reported in the literature. Quraishi et al. (2017) found the medical supervision billing model for anesthesia services was between 0.4 and 0.6% over 15 years. Additionally, the researchers found Medicare Medical Direction was 22.3% to 23.7% for the QK billing modifier (medical direction of two to four concurrent anesthesia procedures involving qualified anesthesia providers) and 29.5% to 31.7% for the QY billing modifier (one physician anesthesiologist medically directing one CRNA). Quraishi et al.'s findings align with a cumulative 55.3% of participants who indicated they practiced under a Medicare Medical Direction or Medicare Medical Supervision billing model. Study participants may have conflated the operational definition of medical supervision with

their state's description of medical supervision. In other words, most study participants practice under a Medicare Medical Direction billing model but erroneously listed Medicare Medical Supervision as the billing structure.

Primary Anesthesia Practice Setting

Most CRNAs (45.3%) indicated they delivered care in a community hospital, while 22.4% of CRNAs stated they worked in an academic medical center. This was a crucial study sample component because academic medical centers and some community hospitals are more likely to offer advanced technological care or recommend innovative therapies than an ambulatory surgical center or critical access hospital (Sticca et al., 2020). Furthermore, large health care systems are more likely to have robust peer review processes, while smaller ones tend to have more limited resources (Richmond & Welsh, 2021). Professions with a peer review process might contribute to IP development, especially in susceptible populations, or exacerbate underlying symptoms. The peer-review process can be competitive and expose an individual to evaluation by colleagues, which could stimulate IP tendencies in a susceptible individual. The remaining practice settings reported by the sample were essential for the analysis as they represented locations where CRNAs were more likely to engage in independent practice and experience greater autonomy in their clinical decision-making.

Comparison with AANA Membership

This study's participant characteristics differed significantly from the CRNA population described by the AANA Membership Survey (AANA, 2021b). Mean age, gender, race/ethnicity, and practice years were compared with the most recent membership profile data. Other sociodemographic and practice variables differences might exist but were not available for comparison. The statistically significant differences suggest the study sample was not

representative of the general AANA membership despite randomization as a participant recruitment maneuver. Bravata et al. (2019) found selection bias contaminated most IP study samples. Indeed, selection bias could have considerably influenced this study's enrollment process and negated the randomization efforts to generate a representative sample. Consequently, the IP directionality remains unknown between the study participants and AANA membership. Still, IP measurements were likely tempered as the variables mentioned above are known to moderate IP development, as reported by Bravata and colleagues.

Primary Aim

Prevalence

The study's primary aim was to measure the prevalence and intensity of IP in CRNAs. The prevalence of IP in the sample was 55.9%, a notable but anticipated finding that fell within the prevalence range reported by Bravata et al. (2019). The same investigators mentioned IP prevalence rates had been reported as high as 82% depending on the population measured. This study was the first investigation to quantify IP in nurse anesthesiologists and one of the few studies to describe IP among advanced practice nurses. Research on IP in nurses is limited but showed a high prevalence. For example, Ares (2018) discovered IP was present in 74.6% of nurses employed as clinical nurse specialists. Haney et al. (2018) reported that all nurses studying as clinical nurse specialists, family nurse practitioners, or Doctor of Nursing Practice (advanced practice focus) had moderate to intense IP feelings, as measured by the CIPS instrument. Interestingly, Bravata et al. proposed that publication bias likely intensified IP prevalence data.

In comparison, studies on physician cohorts showed less IP prevalence. Thomas and Bigatti (2020) found that IP frequency ranged from 22.5% to 46.6% in physician studies. The

variance remains unstudied between the two complementary health care professions but symbolizes an interesting social dynamic that the historical gender composition might explain in each discipline. The difference illustrates the societal values assigned to physicians and nurses.

While an elevated study prevalence rate was anticipated, the results might have underestimated the effect size because of the nonrepresentative sample. The CRNAs in the present study were older, primarily identified as White, reported more years of clinical practice, and were disproportionately male compared to the AANA membership. As previously stated, age, gender, and being an experienced professional might attenuate impostorism measurements. The present study might have detected a higher IP prevalence had the sample been more typical and included younger participants, more CRNAs who identified as people of color or had CRNAs with fewer clinical practice years.

The effect of gender on the overall prevalence rate is less specific as the data conflict on whether gender influences IP prevalence. Bravata et al. (2019) found that most studies showed no difference in IP prevalence between male and female participants; however, several investigations discovered a higher impostorism rate in women. The IP construct is nearly 50 years old, and its evolution might have attracted more men who previously believed they were unsusceptible to IP feelings. Historically, most IP research involved female participants, although those studies often employed convenience sampling.

Furthermore, Clance and Imes (1978) initially hypothesized that IP was exclusively a female gender phenomenon, which led to a national discussion on IP in women in the 1980s. Clance's 1985 book on IP contributed to the debate on IP in women, and multiple articles appeared in magazines primarily marketed to women. However, the IP construct has evolved.

Since Clance & Imes first described IP, more than 300 studies have been conducted, with more than half of all studies published within the last decade (Bravata et al., 2019; Mak et al., 2019).

It is unknown why more male CRNAs participated in the present study. Men represent 46% of all practicing CRNAs (AANA, 2021b) compared to 11% in the general nursing population (ANA, 2014). Male CRNAs might have participated in the research because IP has reemerged as a multidimensional construct with equivalent prevalence according to gender. The resurgence of IP in the mainstream and professional literature has forced a new dialogue about IP's constraining effects on professional advancement. Impostorism messaging may resonate in men who are attentive to the IP dialogue. In addition, some male CRNAs might have been concerned about impostorism in themselves and participated in the study to help clarify their IP feelings.

IP Intensity

The present study followed the CIPS instrument's diagnostic parameters defined by Clance (1985, Chapter 2) to establish IP presence and intensity for the current study. The mean CIPS score in the CRNA sample was 44.6 ($SD = 14.4$), which was lower than the mean CIPS scores reported by Ares (2018) and Haney et al. (2018). In the present study, CIPS measurements ranged from 20 to 93. Seventy-five (44.1%) individuals indicated few IP feelings with scores less than 40 on the CIPS instrument. In comparison, ninety-three (54.5%) participants scored between 41 and 80 on the CIPS, revealing moderate to frequent IP inclinations. Two (1.2%) respondents had CIPS measurements of higher than 81 representing intense IP feelings. Some earlier researchers deviated from Clance's diagnostic parameters and, in doing so, may have misestimated the IP effect size in their studied population. For example, Homes and colleagues

(1993) designated a CIPS score of 62 or greater to signify clinically relevant IP but based the parameter on limited data.

Similar to prevalence, the sample composite may have influenced IP intensity scores, and the older and professionally matured CRNAs could have artificially suppressed CIPS scores. A sample composed of younger and less experienced CRNAs might have had more intense and frequent IP feelings. The mean CIPS score in the present study ($M = 44.6$; $SD = 14.4$) differed from the mean CIPS scores reported in other advanced practice nurses. Ares (2018) found the mean CIPS score was 52.5 ($SD = 12.0$) in employed clinical nurse specialists. Haney and colleagues (2018) reported the mean CIPS score in family nurse practitioner students was 61.0 ($SD = 14.2$). It is unclear why CRNAs had a lower mean CIPS score than other advanced practice nurse specialties. CRNAs and physician anesthesiologists have indistinguishable roles and identical standards of care. Physician anesthesiologists and CRNAs may have similar IP measurements because of similarities in their education, training, and clinical practice paradigms. However, there are no data on IP in physician anesthesiologists.

