ON VERY THIN ICE:
IMPOSTOR PHENOMENON AND CAREERS OF WOMEN GRADUATE STUDENTS

BY

JESSAMYN G. PERLUS

DISSERTATION

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Doctoral Committee:

    Professor James Rounds, Chair and Director of Research
    Assistant Professor Chris Napolitano
    Professor Jennifer C. Greene
    Adjunct Assistant Professor Julia Panke Makela

ABSTRACT

The impostor phenomenon (IP) is characterized by denial of competence and discounting achievements combined with a fear of failure and fear and guilt about success (Clance & Imes, 1978). People with impostor feelings engage in behaviors such as perfectionism, which may lead to accolades, yet paradoxically hinder subsequent achievements. The purpose of this dissertation was to explore how graduate student women describe their experiences of IP and to investigate how IP affects their careers. The mixed-method design incorporated data from two focus groups, 506 survey responses, and eight interviews.

Nearly 3 in 4 women self-identified with IP, however, it emerged in different ways (e.g., fear of making mistakes, second-guessing merits, attributing success to flukes). Findings showed that impostor feelings were associated with psychological constructs (i.e., perfectionism, core self-evaluations, and symptoms of anxiety and depression) in hypothesized directions. Women described multiple ways their salient identities compounded impostor feelings. Regarding career-related consequences, women often inhibited themselves by not submitting applications, staying silent, not venturing outside their comfort zone, isolating, procrastinating, setting lower goals, or quitting. Results also uncovered poor psychometric properties of the widely used Clance Impostor Phenomenon Scale, therefore, caution is encouraged when using this scale in the future. This indicates a need for clearer construct definition and measurement, potentially with two new scales generated from this study.

Women shared hundreds of suggestions such as a shift in mindset in terms of attitude regarding schooling, expectations, and taking ownership of achievements. Additionally, sharing impostor feelings with others emerged as an overarching theme. Overall, findings point to the urgency of clarifying the construct and future replication studies with other populations and methods, particularly given the proliferation of writing about "imposter syndrome." Results may inform modifications to graduate training programs and interventions to promote women's career development during their time in graduate school and in their subsequent careers.

ACKNOWLEDGEMENTS

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CHAPTER 1: INTRODUCTION

In recent years "imposter syndrome" has gained prominence, particularly through non-empirical articles in outlets such as *Nature* (Kaplan, 2009; Woolston, 2016), *Science* (Laursen, 2008), and *The Chronicle of Higher Education* (Gravois, 2007; Hermann, 2016; Shorr, 2017). Although known to the public as "imposter syndrome," the empirical literature illustrates the phenomenon as a fear of failure, denial of competence and discounting praise, and guilt about success (Clance & Imes, 1978). The Impostor[1] Phenomenon (IP) was first identified in high achieving women by Clance and Imes (1978). IP has been subjected to over 35 years of research into correlates and consequences, such as depression (c.f., Sakulku & Alexander, 2011). However, there is still a scarcity of research on IP and the varying approaches to studying it have created a rather muddled picture of the ways in which IP manifests. This study has been designed to help clarify just what is the construct of IP. How can IP be defined and measured? How do women describe their IP experiences?

IP characteristics are counterproductive to career advancement because an individual afraid of being found out as a "fraud" is not likely to fully engage in self-promotional behaviors necessary for advancement, even writing a compelling cover letter. Having an internal sense of intellectual and professional "phoniness" despite praise, accolades and earned achievements has been associated with academic behavior such as procrastination. Some have theorized that within academia the scholarly isolation and focus on producing publications contributes to IP (Zorn, 2005). Specifically, a scholar with high IP might be reluctant to apply for grants, attend conferences, or even meet with students because of the potential for negative evaluation (Zorn, 2005). Moreover, this avoidant behavior is modeled for graduate and undergraduate students.

Within academia, graduate students in particular are an important group to highlight. Some IP studies have focused on graduate students within a single doctoral program, but most are unpublished dissertations (e.g., McEnery, 2014; Studdard, 2002). Five published studies did include the Clance Impostor Phenomenon Scale (CIPS) but most have focused on only one or two programs of study with the exception of one Belgian study which looked at doctoral students across disciplines in Austria (Jöstl, Bergsmann, Lüftenegger, Schober, & Spiel, 2012). Moreover,

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[1] Some participants brought up the negative connotation of the word impostor, and how it could imply that a person is "defective in some way." In writing this dissertation I have attempted not to call people "impostors" but instead *someone experiencing impostor feelings*. Also, Dr. Clance insists on spelling impostor with an "o".

many have not collected qualitative data (Fraenza, 2016; Gibson-Beverly & Schwartz, 2008; Henning, Ey, & Shaw, 1998; Sares, 2017). This phenomenon in particular, as it is so internalized and isolating, is important to understand in the voices of those experiencing it.

Given the status of gender in academia, graduate student women were selected as a key population to focus on. Women tend to attribute their successes to luck whereas men attribute their successes to internal ability, according to attribution theory (Deaux, 1976). Acknowledging the heterogeneity of women's experiences and intersecting identities, this study sought a diverse range of narratives. It looked at a variety of degree programs and departments, including masters and doctoral programs. It also included many correlated constructs, such as core self-evaluations and perfectionism (Vergauwe, Wille, Feys, De Fruyt, & Anseel, 2014), to see if associations could be replicated in a population of female students from the United States.

Individuals with IP often overwork to earn their successes, however, it is unclear how their subsequent efforts are affected. Are they aware of connections between feelings of fraudulence and their career goals? There is limited literature connecting IP to career behaviors. This study specifically connects career-relevant literature by measuring perceived research self-efficacy and educational and career consequences, such as avoiding asking questions in class due to fear of sounding uninformed (Lane, 2015).

Study Significance

Since self-described impostors report numerous successes, some critics may question the need for empirical investigation. However, it is important to explore IP for two primary reasons: (1) these individuals cannot enjoy their successes and (2) they may not be achieving all they are capable of (Clance & O'Toole, 1987). Lack of ownership or satisfaction with success can translate to mental health consequences. Likewise, making major life decisions based on assumptions of limited capability has far-reaching educational and career consequences. Investigating these connections is vital because the aforementioned consequences are often overlooked due to exemplary functioning skills.

This often-silent problem may be widespread. As of 2015, there were 1.7 million women enrolled in postbaccalaureate degree programs, outnumbering men 58% to 42%. The National Center for Educational Statistics anticipates that by 2026, postbaccalaureate enrollment will increase by 12%, and female enrollment increases at a faster rate than male enrollment (National

Center for Education Statistics, 2017). A better understanding of IP in graduate student women would be beneficial to higher education administrators, academics, those concerned with retention of women in higher education, and mental health providers.

Study Purpose

The purpose of this dissertation is to explore how women describe their experiences of IP in graduate school and to investigate how IP affects their career process. The quantitative elements help clarify the construct of IP in relation to other related psychological constructs (i.e., core self-evaluations, mental health, and other personality characteristics). The study design incorporates qualitative interviews in order to achieve a better, more nuanced understanding of the nature of IP and its relationship to educational and career progression. Obtaining a deeper understanding—in which women's voices are centered—may improve interventions designed to promote women's career development during their time in graduate school and in their subsequent career.

Inquiry Questions

1. How do graduate student women describe and define their experiences of IP?
2. In what ways do salient identities such as gender or race –or their intersection– shape how women graduate students experience IP?
3. What is the nature of the association between IP and educational and career development?

CHAPTER 2: LITERATURE REVIEW

Organization of the Literature Review

This chapter consists of a review of relevant literature supporting the proposed research model. The first section explores characteristics of the impostor phenomenon (IP) among women. The subsequent sections summarize findings on how the IP is related to perfectionism, core self-evaluations, mental health, research self-efficacy, and career development. Lastly, it details the importance of IP in academia, offering a hypothesized explanatory model.

Characteristics of the Impostor Phenomenon

The impostor phenomenon is defined as an internal experience of intellectual and professional incapability despite objective evidence to the contrary (Clance, 1985; Clance & Imes, 1978). People who suffer from IP believe their successes are due to luck or error, and they live in near constant fear of being "unmasked" as unintelligent or less capable (Clance, 1985). Often they have high standards and dismiss their talents if they are not immediately the very best (Clance, 1985).

The IP, or as it is commonly known, "imposter syndrome," is not a mental health diagnosis. In fact, there is no clear consensus on exactly what IP is. It is believed to have cognitive and affective components (Kolligian & Sternberg, 1991; Leary, Patton, Orlando, & Funk, 2000). Some suggest it is a motivational style (Chae, Piedmont, Estadt, & Wicks, 1995), and others conclude that it is a pattern of "dysfunctional thoughts and feelings," which can be considered a maladaptive personality style composed of other personality traits (Vergauwe et al., 2014). This implies it might be chronic though this has not been confirmed.

A tenet of IP is the impostor cycle. In the impostor cycle, a person faces a new project or task, which causes doubt or fear, in other words, questioning whether success will be possible. Anxiety or other symptoms arise. The individual then works extremely hard, often by over preparing, or conversely, procrastinating. More often than not, the completed project or task is successful and merits positive feedback, yet the cycle is reinforced, cementing the belief that success requires suffering (Clance, 1985; Clance & Imes, 1978). The impostor cycle is most consistent with a personality style as it points to an enduring attitude.

It is difficult to estimate the prevalence of IP. Some have offered that 70% of people will experience IP at least once in their lives (Sakulku & Alexander, 2011). However, there is no

agreement about how long IP experiences might last. In a sample of Austrian doctoral students, 82% reported at least low levels of IP (Jöstl et al., 2012). Lane (2015) found 80% of an emerging adult sample to identify with IP.

Women and the Impostor Phenomenon

  The literature contends that both men and women experience IP, however there is disagreement about who experiences it to a greater extent. While some have found no sex differences (Bernard, Dollinger, & Ramaniah, 2002; Chae et al., 1995; Cokley, McClain, Enciso, & Martinez, 2013; Cowman & Ferrari, 2002; Ferrari, 2005; Fried-Buchalter, 1992; Rohrmann, Bechtoldt, & Leonhardt, 2016), others have found women report more frequent and higher intensity impostor feelings (Cozzarelli & Major, 1990; Hayes, & Davis, 1993; Jöstl et al., 2012; King & Cooley, 1995; Kumar & Jagacinski, 2006; McGregor, Gee, & Posey, 2008; Oriel, Plane, & Mundt, 2004). Clance and Imes (1978) first described the term based on clinical observations in high achieving women, including graduate students. For women especially, family messages, societal messages, and other sources of gender socialization may serve as catalysts for IP (Clance, 1985).

  There is a long-documented history of women receiving messages and stereotypes about achievement capabilities (e.g., Eccles, 1994; Stein & Bailey, 1973). A recent study of achievement and gender perceptions showed children as young as six endorse stereotypes related to men and women's achievement; the authors found that girls were less likely than boys to believe that women are "really, really smart" and girls begin to avoid activities for children who are "really, really smart" (Bian, Leslie, & Cimpian, 2017).

  Higher rates of IP among women are also consistent with attribution theory, or how individuals develop causal explanations for life events and how that influences behavior. Specifically, men tend to attribute successes to internal ability and women tend to attribute successes to luck (Deaux, 1976).

Perfectionism and the Impostor Phenomenon

  Perfectionism is a hallmark of IP. Perfectionism is a personality trait characterized by striving for flawlessness and setting exceedingly high standards for performance accompanied by the tendency for overly critical evaluations of one's behavior (Flett & Hewitt, 2002; Frost,

Marten, Lahart, & Rosenblate, 1990). Individuals experiencing IP often expect to do everything flawlessly, including things they have not attempted before. The high standards become tied to their self-evaluations (Clance, 1985; Sakulku & Alexander, 2011; Thompson, Davis, & Davidson, 1998). Individuals who experience IP tend to overgeneralize themselves as failures when they are unable to fulfill their perfectionistic goals (Clance, 1985).

Links between IP and perfectionism have been found in medical students (Henning et al., 1998), managers (Rohrmann et al., 2016), undergraduate students (Ferrari & Thompson, 2006) and graduate students (Fraenza, 2016). A sample of Belgian workers revealed a positive association between impostor tendencies and maladaptive perfectionism (e.g., concern over mistakes) and a negative association with adaptive perfectionism (e.g., setting high goals), summarizing that both perfectionism scales accounted for 42% of the variance in impostor tendencies (Vergauwe et al., 2014).

According to a review by Sakulu and Alexander (2011), a key way to distinguish between those with impostor feelings and perfectionists is that perfectionists will not disclose their mistakes to others because they fear being viewed as imperfect, while impostors are more willing communicate their self-perception of imperfect performance (Ferrari & Thompson, 2006). Another difference is that those with impostor feelings are less able to internalize successes compared to perfectionistic individuals who are able to feel validated when their goals are met (Seritan & Mehta, 2016).

Hypothesis 1: There will be positive associations between IP and two subtypes of perfectionism (setting high standards and concern over mistakes).

Core Self-Evaluations and the Impostor Phenomenon

Judge and colleagues (2001) define core self-evaluations (CSE) as a higher order construct composed of self-esteem, generalized self-efficacy, emotional stability (low neuroticism), and locus of control (LOC). Self-esteem is the overall value that one places on oneself as a person (Harter, 1990). Generalized self-efficacy is an evaluation of anticipated ability to overcome challenges (Bandura, 1977). Emotional stability (low neuroticism) is the tendency to have a positive outlook and focus on positive aspects of the self (Watson, 2000). LOC describes what an individual believes causes events in their life – an internal locus is when someone sees their own behavior as the cause (Rotter, 1966). Those with a more internal agency

are more likely to reinforce behavior, for example working hard and earning a good grade.

These four personality traits indicate that across situations individuals with positive CSE consistently see themselves as capable and in control (Judge, Erez, Bono, & Thoresen, 2003). CSE has been linked to numerous career-related outcomes including job satisfaction, job performance, and even life satisfaction (Judge & Bono, 2001; Judge et al., 2003; Judge, Van Vianen, & De Pater, 2004). Furthermore, people with higher (positive) core self-evaluations are likely to choose goals that have the best chance to make them happy with their job and lives (Judge, Bono, Erez, & Locke, 2005) and report less job stress (Brunborg, 2008).

Those with IP are expected to have low CSE due to the lack of confidence, doubts about accomplishments, and fear about future endeavors (Clance & O'Toole, 1987). Few studies have jointly investigated CSE and IP, but those that have consistently find CSE to be strongly negatively related to IP, indicating negative self-appraisal across situations (Neureiter & Traut-Mattausch, 2017; Vergauwe et al., 2014).

IP is most frequently linked to one of CSE's facets, self-esteem; specifically those with higher IP tend to report low self-esteem (Chrisman, Pieper, Clance, Holland, & Glickauf-Hughes, 1995; Oriel et al., 2004; Sonnak & Towell, 2001). It is likely that self-doubt and self-criticism found in IP recursively feed into self-esteem. Self-esteem is believed to be different from IP in a number of ways. First, self-esteem is broader, encompassing attitudes and feelings related to the whole self. In other words, one could have adequate self-esteem and still experience IP (Perone Birett, 2007). Second, the IP is related to high performance and success, yet low self-esteem tends to predict lower performance (Judge & Bono, 2001). Third, due to a fear of failure, a poor performance will likely lead to a more extreme negative reaction in those with high IP compared to those with generally low self-esteem (Badawy, 2014; Cozzarelli & Major, 1990).

At the facet level, there have been mixed findings. Vergauwe (2014) did not find associations with IP and self-esteem and LOC, pointing instead to the importance of self-efficacy. Supporting this, IP sufferers tend to report low perceptions of ability (Leary et al., 2000). One study of undergraduates found neuroticism to be the best personality predictor of IP scores (Bernard et al., 2002). Given the hallmark characteristics of IP in attributing success to luck or other external factors, IP has been found to relate to an external LOC (Sightler & Wilson, 2001).

Hypothesis 2: There will be a negative association between IP and CSE. Specifically, higher IP will be related to lower self-esteem (2a), lower generalized self-efficacy (2b), lower emotional stability (2c) and an external locus of control (2d).

Mental Health and the Impostor Phenomenon

Graduate students often report problems with well-being. A 2014 study of graduate students at Berkeley found high rates of depression (The Graduate Student Assembly, 2014). Doctoral students exhibited higher levels of depression than master's students, and 47% reached a threshold considered depressed.

A large survey across over 8,000 women graduate students from 67 U.S. schools endorsed the following within the last 12 months: feeling hopeless 47%, overwhelmed 89%, exhausted (not from physical activity) 86%, very lonely 59%, very sad 67%, so depressed that it was difficult to function 38%, and overwhelming anxiety 38% (American College Health Association & National College Health Assessment, 2017). The same study found 27% of women graduate students reported being diagnosed with depression. Women also reported academics 34% and career related issues 36% had been "traumatic or very difficult" to handle (American College Health Association & National College Health Assessment, 2017).

Evans and colleagues (2018) surveyed 2,279 masters and doctoral students in 26 countries and 234 institutions. Using established indicators of generalized anxiety and depression they found graduate students to be more than six times as likely to experience anxiety and depression compared to the general population (Evans et al., 2018). Specifically, 41% endorsed moderate to severe anxiety and 39% endorsed moderate to severe depression. Their findings also upheld a trend for women to report more anxiety than men.

Researchers have demonstrated a link between mental health consequences and IP (Chrisman et al., 1995; Cokley et al., 2013; Sakulku & Alexander, 2011), generally with higher IP intensity associated with poorer mental health (Sonnak & Towell, 2001). This might include emotional exhaustion (Clance, 1985), or generalized psychological distress (Henning et al., 1998). Symptoms of anxiety, such as feeling tense or worried, have been linked to IP in populations of university staff (Topping & Kimmel, 1985), medical residents (Oriel et al., 2004), and graduate students (Fraenza, 2016). Similarly, depressive symptoms, such as loss of interest or feeling hopeless, have also been linked to IP (Chrisman et al., 1995; Clance, 1985; McGregor

et al., 2008; Oriel et al., 2004). The tendencies for high self-criticism and negative affect are believed to drive the association (e.g., Chrisman et al., 1995). Depression and IP likely "feed off each other" (McGregor et al., 2008).

Hypothesis 3a: There will be a positive association between IP and anxiety symptoms.
Hypothesis 3b: There will be a positive association between IP and depressive symptoms.

Research Self-Efficacy and the Impostor Phenomenon

Self-efficacy is a well-established predictor of achievement in multiple areas (Bandura, 1997). In universities, self-efficacy has been linked to writing articles or applying for grants (Hemmings & Kay, 2009) and research productivity among faculty (Vasil, 1992). Gender differences have also been found, with male faculty reporting higher self-efficacy (Hemmings & Kay, 2009). Research self-efficacy in particular is an important component of career development (French, Ullrich-French, & Follman, 2008) because this is a key element of many graduate programs and is more self-directed than undergraduate training. Exploring the link between IP and research self-efficacy is expected to contribute to the understanding of psychological barriers in women's careers. One previous study explored research self-efficacy and IP in a population of doctoral students and found a small negative association, the higher the IP the lower the research self-efficacy (Jöstl et al., 2012). They argue it is an important step between IP feelings and concrete career outcomes.

Hypothesis 4: There will be a negative association between IP and research self-efficacy.