Finally, the gender imbalance in the CRNA sample may have suppressed IP intensity measurements. While IP prevalence is unaffected by gender, women may have more intense IP feelings than men. Oriel et al. (2004) reported female family practice residents had significantly higher mean CIPS scores compared to male family practice residents ($M = 54.3$ [men] v. 58.5 [female]; $p = .03$). Henning et al. (1998) also found statistically significant higher mean CIPS scores in female health care students compared to males ($M = 52.1$ [men] vs. 57.8 [female]; $p < .001$). Greater IP intensity might be present in the nurse anesthesiologist population, but its significance remains unclear. Importantly, no research has quantified the clinical significance of higher CIPS scores in the context of health care delivery based on gender.

Secondary Aims

Secondary Aim 1

Secondary aim one attempted to determine the relationship between CIPS scores and select sociodemographic and practice variables. The CIPS scores were analyzed for statistical significance using three of the four categories established by Clance (1985), with values greater than 40 signifying moderate IP. Of the 13 independent variables examined, only race/ethnicity, CRNA age, and practice years as a CRNA had statistical significance. The alternate hypothesis anticipated significant relationships between the CIPS scores and certain CRNA practice behaviors. The hypothesis projected an inverse relationship; as CIPS scores intensified, fewer CRNAs would utilize advanced clinical skills, make autonomous, or engage in independent practice.

While the sample did not represent the AANA membership, the investigation revealed a substantial IP prevalence across all practice locations. The IP pervasiveness could have neutralized the differences in practice behaviors between the ACT model and independent practice. It is also plausible that health care organizations are slow to implement new therapies and technologies. A sluggish adoption by the facility could mask any IP effects on the queried variables.

Another consideration is the selected variables for this study may not embody the dimensions affected by clinician impostorism. Clance and Imes (1978) defined IP as self-perceived intellectual phoniness frequently experienced by high achieving individuals working in peer-reviewed professions. The definition was based on 150 professional women who participated in psychotherapy sessions with the researchers. The consequences of IP include, in part, professional paralysis and avoidance behaviors. Eventually, IP evolved into a

multidimensional construct with a wide-ranging application to individuals, professional fulfillment, and career optimization. Researchers demonstrated avoidance behavior was common in individuals with IP; however, avoidance behaviors have not been studied in nurse anesthesia practice. Impostorism may not affect whether a CRNA pursues independent practice or adopts novel and advanced technologies into their anesthesia practice. Impostorism could present in other professional aspects of anesthesia practice, such as a reluctance to pursue leadership opportunities or non-clinical activities such as committee participation. On an individual level, IP in the CRNA may be a persistent threat to personal wellbeing and manifest as depression, trait anxiety, or burnout.

Race & Ethnicity

A statistically significant relationship was found between IP intensity and the five-race and ethnicity categories when CIPS scores were dichotomized into <40 vs. ≥ 41 ($p = .045$). No relationship was found when greater intensity was considered, i.e., CIPS scores <60 vs. ≥ 61 ($p = 0.999$) or when CIPS scores were arranged into three intensity categories. Statistical significance also was noted when race/ethnicity was organized into White vs. non-White groups across the three categories of IP intensity ($p = .044$) and when CIPS scores were dichotomized into <40 vs. ≥ 41 ($p = .012$). Although the primarily homogenous study sample limits these findings, the significant relationships are consistent with conclusions reported by Bravata et al. (2019). The present study's findings raise several questions about the legitimacy of quantifying IP in the context of race and ethnicity using the CIPS instrument. Bravata et al. (2020) expressed concerns about the validity of the CIPS instrument to detect meaningful IP in ethnic populations as instrument validation was performed using small numbers of underrepresented minorities.

Furthermore, the CIPS instrument may not adequately stratify IP intensity based on race or ethnicity.

The current study did not differentiate whether a person's race or ethnic identity drives IP or whether impostorism exacerbates perceptions of racism and the associated struggles non-White CRNAs encounter as they attempt to navigate themselves through a racially biased system. Further research is needed to elucidate the cultural significance of IP in CRNAs who identify as a racial or ethnic minority. Stone et al. (2018) used thematic contextualism to analyze the IP construct in Black graduate students. The researchers discovered five themes related to impostorism in Black graduate students: awareness of low racial representation, questioning intelligence, expectations, psychosocial costs, and explaining success externally. Stone et al.'s themes may pertain to CRNAs who identify as an underrepresented minority. An alternate approach might consist of analyzing IP measurements using a culturally adjusted lens to illuminate feelings of distinctiveness, racial isolation, and performance expectations established by non-minority CRNAs. This alternate approach is an important consideration as the AANA, and nurse anesthesia residency programs address diversification in the nurse anesthesia profession.

Age

A statistically significant relationship was found between CRNA age and CIPS score intensity. In the study sample, older CRNAs had fewer IP feelings than younger CRNAs who were more likely to have intense impostorism. Indeed, the study showed an inverse relationship between age and IP intensity in all CIPS score categories (few to frequent/intense). Brauer and Proyer (2017) explored the relationship between IP and age in working professionals and college psychology students. Their investigation discovered a negative correlation between IP

measurements and age in the professional working cohort but not the students ($r = -.34, p < .001$), a result that suggests increased age diminishes IP tendencies. It is unknown how age reduces IP tendencies or if another factor associated with age attenuates IP feelings, for example, improved self-efficacy.

The mean age of the participants in the current study was 51.5 years ($SD = 10.4$), which was older than the mean age of 30 in most of the studies reviewed by Bravata et al. (2019). This was an exciting and potentially influential discovery. Suppose the present study's sample had been younger. In that case, the study might have documented higher CIPS scores and revealed more intense IP and significant relationships with other study independent variables. The change to a younger CRNA demographic coupled with higher CIPS scores would align better with the IP measurements reported by Ares (2018) and Haney et al. (2018).

Practice Years

CRNA practice years ($M = 18.3; SD = 11.1$) showed a significant relationship with CIPS score intensity across all IP categories (few to frequent/intense impostorism). CRNAs with the most practice years had fewer IP tendencies than CRNAs with fewer years of anesthesia practice, who revealed more intense CIPS scores. Like age, a protective quality against IP development appears to emerge the longer a CRNA engages in professional practice. It is unknown if more practice years confers a protective quality or if another, unmeasured element mitigates impostorism.

The mean practice years was 15.3 for CRNAs who reported frequent impostorism (CIPS scores 61 to 80) and 12 years for CRNAs with intense CIPS scores, i.e., >80. CRNAs who recently completed their nurse anesthesia training may have intense impostorism, but this study did not attain their participation. Similar to the effects of age on IP, the novice CRNA may suffer

from IP and avoid career optimization or other practice dimensions. Later in their career, these CRNAs may pursue professional advancement and the clinical opportunities they previously shunned. This proposition is consistent with research by Clance and O'Toole (1987), who noted that IP sufferers had reduced professional ambition and declined career advancement opportunities when IP feelings were intense. Furthermore, it extends the research by Aubeeluck et al. (2016) and Christensen et al. (2016), who discovered that nursing students with IP tendencies often experienced self-doubt, and avoidance behaviors, which could destabilize a nurse graduate's preparedness to practice.

Ultimately, the effects of IP on CRNAs following completion of training remain unknown but are worth exploring to optimize the anesthesiology workforce at the intersection of graduation and professional practice. The AANA (2021b) reports their membership has grown by 34.1% in the last ten years, and the association's growth has principally occurred from the student and new graduate CRNA enrollment. Importantly, CRNAs who identify and manage their IP feelings earlier in their profession may experience a more fulfilling and satisfying career. Professional satisfaction could benefit patients and health care organizations through value augmentation and a reduced cost of anesthesia services.

Secondary Aim 2

The study could not describe the variance in IP accounted for by select sociodemographic variables, anesthesia practice model, and CRNA practice behaviors because significant bivariate statistical relationships were not found between the CIPS scores and the independent variables. Although this study did not find evidence to substantiate a relationship, it does not mean one does not exist. Notwithstanding this study's limitations, it is essential to consider IP as an evolving, multidimensional construct that affects CRNAs and their practice differently, notably

in dimensions not captured by the present study. Indeed, Mak et al. (2019) found extensive variability on IP as a developing construct limited by concept precision involving phenomenon measurements and application across different populations and settings.

Theoretical Underpinning

Pender's Health Promotion Model (HPM) (Murdaugh et al., 2018) was used for the theoretical underpinning in this study. The middle range considers health a positive dynamic state and individuals as complex biopsychosocial beings who interact with the environment. Individuals transform themselves and their surroundings over time based on their interactions with the environment. Murdaugh et al. (2018) illustrated the HPM with three connected foci that align with the IP antecedents described by Clance (1985). The three areas are (1) individual characteristics and experiences, (2) behavior-specific cognitions and affect, and (3) behavioral outcomes. Nurses encompass the social-interactive setting to influence individual health across the life span through knowledge transfer, individual motivation, and behavior modification from nursing activities.

Conceptual Framework

The study used Pender's HPM (Murdaugh et al., 2018) to construct a conceptual framework. The HPM appeared to have a contextual fit in the setting of IP in CRNAs. The framework proposed that *individual* biopsychosocial factors contribute to IP feelings when influenced by certain practice behaviors, the anesthesia practice model, or the clinical setting. Under certain practice conditions, IP might deteriorate into psychological distress, threaten wellbeing, or impede professional fulfillment as a nurse anesthetist. Conversely, the framework proposed CRNAs who were confident in their clinical judgment, practiced in an

independent setting, and regularly incorporated novel and advanced clinical skills into their practice would have few IP tendencies.

Interestingly, the study did not find a significant relationship between IP measurements and CRNA practice behaviors or the anesthesia practice model. The research recorded moderate to intense IP feelings across all practice locations and anesthesia delivery models. Moreover, the investigations did not discover any significant relationship between IP and advanced clinical skills. These findings suggest impostorism in CRNAs could be more associated with antecedents not measured by the study instruments.

Consistent with Clance's (1985) propositions on impostorism antecedents, CRNAs might be exposed to IP risk factors during childhood and remain at-risk for IP development and its consequences throughout their professional careers. Equally important, other precursors may increase the risk of IP. Sakulu and Alexander (2011) noted perfectionism and neuroticism contribute to IP, while Clance and Imes (1978) found that maladaptive perfectionism was common in high-achieving women with impostor feelings

Impostorism may persist across professional practice environments because these settings tend to be achievement-oriented and competitive. Clance and Imes (1978) found IP tendencies were common in high achieving women with professional careers, including academia, medicine, law, and nursing. Physician anesthesiologists and CRNAs are part of a peer-reviewed profession with the same standards of care and identical professional responsibilities. A competitive rivalry sometimes emerges and might be exacerbated by political and social tensions propagated by operational transitions in the health care system that result in organizational control and design changes. These tensions could foster IP development through construct advancement and harmful narratives intended to devalue the CRNA's role in health care. While

the present study did not capture this element, negative social messaging could be an influential and ubiquitous antecedent to IP development, potentially worsened by context and practice setting. Indeed, Bernard et al. (2018), Clance and Imes (1978), Clance and O'Toole (1987), and Cokley et al. (2017) proposed that communal hierarchies and the stressors frequently associated with the lower societal positions shape and promote IP at the individual level. While the conceptual framework included cultural influences, the model incorporated social constructs into the biopsychosocial domain and reduced its impact as a standalone antecedent. Instead, the geopolitical-driven social construct that promotes physician dominance over nurses should be analyzed as a distinct antecedent in a future conceptual framework applied in the context of advanced practice nurses and IP development.

Implications

This study's findings have implications for CRNA practice, wellness, health policy, and future research. In the current study, the prevalence of IP was 55.9% and suggests IP in CRNAs is a pervasive issue and might be more prevalent if the construct was measured using a younger and more diverse sample. A higher prevalence would support an urgent matter requiring a prompt response by CRNAs, organizational leaders, educators, and industry stakeholders.

Practice

Nurse anesthesiologists with impostorism may not optimize their clinical practice or achieve career actualization. Their perceived value in health care may be negatively affected by IP as they continue to operate on the periphery of anesthesia care, specifically departmental and organizational leadership roles. While their clinical care remains competent and safe, it is unknown if CRNAs with intense IP bring forward new ideas and practice techniques to enrich clinical outcomes. Also, patient care is not optimal because the CRNA with intense IP might

avoid challenging situations and does not operationalize all their skills and knowledge to enhance the patient outcome.

It is difficult to capture all the influences IP may have on a clinician's practice. The findings from this study do not indicate how clinically relevant IP feelings are in the context of nurse anesthesia practice or between CRNA sociodemographic variables. It is possible that IP doesn't affect nurse anesthesia using the practice variables included in this investigation. Different practice variables should be explored to determine a significant relationship with IP. For example, CRNAs with IP may prefer a specific anesthesia practice model over another.

Professional trade organizations may benefit from introducing their membership to IP and career-related effects. In addition to supporting periodic measurements and evidence-based research journal articles, national and state trade organizations can facilitate podium presentations on IP in CRNAs to promote awareness and disseminate management strategies. The research division of the trade organization could sponsor investigations on IP, its multidimensionality in the context of nurse anesthesia practice, and correlate study findings with other wellness or policy issues the organization is interested in developing.

Employers might offer IP management workshops to address IP in their health care workforce and facilitate a smooth transition into professional practice. An IP workshop might reduce the erosion of advanced clinical skills and clinical decision-making sometimes experienced by some nurse anesthesiologists after they complete their residency. Interprofessional IP workshops for health care providers have been shown to improve impostorism awareness and, anecdotally, alleviate some IP consequences. Haney et al. (2018) designed an interprofessional workshop on IP for advanced practice nurses, pharmacists, and medical students. In the one-day seminar, Haney and colleagues measured IP and discussed

strategies to mitigate IP's adverse career effects. Finally, educators and employers could collaborate to investigate IP progression from training to professional practice longitudinally.

Wellness

Previous research has established a correlation between IP and threats to wellbeing (Chrisman et al., 1995; Cozzarelli & Major, 1990; Henning et al., 1998; Sonnak & Towell, 2001); however, IP and wellness have not been formally studied in the CRNA population. Nurse anesthiologists are at-risk for burnout, depression, trait anxiety, and other wellness elements, all of which can be exacerbated by unmanaged IP. For example, Del Grosso and Boyd (2019) explored burnout in CRNAs and found the condition to be a longstanding problem and an important indicator of wellness. It is possible IP contributes to burnout in CRNAs. A conversation about IP and wellness in the CRNA community is needed and can be led by the AANA or training programs. Also, seminars developed to promote wellness in CRNAs should include a discussion on identifying IP and effective management options. Haney et al. (2018) hosted a workshop for advanced practice providers on IP management and reported some attendees used the treatment efforts to improve their IP. The workshop model could be adapted to a wellness seminar with similar learning and wellness outcomes.