Career Development, Academic Achievement, and the Impostor Phenomenon

Emerging adulthood (ages 18-25) encompasses the typical graduate school entry age and is a crucial developmental milestone (Arnett, 2000). Identity tension during the transition to professional life is common. In the workplace, recent college graduates report confusion due to unanticipated changes in structure, oversight, and appropriateness regarding interpersonal interactions (Polach, 2004), changes that could easily translate to entering a new program of higher education and thus increase a sense of feeling like an impostor.

The IP in relation to work outcomes has only recently been explored (Neureiter & Traut-Mattausch, 2016b; Whitman & Shanine, 2012). The career trajectory consequences are manifold. This might include avoiding asking questions due to fear of sounding uninformed (Lane, 2015),

to making major life decisions based on perceptions of limited capability (Fried-Buchalter, 1997; Lane, 2015). In a workplace study employees with stronger impostor feelings demonstrated less organizational citizenship behaviors, lower levels of job satisfaction, and expressed a stronger desire to stay in the organization because the costs of leaving were too high (Vergauwe et al., 2014). These findings align with Clance's original assertion that those with IP limit their goals and remain in positions below their capabilities (Clance, 1985). From an organization perspective, having highly-qualified, expensively-trained women concentrated on the lower levels constitutes poor resource management with "considerable skill wastage" (Morley, 1994).

People experiencing impostor feelings are less likely to use career development resources and struggle with envisioning possible paths in career planning, especially related to gaining higher positions (Neureiter & Traut-Mattausch, 2016a). IP functions as an inner barrier to moving up to higher levels and leadership positions (Neureiter & Traut-Mattausch, 2016a; Neureiter & Traut-Mattausch, 2016b). Similarly, those with IP have difficulty requesting a higher salary (Neureiter & Traut-Mattausch, 2016b). Salary disparities between the sexes are rampant. The World Economic Forum states the gender wage gap has widened in the past four years—currently at 59%—and it is estimated to take 170 years to close (Treanor, 2016).

The Impostor Phenomenon in Academia. Clance (1985) suggested that students might exhibit more intense impostor characteristics due to the frequency of evaluations and the seriousness of the consequences. She says students tend to score higher on the impostor scale than "any other group" (Clance, 1985, p. 110).

A dissertation study interviewing eleven graduate women found the higher education system to be "uncomfortable and unwelcoming" (Studdard, 2002). Zorn (2005) proposed specific contributing factors: aggressive competitiveness; disciplinary nationalism (i.e., highly specialized fields that do not value interdisciplinary work); scholarly isolation; and valuing product over process. This is consistent with past research that women often feel isolated in academic settings (Belenky, Clinchy, Goldberger, & Tarule, 1986). Successful women may be tokenized and their credibility undermined though "gender charity" in educational appointments (Yates, 1993). Others have posited that higher education's "publish or perish" mentality is particularly conducive to IP feelings. Academia comes with new role expectations and challenges that exacerbate impostor feelings (Jöstl et al., 2012). Even accolades such as

prestigious awards can be accompanied by self-doubt, particularly for women and students of color, casting IP as an issue of social justice (Shorr, 2017).

Faculty members are not immune to IP after completing their graduate studies; the evaluation culture could lead to feelings of deficiency (Jöstl et al., 2012). Zorn suggests that due to a fear of being "found out," a faculty member with IP could be reluctant to meet with students, answer questions in class, apply for grants, or attend conferences (2005). In academia, internal experiences such as writers' block or lack of motivation are often kept secret, maintaining the "myth of the ingenious scholar," relentless in pursuit of scholarly productivity. This is modeled for students, who see only the polished products, perhaps leading to the conclusion that "only Einstein—or a professor—could think up a theory" (Belenky et al., 1986, p. 215). A recent study found that faculty, especially untenured faculty, do experience impostor feelings; moreover, their impostor tendencies were related to job burnout through emotional exhaustion (Hutchins, 2015). Conversely, tenure-track faculty members reporting few or no impostor feelings expressed more comfort with mentoring, enjoyed being role models, and were more encouraging of questions (Brems, Baldwin, Davis, & Namyniuk, 1994).

With the IP, perceptions play a key role in feelings, behaviors, and cognitions, and seemingly outweigh any evidence of accumulated objective achievements. To date, no one has investigated IP in relation to these diverse academic consequences in one study. There is no encompassing measure of these thoughts and behaviors; therefore I generated new exploratory items for this study. This was to explore what kinds of perceptions and consequences, both negative and positive, were endorsed to obtain a more descriptive understanding of the IP.

Hypothesis 5: There will be a positive association between IP and academic consequences such that the more one feels like an impostor the more consequences they will endorse.

Summary

The IP is related to individual differences in perfectionism, core self-evaluations, anxiety symptoms, depressive symptoms, as well as career beliefs such as research self-efficacy for graduate students, especially women. Figure 1 outlines the hypothesized relationships.

CHAPTER 3: OVERALL METHOD

Research Design

I designed a mixed methods study in order to develop a deeper understanding of women graduate students' internal barriers and career outcomes and to compare findings with existing literature and established quantitative survey instruments (e.g., perfectionism). Specifically, this is a three-phase study (see Figure 2). Multiple methods are warranted to gain a more complete, contextual picture of a single phenomenon —IP— than a single method could achieve. This serves the purpose of *complementarity*[2] with an element of *development*[3] since the methods were implemented sequentially. Each step built off the previous phase. Data were integrated to explore unique insights and varied experiences of respondents.

Due to the nature of the research questions, qualitative and quantitative methods were equally weighted at different points in the study, as denoted by the capitals: QUAL → QUAN + qual → QUAL. The methods have complementary strengths to make efficient use of time, sample, and cost. For example, career consequences were measured quantitatively in a large sample and by a small number of women's own stories. This is consistent with recommendations for mixed methods research in counseling psychology (Hanson, Creswell, Clark, Petska, & Creswell, 2005) and with previous qualitative research on IP (Lane, 2015; Sanford, Ross, Blake, & Cambiano, 2015).

As shown in Figure 2, mixing happens at multiple points, congruent with a dialectical stance. This stance supports that the distinct pieces are not kept separate; there is a dialogue between paradigms, methodologies, and data. The stance affirms that paradigm assumptions guide practical inquiry decisions along with context and theory. Separate philosophical frameworks (paradigms) are valuable, and can be used in respectful conversation to meaningfully engage with difference and generate new insight. This was the most appropriate stance given the qualitative and quantitative methods, which align with constructivist and post-positivist paradigms, respectively. See Appendix A for more discussion of mixed methods.

In summary, the purposes of mixing methods were to examine the IP from multiple perspectives and techniques to achieve depth and breadth and arrive at a more nuanced understanding than could be achieved by any singular method.

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[2] *Complementarity* aims for a more comprehensive and clarified picture of the phenomena by measuring different facets (Greene, Caracelli, & Graham, 1989).
[3] *Development* implies sequential implementation with the aim of using results from one method to inform the next while trying to measure the same phenomena (Greene et al., 1989).

Inquiry Questions

1. How do graduate student women describe and define their experiences of IP?
2. In what ways do salient identities such as gender or race –or their intersection– shape how women graduate students experience IP?
3. What is the nature of the association between IP and educational and career development?

Phase 1: Focus Group

The first step consisted of two focus group interviews[4] to gain a preliminary understanding of women's experiences in graduate school and their career-related goals. This phase addresses the first two inquiry questions. The literature on IP has identified a number of relevant correlates; these focus groups helped determine which were best suited for inclusion in the survey for this population of women graduate students. It also provided a deeper understanding of IP experiences and allowed for dialogue as women shared their narratives.

Phase 2: Survey

The survey was designed to address inquiry questions 1, 2, and 3. An online survey invitation was sent to 3,000 women distributed among masters and doctoral students at a large midwestern university. It included the Clance Impostor Phenomenon Scale (CIPS), constructs informed by the focus groups such as perfectionism, and open-ended questions inviting women to describe their experiences.

Phase 3: Interviews

The interviews addressed inquiry questions 1, 2, and 3. Eight participants from the survey were individually interviewed to gain a longer narrative account of their personal experience with IP. The interviews emphasized how women interpret and make meaning of their experiences. This method was warranted because IP is an isolating phenomenon and it was expected that different themes would emerge compared to the group interviews.

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[4] The term focus group interview is used because it is most appropriate given the group's purpose. It prioritizes data collection, contains homogeneous participants, uses a standard set of open-ended questions, values the discussion from the *interaction* of participants, and has limited guidance of a moderator (Morgan, 1996). It diverges from traditional focus groups (c.f., Krueger & Casey, 2014) in that there were two total and the purpose was subsequent survey modification so there was no group summary at the end of each group, and reporting is done in aggregate within the context of the whole mixed methods study.

Participant Consent

The study received approval by the university's Institutional Review Board. Pseudonyms for interviews and focus groups were used, and identifying crosswalks were stored separately. Participants read and consented online for the surveys, and with paper forms for the focus groups and interviews. The methodology for each phase is described further in Chapters 4, 5, and 6.

Analysis

In this mixed-methods design the data were compared and contrasted throughout the analysis stage. This is appropriate because the purpose is complementarity, not convergence or triangulation. The data sets as a whole were repeatedly read, working inductively toward warranted assertions (claims grounded in the data). Data analysis contains multiple parts: preliminary focus group analysis, statistical analysis of survey data, qualitative analysis of open-ended survey questions, and thematic analysis of interview data. Lastly, the merged quantitative and qualitative results were interpreted to achieve a deeper understanding. Data quality was assessed based on standards appropriate for that form of data. See Appendix A for details on mixed methods purpose, stance, paradigms, and evaluation of data quality.

CHAPTER 4: FOCUS GROUP

This chapter describes the measures, participants, and modifications to the subsequent survey based on the focus group interviews.

Measures

Qualitative data were gathered from focus groups. The questions used to conduct these groups were developed from themes emerging in the literature and from informal observations of the population of interest. For example, "Does this definition of IP resonate with any of you? Could you describe the frequency or circumstances in which you experience it? How long does it typically last?" See Appendix B and C for outline and questions.

Participants

Two focus groups were carried out containing 9-10 people each. Recruitment was through list-serves within the university and word-of-mouth. Email invitations were sent to department heads and directors of graduate studies for at least one department within each college at the university. Inclusion criteria were (1) to self-identify as a woman and (2) have completed at least one semester of graduate school. There were no screening questions about the extent to which they experienced impostor feelings.

Group 1 contained ten participants, three from the college of Liberal Arts and Sciences, two from Education, three from Engineering, and two from Applied Health Sciences. All students were domestic. Seven fell within the 22-25 age range, two were 26-29, and one was 38 or older. Five were the first in their family to attend graduate school. Six started graduate school immediately after undergrad; others took 1 to 10 years off. Two identified as Asian/Pacific American, one was Black/African American, two were Hispanic/Latino, one was biracial (Hispanic/Latinx and White/Caucasian) and four were White/Caucasian.

Group 2 contained nine participants, four from the College of Liberal Arts and Sciences, two from Engineering, and three from Applied Health Sciences. Three students were international. Six fell within the 22-25 age range, two were 26-29, and one was 38 or older. Five were the first in their family to attend graduate school. Five started graduate school immediately after undergrad; others took 1 to 21 years off. Three identified as Asian/Pacific American, one was Black/African American, one was Hispanic/Latino, and four were White/Caucasian.

Procedures

  The 90-minute focus groups were conducted by the author and audio recorded with participant consent. An additional researcher attended the focus groups to take notes. In exchange for participating, focus group members each received a $10 Starbucks gift card.

  Focus group analysis. Focus groups were transcribed then checked by a person other than the transcriber. Transcripts were interpreted using thematic analysis with emergent codes using NVivo 11. An inductive approach was used because it does not presuppose a framework and allows the data to form patterns naturally to discover new relationships. After this phase a time for analysis and reflection was built in to consider findings thus far.

Preliminary Focus Group Results

  The goals of the focus group were to (1) identify which constructs to add / remove from the survey and interviews and (2) observe graduate student women sharing their personal stories with each other and gain insight into IP experiences.

  Deletions. Procrastination is a construct that has been associated with IP in the past but many students in the group did not endorse it and the comments shared did not add substantially to the understanding of IP that was not already captured by anxiety. Second, one of the scales (Depression Anxiety Stress Scale DASS; see Measures in Chapter 5) contained seven items about stress, which were removed because all the graduate students endorsed regular stress, which indicated it would not contribute unique variance. Lastly, the original survey contained perceived career barriers because women in particular tend to perceive more career barriers than men (Flores & O'Brien, 2002; Luzzo & McWhirter, 2001). However, the scales with the best psychometric validity contained too many items (49 items) therefore new items were generated.

  Additions. Due to the difficulties with perceived career barriers twelve new items were generated with the prompt "As a consequence of feeling like an "impostor," I have…" (See Appendix D). The items came from the topics emerging in the focus groups. Additional themes of IP also emerged (see Chapter 7) which resulted in seven new items. An open-ended question about comparisons was also included "When you are comparing your current success against where you'd like to be, who do you compare yourself to most often?" because interesting gender and age dynamics emerged in the focus groups.

Emphasis. It became exceedingly clear some measures should remain in the study, thus reinforcing their inclusion based on the previous literature. For example, both groups spoke openly about internal struggles with mental health and ways to seek help. Gender in the context of academia also emerged as an important contributor to impostor feelings, particularly for the women in math and engineering fields.

The themes emerging from the focus groups are presented in Chapter 8 as part of the mixed methods findings.

CHAPTER 5: SURVEY

This chapter describes the measures, participants, and demographics of survey respondents.

Measures

Clance Impostor Phenomenon Scale (CIPS). The CIPS was created to evaluate experiences of feeling like an impostor (Clance, 1985). A sample item is "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." The CIPS consists of Likert-type items evaluated on a 5-point scale from 1 (*Not At All True*) to 5 (*Very True*). The CIPS has shown internal consistency reliability with Cronbach's alphas of .92 (Chrisman et al., 1995) and .96 (Holmes, Kertay, Adamson, Holland, & Clance, 1993), including populations of graduate students .91 (Roskowski, 2010). The CIPS was specifically designed to minimize social desirability when responding (Holmes et al., 1993). Permission to use the scale was obtained from the author. The author identified three factors: *fake* (e.g., "I'm afraid people important to me may find out that I am not as capable as they think I am"), *discount* (e.g., "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"), and *luck* (e.g., "At times, I feel my success has been due to some kind of luck"). However these factors have not been well supported (French et al., 2008). Examining the psychometric properties of the CIPS is part of the research goal and is reported in Chapter 7.

Perfectionism. To measure perfectionistic tendencies the Short Revised Almost Perfect Scale was selected (Rice, Richardson, & Tueller, 2014). This 8-item measure has a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree), but for this study the "slightly" categories were deleted for a final range of 1-5 so the survey as a whole was consistent. It has two subscales: standards and discrepancy, which represent "perfectionistic strivings; high personal performance expectations" and "perfectionistic concerns; the perceived gap between personal standards and one's evaluation of having met those standards" (Rice et al., 2014). Rice and colleagues (2014) reported good reliability for both subscales with alphas above .85 in a sample of undergraduate students.

Core Self-Evaluations (CSE). The Core Self-Evaluations Scale (CSES; Judge et al.,

2003) was used to assess CSE. This 12-item scale contains four facets with three items each: self-esteem (e.g., "Overall, I am satisfied with myself"), generalized self-efficacy (e.g., "When I try, I generally succeed"), emotional stability (e.g., "I am filled with doubts about my competence"), and locus of control (LOC; e.g., "I do not feel in control of my success in my career"). Responses range from 1 (strongly disagree) to 5 (strongly agree). An internal LOC is indicated by a higher score. Internal consistency alphas for the entire scale have been reported as good (α = .91); the alphas for the separate subscales have also been found acceptable in a sample of Belgian employees: self-esteem α = .71, self-efficacy α = .60, emotional stability α = .87, and LOC α = .67 (Vergauwe et al., 2014). Judge reports high test-retest reliability r = .81 (2003).

Mental Health. It was expected that mental health would be associated with IP. The 21-item Depression Anxiety Stress Scales (DASS; Antony, Bieling, Cox, Enns, & Swinson, 1998; Lovibond & Lovibond, 1995) was selected because it covers high prevalence mental health concerns. Due to survey fatigue and redundancy the seven stress scale items were omitted. The instructions were modified for this study to prompt respondents to specifically "Think of the last time you were faced with a task that you knew would be difficult and required performing well." Sample items are "I felt that life was meaningless" (Depression subscale) and "I found myself getting agitated" (Anxiety subscale). Each item is rated from 1 (did not apply to me at all) to 5 (applied to me very much, or most of the time). The two 7-item subscales have acceptable reliability: Depression α = .94 and Anxiety α = .87 in clinical and community samples (Antony et al., 1998).

Research Self-Efficacy. The 7-item Research Self-Efficacy Scale (Jöstl et al., 2012) was selected for its relevance to female graduate students. Participants read a prompt "Based on the current stage of my career, I believe I am capable of …" and respond to items, such as "… planning and executing research projects." Since research will not be relevant to every discipline, the instructions indicate that respondents should skip irrelevant items. The original response scale was modified to a 1-5 scale with 1 (strongly disagree) to 5 (strongly agree) instead of a summative index to allow for more variation in responses. One item relating to going abroad was omitted. Jostl's version of the scale received a Cronbach's alpha of .69 in a sample of Austrian doctoral students.

Thoughts and Consequences of IP. A satisfactory existing scale capturing the intricacies of cognitions and behavioral consequences, both adaptive and maladaptive, of IP

could not be located. Therefore, 12 items were generated specifically for this study based on the hypothesized consequences found in the literature (Zorn, 2005) and the content that arose from the focus groups. The items are rated on a 5-point scale with responses from 1 (strongly disagree) to 5 (strongly agree). A sample item is "I do not have my career planned out like other students seem to." Additionally, a dichotomous yes/no direct question about IP was added: "Since starting graduate school, have you ever felt like an "impostor"?"

Open Ended Questions. Six open-ended questions were included. (1) "Some female graduate students report feeling like an "impostor," as if they don't really deserve their accomplishments. If you have felt this way, please describe it." (2) "Have you ever shared these feelings with someone else? If so, what was that like?" (3) When you are comparing your current success against where you'd like to be, who do you compare yourself to most often?" (4) "Are there any ways you think your career/education has been impacted by feeling like an "impostor" (e.g., not applied for awards or promotions because of feeling unworthy)?" (5) "Please comment on whether you perceive your gender to have impacted your career choices (e.g., choosing a profession, people's attitudes about your gender, anticipating getting hired, being treated differently in your future workplace)." (6) "What advice would you give to someone trying to overcome feeling like an impostor?" Lastly, "Are you willing to be interviewed in person about your experiences? If yes, enter your email and you may be contacted later."

Background Characteristics. Background characteristics are divided into three categories: (1) demographics, (2) educational history, and (3) current education program. Demographics contain: Sex/gender, age, international student status, and racial/ethnic identity. Although women are the target population, the sex/gender question allows participants to specify if they identify as transgender or non-binary. The age question is included to explore differences: does increased age mitigate impostor feelings, or conversely, does attending graduate school at a non-traditional age increase impostor tendencies?

Racial/ethnic identity is included because studies of IP have noted its importance (Craddock, Birnbaum, Rodriguez, Cobb, & Zeeh, 2011). For example Asian Americans have reported higher IP feelings than African American or Latino/a Americans (Cokley et al., 2013). Other studies have noted the dearth of research on minority populations, and how critical this is due to the theory of "othering" in academia, whereby white students may be seen as the norm and African American students are not (Peteet, Brown, Lige, & Lanaway, 2015). Bernard et al.