Education

Nurse anesthesia educators have an essential role in identifying IP in their students and discussing the career effects and management options. From this research, nurse educators can facilitate IP discussions during undergraduate and advanced practice training. Measuring IP using the CIPS instrument during nurse anesthesia training is an essential first step in understanding the extent and potential effects of IP on a prospective nurse or CRNA entering a conceivably long professional advanced practice nursing career. Identifying at-risk individuals

and introducing effective IP management options into curricula may mitigate the negative consequences of untreated impostorism. Educators can create supportive learning environments that foster professional development, promote self-efficacy, and better career transitions.

Research

New research should explore the IP dimensionality and duration in CRNAs. It is unclear if the current study captured the different ways IP can present in CRNAs, and it is also unknown how clinically relevant impostorism is in nurse anesthesia practice. Future studies should consider how IP manifests in nurse anesthesiologists and how those manifestations influence clinical practice and patient care. Equally important, research should explore how CRNAs cope with their impostorism. A qualitative design could explore the lived experiences of CRNAs with IP and their self-management and environmental adaptiveness.

A longitudinal correlation design could be used to determine if IP feelings remain stable or change over time. CRNAs with frequent to intense CIPS scores may alter their practice or avoid spotlight activities such as pursuing leadership or representing the department on organizational-sponsored projects.

Conversely, time may mitigate IP tendencies allowing CRNAs to pursue leadership and role optimization. The AANA should consider adding the CIPS instrument as an optional assessment to their annual membership survey. A more substantial response rate and a more heterogeneous sample would produce more generalizable results. The COA should also sponsor research to explore IP in nurse anesthesia residents and training programs. Educational programs could use the findings to facilitate a smoother transition from training to professional practice. Finally, future investigations should implement innovative communication and novel recruitment efforts that encourage younger CRNAs to participate in professional research.

Policy

New policies can compel transformation in health care. The nurse anesthesiologist will have expanded clinical responsibilities as health care organizations transition away from expensive ACT models to more cost-effective anesthesia delivery systems, e.g., CRNA-only practice. Increasingly, CRNAs will participate in these independent practice models. While CRNAs with IP must develop effective coping strategies to become fully engaged in the new practice setting, stakeholders and organizational leaders must promote safe environments that discourage IP development, e.g., negative messaging about CRNA care. Health care systems should implement inclusive policies that optimize the CRNA role and retire dated policy and ideology that promote physician hegemony. Efforts should address the organizational and societal barriers that prevent CRNAs from achieving complete role optimization and value in health care.

A transformative reorganization could persuade more CRNAs to pursue an independent practice opportunity, adopt innovative practice behaviors, or utilize advanced clinical skills. States should modernize their nurse practice acts to allow CRNAs FPA. This convention will enable the nurse anesthesiologist to function to the top of their education and training and facilitate professional fulfillment and gratification. Value acknowledgment might attenuate IP feelings. Organizational stakeholders can harness the IP-liberated CRNA through new leadership appointments. The ultimate benefit is for stakeholders to recognize and decisively value nurse anesthesiologists as essential health care professionals, leaders, and industry experts.

Limitations

The study had several limitations that should be considered before generalizing the results to all CRNAs. The first limitation was the research design, which used a cross-sectional,

correlational approach. While the study employed a randomized recruitment process, a randomized control trial, the gold standard in research, was not feasible. According to Bravata et al. (2019), no IP study has used a randomized control trial to explore impostorism. Additionally, this study was likely affected by selection bias despite using randomized participant invitations. CRNA participants may have been exposed to impostorism through professional training or the recent resurgence in the lay literature. A previous introduction to IP may have interested CRNAs who identified with the construct but were not formally diagnosed or had their IP tendencies measured. The selection bias may have artificially elevated the IP prevalence and intensity in the study

The second limitation was the study was underpowered. An *a priori* calculation using an estimated effect size of 35% indicated 348 participants were needed. The study enrolled 188 participants, but only 170 CRNAs submitted completed responses. The study achieved 49% of the sample size required, although the response rate was consistent with the AANA Research Survey services. The research team could have considered other enrollment methods and communication tools to recruit a more diverse and representative sample. Nonetheless, the 170 participants did provide rich, useable data.

Third, the study sample was not representative of the CRNA population, limiting generalizability. The sample was significantly different from the 2021 AANA membership composite in four essential areas. The first area was gender. Interestingly, the study recruited more male participants than females. It is unknown why more male CRNAs completed the surveys, but the gender differential may have affected the IP measurements. Although Bravata et al. (2019) found no significant difference in IP prevalence between male and female subjects across multiple studies, the research is unclear if the IP risk and intensity is the same for men and

women or another gender identification category. More male participants may have reduced the mean CIPS score and affected the correlation analysis. The second area of difference was age. The mean age in the study was 50.5 years, while the mean age of a CRNA was 48.1 years (AANA, 2021b). Although the data are limited, most IP research shows a decline in IP tendencies as individuals age. According to Bravata et al., the mean age in the IP research was 30. It was a surprise that the prevalence of IP in the sample was just under 56%, given the older age of the participants. The finding suggests that IP may have a lasting effect on CRNAs and their practice. Furthermore, a more significant IP prevalence may have been found had the mean participant age been younger. Like age, the study participants were practicing anesthesia significantly more years than the membership data reported. The longer clinical practice years may have attenuated an IP measurement.

Finally, it is unknown if all the independent practice variables reflect an accurate dimension of IP in CRNAs. The IP definition has evolved since Clance and Imes (1978) coined the phenomenon. The construct is now recognized as multidimensional, and impostorism may present differently in different professions. It remains unclear how IP manifests in all clinicians, especially CRNAs who utilize critical thinking and perform advanced clinical tasks on nearly all patients under their care. Future approaches to studying IP in CRNA should include clinical and non-clinical dimensions of the profession, such as pursuing leadership, policy creation, and department research activities.

Research Summary

The IP construct has been described as self-perceived intellectual phoniness frequently experienced by high-achieving individuals in competitive settings despite clear evidence of the individual's merit. While IP has been researched for nearly 50 years across different populations

and contexts, a broadly accepted clinical definition with firm diagnostic criteria remains elusive. Most of the research on IP has employed observational methods, has limited generalizability, or potentially contains selection or publication biases. No research-based treatments have been formally studied. More recently, the construct has been viewed as multidimensional and evolving, making static diagnostic parameters challenging.

Interestingly, psychology researchers are reconsidering social context as an influential IP antecedent, a thought that could shape how IP is perceived in specific populations or professions. This could be an interesting development for CRNAs who may develop IP due to negative messaging they receive from other non-CRNA anesthesia providers. Additional research opportunities center on IP's personal and professional consequences, including psychological distress, professional paralysis, and career non-advancement.

Before this research study, the CRNA profession had not been adequately studied concerning IP, and, consequently, little was known about the professional effects IP has on nurse anesthesiologists. As advanced practice nurses working in dynamic, high-performance settings, CRNAs are at-risk for IP. The career-related effects on CRNAs could be far-reaching and contribute to job burnout, career apathy, and professional stagnation. Undiagnosed and non-managed IP might threaten nursing's professional growth and advancement, especially when the US Health Care System is becoming more reliant on advanced practice providers to deliver care that previously fell under the physician domain. Nurse anesthesiologists may feel devalued in employment settings where physician anesthesiologists peer-review their performance.

It is unknown how IP in CRNAs affects patient care or clinical outcomes; this question needs to be studied to determine if IP has persuasive implications in the care delivered by nurse anesthesiologists. Additional IP research in CRNAs and the associated consequences may

provide a deeper understanding of the career effects in CRNAs. New practice variables encompassing clinical and non-clinical nurse anesthesia practice should be pursued using a more representative sample of CRNAs. Finally, new study findings may encourage practice equity for CRNAs through a more balanced relationship with physician anesthesiologists and an improved work culture that fosters respect and clinical opportunities.

Final Conclusion

This study showed an IP prevalence of 55.9% in a random sample of 170 CRNAs members of a national trade organization. Race/ethnicity, CRNA age, and years of practice as a CRNA demonstrated statistically significant relationships with IP intensity. Impostorism was pervasive across all practice settings and anesthesia practice models, although the research did not find significant relationships between IP and other select sociodemographic and practice variables. The study sample was nonrepresentational of the AANA membership, making it difficult to generalize the results. Nonetheless, IP as an evolving, multidimensional construct may manifest differently in CRNAs and affect CRNA practice in unknown ways. Future research should explore the different dimensions of IP in CRNAs by including clinical and non-clinical practice variables for consideration within a robust, diverse participant sample. Identifying IP and promoting effective management may optimize the CRNA's role and value in health care.

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Appendix A

Operational Definitions

Keyword or Phrase	Operational Definitions
Advanced Clinical Skills	CRNA clinical skills are defined by the Scope of Nurse Anesthesia Practice (AANA, 2020). For the purpose of this study, advanced clinical skills will include CRNAs inserting central venous catheters, performing ultrasound-guided regional anesthesia, and using point-of-care ultrasound to evaluate patients
Anesthesia Care Team	Anesthesia care and services led by a physician anesthesiologist who directs or supervises the care of qualified anesthesia personnel and meets the <i>ASA Guidelines for the Ethical Practice of Anesthesiology</i> (2018).
Autonomy	The CRNA's use of their experience, clinical judgment, and responsibility to practice without unnecessary restriction imposed by an institution or clinician (Peacock & Hernandez, 2020).
Certified Registered Nurse Anesthesiologist	A board-certified APRN who practices both autonomously and in collaboration with a variety of health providers on an interprofessional team to deliver high-quality, holistic, evidence-based anesthesia and pain care services. The CRNA cares for patients at all acuity levels across the lifespan in various settings


	for procedures including, but not limited to, surgical, obstetrical, diagnostic, therapeutic, and pain management (AANA, 2019).
Clinical Decision-Making	Clinical decision making in advanced practice nursing is a dynamic, intricate process defined as a sequence of judgements and analyses based on practitioner knowledge, experience and subjective and objective data specific to a clinical context and the evaluation of that data to implement actions to attain a desired outcome (Johansen & O'Brien, 2016).
Full Practice Authority	The ability of the nurse anesthesiologist to practice to the complete extent of their education, skills, and competencies (AANA & COA, 2020).
Impostor Phenomenon	Impostor Phenomenon is a subjective, inaccurate self-assessment involving feelings of intellectual and professional incompetence and fraudulence despite external evidence of success (Barrow, 2018; Clance, 1985).
Independent Practice	An independent CRNA who provides anesthesia services without reliance on or control by another anesthesia provider. (AANA & COA, 2020).
Medical Direction	A Medicare payment rule for physicians who medically-direct qualified anesthesia personnel in a ratio not to exceed four concurrent anesthesia cases while complying with the seven physician activities required for each case as defined in the Tax Equity and Fiscal Responsibility Act (TEFRA) 1982 (Centers

	for Medicare & Medicaid, 2020). Under this model, physician anesthesiologists may claim 50% payment for each anesthesia case they medically direct, up to the maximum of four concurrent cases.
Medical Supervision	A Medicare payment rule for physicians who medically supervise qualified anesthesia personnel in a ratio that exceeds four concurrent anesthesia cases (Centers for Medicare & Medicaid, 2020). The medical supervision model offers physicians less remuneration.
Physician Anesthesiologist	A physician educated and licensed to practice medicine and anesthesia in the United States. The physician may or may not be board-certified in anesthesiology (AANA, 2019).
Specialty Anesthesia Practice	Specialty anesthesia practice means the consistent delivery of anesthesia services to one of the following patient populations: <ol style="list-style-type: none"> 1. Cardiac - patients requiring cardiac or open-heart procedures; 2. Pediatric - patients who are less than 18 years of age and require anesthesia service; and 3. Pain management - patients requiring pain management services for any condition classified as chronic pain.

Appendix B

Clance Impostor Phenomenon Scale

1	I had often succeeded in a test or task even though I was afraid that I would not do well before I undertook the task.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
2	I can give the impression that I'm more competent than I really am.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
3	I avoid evaluations if possible and have a dread of others evaluating me.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
4	When people praise me for something I've accomplished, I'm afraid I won't be able to live up to their expectations of me in the future.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
5	I sometimes think I obtained my present position or gained my present success because I happened to be in the right place at the right time or knew the right people.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
6	I'm afraid people important to me may find out that I'm not as capable as they think I am.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
7	I tend to remember the incidents in which I have not done my best more than those times I have done my best.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
8	I rarely do a project or task as well as I'd like to do it.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
9	Sometimes I feel or believe that my success in my life or in my job has been the result of some kind of error.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
10	It's hard for me to accept compliments or praise about my intelligence or accomplishments.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
11	At times, I feel my success has been due to some kind of luck.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	

12	I'm disappointed at times in my present accomplishments and think I should have accomplished much more.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
13	Sometimes I'm afraid others will discover how much knowledge or ability I really lack.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
14	I'm often afraid that I may fail at a new assignment or undertaking even though I generally do well at what I attempt.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
15	When I've succeeded at something and received recognition for my accomplishments, I have doubts that I can keep repeating that success.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
16	If I receive a great deal of praise and recognition for something I've accomplished, I tend to discount the importance of what I've done.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
17	I often compare my ability to those around me and think they may be more intelligent than I am.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
18	I often worry about not succeeding with a project or examination, even though others around me have considerable confidence that I will do well.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
19	If I'm going to receive a promotion or gain recognition of some kind, I hesitate to tell others until it is an accomplished fact.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
20	I feel bad and discouraged if I'm not "the best" or at least "very special" in situations that involve achievement.					Response #
	1- Not at all True	2- Rarely	3- Sometimes	4- Often	5- Very True	
Total Score (Add individual responses together)						Total Score

Used with permission from Clance, P. R. (1985). *The impostor phenomenon: When success makes you feel like a fake*. Peachtree Publishers.