(2017) found that past experiences of racial discrimination among an African American college student population predicted higher IP at time 2 after controlling for time 1 IP.

Educational history contains (a) highest level of earned academic degree, (b) whether or not students identify as the first in their family to attend graduate school, (c) whether or not they went straight to graduate school after completing undergraduate education, and (d) how many years of graduate school they have completed so far. This explores if familiarity with graduate school and family pressure play a role.

Current degree program includes (a) level (e.g., masters or doctorate), (b) college, and (c) department. This allows for exploration of discipline-related differences. See Appendix D for demographic measures included in the survey.

Participants

After obtaining approval through the student affairs research office, the university's office of institutional research provided a random sample of 3,000 emails of graduate students meeting inclusion criteria. Although men do experience the impostor phenomenon, this study focused exclusively on women in order to delve deeper into diverse women's experiences. Furthermore, the sample excluded some professional degrees (i.e., Law) and online programs because their sequencing is substantially different from other graduate training. Participant invitations were proportionally balanced by college and degree program.

Table 1 shows the response rates by race/ethnicity, college, and current degree program, the three primary variables around which diversity was sought. Overall 508 individuals responded but two were removed because they indicated they were male. Others indicting transgender or any other gender identity were kept in the sample ($n = 8$). The overall response rate was 17% (508 out of 3,000). Table 2shows the background demographics of the sample. Over half the sample was White or Caucasian (61%), followed by Asian (20%) with all other groups less than 7%. Most respondents came from the College of Liberal Arts and Sciences (27%), which has the largest proportion of eligible doctoral students. The next largest was Engineering (14%). The final tally indicated a close split between masters (47%) and doctoral responders (50%) although at this institution master's students represent more of the female graduate student population.

Descriptive statistics including means, standard deviations, and omegas (indicators of reliability) are shown in Table 3. Omegas are interpreted similar to Cronbach's alpha but provide a more accurate estimate in the case of latent analysis (Raykov, 1997). The high reliabilities all above .96 provide more support for the scales' internal consistency. Table 4 displays the correlations for all constructs in the study. All measures were significantly inter-correlated with the exception of perfectionism-standards.

Procedures

The 3,000 graduate students meeting inclusion criteria were emailed an invitation to participate which included a link to the WebTools survey. The survey took 10-15 minutes and was open for two weeks in October 2017. An email reminder was sent one week prior to the survey closing. After completing the survey students had an opportunity to enter in a drawing for one of five Amazon Kindle Fire Tablets.

CHAPTER 6: INTERVIEWS

This chapter describes the interview measures, participants, and procedures.

Measures

Qualitative narratives from one-on-one interviews were gathered. The semi-structured interview questions were developed from the literature and from analyses of the quantitative data from the survey. See Appendix E for outline and interview questions.

Participants

The survey contained an opt-in item about willingness to be interviewed. Of the 247 opting in, twelve interview invitations were sent. These individuals were purposely selected to obtain variation in degree programs and racial/ethnic background in addition to relatively high and low IP scores. The rationale for this purposive selection instead of random selection was to maximize the information richness of the interviews. Interviews were sent in a staggered manner, for instance after identifying a potential candidate based on IP score and sending an invitation, the next interviewee was sought to not replicate the same demographics or program. Four of those invited declined or did not respond in time. The remaining 8 completed a 60-minute interview with the author. The interviews were linked to their survey responses in order to compare the quantitative results of the CIPS.

The eight individuals who participated in the interviews ranged from ages 22 – 41. Four were Caucasian, two were Asian, and two were African American. Two were international. Five were in doctoral programs and three were in masters programs. Colleges represented included Liberal Arts and Sciences; Information Sciences; Agricultural, Consumer and Environmental Sciences; Fine and Applied Arts; Education; Media; and Engineering. Four had proceeded straight to graduate school. They had completed between 1-9 years of graduate training (mean = 3.4, median = 2.5). Five were the first in their family to attend graduate school. IP scores ranged from 40 to 94 (mean = 69, median = 73). It is generally accepted that a cutoff score of 62 indicates substantial impostor feelings (Holmes et al., 1993).

Procedures

Interviews took place in a private setting, either an office at the College of Education or The Career Center, based on the participant's convenience. Interviews were audio recorded with the participant's consent and transcribed by a trained research assistant and checked by the author. In exchange for participating, interviewees received a $15 Starbucks gift card.

Interview Analysis

Interviews were read using thematic analysis with emergent codes using NVivo 11, again with an inductive approach. Memos were kept throughout data collection and analysis. These memos contain comparisons, observations, and connections observed as the data were gathered. Resulting themes from the analysis of all the qualitative pieces are presented in Chapter 8.

CHAPTER 7: CONSTRUCT VALIDITY OF THE IMPOSTOR PHENOMENON

Clance's introduction of IP has been extremely influential in the field. Without it the literature would not have amassed over 35 years. Although the Clance Impostor Phenomenon Scale (CIPS) has been used in dozens of studies it has not undergone rigorous examination. Measurement of any phenomena requires valid and reliable instruments. Before full mixed-method results are presented in Chapter 8, this chapter covers background on scale construction, construct validity, and addresses three questions:

1. Does the CIPS have an adequate factor structure, and if so, what is it?
2. Does a new factor structure with a subset of CIPS items have convergent validity?
3. Does a new set of items measuring IP also relate to the new factor structure?

Brief Introduction to Construct Validity

The first step in scale development is to create a precise and detailed conception of the target construct and its theoretical context (Clark & Watson, 1995). IP as a construct was first introduced in 1978 (Clance & Imes, 1978). The first measure of IP was the Harvey Imposter Phenomenon Scale (HIPS; Harvey, 1981). The CIPS was published in 1985 to improve on the HIPS and since then has been used most frequently by researchers and is recommended over the HIPS (Holmes et al., 1993). No details are provided about the scale development history and there is no test manual. Given that Clance describes observations of women (Clance, 1985), it is likely the scale was developed through the deductive method, which is economical (Burisch, 1984). However, Cronbach and Meehl assert "references to something 'observed by the writer in many clinical cases' is worthless as evidence" (Cronbach & Meehl, 1955, p. 297).

Clark and Watson (1995) outline guidelines for item writing for scale development with the ultimate goal of having differentiated items that are only moderately inter-correlated and not redundant. First, language should be simple, straightforward, and appropriate for the reading level, which appears appropriate for individuals with a bachelor's degree. Several items in the CIPS are formulated in ways that may affect factorial properties. For example containing colloquialisms, polarizing words, double-barreled items, or affect-laden words (e.g., "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").

Cronbach and Meehl's (1955) seminal article describes four kinds of validity: predictive, concurrent, content, and construct. A scale can be considered a good measure of a construct if there is a strong fit between predictions with external criteria, either alternative measures of the same construct or theoretically relevant outcome. Holmes, Clance, and colleagues (1993) compared the CIPS to the HIPS and found high inter-item reliabilities for both scales, yet recommended the CIPS due to sensitivity at differentiating impostors from non-impostors.

This sub-study evaluated the CIPS psychometric properties through examination of item analyses, internal consistency reliability, and the factor structure via confirmatory factor analysis. In other words, does the latent factor indexed by the CIPS behave as it should, if it were in fact a latent construct for IP?

Analysis Plan and Results

The survey measures, participants, and procedures are described in Chapter 3 and 5.

1. Does the IP scale have an adequate factor structure, and if so, what is it? First, confirmatory factor analysis (CFA) was conducted to identify hypothesized factors for all constructs including the CIPS. Initial model fit was gauged by the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and root mean square error of approximation (RMSEA). In accordance with common guidelines, good fit was indicated with CFI and TLI close to .95, and RMSEA close to .06 (Hu & Bentler, 1999). All data were modeled in Mplus 8 (Muthén & Muthén, 2017). The CFAs were estimated using ULSMV (mean and variance-adjusted unweighted least squares), given the categorical data and are displayed in Table 5.

Personality variables often fail traditional cutoff criteria due to the complexity of personality phenomena (Hopwood & Donnellan, 2010). In accordance with recommendations I proceed with borderline fits and consider the substantive meaning and fidelity to the underlying theoretical assumptions of the results.

Confirmatory factor analysis for all scales.

CIPS – Impostor Phenomenon. The CIPS proved to be problematic. A full unidimensional scale with all 20 items failed to meet the traditional cutoff criteria (CFI 0.94, TLI 0.93, RMSEA 0.08). Attempts to identify the *luck*, *discount*, and *fake* factors that others have identified also did not succeed. For example, French and colleagues (2008) conducted a CFA in a sample of undergraduates and determined that a two-factor solution fit best, specifically with

fake and discount collapsed into one factor. My final model had a number of modifications. First, items 1, 2, 19 and 20 were dropped. This is consistent with studies that also dropped those items due to poor fit (French et al., 2008). Additionally, I dropped items 5, 11, and 16 because of poor fit indicated by modification indices. The final version fit well (CFI 0.97, TLI 0.96, RMSEA 0.09).

To further corroborate the decisions made about the 13-item version I carried out principal components analysis (PCA) in SPSS with the 20 items with Eigenvalues greater than 1 and varimax rotation. I considered 1, 2, 3, and 4 component solutions. Having just one component explained 42% of the variance with each additional component adding 6% or less. The 4-component solution did not have any interpretable patterns and in fact highlighted the problems with the items. For example, "When I've succeeded at something and received recognition…" loaded onto three components with nearly equal weights .44-.50. After consulting with psychometrics experts, it was concluded that the reduced 13-item scale was unidimensional and should be used for subsequent analysis.

SAPS – Perfectionism. Based on the scale, a two-factor solution with standards and discrepancy achieved acceptable fit (CFI 0.96, TLI 0.94, RMSEA 0.09).

DASS – Depression and Anxiety. The hypothesized 2-factor structures with 7-items each did not fit well. Modification indices indicated that item 1 ("I was aware of dryness of my mouth") was problematic therefore it was dropped. The final 13-item 2-factor CFA achieved acceptable fit (CFI 0.95, TLI 0.94, RMSEA 0.10).

CSES – Core Self-Evaluations. The hypothesized 12-item structure did not meet acceptable fit criteria therefore two modifications were made. First, since four items were reverse coded a factor for reverse coding was added to account for shared error variance due to the reversed items (Weijters & Baumgartner, 2012). Second, item 11 ("I am capable of coping with most of my problems") was dropped at the suggestion of modification indices and the two items making up self-esteem were locally identified. The final 11-item CFA achieved good fit (CFI 0.97, TLI 0.95, RMSEA 0.07).

RSES – Research Self-Efficacy Scale. The hypothesized research self-efficacy scale with six items fit well (CFI 0.97, TLI 0.95, RMSEA 0.10).

2. Does a new factor structure with a subset of items have convergent validity?

  Simultaneous Confirmatory Factor Analysis. After establishing models that fit acceptable thresholds, I proceeded with a CFA with all five scales as an intermediary step before the SEM. The first simultaneous CFA was characterized by convergence issues relating to emotional stability. The second simultaneous CFA dropped the emotional stability items as well as five items, which were highly cross-loaded (from perfectionism, core-self-evaluations, depression, and anxiety). In the final model both CFI and TLI approach .95, consistent with recommendations (CFI 0.95, TLI 0.95, RMSEA 0.04). Fit indices are shown in Table 6.

  Structural Equation Modeling. Next, I sought to investigate whether IP as measured by the 13-item version of CIPS (now referred to as CIPS-SF) achieves a pattern of relations with other theoretically-related constructs based on other empirical research. I compared CIPS-SF with these constructs in order to explore if the predicted relationships emerged in the predicted directions, providing evidence of convergent validity. As shown in Figure 3, all of the patterns achieved significant fit in the predicted direction. In other words, the IP predicted both kinds of perfectionism, symptoms of anxiety and depression, and research self-efficacy. This supports that CIPS-SF could be a reasonable way to measure IP in a female graduate student population.

  3. Does a new set of items also relate to the new factor structure? Focus groups conducted prior to the survey generated topics or items that could be relevant to more completely capturing the experience of IP. These topics were then formed into 14 new items about the IP experience with the same response options as the original CIPS. These items were reduced to seven given available space in the survey and to not be redundant with the CIPS (see Table 7).

  A CFA of the seven items exploring a unidimensional scale indicated poor fit (CFI 0.57, TLI 0.35, RMSEA 0.15). However, the items naturally separate into two factors: normalizing (1, 2, 3, 7) and belonging (4, 5, 6). After dropping item 7 ("Not bragging about my accomplishments is just being modest") due to poor wording, the indices fit well (CFI 0.995, TLI 0.99, RMSEA 0.02). These two factors both correlated significantly with the 13-item IP scale (IP and Normalize $r = .25$, $p = 0.00$), IP and Belonging ($r = .77$, $p = 0.00$). They also correlated with each other ($r = .21$, $p = 0.001$).

Discussion of Latent Analysis Study

This study found that (1) the 20 CIPS items did not point to a singular latent construct indicating the presence of the IP but a modified factor structure with only 13 items did. (2) The 13-item version (CIPS-SF) achieved convergent validity with other scales. Finally, (3) a new 6-item scale also relates to CIPS-SF. Therefore, the CIPS-SF may be a useful tool for researchers and practitioners seeking to measure IP.

The CIPS is widely used and numerous studies that use it cite one validation study (Cozzarelli & Major, 1990) to justify its use. Cozzarelli and Major (1990) examined whether IP scores had unique predictive ability after accounting for self-esteem and defensive pessimism in a sample of undergraduate psychology students. They found considerable overlap between IP, trait-self-esteem, and defensive pessimism. These constructs explained all differences between impostors and non-impostors. The construct is not clearly and consistently differentiated from many similar constructs such as perfectionism and self-esteem.

Chrisman and colleagues (1995) compared the CIPS to the Perceived Fraudulence Scale (Kolligian & Sternberg, 1991) and established high internal consistency in a sample of undergraduate students. Their discriminant analyses comparing CIPS to depression, self-esteem, social anxiety and self-monitoring and found IP was related to but distinct from these constructs. They did a PCA yielding 3 factors: fake, discount, luck after dropping items 1 and 2. They concluded it has a stable factor structure.

Limitations. It important to state that this study was not originally designed as a construct validation study or a study to develop a new scale, so I was unable to follow many of the gold standards (Clark & Watson, 1995). However, it still was able to demonstrate that despite face validity, there are psychometric concerns about the scale in a large sample spanning many disciplines. Another limitation has to do with the adjustments made indicated by modification indices – although theoretically defensible they may not appear in another sample. The high correlations between IP and other variables complicates the understanding of what is IP uniquely, therefore future work should attempt to identify higher order factors, but that was not the intention of this work.

Future Directions. Replication is becoming a crucial issue, particularly in psychological science and with measurement (Loken & Gelman, 2017; Open Science Collaboration, 2015). I replicated the poor functioning of items 1, 2, 19, and 20 found in other studies (Chrisman et al.,

1995; French et al., 2008). My study contributes new understanding to the latent factor of the IP. It failed to identify the Luck, Discount, or Fake factors that are supposed to be a key part of the scale. This study highlights the need for sound measures of IP; it is meaningless to replicate measures that lack validity. The six new items complementing the IP, which identified belongingness and normalizing themes, could be added as a supplement or hybridized scale but these require further investigation and validation. Future research is clearly needed to help clarify the construct, specifically with other kinds of validation methods like the multi-trait multi-method matrix in varied populations.

   Conclusion. What should future researchers wanting to measure IP do? For now, it is not recommended that the scale be entirely abandoned. However, extreme caution should be taken and factor analysis is strongly recommended to better understand how the items behave in the researcher's intended population. For now, the CIPS-SF could be considered in conjunction with the six new items generated from this study. More discussion of theoretical implications is presented in Chapter 10.

CHAPTER 8: RESULTS BY RESEARCH QUESTION

I should have kicked grad school's ass, I should be a rising star. But the PhD program has kicked my ass and I am very much not a rising star at all.

This chapter integrates the qualitative and quantitative results by research question. Themes were uncovered through reading of the qualitative responses and coded with qualitative analysis software, NVivo. After reading to absorb potential themes, transcripts were read again to identify broad themes (e.g., IP Consequences), and then read again to seek patterns among subthemes. Codes were then compared and discussed with experts at multiple points during analysis, and adjusted as needed (e.g., combining *future goals* with *career*). Table 8 outlines the themes from the data, which are later described in detail.

Research Question 1: How do graduate student women describe and define their experiences of IP?

The mixed-method approach can help shed light on multiple ways to understand IP experiences. Chapter 7 focused on the quantitative findings highlighting the importance of considering quantitative data from a latent approach in addition to the traditional observed level.

The CIPS possible outcomes range from 20-100 and the IP can be considered on a continuum, which has been recommended (Vergauwe et al., 2014). It can also be treated as a dichotomous indicator with a cutoff indicating high or low IP. Holmes (1993) recommends a cutoff score of 62. As noted in Chapter 7, for this study it is preferred to treat the scale as a latent construct therefore the inclusion of all 20 items here is for illustrative purposes to compare with previous research. Table 9 shows two breakdowns of whether or not an individual would be classified as an impostor. The top row uses the traditional cutoff of 62. The bottom row is a self-identified response. Therefore, between 66-73% of respondents would be classified as impostors.

Of the 487 people that responded to both, 78 (16%) did not meet the cutoff criteria but still felt like an impostor, 40 (8%) denied feeling like an impostor yet met the cutoff criteria, 280 (57%) self-identified as impostors which aligned with their cutoff score, and 89 (18%) were not impostors neither by self-identification nor cutoff score. This provides initial prevalence rates of how widespread these feelings are in a sample of graduate student women. Additionally, Clance specifies that a score of 41-60 indicates moderate impostor feelings (Clance, 1985), so these

numbers could be underestimates. It also shows the complicated nature of identifying with the term separate from one's score. Clearly, some individuals choose whether or not to associate with the idea of being an impostor.

To complement the quantitative results, it is important to understand how women describe this feeling in their own words. Quotes with names are pseudonyms to preserve anonymity. Quotes are in participants' own words except for omitted filler words (e.g., "like" and "umm"), and adjusting punctuation for ease of readability. The examples provided come from experiences in classes, labs, practical work, and more. The focus groups, survey, and interviews revealed twelve subthemes (see Table 8): Fear of Failure or Mistakes, Frequency and Duration, Doubting Merit, Every Success is a Fluke, A Disconnect, Fear of Success, Ease Does Not Equal Competence, Discount, Luck, Fake, Lack of Support, and From Undergraduate to Graduate. Following the subthemes of IP are examples of perfectionism, core self-evaluations, and mental health.

One of the very first things said in the first focus group encapsulates IP well:

Sometimes I feel like you're on very thin ice and at any moment everything is going to collapse under me. I don't know why. I can't shake it. I know I've done the work. I know that I deserve to be here but there are times that I feel like things are very shaky. – Ary, Focus group, College of Education

Fear of Failure or Mistakes. IP feelings often conveyed a sense of precariousness. For some people, they are successful and one mistake is going to get them kicked out. Whereas for others, they have been "faking it the whole time" and fear a mistake will cause them to be found out then they will be asked to leave.

Realizing that there is SO much that I don't know is really intimidating, and I'm honestly terrified that I will fail spectacularly and disappoint everyone. – Survey 249, School of Veterinary Medicine, doctorate

I feel like I got my position because I cracked jokes with my professor during interviews and he likes my sense of humor. I also feel like my CV looks impressive because I have done many internships, so I look like a good candidate, but I don't know what I'm doing and I'm not really intelligent, I'm just a hard worker…I'm worried that every mistake I make and every bad draft I turn into my adviser will alert him to the fact that I'm not very intelligent and not an all star grad student. I worry he'll feel like I'm a mistake.
– Survey 346, School of Integrative Biology, doctorate

> Is it going to hit me during my candidacy exam? Is everyone going to be like, "Oh, wow you were faking it. Sorry. You've gotta go now." So that's what's always in the back of my mind like, I'm somehow fooling everyone and it's going to catch up to me later.
> – Cindy, Focus Group, College of Liberal Arts and Sciences

Two women identified bigger issues with how failure impacts how they see themselves. A focus group participant shared, "I've tied so much of my identity to my academic self, that any academic failure is a failure at life." Similarly, a survey participant said "I put all my worth as an individual in me succeeding in my PhD." They recognized how this could be problematic for how manage their mental health and sustain performance in academics.

Frequency and Duration. Responses varied in terms of how often people experienced IP and whether or not it changed over time. Some described feeling like an impostor constantly throughout their graduate schooling. "So I feel that every single day, morning and night. When I'm studying, when I'm doing research. All the time." – Michelle, Focus Group, College of Liberal Arts and Sciences.

Others described intentional changes they made in their lives to try and overcome it such as seeking mental health counseling. Still others discussed how IP grew over time because it became less and less acceptable to ask questions about things they should "know by now." However, in some cases respondents were able to accumulate experience and self-efficacy, which lessened IP feelings.

> Imposter Syndrome was so real to me my first semester of grad school that over winter break, before grades came in, I was already looking up the cost to break my lease and rent a UHaul to go back home. Over the years, the Imposter Syndrome has lessened but is always there. – Survey 157, College of Liberal Arts and Sciences, doctorate

> Often in my first year or two felt like everyone must know much more than me. But since I passed my qualifying exams especially (and even more so after having my first full paper accepted), I haven't felt like an imposter at all. I felt very well prepared for my quals and now I'm confident that I'm as knowledgeable as everyone else in my area.
> – Survey 220, College of Engineering, doctorate

Doubting Merit. Arguably, getting into graduate school in any discipline is an achievement. However, the participants described many doubts about how they got this far. Sometimes people feel like they "didn't earn their way" or "just squeaked by." Perhaps they felt that they "look better on paper" but do not truly deserve to be where they are.

It feels like the College made a mistake in accepting me - as if I just slipped through the cracks. – Survey 118, College of Education, doctorate

I constantly feel as though if the conditions had been slightly different I wouldn't have made it. I felt that way about getting into my lab, my GPA, even my defense. – Survey 298, College of Agriculture, Consumer, and Environmental Sciences, professional degree

This concern over belongingness has them looking over their shoulder, "waiting for the other shoe to drop" if they are found out. "It feels kind of like someone is going to jump out and say I'm being pranked, that I don't actually belong here. I feel like everyone around me is so more prepared and accomplished than me" – Survey 244, School of Information Sciences, masters.

Some doubts about merit had to do with their identity, "I got it because I was a woman" or "because people felt bad for me." They wonder "did I get this because I filled some diversity disability checkbox for them or am I really qualified?" They believe they may have "interviewed really well or talked my way into my position."

Often I feel as though I have lied to people and have put on a greater air of accomplishment. I was recently elected to a board position for a student group and I have spent the whole time worried I have somehow tricked people into voting for me, rather than someone better qualified. – Survey 75, School of Information Sciences, masters

Every Success is a Fluke. With the IP, often women have difficulty internalizing their successes. The idea of success being a "fluke" came up repeatedly which implied they do not feel ownership over the achievement and lack conviction they could repeat a similar success.

I am constantly doubting myself and undercutting my accomplishments because it feels like a fluke. I worried that one day my work will not be good enough and others will ridicule me for it. – Survey 24, College of Education, doctorate

I often feel like an impostor. I know objectively that most of the time, graduate work (conferences, papers, grant applications, etc.) go fine, but I often worry that those previous successes were flukes or that people evaluating me have made a mistake or are just being polite. – Survey 303, College of Liberal Arts and Sciences, doctorate

I had a paper accepted by a journal with no revisions … and I know that that fact is remarkable, but I'm STILL convinced that it was probably a coincidence or that maybe this journal has low standards. – Survey 211, College of Veterinary Medicine, doctorate

A Disconnect. One key of IP is a disconnect between objective evidence of successes, (e.g., publications, awards, grades) and impostor feelings. Many women described inability to reconcile evidence of accomplishment with their internal feelings, especially students who prided themselves on their rational or logical nature.

> I know that I have experience, knowledge, competencies, abilities, and I still am fairly constantly, quite honestly, worried that they are going to notice and then be like "Oh sorry we had to cut your funding money because you don't belong here." – Jessica, College of Liberal Arts and Sciences, doctorate

Fear of Success. The praise and recognition for accomplishments becomes a double-edged sword because it brings attention or scrutiny and for many, this increases pressure for future successes. Pride, if at all present, is short lived. For example, "I tend to cancel out the successes I have with my failures." – Michelle, Focus Group, College of Liberal Arts and Sciences. Others added,

> When I accomplish something, I get a brief period of happiness followed by a lingering worry that people will expect me to continue to succeed and I will let them down. I feel as if every time I do something it has to be even better to convince everyone else that I know as much as they think I know. – Survey 338, College of Liberal Arts and Sciences, doctorate

> My fellow students and my advisor appear to think I'm really good at [living up to the standards of productivity, work quality, and stress resilience] and it baffles me - and it makes me think they'll be sorely disappointed when they realize I can't measure up to that image. – Survey 274, College of Liberal Arts and Sciences, doctorate

Guilt about success, in addition to fear of success is another common feature.

> I often feel like an impostor when I succeed. Whenever I win an award or get a competitive grant, I cry because I feel like I don't deserve it, or I feel guilty for taking that award from another worthy student. I also feel like an impostor when accomplished scientists compliment me or collaborate with me. My fear is that I'm at my peak now, but that I will plateau and scientists who put their faith in me will be disappointed because I "showed so much promise, but didn't amount to much..." – Survey 161, College of Liberal Arts and Sciences, doctorate

Ease Does Not Equal Competence. Some women described that praise felt hollow if the work they were performing was relatively easy for them. This could be a form of denying her own competence, which is a key attribute of IP.

I felt like an imposter when I passed my qual. The qual felt almost too easy, like they were giving me easy questions on purpose and had already decided ahead of time to let me pass, perhaps because I met a diversity quota or something. – Survey 197, College of Engineering, doctorate

Discount, Luck, and Fake. Discounting praise, attributing successes to luck, and feeling like a fraud are three themes that the literature regularly describes as hallmarks of IP. They were expected to emerge from the quantitative scale but did not form stable latent sub-factors. However, Table 10 contains examples of these three themes emerging from the qualitative results.

Lack of Support. Support is important for developing self-efficacy and building on successes, yet many women described how the lack of support in their situations often exacerbated their feelings of being an impostor. Difficult advising relationships, competitive lab environments and classmates, and negative feedback were examples that came up. One student shared, "our professors are very vocal in saying that the first year students [we] aren't meeting their expectations." Others described a sense of being trapped or stagnating without the help they needed.

I feel that people think I know more than I do and that I am asked/expected to do things that I don't know how to do. When I express that I don't know how to do them I do not receive support from my adviser and I do not feel that it is appropriate to go around my adviser to burden other people/faculty with my incompetence. – Survey 79, College of Agriculture, Consumer, and Environmental Sciences, masters

I am in the process of publishing some papers and every time this happens, I always have a comment about the fact this is luck or this would have happened without me. Or if I am the second author, I had a comment about the fact I am a free-rider. All those comments were from male Ph.D. graduate students in my program. – Survey 101, College of Agriculture, Consumer, and Environmental Sciences, doctorate

Perfectionism

The literature supports that IP is linked to perfectionism. *Hypothesis 1* was that there would be a positive association between IP and perfectionism. As shown in Figure 3, the results supported this hypothesis with IP significantly related to both forms of perfectionism: having high standards ($\beta = 0.13$) and the discrepancy between those high standards and evaluation of one's own performance ($\beta = 0.78$).

Women also described what perfectionism looks like in their own lives,

I hold myself to a higher standard than I hold other people to… Where I would forgive someone else, I beat myself up a little bit. – Shea, Focus Group, College of Applied Health Sciences

Calliope commented on how the mask of perfectionism interferes with learning,

Unwillingness to demonstrate any lack of understanding or inability to comprehend is tied to a sense of perfectionism ... I have to present a perfect understanding, a perfect grasp of my field, my work. And that can be very limiting because if you're not willing to admit that you don't have a strong grasp of the stuff that you're working with I think it might limit, … your willingness to take on challenging questions. Right? Because challenging questions necessarily come with sort of, a break in the façade of your all-knowing projection. I think that can be a challenging of perfectionism is not pushing yourself out of your comfort zone." – Calliope, Focus Group, College of Liberal Arts and Sciences

Emma discussed her competing desires for perfection versus good work,

Research is not solvable in one day. You do really need to let it soak in and I need mine to be perfect… I brute force my way at it because it should be perfect and it should be perfect now. But sometimes no matter how much time you devote to something, you just need time off to really let the idea sink in. – Emma, Focus Group, College of Liberal Arts and Sciences

She went on to provide an example of how perfectionism can be maladaptive,

I went to a conference two days ago and I had a 20-minute presentation and it's meant to be a practice talk. And even though I wanted to go to all these workshops I was like I have to work on my talk because it's not perfect. And I could change the font and make it this more cohesive... And it didn't matter in the end. – Emma, Focus Group, College of Liberal Arts and Sciences

Lastly, Catherine noted "The hardest for me is defining not what is perfect, but what is good enough." Catherine, Focus Group, College of Liberal Arts and Sciences

From Undergraduate to Graduate. Women also discussed the transition from undergraduate to graduate education. Generally, there is less emphasis on grades in graduate school and there is less structure, which means students have to adapt. One student's advisor told her,

"Oh don't worry about it, you just need a B to pass grad school" And I was like, "well if I can get an A and I want to work hard I should study for that A, right?" And even like other professors said "Oh your grades don't matter. When you apply for jobs who's going to look at your grades? It's all about publications or your research. Just pass grad school. Just get the bare minimum." – Sarah, Focus Group, College of Applied Health Sciences

Another commonly noted difference was going from a "big fish in a small pond" to a situation where they are no longer above average, like "being dumped in the ocean where my accomplishments did not compare." Some people like April might be prepared for this,

> [My mom] said, "You've been the best at everything before and now you're in a situation where you're not the best so you need to gird your loins and keep at it". – April, Focus Group, College of Liberal Arts and Sciences

Others noted a complete shock and challenge to their plans to continue,

> I never felt like an impostor until I arrived to graduate school. I had always been the highest achieving student; summa cum laude, valedictorian, president of several organizations. Now in graduate school, in one of the top programs in my field, I feel very out of place. As if everyone is in one place and I am in another. I feel like everyone knows more than me; knows how to speak better than me... I often feel so uncomfortable, I consider dropping out which I never EVER thought of as an option. – Survey 377, College of Liberal Arts and Sciences, masters

Core Self-Evaluations

Core self-evaluations are the way a person sees themselves and it was expected that higher IP would be related to lower self-esteem (*Hypothesis 2a),* lower generalized self-efficacy *(Hypothesis 2b),* an external locus of control (*Hypothesis 2c),* and lower emotional stability *(Hypothesis 2d).* As shown in Figure 3, the hypotheses were partially supported. Higher IP was significantly related to lower self-esteem (β = -0.89), lower self-efficacy (β = -0.43), and a negative locus of control (indicating external control, β = -0.74). Emotional stability was removed from the analysis because the items would not converge. The quote below highlights IP with many components of core self-evaluations.

> Even though I can objectively recognize that I'm smart, personable, funny, etc., and can even recognize that I'm smarter, more personable, funnier, etc. than some of my peers, these objective judgments do nothing to fill the yawning pit of my self esteem. I feel like I am entirely responsible for my failures, but when I accomplish tasks or otherwise succeed in my work, I feel as if it "just happened", like I'm in the driver's seat when I screw up, but when I succeed, it's an accident. – Survey 301, College of Agriculture, Consumer, and Environmental Sciences, doctorate

Many respondents used the word "confidence" to describe how IP affected their self-appraisal. A student from the College of Education said, "It is like I came to grad school and lost all confidence in myself." Another added, "I think it primarily impacts me in terms of internal

self-confidence. I can put up a good front, but inside I am asking how others could ever take me seriously." – Survey 404, School of Information Sciences, doctorate

Mental Health

Mental health was a very common theme arising from the focus groups, interviews, and surveys. One person described IP as an "energy tax," making every assignment just a bit harder. Many openly shared lifelong history with mental health struggles comorbid with impostor feelings in graduate school. Others discussed recognizing for the first time in graduate school that they needed to seek counseling.

> I went through therapy, and I think the biggest lesson I learned through that was figuring out how to take care of myself. Which you kind of can't get from friends sometimes. I think it's really hard to talk about things like anxiety and depression in grad school, at least that was my experience, because I think people don't really get it until you personally go through it. – Kaylee, Focus Group, College of Engineering

Anxiety. It was expected that there would be a positive association between IP and symptoms of anxiety (*Hypothesis 3a)*. This was supported by the survey results ($\beta = 0.54$). Recall, this measure is not of clinical anxiety but of symptoms of anxiety in relation to a situation that challenges one's competence. Some people described developing habits such as throwing up before exams or having panic attacks when trying to engage in an activity associated with their impostor feelings.

> I have always felt this way, but as I have been nearing the end of my studies, my anxieties and fear of being an imposter have become amplified. I am currently at the stage of my dissertation where I am writing, and I find myself paralyzed by anxiety which has dramatically decreased my writing progress. I have a fear that I didn't do my research correctly, that I don't have enough evidence to make the claims I am making, that I will not pass my defense once I am done writing. – Survey 205, College of Fine and Applied Arts, doctorate

> It feels like struggling to write a cover letter or market yourself to employers because you feel like your lesser than the other candidates. It feels like running for vice president instead of or president to be in the background. It feels like knowing that you're right but being too anxious to raise your hand in fear of looking stupid. It has led to a level of anxiety that I have never experienced and I often attribute it to the rigors of graduate school. This anxiety is an ever-present barrier to my success and confidence. – Survey 483, College of Law, professional degree

Loneliness and Depression. It was expected that there would be a positive association between IP and symptoms of depression (*Hypothesis 3b).* This was supported by the survey results ($\beta = 0.57$). Again, this measure is not of clinical depression but of symptoms of depression in relation to a situation that challenges one's competence. The qualitative examples provided ranged from self-isolation to self-reporting diagnoses or symptoms largely consistent with major depressive disorder.

Isolation can occur due to the nature of the program or by intentional choices. Some women described avoiding people that were competitive or "toxic." Loneliness also was attributed to lacking a sense of belongingness and feeling unable to relate to others because of IP.

> Your work tends to be fairly isolating. Just the nature of it. You're working on your own project… You're alone in front of a computer all day and then you're really tired and you don't feel like going out to a bar or to go running with friends. And then that just kind of collects and collects. Especially for people who tend to be a little more antisocial, and for people who are social, that gets really hard and so we keep talking about this feeling of isolation and loneliness and it's that compounded effect with the type of work, I think, and the lifestyle that leads to that. – Scout, Focus Group, College of Education

> I prefer to work alone in classes out of fear I might benefit from discussion with others, but will have nothing to contribute to "pay them back" for the help - so I end up struggling with all-nighter homework and working by myself, which creates trouble when I have to communicate with my peers or take an oral exam, for instance, since I have never learned how to express myself and have no idea if I can trust my knowledge. – Survey 292, College of Engineering, doctorate

Depressive-type consequences emerged as well. The individual from Engineering continued,

> I constantly feel that I am not good enough to be in my program and that I am a failure and a disappointment to my advisor, to my group and my colleagues. I worry that they will discover I am not truly knowledgeable and am pretending to get by. I sincerely want to learn, I really do but I need time and I feel like everyone expects output from me, and I feel like I am not allowed to take that time to grow and learn at my own pace. I have been struggling with increasing issues of self-doubt, anxiety and depression, and it has poisoned my first two years of graduate school and my relationship with my partner. My stress and doubts about my ability transfer into my home and make me miserable, isolated, apathetic and unable to put myself out there and do even simple things. – Survey 292, College of Engineering, doctorate

> I think if I weren't struggling with this depression/impostor syndrome/whatever, I might love research - I manage to almost feel like I'm somewhere in the neighborhood of fun when I get past it enough to get my brain fully engaged. – Survey 503, College of Applied Health Sciences, doctorate

Clearly there are myriad mental health consequences for women in graduate school and in many cases this is recursively feeding into sense of self-appraisal as an impostor.

Not Everyone Identifies with IP

There were a number of individuals in the survey and interview who did not strongly identify with IP. A handful of statements discussed feeling like accomplishments are deserved, e.g., "Even though I may feel ill-equipped at times, I know I deserve everything I have worked for." Some viewed the learning curve as a necessary part of training.

> I see being in a graduate school as a privilege to learn from my peers and instructors. I don't want to take this opportunity for granted... I'm trying to learn as much as I can and do what's interesting to me academically. – Survey 251, College of Liberal Arts and Sciences, masters

A small number of people seemed baffled by the idea the existence of IP, "It does not exist ever" and "its really very uncommon in college of engineering."

Lastly, one participant commented on the way academia fosters a graduate student's understanding of accomplishment. Without the open-ended questions new perspectives such as this one would not have emerged.

> I believe that the academic environment often encourages overstating and exaggerating accomplishments, especially the role a single individual played in a complex project… I don't believe graduate students feel like imposters due to lack of self-confidence, I believe we may assess our contributions and achievements differently internally than we're encouraged to externally…the feeling that a discovery hasn't "revolutionized" the field even when it's a significant achievement can be realistic, not self-deprecating. The entire concept of deserving an accomplishment in a field where hard, good work often leads to failure or null results is a bit simplistic. The concept of "being an authority" in a field that gently pushes the boundary of knowledge is absurd... – Survey 74, College of Agriculture, Consumer, and Environmental Sciences, doctorate

Summary of Research Question 1. Nearly 3 in 4 women self-identified with impostor phenomenon, however, IP emerges in different ways for different women. Fear of making mistakes and being found out caused stress. For some, IP was a constant feeling and others discussed it changing over time, often lessening. They second-guessed their merits for getting into graduate school and also subsequent successes, wondering if achievements were due to fluke, pity, or some other external factor. Accomplishments were bittersweet because they came with pressure to keep performing or a frustration with the dissonance between seeing positive

outcomes but still feeling unworthy. They described the problems of transitioning into graduate education and adapting to new environments and expectations. IP was significantly related to perfectionistic tendencies, core self-evaluations, and anxious and depressive symptoms.

Research Question 2: In what ways do salient identities such as gender or race –or their intersection– shape how women graduate students experience IP?

Identities such as gender and race were expected to impact how women experience and describe IP. Previous studies suggested that being a minority might exacerbate feelings. This section describes gender, race, age, nationality, and intersections.