Appendix C

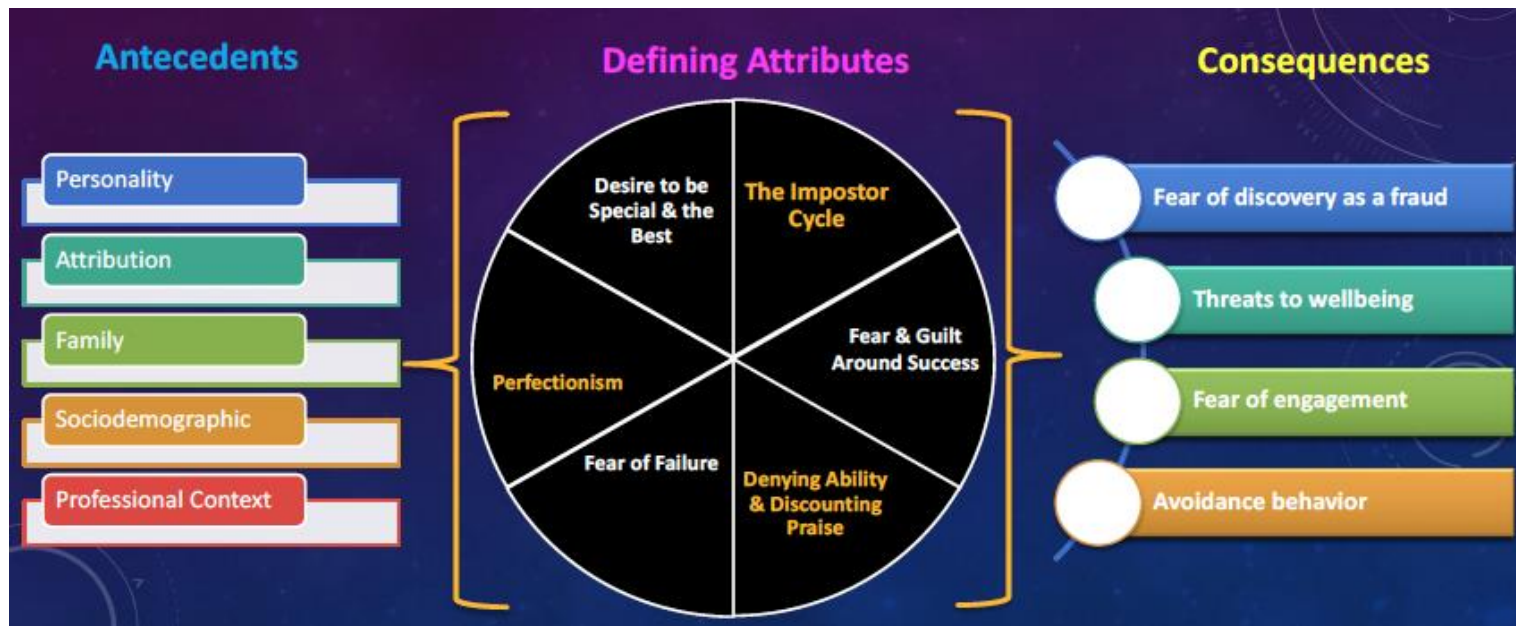
Select CRNA Sociodemographic and Practice Survey

Select CRNA Sociodemographic Variables								
1	Age in Years:							
2	Gender Identity:							
	Female	Male	Non-binary	Prefer Not to Disclose				
3	Race/Ethnicity:							
	American Indian/ Alaskan Native	Asian	Black	Latinx	White	6 - Other: (List)		
4	Highest Education Level:							
	Certificate/ Diploma	Associates Degree	Bachelor's Degree	Master's Degree	Practice Doctorate	Research Doctorate	Other: (List)	
5	Years of CRNA Practice:							
Select CRNA Practice Variables								
6	Primary Anesthesia Practice Model:							
	Anesthesia Care Team with Medical Direction	Anesthesia Care Team with Medical Supervision		Independent Practice in a <i>Group</i> Setting	Independent Practice in a <i>Solo</i> Setting			
7	Primary Anesthesia Practice Setting:							
	Academic Medical Center	Community Hospital	Critical Access Hospital	Veterans Administration	Military	Freestanding Surgical Center	Office Other: (List)	
8	Primary Practice State Scope of Practice for CRNAs:							
	Physician Supervision	Physician Collaboration		Independent Practice	Full Practice Authority			
9	Indicate the <u>frequency</u> you <i>independently</i> perform ultrasound-guided regional anesthesia:							
	Not Applicable	Zero Percent	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	
10	Indicate the <u>frequency</u> you <i>independently</i> perform central line placements:							
	Not Applicable	Zero Percent	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	
11	Indicate the <u>frequency</u> you <i>independently</i> perform point-of-care ultrasound (PoCUS):							
	Not Applicable	Zero Percent	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	
12	Indicate the <u>frequency</u> you <i>independently</i> create the anesthesia plan of care and make clinical decisions (outside the control of a physician)							
	Not Applicable	Zero Percent	1 to 25%	26 to 50%	51 to 75%	76 to 99%	100%	
13	Indicate if your practice <i>consistently</i> and <i>specifically</i> focuses on one of the following anesthesia specialties:							
	1- Not Applicable	2- Cardiac (Open Heart)		3- Pediatric		4- Pain Management		

Appendix D

Conceptual Figure

Relationship Between IP Antecedents, Defining Attributes, and Consequences



Appendix E
University of San Diego
Institutional Review Board Approval



Jun 4, 2021 5:01:00 PM PDT

Jeffrey Darna
Hahn School of Nursing & Health Science

Re: Exempt - Initial - IRB-2021-359, A Description of Impostor Phenomenon in Certified Registered Nurse Anesthesiologists

Dear Jeffrey Darna:

The Institutional Review Board has rendered the decision below for IRB-2021-359, A Description of Impostor Phenomenon in Certified Registered Nurse Anesthesiologists.

Decision: Approved

Selected Category: 7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Findings:

Research Notes:

Internal Notes:

The USD IRB requires annual renewal of all active studies reviewed and approved by the IRB.

Please submit an application for renewal prior to the annual anniversary date of initial study approval.

If an application for renewal is not received, the study will be administratively closed.

Note: We send IRB correspondence regarding student research to the faculty advisor, who bears the ultimate responsibility for the conduct of the research. We request that the faculty advisor share this correspondence with the student researcher.

The next deadline for submitting project proposals to the Provost's Office for full review is N/A. You may submit a project proposal for expedited or exempt review at any time.

Sincerely,

Eileen K. Fry-Bowers, PhD, JD
Administrator, Institutional Review Board

Office of the Vice President and Provost
Hughes Administration Center, Room 214
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Appendix F

Data Analysis Plan

Proposed Variables	Dependent Variable (DV) / Independent Variable (IV)	Measurement Level	Anticipated Statistics
The primary aim described select sociodemographic, anesthesia practice model, CRNA practice behaviors, and IP in a random sample of CRNAs.			
Age	IV	Ratio	Descriptive Mean, median, mode Spread: Standard deviation, IQR, range, skewness, kurtosis
Gender Identity Female Male Non-binary Prefer not to disclose	IV	Nominal	
Race/Ethnicity American Indian/Alaska Native Asian Black Latinx White Other	IV	Nominal	
Highest Education Level: Certificate/Diploma Associates Degree Bachelor's Degree Master's Degree Practice Doctorate Research Doctorate Other: (List)	IV	Ordinal	
Years of CRNA Practice	IV	Ratio	