Gender. Gender turned out to be a much larger than expected theme, therefore it has an entire appendix (Appendix F) dedicated to the nuances of the findings. Not all women felt disadvantaged by their gender, however, there were hundreds of examples of negative experiences. They described early messages about girls' capabilities and how this influenced their career choices. Now in graduate school, many put up with hostile working environments where they are not taken as seriously as their male peers. This quote from an engineering student provides just one example,

> I could write an essay on the bad experiences I've had as a female engineer, and how it has impacted me as a person and in turn my career. To keep it short: I definitely have lower self-confidence, a growing despair about things getting better, a passion for STEM education as an attempt to change it, and a sad need for validation as a result of feeling invalid in the field dominated by men. – Survey 356, College of Engineering, masters

Some women discussed differences in how men might experience IP. Overall these quotes expect that women may experience is to a greater degree.

> I truly believe this is a feeling most male students don't have to the degree that female students experience it. Talking to male friends about these feelings sometimes helps, but often makes me feel worse--as though the main problem is my own insecurity, and not the climate. If they're fine, shouldn't I be as well? – Survey 137, College of Liberal Arts and Sciences, doctorate

> I often feel talked down to. For example, when I discuss imposter syndrome with my colleagues, female colleagues often sympathize and express similar feelings, but male colleagues will try to comfort me in a way that feels somewhat condescending (Ex: "It will be okay, just hang in there." Or "Everyone goes through that, just keep your chin up." Like I'm a child). I also feel like I rarely get taken seriously, and my ideas are often dismissed. – Survey 464, College of Media, doctorate

So I do think there is a general experience but I also believe that women do experience some forms of impostor syndrome more than men. Especially those who come to realize later that there are these unseen forces of gender that might be shaping their lives and they haven't been aware of it their whole lives. – Stephanie, College of Agriculture, Consumer, and Environmental Sciences, doctorate

In sum, many women identified gender as a core identity affecting their educational experiences and moreover noted differences how they experience IP as women compared to their male peers.

Race/Ethnicity. In some circumstances women reported racial microaggressions but there were also examples of outright hostility. This is a part of their lived experiences. One woman said, "It's a running joke that my department takes one token black woman a year." Elaine, an African American participant, shared the following powerful quote,

[E]ven the students I'm supposed to be teaching don't think I belong here. Even though I have been studying [my field] longer than they've been alive. So it's like death by a thousand paper cuts. Every day like, you're having something that is saying "while you may be qualified on paper"…. I am not supposed to be here. I'm not supposed to be here with my nappy hair, with my dark skin. That's not supposed to be a thing because we don't fit the stereotype of the older white guy with the patches on their elbow. – Elaine, [college omitted], doctorate

I'm always aware that as a Black woman, I will be looked at differently and my work will be challenged. I have to be 100% at all times because if I make one mistake, all of my other work goes out of the window – Survey 24, College of Education, doctorate

From receiving negative student evaluations to having the scholarly merits of your research agenda questioned, Black women have to deal with a lot to be a part of the professorate. I have made the decision that I will not wavier on my principles or my research. I am optimistic that there is a place that will appreciate what I have to offer. – Survey 273, College of Education, doctorate

Although individuals from other racial and ethnic backgrounds responded to the survey, they did not specifically share responses that mentioned race and ethnicity therefore it is unclear how they perceive this aspect of their identity to be related.

Elaine critiqued the larger system, "Especially around here, they market diversity, they market "we're inclusive," … but the real life experiences on the campus suggest otherwise." Another doctoral student who had a particularly difficult experience in her program stated, "I

discourage any potential students in my field from applying to [university]. Especially if they are women, people of color, LGBTQ or from other marginalized communities."

Pam and Elaine added their thoughts on how they work to overcome stereotypes compounded with IP. Elaine stated, "I wish I could tell you the answer was putting more people of color in positions of power, but I don't think that's the answer either… it's an ideological thing that you have to be willing to face and I'm not sure if we are."

Pam discussed the importance of having a support system with women of the same ethnic identity,

> Black women and other women of color we have to go through a lot so sometimes it's hard for us to recognize successes but I think that having each other to be there and say "No it's dope, You're doing great." That's helpful. … We have to try to build one another up. Those messages are still going to be there like racism and sexism. They're still going to exist because there are populations that benefit from that. But those that aren't, we have to speak up. – Pam, College of Education, doctorate

International. Being a student from a foreign country adds various hurdles to graduate education. For example, language barrier was a common concern and international students shared how they tried to lose their accent to fit in and thus feel like they belong. Likewise, a few people mentioned fear of incorrect pronunciation as a hindrance to answering questions or speaking up. In addition to language, some mentioned differential access to resources,

> I did not grow up in the US and thus I did not have access to the same high-quality education that most millennial students have had. On the other hand, I am not an international student either, meaning I was not cherry-picked to be here. Not that I think I don't deserve to be here. I do deserve to be here! … I am really proud of my background and my long and hard path to get here. Yet, once you get here and you see the level of students, you get completely disheartened because these kids have been prepared since childhood, they went to great schools and, despite having worked hard, I will always have to work 100x more. – Survey 506, College of Liberal Arts and Sciences, masters

Age. Age arose as a contributor to IP both for those who were younger and older than the majority of students in their program. For example, Stephanie shared, "I get mistaken for an undergraduate student a lot which isn't a big deal. But like, come on now I'm twenty-six. I've been out of there for a while." In contrast, one of the survey respondents said, "Even though I am older than some of my instructors. I just feel juvenile in my thought processes."

Intersections. Intersectionality acknowledges the multiple systems of power at play, and specifically the interlocking nature of identities (Cho, Crenshaw, & McCall, 2013). In theory,

multiple minority statuses could be indicative of more impostor feelings. One respondent said, "Young students (domestic or international) cannot grasp what it is like to be a female immigrant in her 40's trying to finish graduate school."

Elaine shared how her identities contributed to her not feeling welcomed like a typical university student, "Basically from day one it was kind of the assumption that the university environment isn't for me, you know, a black woman with a kid, that's not 18 to 22."

Lastly, Anjali pointed out that although some aspects of her identity may be salient, they do not necessarily outweigh other aspects of her experience that contribute more to her impostor feelings.

> I mean for me… the imposter feeling was more related to career than to something in the program. I feel more included in the program. Because we have such a diverse program. It's nothing to do with like I'm from another country or I'm a woman but it's more related to my career. I think its tough coming here. – Anjali, College of Fine and Applied Arts, masters

Summary of Research Question 2. Salient identities played a role for many graduate students and impacted their sense of belonging in their graduate program. Gender was the most common identity mentioned and women shared myriad ways they felt their gender, in the context of their educational environment, impacted their impostor feelings. Perceived racial injustices seemed to exacerbate feelings of IP, particularly for the African American women respondents. Additionally, international status, age, and intersectionality all emerged as factors affecting IP for some women. The overall patterns seemed to be that a sense of "otherness" from the typical student in their respective program contributed to IP, with feelings intensified if there was no sense of belongingness.

Research Question 3: Is there a link between IP and educational and career development?

Based on previous research and the focus groups it was expected that the IP would have an inhibitory effect whereby women would have less confidence and initiative to pursue work, which would affect their educational and career decision-making and eventual career outcomes. This study investigated research self-efficacy and other academic consequences.

I expected a negative association between IP and research self-efficacy (*Hypothesis 4),* which was supported. As shown in Figure 3, there was a significant negative association with the

research self-efficacy scale (β = -0.38). This indicates that the more impostor type feelings one has, the less confidence they have in their ability to carry out research.

It was also expected that there would be an association between IP and academic consequences (*Hypothesis 5*). The 12-items generated for the study supported this (two-tailed Pearson correlation $r = 0.66$, $p = 0.000$). Table 11 shows the item breakdown of mean, standard deviation, and percent of respondents who endorsed ever experiencing each consequence.

Many women elaborated on the consequences they perceived due to IP and eight themes emerged: publishing, not submitting applications, procrastinating, remaining in their comfort zone, quitting, staying silent, isolating, and searching for work-life balance.

Publication Pressure. For many research-intensive graduate programs, publications are currency, valued more highly than grades. Many students commented on the intense pressure to publish and also the slow and sometimes unrewarding nature of the manuscript-to-publication process. "This whole publish or perish thing, my God you know, that's like sad." – Ary, Focus Group, College of Education. They discuss the indoctrination of the idea of publications as value and directly tied to self-worth.

> I haven't published anything yet which I feel like is probably a thing that I need to have done already and so clearly I am a failure because I haven't done that yet. – Jessica, College of Liberal Arts and Sciences, doctorate

> What's so interesting about grad school, like unless you're actively publishing every month, which nobody does, there's very little like "I've hit this point. I've achieved this concrete thing that I wanted to achieve" and so it starts to get a little like "What have I actually done in all this time I've been working here?" – Marie, Focus Group, College of Engineering

> When you do publish three papers or more in your time here and people say "Oh, you're really successful" like, it feels like you're an impostor because you're basing the definition of success off of, I guess, how we've been told what success is from the time we're five. – Scout, Focus Group, College of Education

Do Not Submit Applications. Another common theme echoed IP Consequence item #1, passing up opportunities. Specifically, women gave examples of various jobs, positions and resources that they did not pursue for a variety of reasons (Tanle 12). A common trend among these is a sense of not being smart or worthy enough.

There were outliers as well. One interviewee noted,

> I am notorious for applying for everything I possibly can, and so I have received quite a bit of funding. Sometimes I feel like I don't deserve all the attention/funding, because a lot of the reason I am where I am is due to privilege and opportunities I've had as a white woman from a highly educated family. – Stephanie, College of Agriculture, Consumer, and Environmental Sciences, doctorate

She is attentive to the complex layers of identity and systemic privilege that she benefits from.

Procrastinate / Paralysis. Many people described examples of procrastination or avoidance. In some cases this was experienced as paralysis despite wanting to complete work, yet various reasons such as fears of not doing well enough interfered. At times, this results in missing deadlines, opportunities, or stagnating progression. For example, one doctoral survey respondent said, "I am terrified of taking my qualifying exams so I'm delaying them as late as possible." Others talked about manuscripts and funding applications.

> I think I'm much more cautious because of my feelings of inadequacy, and sometimes my anxiety paralyzes me in my work. For example, I received a revise and resubmit on an article I wrote for a prestigious journal, and after two years, I still haven't begun revising it, I think because I can't believe it wasn't rejected – Survey 137, College of Liberal Arts and Sciences, doctorate

> I've been sitting on a manuscript for my early research (a project I completed almost 2 years ago) because I don't think it's good enough. I've had 3 different professors' eyes on this paper and even some thorough editing by my advisor, but I can't seem to pull the trigger. – Survey 178, College of Education, doctorate

> I feel this way whenever a fellowship opportunity is announced. I will initially think I should apply, but then the self-doubt takes over after a few minutes. I probably have 2-3 incomplete applications every year. – Survey 364, College of Engineering, doctorate

Stay in Their Comfort Zone. These graduate students described the multiple ways they had elected to maintain the status quo, what Clance called *staying away from the difficult* (Clance, 1985). In some instances this meant not seeking a better environment (e.g., advisor, lab, job) for reasons such as "I think any other option will feel this way." They provided examples of not leaving their comfort zone by taking challenging courses even if they wanted to. They described avoiding leadership roles or positions that also come with more scrutiny and responsibility. One person summarized, "I haven't pushed myself to the limit of my abilities." Another doctoral student shared, "I have passed up two promotions … because I was afraid. It

was more comfortable to stay where I am and not take on a huge risk or huge workload that I may fail at." The vulnerability is too much of a deterrent compared to potential benefits.

Quit. Many graduate students questioned whether or not they would continue. Item 2 showed 39% had at least considered dropping out of graduate school. Some described how they or others in their lab had changed their career trajectory; instead of going for the PhD they stopped after a masters. Others switched programs or colleges partway into graduate studies. The reasons they gave for persevering often included a support system, either their advisor or family or friends that helped them throughout. Others stayed because of a dependent (a kid). Melissa from a College of Engineering masters program shared her new mantra, "No one needs a PhD… You can lead a very happy life, a very successful life without a PhD."

Others shared how they learned from observing role models,

> There is one girl in our program who won an amazing fellowship, she's popular, she's kind, and she's beautiful. When she asked how my first year was and I told her it was challenging and horrible at times, she told me she was close to quitting her first semester. I wouldn't have guessed she was struggling so much… I'm so glad she was able to be vulnerable and honest with me. – Survey 28, College of Agriculture, Consumer, and Environmental Sciences, masters

Elaine talked about the uncertainty of graduate education and is it worth it?

> I do think about dropping out all the time… I do think about walking away from it, constantly, because sometimes it just doesn't seem worth it. You know even if I do get my PhD, am I gonna get a job? And there's this nagging fear that I will end up working at Starbucks when it's all over (laughs.)" – Elaine, [college omitted], doctorate

Stay Silent. There were dozens of examples of women who reported not speaking up. They stayed quiet in class, in the presence of professors, and with other students. They often described hesitating to share their opinions, and especially not asking questions. The reasons provided included fear of "sounding stupid," "making a fool out of myself," "appearing unintelligent" or getting a follow up question that "might bring out my weaknesses." They identified that this hinders their ability to make personal connections or find projects or teammates. Many people also stated this "wastes time" when they are searching for answers or solutions without asking for help.

It is possible that some academic subcultures favor personalities that are more outgoing to exuberant at the expense of more quiet people as this student noted,

In academic culture, people are viewed as more intelligent the more they speak up and ask questions and make suggestions. I think this makes people think I'm less smart or capable than other students, but I often have the same thought or question that others voice. I just feel like everything I say is being judged, so I'd rather not speak. – Survey 208, College of Engineering, doctorate

Three examples highlight the potential damage to research progress due to this silencing. In the last two examples, the inhibitions are at odds with the goal of a degree program.

I don't stand up for myself nearly as much as I should. I am often right when a large portion of my research group is wrong. – Survey 263, College of Liberal Arts and Sciences, doctorate

I don't ask questions because I think I should know everything already. – Survey 225, College of Liberal Arts and Sciences, doctorate

I also find voicing my opinion on any scientific matters extremely difficult. This has made designing my Ph.D. project very difficult. – Survey 346, School of Integrative Biology, doctorate

Isolation. The emergence of self-isolation echoes the findings from the mental health analysis. Additionally, Table 11 shows that 87% indicated they felt lonely or isolated. There were many examples of not reaching out to professors "because I worry they'll think I'm silly." There were also other circumstances of avoiding networking because "I feel like I don't know anything" or "I feel like I am bothering them or wasting their time."

There were examples of avoiding other students as well. For example, "since everybody else was doing so well I couldn't really seek help within the group." One survey participant summarized, "In academia the myth of the lone genius is very harmful."

The Search for Work-Life Balance. One theme that arose from the qualitative responses that was not measured in any of the survey items was a struggle with time management. First, there is an adjustment to the lifestyle and workload.

Grad life is different; PhD life is intense... You have a lot of, a lot of responsibilities, you're TA'ing, you're RA'ing on top of your coursework and then once you complete your coursework you have to write a book" – Pam, College of Education, doctorate

A few participants described habits they developed in undergraduate studies where they prioritized work over their social life. "The only reason I'm doing well is I'm putting in ten times

the work that everyone else does. I don't have a social life, that's why I'm doing well." – Cindy, Focus Group, College of Liberal Arts and Sciences.

> I basically didn't have a social life. Nope, I can't go out. I wouldn't eat – I wouldn't do anything. I would just focus on getting it done. I mean I didn't do anything basically. It was just my life until it got done." – Maya, Focus Group, College of Applied Health Sciences

> I had developed this habit in undergrad that I wasn't able to sleep the day before a test. I would spend all night studying. In grad school sleep is like your main energy source. If you don't sleep you just don't function. You can't make up for it later... But then the problem was that it got so bad that I wouldn't sleep, then I had anxiety attacks, then I would not eat and not sleep and then it got to a point where I realized this needs to change. – Emma, Focus Group, College of Liberal Arts and Sciences

Some were overwhelmed by the expectations for what they were supposed to be accomplishing. "I can't be everything--perfect employee, student, instructor, mom, wife, daughter, friend and keep the perfect house. It falls in around me" – Survey 49, College of Applied Health Sciences, masters.

> When [classmates] describe something and they can just belch out all these different authors at one time. You're just like, "what do you do with your life? So then it just makes me wonder, "Am I even supposed to have free time?" Am I supposed to have my own life? Or am I just supposed to give it all to this program, to academics?" – Nyla, Focus Group, College of Applied Health Sciences

A focus group participant talked about needing to identify for herself what her schedule would be and recognizing where contentment comes from,

> I'm not happier because I have a paper. It is something you need to do and it's something I'm interested in, but it's not what makes me happy. If I'm sitting there at home eating cookies or watching TV, I'm like "this is what I want to do so I'm going to do it." And I will feel a little guilty and then I decide I don't care. Which only works sometimes… But just deciding baseline happiness or baseline contentment and how to maintain it is good for the crunch times because you go into it invigorated instead of dragging on the floor. – Catherine, Focus Group, College of Liberal Arts and Sciences

No Career Consequences. Not everyone identified potential links or consequences of IP. For some, they persevered despite negative feelings, often with the encouragement of advisors or a support system. One survey respondent said, "I always apply or go for something. Let them tell me no, I'm not going to do it for them." Two others provided examples of how they were peripherally aware of IP but still they largely were able to complete their career goals.

I haven't held myself back on a professional, academic level very much so I wonder if I didn't have these feelings that probably have in some ways have held me back but I can't figure out how because it's so entwined. I wonder if like I'd be even more of a go getter. – Melissa, College of Engineering, masters

I have been successful at publishing and getting grants and I'm very proud of that success. My impostor syndrome has not gotten in the way of my academic career, but it has just introduced occasional emotional stressors along the way that I wish I didn't have to deal with. – Survey 161, College of Liberal Arts and Sciences, doctorate

For others, they did not experience any IP or any identifiable career consequences. For example, "I haven't felt like an impostor. I've learned to be confident in my skills and apply for awards and promotions because I am qualified to do so." – Survey 148, Liberal Arts and Sciences, doctorate

Summary of Research Question 3. Participants self-identified many consequences proximally or distally related to their education and career progression. Women often inhibited themselves by not submitting applications despite their qualifications, staying silent or not moving outside their comfort zone, isolating themselves, procrastinating, and struggling with time management. They also listed consequences such as setting lower goals, under-achieving, or in rare cases, quitting their program. Overall there is a commonality of self-limiting behaviors that may have a cumulative effect on self-concept and on career outcomes.

CHAPTER 9: ADVICE FOR OVERCOMING THE IMPOSTOR PHENOMENON

Recognize it is a common feeling and just because you may feel unworthy doesn't make it so.

The three research questions focused on understanding what the experiences are like, but an additional curiosity was learning how women navigate and cope with their IP feelings. The last question of the survey asked "What advice would you give to someone trying to overcome feeling like an impostor?" Women generated over 300 responses. The ultimate hope is that through these ideas, combined with the findings from Chapter 8, data-informed interventions can be created.

This chapter describes the advice women generated thematically. Table 13 breaks the themes into two general patterns: (1) Ways to reframe the way you think about yourself and your accomplishments and thus how you might change your behavior and (2) The importance of getting other people involved. Figure 4 shows exemplary quotes from the main themes in the form of a word cloud (created at Tagxedo.com).