<p>Primary Anesthesia Practice Model:</p> <p>ACT - Medicare medical direction</p> <p>ACT - Medicare medical supervision</p> <p>Independent - <i>Group</i> setting</p> <p>Independent - <i>Solo</i> setting</p>	IV	Ordinal	
<p>Primary Anesthesia Practice Setting:</p> <p>(Required Entry)</p> <p>Academic Medical Center</p> <p>Community Hospital</p> <p>Critical Access Hospital</p> <p>Veterans Administration</p> <p>Military</p> <p>Freestanding Surgical Center</p> <p>Office-based</p> <p>Other: (List)</p>	IV	Ordinal	
<p>Advanced Clinical Skills frequency</p> <p>(Required Entry)</p> <p>(NA; Zero percent; 1 to 25%; 26 to 50%; 51 to 75%; 76% to 99%; 100%):</p> <p>US-guided Regional Anesthesia</p> <p>Central Line Placement</p> <p>POCUS</p> <p>Specialty Anesthesia (Cardiac, Pediatric, Pain management)</p>	IV	Interval	
<p>Anesthesia Plan & Clinical Decision-Making frequency:</p> <p>(Required Entry)</p> <p>(Zero percent; 1 to 25%; 26 to 50%; 51 to 75%; 76% to 99%; 100%):</p>	IV	Interval	
<p>State Scope of Practice:</p> <p>(Required Entry)</p>	IV	Ordinal	

Physician Supervision Physician Collaboration Independent Practice Full Practice Authority			
Impostor Phenomenon	DV	Ratio	
Secondary Aim one described the relationship among select sociodemographic variables, anesthesia practice model, CRNA practice behaviors, and IP in a random sample of CRNAs.			
Age	IV	Ratio	Spearman rho Correlation or Point Biserial Correlation
Gender Identity Female Male Nonbinary	IV	Nominal	
Race/Ethnicity American Indian/Alaska Native Asian Black Latinx White Other	IV	Nominal	
Highest Education Level: Certificate/Diploma Associates Degree Bachelor's Degree Master's Degree Practice Doctorate Research Doctorate Other: (List)	IV	Ordinal	
Years of CRNA Practice	IV	Ratio	

<p>Primary Anesthesia Practice Model: (Required Entry)</p> <p>ACT - Medicare medical direction</p> <p>ACT - Medicare medical supervision</p> <p>Independent - <i>Group</i> setting</p> <p>Independent - <i>Solo</i> setting</p>	IV	Ordinal	
<p>Primary Anesthesia Practice Setting: (Required Entry)</p> <p>Academic Medical Center</p> <p>Community Hospital</p> <p>Critical Access Hospital</p> <p>Veterans Administration</p> <p>Military</p> <p>Freestanding Surgical Center</p> <p>Office-based</p> <p>Other: (List)</p>	IV	Ordinal	
<p>Advanced Clinical Skills frequency (Required Entry)</p> <p>(NA; Zero percent; 1 to 25%; 26 to 50%; 51 to 75%; 76% to 99%; 100%):</p> <p>US-guided Regional Anesthesia</p> <p>Central Line Placement</p> <p>POCUS</p> <p>Specialty Anesthesia (Cardiac, Pediatric, Pain management)</p>	IV	Interval	
<p>Anesthesia Plan & Clinical Decision-Making frequency: (Required Entry)</p> <p>(Zero percent; 1 to 25%; 26 to 50%; 51 to 75%; 76% to 99%; 100%):</p>	IV	Interval	
State Scope of Practice:	IV	Ordinal	

Physician Supervision Physician Collaboration Independent Practice Full Practice Authority			
CIPS Score (IP feeling frequency) Few (< 40) Moderate (41 to 60) Frequent (61 to 80) Intense (> 80)	DV	Ordinal	
Secondary Aim two was designed to describe the variance in IP accounted for by select sociodemographic variables, anesthesia practice model, and CRNA practice behaviors in a random sample of CRNAs			
Age	IV	Ratio	Ordered logistic regression Odds ratio (Multi-logistic regression if the median split procedure used)
Gender Identity Female Male Nonbinary	IV	Nominal	
Race/Ethnicity American Indian/Alaska Native Asian Black Latinx White Other	IV	Nominal	
Highest Education Level: Certificate/Diploma Associates Degree Bachelor's Degree Master's Degree Practice Doctorate Research Doctorate Other: (List)	IV	Ordinal	

Years of CRNA Practice	IV	Ratio	
Primary Anesthesia Practice Model: (Required Entry) ACT - Medicare medical direction ACT - Medicare medical supervision Independent - <i>Group</i> setting Independent - <i>Solo</i> setting	IV	Ordinal	
Primary Anesthesia Practice Setting: (Required Entry) Academic Medical Center Community Hospital Critical Access Hospital Veterans Administration Military Freestanding Surgical Center Office-based Other: (List)	IV	Ordinal	
Advanced Clinical Skills frequency (Required Entry) (NA; Zero percent; 1 to 25%; 26 to 50%; 51 to 75%; 76% to 99%; 100%): US-guided Regional Anesthesia Central Line Placement POCUS Specialty Anesthesia (Cardiac, Pediatric, Pain management)	IV	Interval	
Anesthesia Plan & Clinical Decision-Making frequency: (Required Entry) (Zero percent; 1 to 25%; 26 to 50%; 51 to 75%; 76% to 99%; 100%):	IV	Interval	

State Scope of Practice: Physician Supervision Physician Collaboration Independent Practice Full Practice Authority	IV	Ordinal	
CIPS Score (IP feeling frequency) Few (< 40) Moderate (41 to 60) Frequent (61 to 80) Intense (> 80)	DV	Calculated Ordinal or categorical	

Appendix G

Permission to Use the Clance Impostor Phenomenon Scale

Jeffrey Darna <jdarna@XXXXXX>

Request for Permission to Use the Clance Impostor Phenomenon Scale for Research Dissertation Purposes

6 messages

Jeffrey Darna

Thu, Mar 25, 2021 at 4:43 PM

To: drpaulinerose

Dr. Clance,

My name is Jeffrey Darna, and I am an advanced practice nurse and Ph.D. student at the University of San Diego, Hahn School of Nursing and Health Sciences. Recently, I began my dissertation work and identified Impostor Phenomenon as a research interest. Specifically, I intend to explore and measure Impostor Phenomenon in Certified Registered Nurse Anesthesiologists (CRNAs). CRNAs are advanced practice nurses educated and trained to deliver perioperative evaluation and management across the life span and in all clinical settings that require anesthesia services. CRNAs may be at-risk for Impostor Phenomenon and have career-related effects that influence patient care. Measuring Impostor Phenomenon in CRNAs may provide valuable insight into certain practice behaviors and opportunities that are unique to this nursing specialty.

I am interested in using the Clance Impostor Phenomenon Scale (CIPS) to measure Impostor Phenomenon in a random sample of CRNAs. I've attached an abstract to provide an overview of my planned study. I humbly ask for permission to use the CIPS instrument for my dissertation/research purposes.

Please let me know if I may provide any additional information or address any concerns.

Kind regards,

Jeff Darna

--
Jeffrey R. Darna, DNP, CRNA, ACNP-BC
Los Angeles, California

Darna, J. Impostor Phenomenon Abstract.pdf
67K

Pauline Rose Clance <drpaulinerose@XXXX.XXX>

Fri, Mar 26, 2021 at 5:35 PM

To: Jeffrey Darna <jdarna@XXXXX.edu>

Cc: andra XXXX <pXXXXX7@XXXXX.com>

Thank you. How do you plan to distribute the scale and promote the copy right and Protect Confidentiality? I am very glad you will be doing research on the CIPs Regards,

Jeffrey Darna <jdarna@XXXXXX.edu>
To: Pauline Rose Clance <drpaulinerose@XXXXX.net>
Cc: andra XXXXX <pXXXXXX7@XXXXX.com>

Sat, Mar 27, 2021 at 11:50 AM

Dr. Clance,

Thank you for your reply. Below are answers to your questions.

1. I plan to transcribe the CIPS instrument to the REDCap research platform. The platform will create a nontraceable hyperlink to the survey. The link will be embedded into an email that will be distributed through the American Association of Nurse Anesthetists (AANA) Membership Databank. As a condition of using the membership databank, the researchers will not have access to member data or contact information. The AANA will randomly select members who meet study inclusion criteria (active membership, actively practicing anesthesiology) and send them an email with the study link, description of the study, and opt-out capability.
2. With respect to the copyright, I will include the copyright clause with the appropriate reference and indicate permission was obtained to use the CIPS instrument. I noted the clause language and reference on your website.
3. The study will undergo IRB review and approval through the University of San Diego. Informed consent will be obtained by the participant accessing the hyperlink embedded in the study invitation email. And as described above, the research team will not have access to any participant's personal data (e.g., name, location, email address, or contact information). The study will collect *select* sociodemographic data (e.g., age, gender identity, years of experience).

Once again, thank you for your consideration.

Jeff Darna

On Fri, Mar 26, 2021 at 5:35 PM Pauline Rose Clance <drpaulinerose@XXXX.net> wrote:

Thank you. How do you plan to distribute the scale and promote the copy right and Protect Confidentiality? I am very glad you will be doing research on the CIPs
Regards, dr Clance

I work with and am replying to your Impostor Phenomenon (IP) request on behalf of Dr. Clance. Firstly, we hope you, your family, friends, and colleagues are safe, healthy, hopeful, and proactive during the COVID 19 pandemic. You have permission to use and make copies of the scale, *Clance Impostor Phenomenon Scale (CIPS)*, and I have attached it along with the scoring.

Please tell us a little more about your research, such as how you plan to contact participants about the research and how you plan to transmit/administer the CIPS in order to ensure secure transmission (already done). Below are some criteria:

Dr. Clance does not grant permission to distribute her CIPS to be made available to everyone on the world-wide web (i.e., personal internet email, social media platforms, snowballing methods, etc.) via electronic survey. She gives permission to do so if: the population is clearly defined and only accessible to that population; if researchers use a secured computer program that only allows internet access to that clearly identified population, along with the researcher's ability to clearly identify (ISP address) those accessing the scale (when possible), with login controls, survey time-limit, and maintaining confidentiality. When all those requirements are met, having the copyright/permission to reproduce clause on each page of the scale via electronic survey is fine.

Does REDCap have additional security controls you can put in place, such as survey availability time-limit (and delete activity of survey link once data has been obtained) and blocking ability to copy a survey? We do not prefer to have the survey link included in an email advertisement of research; however, given it is being distributed to registered members of a professional association, we will approve it, but try to include security measures whereby the CIPS cannot be copied/picture taken of, etc., to increase copyright infringement. Also include the full CIPS copyright statement (see below) somewhere on the survey. Thank you.

Also please read the permission form, included with the scale, and reply with your consent. We would greatly appreciate receiving a full copy of your Dissertation for our records and will add the citation to the IP Reference List.

Given that you are using the CIPS, please use the terminology/title "Impostor Phenomenon" rather than Imposter Syndrome. See explanation below. Thank you.

FYI:

Given the official title of the scale (CIPS: Clance Impostor Phenomenon Scale) includes the words "Impostor Phenomenon," (IP) Dr. Clance suggests that researchers use that specific terminology (e.g., Impostor Phenomenon) rather than using "Imposter Syndrome," as that terminology (e.g., syndrome) refers to an official medical diagnosis, of which the IP is not [Kaplan, K. (May 20, 2009). Unmasking the impostor, *Nature*, 459, p. 2].

The preferred spelling is "Impostor" - with an "o" at the end rather than an "e."

Also, sometimes the word "syndrome" is seen in the social media rather than the word "phenomenon" - and use of the word "phenomenon" is the correct term to use when referencing the CIPS (Clance Impostor Phenomenon Scale) or Dr. Clance's work.

In regards to publication, we suggest that authors include both terms, Impostor Phenomenon and Imposter Syndrome, for "Key Word" searches.

I have further included an IP Reference list (not all inclusive) for your use and/or to make available for participants if they want to know more about the IP and you could refer them to Dr. Clance's website:
<<http://www.paulinerooseclance.com>>

FYI:

NEW RELEASE I have re-released my original 1985 *The Impostor Phenomenon: Overcoming the Fear That Haunts Your Success* book on Amazon Kindle for download to Reader: https://www.amazon.com/Impostor-Phenomenon-Overcoming-Haunts-Success-ebook/dp/B074D3NDGQ/ref=sr_1_1?s=digital-text&ie=UTF8&qid=1501621649&sr=1-1&keywords=the+impostor+phenomenon

There has been significant world-wide research and social media interest on the Impostor Phenomenon (IP), along with practical application of the Clance Impostor Phenomenon Scale (CIPS) since their inception in 1985.

The original book offers an in-depth background on the author's foundational conceptions of the IP, along with the IP Cycle, IP Profile, and exercises for those prone to experiencing IP feelings. Other IP articles by Dr. Clance may be viewed on her website: <http://www.paulineroseclance.com/index.html>

Requests for an updated Reference List on IP research and citations may be sent to Dr. Clance @ drpaulinerose@comcast.net

The book, inclusive of the Clance Impostor Phenomenon Scale, is copyrighted, so research/professional use and reproduction of the scale still requires permission by Dr. Clance: http://www.paulineroseclance.com/impostor_phenomenon.html

If you plan on submitting your research for publication, please first write again for permission conditions of the CIPS. Below are some criteria:

In regard to including the *Clance Impostor Phenomenon Scale (CIPS)* itself in a (journal) publication, permission is not given. There have been mixed legal issues with journal publishers who sometimes consider the CIPS as their property to freely disseminate when it is included in a publication, which does not protect Dr. Clance's copyright, required permissions by her to reproduce, and does not allow for reliable tracking/documentation of CIPS research/use. Dr. Clance does not charge for use of the scale to better enable persons to do research with publication without legal/financial complications. Many researchers use copyrighted scales for research and publish results, yet only properly cite a scale without including it, in its entirety, in a publication. Dr. Clance is highly supportive for persons to publish their results (we hope it works out for you!) in reputable, accredited journals. If you do publish, please send us the citation and a copy of the work/link for our records. The proper citation for the CIPS is as follows:

Clance Impostor Phenomenon Scale (CIPS). From *The Impostor Phenomenon: When Success Makes You Feel Like A Fake* (pp. 20-22), by P.R. Clance, 1985, Toronto: Bantam Books. Copyright 1985 by Pauline Rose Clance, Ph.D., ABPP. Use by permission of Dr. Pauline Rose Clance. Do not reproduce/copy/distribute without permission from Pauline Rose Clance, drpaulinerose@comcast.net, www.paulineroseclance.com.

Some authors have alternatively chosen to include an approved link to the CIPS from Dr. Clance's website in the Citations area of their work, which would also include the above original source citation, for which permission is given: Dr. Clance's website <http://paulineroseclance.com> and/or IP webpage (http://paulineroseclance.com/impostor_phenomenon.html - do not include CIPS PDF link directly).

Thank you for your interest in the Impostor Phenomenon and we wish you well with your work!

Sincerely,

Andra