These quotes exemplify the multitude of feelings and various approaches to overcoming IP sensations. Clearly there is a focus on the internal: both on how a person can change their patterns of thinking (everyone is on their own path, you belong too) and adjust their behaviors (track accomplishments, actively try to not make comparisons to others). Although it can be difficult, opening up to other people, especially a trusted person, was brought up numerous times and described as cathartic, validating, scary, but also an important turning point. Some people were even inspired to create networks or groups or make it a regular part of doctoral mentoring, so other students would not go through the same self-doubting process they did.

Notably, many of these themes of advice map onto the IP experiences. For example, Fear of Failure or Mistakes can be addressed by Cultivating a Learning Mindset; Doubting Merit is countered by believing that You Belong; Fear of Success could be challenged by intentionally Tracking Accomplishments.

Naming IP is Powerful

Unexpectedly, the idea of knowing the term "imposter syndrome" or "impostor phenomenon" came up in the focus group and then over 30 more times throughout the survey and interviews. Some participants even described researching the topic on their own. Women

discussed the empowering nature of knowing there is a name for it and therefore that it represents a common experience. They reflected on the ongoing work of recognizing IP in themselves,

> I will bring this up in a course… and, what surprises me the most, is that I can talk to my students about the phenomenon all the while not seeing how Imposter Syndrome is impacting my own lived experience." – Survey 118, College of Education, doctorate

> So it was nice for me to know this definition so then I just took a moment: you're in a bad headspace right now, your advisor said good things, come back to this later. Just remove yourself from this. So it was nice to know that definition so then I started to recognize it in myself. – Cindy, Focus Group, College of Liberal Arts and Sciences

> We (our grad student association) have hosted professional development workshops on overcoming impostor syndrome. To share this struggle so openly is liberating! I still feel like an impostor sometimes, but I have perspective that everyone feels this way and the feeling becomes manageable and doesn't prevent me from doing good work or relaxing at the end of the day. – Survey 189, College of Liberal Arts and Sciences, doctorate

It is possible that interventions that purposely and properly use the terminology and provide more information may be an important part of the reframing mindset process.

Mentor or Role Model

Many students commented on mentors or role models they had encountered. These role models could be more-advanced students in their program, professors, advisors, or family members.

> Seeing my [male] advisors with women who were in academia and working and they treated them with total respect I guess kind of helped me deal with any impostor syndrome I was going to start feeling because I felt like my advisors had a lot of faith in my capabilities. – Jenn, Focus Group, College of Engineering

Often it was mentioned how important it was to have a mentor with the same identity.

> I think that my career and professional path has been very heavily influenced by some of my female mentors. I think in undergrad I was very fortunate to have a really good female advisor who I just think seeing her example, like she's a mother of two very young kids. Seeing she was able to balance her work life and family life fairly well. We even had conversations of her issues of being a woman in academia and like the obstacles she had to face, but seeing her able to succeed has helped me decide this is a path that I want to take." – Sarah, Focus Group, College of Applied Health Sciences

Elaine clarified that shared identities did not alleviate all problems.

> It's like the blind leading the blind. You know, you've got like all these women who are experiencing the exact same thing and none of us really know what to do about it. You know, and there's no kind of intervention. Even picking a woman of color as my advisor, that doesn't help because in a sense you know she doesn't know how to tell me that "You're not actually an imposter. You're here because you're supposed to be." You know, and they're working out whatever it is they're trying to work out. – Elaine, [college omitted], doctorate

Elaine's experience highlights the career process and that many graduate students may one day become a faculty member (and many are already teaching at the university level). Therefore, speaking openly about IP to help women at every level overcome IP may help ensure more adequately prepared future mentors and role models.

A Note on the Involvement of Others. Social support, belonging, comparison, and opening up to others turned out to be enormous categories under the umbrella of involving others. There were intricate nuances to the fears and hopes of sharing with people and how it was received, including intense shame of telling others or admitting weakness (e.g., "Scientists don't have the luxury of being meek. Appearing confident is half the battle of winning respect."). These results will be analyzed in the future and brought into the contextual literature to appropriately do justice to the stories shared by the women.

Unqualified

Over a dozen respondents stated they did not know how to overcome IP or provided some version of this statement, "I don't feel qualified to give advice on this topic." It is possible the feeling of being an impostor is so pervasive that it seeps into even hypothetical advice giving.

The Academia Bubble

One participant recommended intentionally seeking outside perspectives from the "real world." She encouraged people to engage with others who are not graduate students or faculty. There was almost no advice from students about how to change the system of academia. However, some did comment on its role in perpetuating impostor feelings.

Know that many people feel this way and it's a result of a poorly designed system where students don't know about each other's experiences and we're not supposed to talk about how confused we are with faculty. – Survey 501, College of Media, doctorate

Jessica, an interviewee, wished for more feedback from her program or advisor, hoping that regular reinforcement might mitigate the skewed perception she has.

It would be nice if there was like an imposter check… if there was a question you could ask your advisor … will you not just by saying yes but actively validate that I do belong here? Give me evidence of why. Show me how you see it. Because I feel like a lot of the disconnect is that you don't know how other people see you. – Jessica, College of Liberal Arts and Sciences, doctorate

This quote eloquently provides many of themes that arose in the various advice categories.

This system of academia feels like this big headless institution that is constantly judging and excluding and criticizing. But it's made up of people, all who have their own insecurities and fears and shortcomings. You're not just a graduate student in a cog of brilliant scientists. You are an individual, who was accepted by individuals who wanted to work with you, and you are a classmate of individuals who are trying to figure out this process just like you. No graduate student in your cohort (barring extraordinary circumstances) has ever gotten a PhD before. If they look like they know what they're doing, they don't. They're figuring it out too. Think about your strengths. Minimize your weaknesses. Because you're here on your own merit, and you're going to make it through. Even if they let you in by mistake, you're here! A PhD is all about sticking through the challenges, even if things don't come immediately. – Survey 337, College of Liberal Arts and Sciences, doctorate

Summary of Advice

There is no one magic solution or pill to overcome IP. However, women shared hundreds of suggestions based on their own experience or advice they had been given. Intentionally learning more about others' experiences and similar impostor feelings was a common piece of advice because it alleviates the sense of isolation and may set a new norm. Women identified that a shift in mindset was needed in terms of attitude regarding schooling, expectations, and taking ownership of achievements. They recognized overcoming IP is an ongoing challenge and requires effort to adjust maladaptive behaviors. Even learning about the concept of IP seemed to have a positive effect. Identifying mentors or role models is another key strategy. Lastly, the culture of academia was identified as problematic.

CHAPTER 10: DISCUSSION

Overview

This chapter summarizes the results from the mixed-methods study, offers discussion of the limitations, gives suggestions for future research, and explores theoretical and practical implications.

Summary and Interpretation of Findings

In this study I set out to explore what is the impostor phenomenon (IP), specifically how do women describe their experiences of IP in graduate school and how does it affect their career process? The mixture of qualitative and quantitative results shed light on the complexities of the women's experiences. It encompassed masters and doctoral programs in a wide variety of disciplines. No previous study has looked at more than three programs while including the CIPS. This study also incorporated constructs such as core self-evaluations and perfectionism (Vergauwe et al., 2014) to see if associations could be replicated in a population of students from the United States. I connected career-relevant literature by measuring research self-efficacy.

Experiencing the Impostor Phenomenon. The first research question asked how do graduate student women describe and define their experiences of IP? Broadly, IP is an internal experience of intellectual and professional incapability despite objective evidence to the contrary (Clance, 1985; Clance & Imes, 1978). Depending on the cutoff, between 66-73% of respondents endorsed feeling like an impostor, indicating the phenomena is widespread but not ubiquitous. Women provided hundreds of examples of their internal experiences. They shared versions of the impostor cycle whereby each new challenge is met with anxiety or fear despite previous successes. The themes that emerged from the qualitative coding fit with the list of concepts provided by Clance: Denying competence, discounting praise, dread of evaluation, fear of failure, fear and guilt about success, and needing to be the best. None of the themes contradict how the IP has been described in the past. Two of the themes have regularly been linked to IP: Fear of failure (Neureiter & Traut-Mattausch, 2016a; Thompson, Foreman, & Martin, 2000) and fear of success (Fried-Buchalter, 1997; Neureiter & Traut-Mattausch, 2016a).

There was a continuum of some people experiencing impostor-type feelings near constantly for the duration of their graduate education, to others experiencing it initially but gradually developing self-efficacy, and some who never once experienced it. This pattern has

also been found in past examinations of graduate student women (Ahlfeld, 2009). Many respondents described frustration at their current performance, regular comparisons to other people and subsequent self-criticism, and feelings of isolation. Pride from successes was often short-lived and came with more pressures to keep performing or risk being "found out."

Other studies of graduate students have also found high rates of IP in Austrian doctoral students, 82% (Jöstl et al., 2012) and in emerging adults, 80% (Lane, 2015). Craddock and colleagues (2011) interviewed graduate students, and concluded that IP feelings are a normal part of graduate study. Clance recently stated that she might conceptualize IP differently. She said, "If I could do it all over again, I would call it the impostor experience, because it's not a syndrome or a complex or a mental illness, it's something almost everyone experiences" (Clance, cited in Anderson, 2016).

Perfectionism. Perfectionism has frequently been linked to IP (Fraenza, 2016; Rohrmann et al., 2016; Vergauwe et al., 2014). This study replicated those findings and generated numerous examples of the consequences of maladaptive perfectionism. Notably, the discrepancy between performance and high standards demonstrated a much larger link to IP than just having high standards. Conceptually, it fits that high achievers with impossibly high standards will tie their self-evaluation to their academic performance, which Clance calls the "superwoman" aspect (Clance, 1985). A recent meta-analysis found that over the last 27 years, college students have reported increasingly more perfectionism (Curran & Hill, 2017). They perceive others to be more demanding and they demand more from themselves. The authors link this trend to beliefs that educational and professional achievements signify innate personal value. These feelings support the reciprocal effects model (Marsh & Scalas, 2011) where pathways exist between students' achievement and their academic self-concept. The implication is for students with the same level of achievement, those with lower academic self-concept will lag behind their peers with higher self-concept. Notably, perfectionism is a "core vulnerability" to more serious disorders or symptoms (Flett & Hewitt, 2002).

Core Self-Evaluations. Self-esteem, generalized self-efficacy, emotional stability (low neuroticism), and locus of control (LOC) are the four components that make up core self-evaluations (CSE). First, in this study I demonstrated a negative association between self-esteem and IP, replicating previous findings (e.g., Chrisman et al., 1995; Oriel et al., 2004; Sonnak &

Towell, 2001), except for Vergauwe (2014) who found no association. Often academic self-doubts or self-criticism feeds into lowered self-esteem.

As expected, generalized self-efficacy also demonstrated a negative association with IP even in the same model with research-self efficacy. This echoes findings from Vergauwe (2014) who identified self-efficacy to be a key factor driving the CSE association. It fits that the more impostor-type feelings one has, the less confidence they have in their ability to complete tasks successfully. As expected, higher IP was associated with an external sense of control. This mindset was provided in numerous quotes attributing successes to "luck" or a "fluke" and an inability to internalize successes or take credit for them.

The items making up Emotional Stability caused a mathematical error in the model and were therefore removed. With a longer version of the CSE scale it may have been possible to retain items indicating the latent construct of emotional stability, therefore it is recommended future researchers continue to include it.

Mental Health, Anxiety, and Depression. The mental health indicators for anxiety and depression showed associations in the expected directions; the more impostor feelings the more likely people were to report anxious and depressive symptoms. The qualitative quotes show how difficult of a time many women are having in graduate school. This study did not ask about pre-existing clinical diagnoses nor does it claim causality between IP feelings and clinical mental health problems. However, it is clear that there is comorbidity, making functioning extremely difficult for many women students at this Research 1 institution. These findings seem to align with other estimates of anxiety and depression among graduate students (Evans et al., 2018) and provide support for the link with IP (Fraenza, 2016; McGregor et al., 2008; Oriel et al., 2004). Moreover, women tend to report more anxiety than males and women's physiological responses to anxiety are known to lower perceptions of self-efficacy (Hackett & Betz, 1981).

Salient Identities. Research question 2 asked in what ways do salient identities shape how women graduate students experience IP? Women shared examples of how their race, international status, age, and the intersectionality influenced their experiences during their graduate education. A previous study of IP interviewed twelve graduate student women of color and identified some commonalities such as high familial expectations as well as internalization of those expectations (Ahlfeld, 2009). This is consistent with the theory of "othering" in academia with white students seen as the norm (Peteet et al., 2015). Trotman (1984) has

suggested that IP is an inherent outcome of the dual oppression of race and gender faced by African American women. Stereotypes of women of color not being intelligent may result in these women being treated negatively therefore causing them to attribute their triumphs to something other than her own abilities (Comas-Díaz & Greene, 1994). Other researchers have found that women who feel racially or ethnically different are least likely to be at senior or executive levels, received fewer promotions, and were more likely to downsize their aspirations (Thorpe-Moscon & Pollack, 2014).

Many alluded to a sense of not fitting in with others in their program or with the university as a whole. Study narratives echoed findings from higher education, particularly for women faculty in terms of hostility and differential treatment (Britton, 2017). In fact, the topic of gender generated more themes than predicted and was explored more fully in Appendix F. Many gender findings echo the other IP results such as questioning merits for how far they had gotten. They also shared frustrations with differential treatment compared to their male classmates, which likely contribute to feelings of not belonging in their program, field, or career. Some discussed quitting or changing their path yet feeling conflicted if this change inadvertently reinforced stereotypes about women (e.g., they are not as smart, they prefer to teach instead of research, they just want to raise a family).

Young (2011) found that both being (1) in a foreign land and (2) being seen as a representative for your group (e.g., all women, all people with disabilities) are two major contributors to IP. Overall many women identified ways that their salient identities affected their experience of impostor phenomenon and these should be continually included and explored in conjunction with future IP research.

Research Self-Efficacy and Career Development. The final research question asked if there is a link between IP and educational and career development. I found that female graduate students do perceive this link. One previous study explored research self-efficacy and IP in a population of doctoral students and found a small negative association (-0.09); the higher the IP the lower the research self-efficacy (Jöstl et al., 2012). Their finding was replicated in this U.S. sample to a larger degree, and moreover, the examples provided implicated many other consequences to career and educational progression.

The new scale of IP consequences, combined with the open-ended qualitative responses, provided numerous examples of different ways women perceived their careers to be affected.

Not asking questions or staying silent (due to fear of sounding uninformed) was one finding that has been listed by others (i.e., Lane, 2015). Others have established that those with high IP also tend to be introverted and perhaps less likely to speak up in the first place (Ross, Stewart, Mugge, & Fultz, 2001). This dissertation was also able to provide evidence for many of the assertions proposed by Zorn (2005). Specifically, it identified scholarly isolation and valuing product (e.g., publications) over process (e.g., understanding material) as common experiences.

Clance noted that those with IP limit their goals and remain in positions below their capabilities (Clance, 1985). This goal limiting has also been called "playing small" (Mohr, 2015). This study showed women turning down raises, staying in labs, or not applying to numerous opportunities. This included examples of salary negotiation, also noted by previous studies (Neureiter & Traut-Mattausch, 2016b). This indicates that women's self-perceptions are functioning as an internal barrier to educational and career progression and in some cases women are even engaging in self-sabotage.

Study Limitations

This study was self-report. It would have been informative to find objective measures of "success." However, I decided not to collect GPA given that it is not necessarily a valid measure in graduate students and varies so widely based on program. Similarly, publication count or some other quantitative result would be unfair for some practitioner or arts programs. Anecdotally, when asking the focus group participants to list three accomplishments almost all of them struggled with defining an accomplishment.

Second, it is possible there was a response bias because the survey invitation contained the word "impostor" and perhaps those who are more prone to experience it might have chosen to continue, thus giving an inflated estimate of the prevalence.

Third, many of the measures were slightly modified in some way (for example, removing items, switching the perfectionism scale to a 5-point response instead of 7-point, and modifying instructions). These decisions were based on theoretical and analytical reasons combined with scale reliability needs.

Fourth, I created two new instruments for this study, the 12-item IP Consequences and the 6-item IP indicators. This was done out of necessity because a suitable scale could not be identified. This is in line with Jöstl and colleagues (2012) who argued that the research on

psychological barriers of female doctoral students requires tailored questions relevant to their context. Future research is needed to further revise and refine the scales with other populations.

Lastly, it is possible a third variable not measured here is accounting for more variance in IP. Family upbringing is a common example associated with IP (King & Cooley, 1995). For instance, one interviewee from this study shared "So one day I came home with my report card for my mom to sign ... And I was like, 'mom check it out I have a one hundred in math this has never happened to me before,' and I got grounded because I had a ninety-six in English."

Recommendations for Future Research

There are three broad directions to consider pursuing: (1) different populations (2) timing, (3) and methods. With populations it could be important to extend to all other genders as well as undergraduates and post-doctoral students. Minority status was included in this study, however more work could be done to understand the impact of multiple minority statuses or other relevant identities such as being a person with a disability. It is also important to focus on specific disciplines where women have extra pressures in terms of being high achieving (e.g., STEM, leadership, politics), particularly to understand more about salary disparities. It would be interesting to see if IP differs in some fields like teaching or commission-based compensation models. Lastly, it would be prudent to investigate those who do not feel like impostors to generate more ideas for interventions.

In terms of timing, role transitions (e.g., undergrad to grad, starting a new job) inevitably come with more self-doubts. This is built into the definition of IP and referred to as IP "prime time." The study participants shared examples of their first time setting foot on campus or being in their first graduate class and feeling entirely out of their depth. However, it is important to do more research to understand if this is a temporary learning curve which is developmentally expected or is it an enduring trait or attitude. More research on the impostor cycle would help explore this.

The self-report method is limiting. Objective measures of success, particularly if tracked over time in a longitudinal design would help quantify and define graduate students' achievements. This would also facilitate investigations of predictive validity – for example, do IP scores predict degree completion?

Theoretical Implications

As shown in Chapter 7 the Clance Impostor Phenomenon Scale (CIPS) failed to produce the expected latent factors of luck, discount, and fake. Many items are poorly worded and in the end 7 out of 20 items were dropped to obtain a unidimensional scale measuring IP (CIPS-SF). Nevertheless I was still able to replicate previous associations with this version. Going forward it seems that much attention needs to be paid to the psychometric properties of the scale if it is to be considered a useful tool. Perhaps a revised version incorporating some of the new items, or a CIPS-SF could be more useful. There are alternative measures such as the Harvey Impostor Scale (Harvey, 1981) and the Perceived Fraudulence Scale (Kolligian & Sternberg, 1991), however, these too still run into the problem of construct clarification. For now, continued use of the CIPS is cautioned.

Given the complexity of IP and its interrelatedness with self-esteem, perfectionism, and self-efficacy, and other similar construct such as negative affectivity, a clearer nomological net and definition needs to be constructed. Likewise, other theoretical frameworks could be investigated with IP. For example, Social Cognitive Career Theory (Lent, Brown, & Hackett, 1994) already incorporates key elements such as self-efficacy, outcome expectations, barriers, and individual differences to help understand the career choice process. The IP construct is multi-faceted and overlaps many disciplines such as personality, counseling psychology, vocational psychology, gender studies, higher education, and more. Due to the prominence of "imposter syndrome" in the media and the finding of relief at learning the name, it is prudent to explain more components of the definition. How "high achieving" does one have to be to qualify as impostor rather than a low achiever with self-doubts? Is it a personality trait that is stable across time and context, or is it more of a normative developmental experience?

Intervention Implications

IP is an internalized experience but individuals exist with cultures and systems. An extreme focus on IP has been called "victim blaming" whereby the individual is expected to overcome all barriers on their own. Rather, to combat IP, a multi-pronged approach that incorporates the individual's own self-beliefs plus the role of the university and departments is needed.

Universities and Graduate Programs. This study indicates a need for a shift in academic culture (Evans et al., 2018). This could be pursued by fostering a culture that does not punish mistakes (Seritan & Mehta, 2016) and training faculty on recognizing and minimizing biases (e.g., stereotypes about women and math). Others have recommended clarifying expectations and communications – the more direct, the easier a time students will have knowing if they are performing at an okay level and thus alleviate worry. Clance suggests that feedback be regular and specific (Clance & Imes, 1978). Positive verbal feedback is a core component of self-efficacy, so appropriate encouragement should be provided to students along every step of their educational path (Hackett & Betz, 1981).

Additionally, resources could be directed toward supporting students, such as leadership training and coaching. McCormick and Barnes (2008) provide other suggestions for adapting to academia on the tenure track. With the overwhelming mental health concerns of graduate students (Evans et al., 2018), use of mental health resources should be encouraged and normalized.

Mentoring. Mentoring repeatedly came up in many avenues of the literature (Clance, 1985; Hutchins, 2015; Zorn, 2005). Mentoring can be informal or through a formalized program. It can be from more experienced students, professors, or even people completely outside of the discipline. Mentoring focused on individuals from marginalized groups can reduce pipeline leakage and helps to overcome group-specific workplace barriers (Fassinger, 2008). Many students in this study discussed the role of positive mentors they had in their earlier educational journey. Female students are more likely to pursue a major if they have had female faculty (Bettinger & Long, 2005). Students also discussed the importance of sharing with mentors their feelings of inadequacy, advice that has come up before (Weir, 2013). Importantly, research has shown that the more senior a mentor, the better positioned they are to act as a sponsor for their mentee, such as recommending for a project or promotion (Thorpe-Moscon & Pollack, 2014).

Name and Normalize IP. Information about IP can be relieving (Lane, 2015). This theme also emerged from the qualitative results about advice. It highlights the normality of the experience as part of graduate education and ideally removes some pressure. It also helps individuals separate and reflect on the impostor experience in the context of situational influences and less personally (Young, 2011). The discovery that others may experience impostor feelings alleviates the isolation and helps individuals move toward questioning the

reality of their experiences. Providing information about what IP is or offering open discussions could be part of graduate orientation, regular brown bag meetings, special guest speakers, or through one-on-one mentoring or advising. California Technology and MIT have instituted programs debunking myths about belonging, helping students identify IP tendencies, and focusing on support programming (Parkman, 2016). Additionally, finding discipline-specific role models who have also stated they experience it can be helpful. For example, writers such as Maya Angelou, Jonathan Safran Foer, and Neil Gaiman; actors such as Don Cheadle, Jodie Foster, and Meryl Streep; and lawyers such as Michelle Obama, and Sonia Sotomayor have all publicly described impostor-type feelings (Bennett, 2016; Young, 2011).

Build a Support Network. Sharing with others and cultivating a support network is pivotal. For decades we have known that a sense of belonging is tied to satisfaction in graduate school (Gregg, 1972). Social support has been found to buffer against negative consequences of IP, such as low job satisfaction (Vergauwe et al., 2014). Therefore support functions as an adaptive coping mechanism (Whitman & Shanine, 2012).

Participants described the complicated feelings that come with revealing their impostor selves. One survey respondent stated that they rarely talk to anyone about it, because "There is a lot of shame involved, even telling you." Many people emphasized the importance of finding someone you trust to confide in. For some that was a spouse, friend, partner, advisor, or therapist. For others it was important to find a person sharing the same identity, such as sister circles for African American women. One focus group participant shared her experience of finding a friend in a completely different discipline and they make a point of sharing their accomplishments either each other without a sense of competition or jealousy because the fields are so dissimilar.

However, it is also found in the literature that IP can take a toll on relationships – specifically because one partner has trouble empathizing with the impostor cycle (Young, 2011). They may express frustration, "Why don't you just believe me? You'll do great. You always do!" Therefore it is recommended that the support network include multiple individuals.

Counseling and Therapy. Individuals do not typically go to therapy with the intent to resolve IP (Clance & Imes, 1978), but they wish to overcome effects of IP such as anxiety, fear of not being able to complete tasks, being down on oneself for not meeting her own high expectations. Therefore a clinician may need to look for these indicators to evaluate whether IP

may be an underlying cause. Often outside help is need to understand if someone is experiencing normal self-doubts when facing a new challenge or if it is a more pervasive underlying sense of impostorism. The goal of treatment would be to increase self-worth and disconnect self-esteem from others' evaluations (Roskowski, 2010).

The originator of IP, Clance, is a therapist. She recommended certain techniques including taking a family history to understand messages and roles, as well as emphasizing the empathic relating (Clance & O'Toole, 1987). Clance notes the importance of taking the client's fears and doubts seriously. A cognitive-behavioral therapy (CBT) approach that strives to modify core beliefs and push to learn new, more adaptive behaviors would be an appropriate treatment as well. Clance describes an incremental approach, for example "rather than spending 10 hours on an assignment, you might cut yourself off at eight. Or you may let a friend read a draft that you haven't yet perfectly polished" (Weir, 2013). Alternatively, an Acceptance and Commitment Therapy (ACT) approach focusing on defusion or values congruence could be effective (Hayes, Hayes, Strosahl, & Wilson, 2012).

There is important cognitive reframing that needs to happen, for example loosening rules about "perfection" or changing the belief that success should be effortless. As we saw from the survey results, the gap between having enormously high standards and the performance caused distress, so if that bar can be adjusted the resulting distress could lessen. Also based on the survey findings, increasing self-efficacy (especially research self-efficacy) could lessen IP feelings and also give an individual an internal rather than external locus of control, thus taking credit for their accomplishments.

Support in Groups. Echoing the findings about speaking with someone, a group therapy format could be very cathartic. Clance (1985) discuss a three-stage group therapy format. Group therapy has the benefit of allowing women to see the "lack of reality involved" (Clance & Imes, 1978). Focus group participants of this study described the 90-minute group as cathartic and relieving even though it was designed for research purposes, again pointing toward the power of sharing. Peer-led support groups are also common.

Career Coaching. Practitioners in a career counseling setting can also take steps to help identify and mitigate impostor beliefs. One way would be to help people to increase their knowledge of the job market and therefore of their own marketability (Neureiter & Traut-Mattausch, 2016b). Another would be to take time to ask questions to uncover underlying

negative beliefs. For example, is a person seeking help with masters program applications because they believe they are incapable of completing a doctoral degree?

Starting Now. Two recurrent pieces of advice fall within the realms of tracking successes and stepping outside your comfort zone. The reader is directed to other sources for additional suggestions (e.g., Clance, 1985; Young, 2011).

Track Successes. Often, scholars trivialize their accomplishments, for example "You get a paper published in PNAS, and you tell yourself, 'That's doable. I'll never get a paper in Nature or Science.'" Similarly, any grant could be larger; any job could be better; any paper could be more highly cited" (Woolston, 2016). He goes on to point out how scientists are conditioned to measure things in precise detail but this makes quantifying their own value extremely difficult (Woolston, 2016). Therefore, it is important to acknowledge accomplishments. Keeping a list of praise or accomplishments, or making a point of regularly updating your CV are ideas that emerged as a theme in the advice category and have come up before (Clance & Imes, 1978). Teaching or tutoring younger students can also help demonstrate how much knowledge one has (Weir, 2013). Practice sharing success with trusted others, and practice accepting compliments. You could develop supportive mantras or make a point of writing down the steps YOU took to earn your success (Seritan & Mehta, 2016). Owning your role in your successes, even if there was a bit of luck involved too, will help to combat attribution errors. In other words, this will help develop an internalized sense of control.

Step Outside your Comfort Zone. Reality is that many jobs, grants, positions are competitive and graduate students' time is limited. However, consider pushing yourself outside your comfort zone and applying for things anyway. You definitely will not get the grant if you never submit the application. Advocate for a higher salary or a raise. Submit the paper you have been tweaking for months. As Young notes,

> Remind yourself that not only did you sign up to have your knowledge and ability tested on a regular basis, but you PAID for the privilege. … take advantage of every possible resource available to you... Recognize too that some subjects are going to come more easily to you and others you're going to have to really work at. If you're struggling at to do the work, stop being embarrassed or judging yourself as inadequate and seek assistance instead (Young, 2011, p. 35).

Conclusion

The purpose of this study was to explore how women describe their experiences of the IP in graduate school and to investigate how IP affects their career process. The mixed-method design allowed the results from focus groups, surveys, and interviews to be placed in conversation with one another to enrich and enhance understanding of the findings. Despite shortcomings with the psychometric properties of the impostor phenomenon scale, findings showed that impostor feelings were associated with the hypothesized psychological constructs (i.e., perfectionism, core self-evaluations, anxiety, and depression). Women described multiple ways their salient identities compounded the impostor feelings. In relation to career-related consequences, women often inhibited themselves by not submitting applications, staying silent or not venturing outside their comfort zone, isolating themselves, procrastinating, and struggling with time management. They also described setting lower goals or quitting.

Findings point to the importance of clarifying the construct and future replication studies with other populations and methods. Results can suggest modifications to current graduate training programs and inform interventions designed to promote women's career development during their time in graduate school and in their subsequent career.
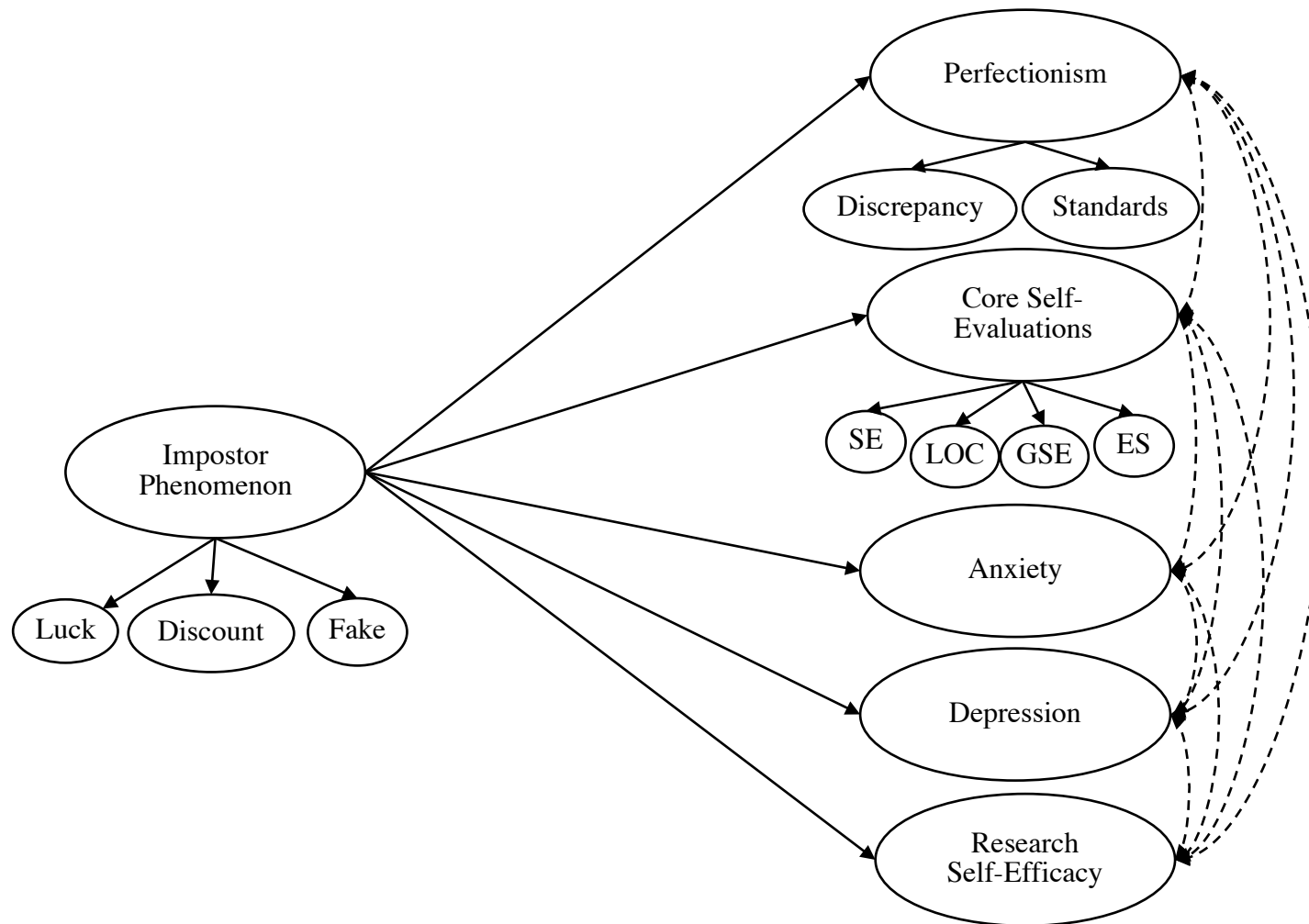
Figure 1. Hypothesized relationships of the impostor phenomenon directly relating to perfectionism, core self-evaluations (SE = self esteem, LOC = locus of control, GSE = general self-efficacy, ES = emotional stability), anxiety, depression, and research self-efficacy.
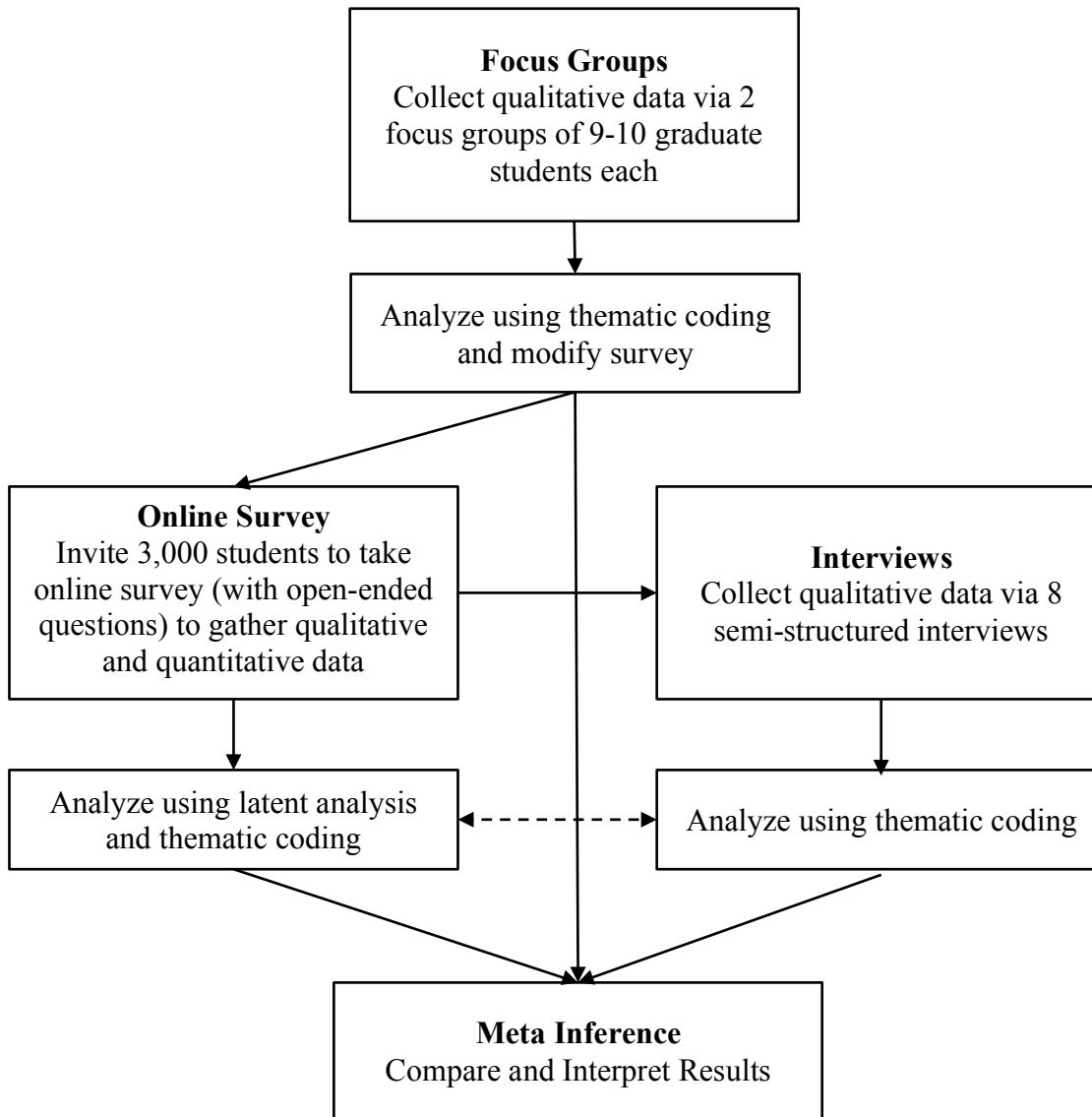
Figure 2. Steps in the developmental and complementarity mixed method design.
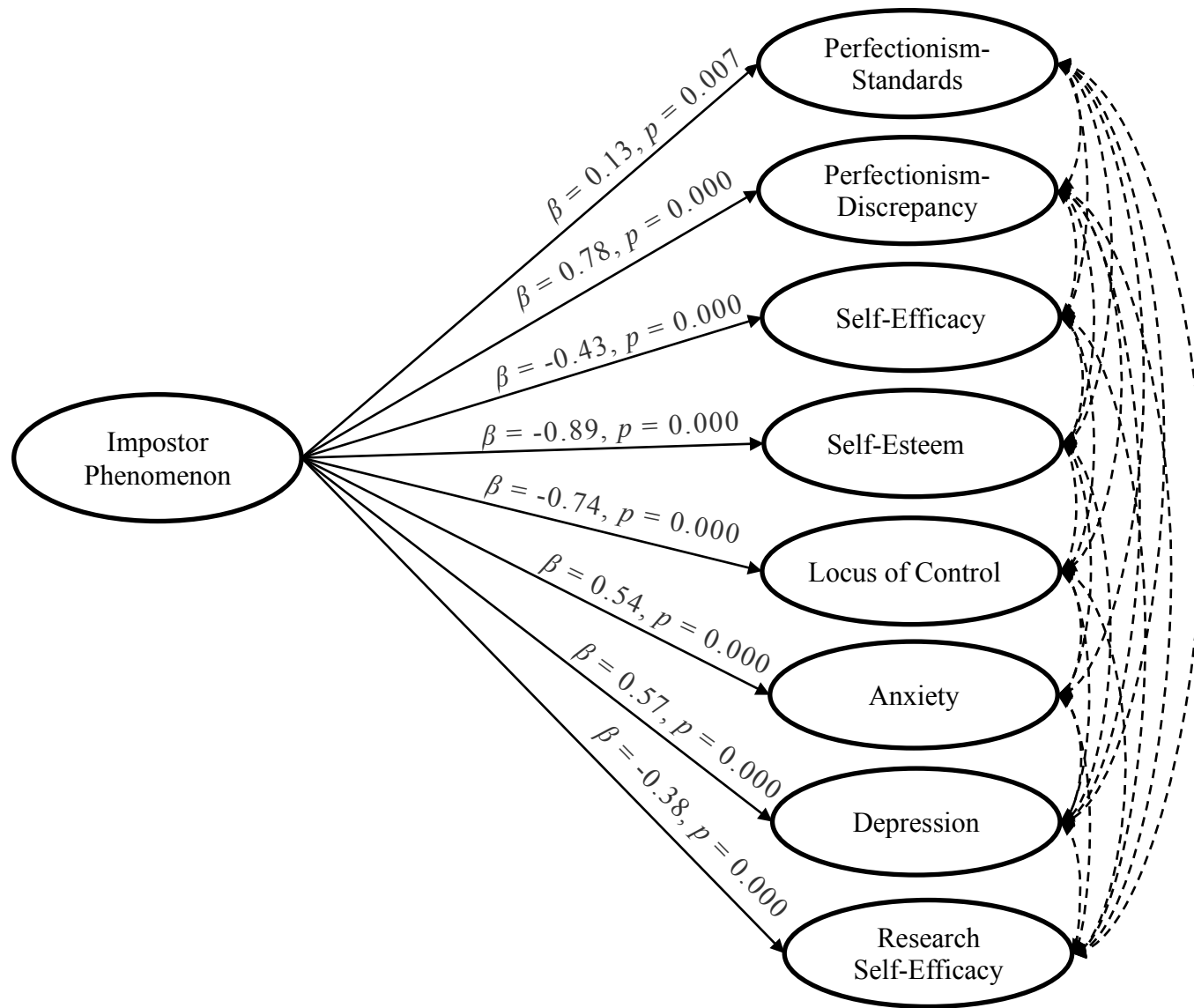
Figure 3. Final results from structural equation model with impostor phenomenon predicting eight constructs. Correlations for dotted lines can be found in Table 4.
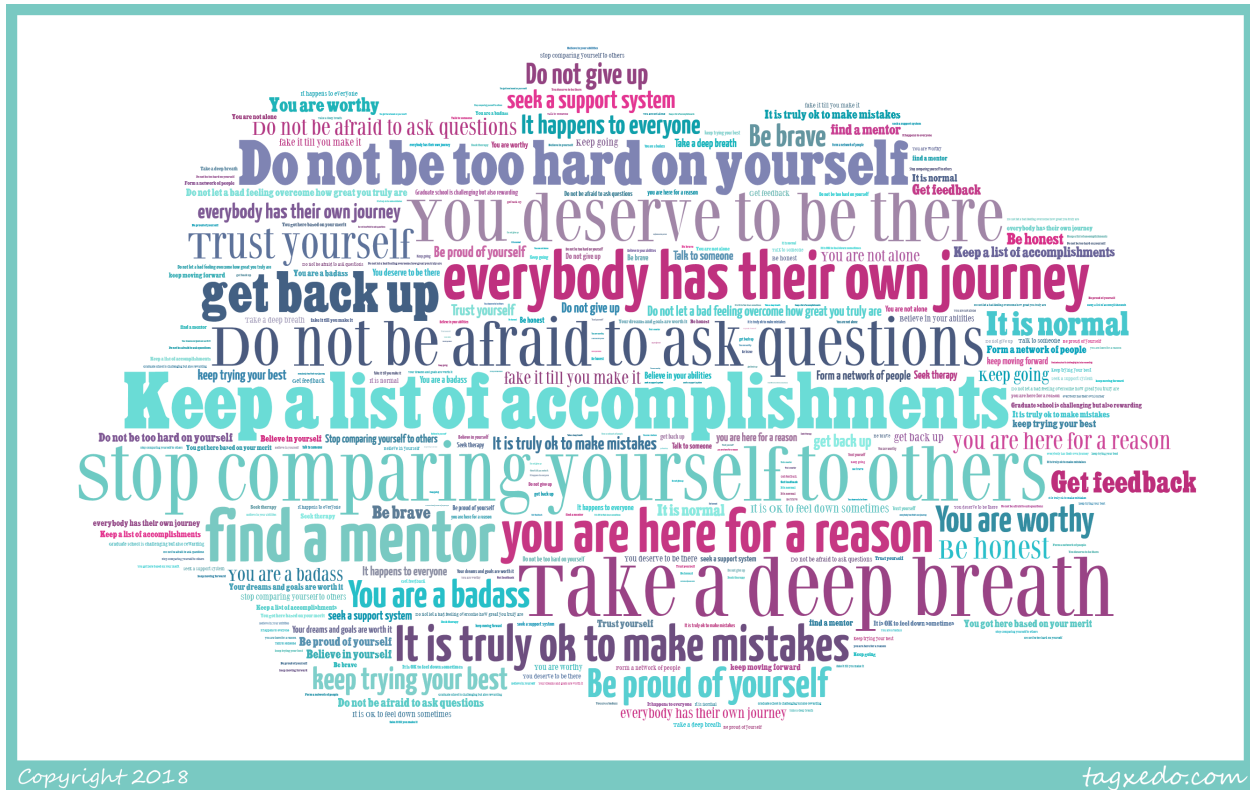
Figure 4. Word cloud of advice from respondents to others struggling with impostor feelings.

TABLES

Table 1. *Response Rates Presented by Race, College, and Degree Program*

Category	# Participants	# Invited	% Invited Participating	# Population	% Population Participating
Race / Ethnicity					
International[**]	108	1413	21%	†	†
White	310	1058	29%	†	†
Asian	99	171	58%	†	†
Hispanic	26	152	17%	†	†
Black/African American	23	135	17%	†	†
Multi-Race	28	54	52%	†	†
Unknown	11	13	85%	†	†
Native Hawaiian and Pacific Islander	0	2	0%	†	†
American Indian and Alaskan Native	0	2	0%	†	†
College					
Agr., Consumer, & Env. Sciences	50	204	25%	311	16%
Applied Health Sciences	33	127	26%	194	17%
Business	24	336	7%	568	4%
Education	34	247	14%	412	8%
Engineering	72	531	14%	822	9%
Fine & Applied Arts	30	283	11%	442	7%
Law	2	32	6%	48	4%
Liberal Arts & Sciences	139	751	19%	1215	11%
Media	5	34	15%	51	10%
School of Information Sciences	46	187	25%	303	15%
School of Labor & Empl. Relations	12	76	16%	131	9%
School of Social Work	33	160	21%	268	12%
Veterinary Medicine	9	32	28%	53	17%
Unknown	17	0	0%	0	0%
Current Degree					
Doctoral	238	1261	19%	2197	11%
Masters	254	1725	15%	2599	10%
Professional	14	0	0%	0	0%
None	0	14	0%	22	0%
Total	**506**	**3000**	**17%**	**4818**	**11%**

Note. [**]The university categorizes international students as a mutually exclusive category with other races; the survey itself asked race and international status separately.
† The university was unable to provide estimates of the number of females meeting inclusion criteria broken down by race/ethnicity.

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Table 2. *Background Characteristics of Survey Sample (*N = 506)

Characteristic	*N*	*%*
Highest Level of Completed Education		
Bachelor's Degree	305	60%
Master's Degree	177	35%
Professional Degree	8	2%
Doctorate Degree	13	3%
Current Degree Program Level		
Master's Degree	238	47%
Professional Degree	14	3%
Doctorate Degree	254	50%
College		
Agricultural, Consumer, and Environmental Sciences	50	10%
Applied Health Science	33	7%
Education	34	7%
Engineering	72	14%
Fine and Applied Arts	30	6%
Law	2	0%
Liberal Arts and Sciences	139	28%
Media	5	1%
School of Information Sciences	46	9%
School of Labor and Employment Relations	12	2%
School of Social Work	33	7%
Veterinary Medicine	9	2%
Business	24	5%
Other	2	0%
What was your path to graduate school?		
Straight from Undergrad	251	50%
Not Straight from Undergrad	253	50%
International Status		
International	108	21%
Domestic	388	77%
First Generation Graduate Student		
Yes	204	40%
No	299	59%
Race / Ethnicity		
Native American / Native Alaskan	0	0%
Black / African American	23	5%
Hispanic / Latino/a/x	26	5%
Asian / Pacific American	99	20%
White / Caucasian	310	61%
Prefer not to respond	9	2%
Other	9	2%
Multi-racial	28	6%
Age		
18 - 21	15	3%
22 - 25	250	49%
26 - 29	132	26%
30 - 33	52	10%
34 - 37	25	5%
38 - 41	20	4%
42 years or older	11	2%

Table 3. *Observed Means, Standard Deviations, Min, Max, and Latent Omegas***

Construct	Observed				Latent
	Mean	**SD**	**Min**	**Max**	**ω**
Impostor Phenomenon	43.29	11.23	14	65	0.997
Perfectionism – Standards	12.87	2.31	3	15	0.993
Perfectionism – Discrepancy	13.26	4.08	4	20	0.994
Core Self-Evaluations – Self-Efficacy	7.82	1.18	2	10	†
Core Self-Evaluations – Self-Esteem	9.36	2.37	3	15	0.971
Core Self-Evaluations – Locus of Control	5.76	1.90	2	10	†
Anxiety	11.64	5.29	5	25	0.992
Depression	12.36	6.15	6	30	0.997
Research Self-Efficacy	3.23	0.80	1	5	0.989

** Omega (ω) is a measure of internal reliability, more appropriate than the traditional Cronbach's alpha. Omegas are calculated from the final version of each scale used in the ultimate SEM. Since emotional stability was removed it is not shown here. All other values come from the observed rather than latent variables because means cannot be generated without invariance testing
† In the final model, Self-Efficacy and Locus of Control were each represented by 2 items therefore omega cannot be calculated.

Table 4. *Correlations Among Impostor Phenomenon and Other Psychological Constructs*

	2	3	4	5	6	7	8	9
1. Impostor Phenomenon	0.13**	0.78***	-0.43***	-0.89***	-0.74***	0.54***	0.57***	-0.38***
2. Perfectionism – Standards		0.31***	0.43***	0.02	-0.09	0.12	0.11	0.10
3. Perfectionism – Discrepancy			-0.47***	-0.80***	-0.74***	0.41***	0.60***	-0.31***
4. Core Self-Evaluations – Self-Efficacy				0.65***	0.48***	-0.24***	-0.42***	0.43***
5. Core Self-Evaluations – Self-Esteem					0.91***	-0.50***	-0.69***	0.47***
6. Core Self-Evaluations – Locus of Control						-0.56***	-0.71***	0.31***
7. Anxiety							0.65***	-0.22***
8. Depression								-0.23***
9. Research Self-Efficacy								

** Correlation is significant at the .01 level, *** Correlation is significant at the 0.001 level.

Note. Correlations are calculated in *Mplus* based on the standardized final version of each scale in the same model, which achieved acceptable factor structure. Emotional Stability was removed from the final analysis therefore it is not included here.

Table 5. *Confirmatory Factor Analyses (CFAs) for Five Scales*

Scale	# Items	# Factors	Chi-Square	DF	RMSEA	Lower 90% CI	Upper 90% CI	CFI	TLI
Impostor Phenomenon (CIPS)	20	1	719.40	170	0.08	0.07	0.09	0.940	0.933
	13	1	325.75	65	0.09	0.08	0.10	0.966	0.959
Perfectionism (SAPS)	8	2	99.71	19	0.09	0.07	0.11	0.960	0.941
Core Self-Evaluations (CSES)	12	4	346.45	48	0.11	0.10	0.12	0.915	0.884
	11	4	115.98	32	0.07	0.06	0.09	0.972	0.952
Depression and Anxiety (DASS)	14	2	412.59	76	0.09	0.09	0.10	0.948	0.938
	13	2	402.80	64	0.10	0.09	0.11	0.950	0.939
Research Self Efficacy (RSES)	6	1	55.17	9	0.10	0.08	0.13	0.970	0.949

DF = Degrees of Freedom. RMSEA = Root Mean Square Error of Approximation. CI = Confidence Interval. CFI = Comparative Fit Index. TLI = Tucker Lewis Index.

Table 6. *Model Comparison Final 5 CFAs*

	Chi-Square	DF	*p* - value	RMSEA	Lower 90% CI	Upper 90% CI	CFI	TLI
All 5 scales simultaneously (Error: Not Positive Definite)	2148.79	1167	0.000	0.04	0.04	0.04	0.946	0.941
Modified Final Version	1565.98	824	0.000	0.04	0.04	0.05	0.952	0.947

CFA = Confirmatory Factor Analysis. DF = Degrees of Freedom. RMSEA = Root Mean Square Error of Approximation. CI = Confidence Interval. CFI = Comparative Fit Index. TLI = Tucker Lewis Index.

Table 7. *New Items Measuring Components of Impostor Phenomenon*

1. I think feeling unprepared is a "rite of passage"
2. Feeling like I don't belong is common for graduate students
3. I get the sense that everybody is "faking it"
4. Everyone around me looks like they have it easier
5. I do not have my career planned out like other students seem to
6. I feel I'm only here because I fulfilled a gender or diversity requirement
7. Not bragging about my accomplishments is being modest

Instructions: for each question, please select the number that best indicates how true the statement is of you. Rate the following from 1 (not at all true), 2 (rarely), 3 (sometimes), 4 (often), to 5 (very true).

Table 8. *Qualitative Coding Themes from Three Methods*

About the Impostor Phenomenon	Consequences of the Impostor Phenomenon
Fear of Failure or Mistakes	Mental Health
Frequency and Duration	Anxiety
Doubting Merit	Loneliness and Depression
Every Success is a Fluke	Publication Pressure
A Disconnect	Do Not Submit Applications
Fear of Success	Procrastinate / Paralysis
Ease Does Not Equal Competence	Stay in Their Comfort Zone
Discount	Quit
Luck	Stay Silent
Fake	Isolation
Lack of Support	The Search for Work-Life Balance
Perfectionism	No Career Consequences
From Undergraduate to Graduate	
Not Everyone Identifies with IP	
Identity	
Gender	
Race	
International Status	
Age	
Intersections	

Table 9. *Impostor vs. Not-impostor Cutoffs*

	Impostor	Not an impostor
Cutoff score of 62	328 (66%)	171 (34%)
Do you identify as an impostor?	362 (73%)	131 (27%)

Table 10. *Discount, Luck, and Fake Themes*

Quotes	College	Degree Sought	Source
Discount			
Sometimes I just play it down. I don't celebrate my wins unless somebody gives me permission.	AHS	Not reported	Focus Group
They gave me independent research funding this year. Which, quite honestly, I don't think anyone else applied for this fellowship that I got.	LAS	Doctorate	Interview
I minimize my accomplishments and thus never feel like I am successful.	LAS	Doctorate	Survey
Luck			
Sometimes I feel like I am here because of luck. Not because of my hard work.	Social Work	Masters	Survey
I attribute my successes more to luck and my failures to not being smart.	LAS	Doctorate	Survey
Any time I have a good day its like I was just lucky, and on bad days its almost like a validation that I don't actually belong.	ACES	Masters	Survey
Fake			
I fake some things that I do and work a lot harder to figure things out on my own.	LAS	Doctorate	Survey
I have felt like others around me were making great strides in their academic and professional careers and I was just "going through the motions," or "faking it."	LER	Masters	Survey

Note. AHS = College of Applied Health Sciences, LAS = College of Liberal Arts and Sciences, ACES = College of Agriculture, Consumer, and Environmental Sciences, LER = School of Labor and Employment Relations.

Table 11. *Impostor Phenomenon Consequences*

	Item	Mean	SD	% Ever
1.	passed on applying for an award or grant	2.34	1.20	64%
2.	considered dropping out of graduate school	2.10	1.19	67%
3.	changed careers (or area of study)	1.74	1.08	39%
4.	not asked questions when I do not understand	2.93	1.16	84%
5.	had to be talked into taking a big step (like a promotion)	2.24	1.16	64%
6.	remained in a less than ideal situation because I did not think I could get a better one	2.55	1.23	74%
7.	kept silent in a work setting when my opinion differed from the majority	2.88	1.23	82%
8.	avoided something that would be challenging (e.g., a difficult course)	2.48	1.11	77%
9.	avoided leadership opportunities (e.g., leading a project, running for a board member position)	2.58	1.18	77%
10.	hidden a mistake I made	2.42	1.14	74%
11.	not reached my full potential	2.89	1.22	83%
12.	felt lonely or isolated	3.17	1.23	87%

Note. Introductory prompt: *As a consequence of feeling like an "impostor," I have…)*
SD = Standard Deviation, Overall mean 2.43 (SD = 0.77)

Table 12. *Type and Reasons for Not Submitting Applications*

Did not apply or postponed	Because

• Scholarships
• Awards
• Grants
• Fellowships
• (Prestigious) Programs
• Jobs
• Auditions
• Labs
• Conferences
• Submitting manuscripts
• Asking for raise
• Negotiating salaries
	• I didn't think I was…
	    ○ smart enough
	    ○ capable of getting in
	    ○ good enough
	    ○ talented enough
	    ○ intelligent enough
	• I do not feel …
	    ○ qualified
	    ○ prepared to provide expertise
	    ○ ready
	    ○ worthy
	    ○ like I deserve it
	    ○ as deserving as other students
	• I don't see how I would possibly get them.
	• It feels like it is hopeless to apply anyway.
	• I am intimidated.
	• I can get really stressed/overwhelmed at the idea of having to compile information about myself.
	• I can't get up the confidence BECAUSE I'm so stressed out by grad school.
	• I don't believe I have done or earned or achieved enough to be "worthy" based on my own ideas of my potential.
	• I don't want to waste other people's time to write reference letters and waste time of people looking at applications.
	• I feel as though nothing I have to say is adding to the field.
	• I feel like there are students who deserve them more than I do.
	• I feel that my work is not and never will be complete enough to contribute.
	• I want to fly under the radar.

Note. The 40 "because" reasons were reduced for clarity and length

Table 13. *Themes from "Advice"*

Own Thoughts and Behaviors	Example Quotes from Focus Groups, Survey, and Interviews
Self-Care	• Have an outlet for self care so that your mind can be healthy. • Invest in yourself, your health, and your happiness. • Try to take one day at a time.
Cultivate a Learning Mindset	• If you make a mistake (and everybody does!), learn from it and move on. • Be honest about when you don't understand something. You'll find that you are not the only one who didn't understand. • Part of graduate school is learning skills that will make you better in your field, so it is natural to not know how to do certain things. Ask other students for help.
Track Accomplishments	• Keeping a list of your accomplishments or compliments from others about your achievements to look at when you're feeling down. • Celebrate every accomplishment even if you don't recognize it as important. • Practice not downplaying your accomplishments. • Remind yourself of your strengths. Remind yourself of the work it took you to accomplish those things.
Confidence	• Start small. Find one thing that you can do well and feel good about it. • Be confident. Be proud of yourself. • Trust yourself. You are here because you deserve this. • Remind yourself you worked hard and you are worthy. • Try to believe in your capabilities. You are better than you think you are. • Your perspectives, viewpoints, and experiences are valid and a wonderful addition to your program/work.
It's Okay to Feel Down Sometimes	• Acknowledge that what you're feeling is real (and that you're not delusional or overly emotional), Understand that no one has the power to stop feeling like an imposter at will). • It's OK to have thoughts of being an impostor - but you don't have to believe them 100% of the time.
Fake it Till You Make It	• It's totally normal to have insecurities, but find your inner strength (or fake it until you make it) to break the cycle of negativity. • Fake it 'til you make it. It's difficult but then one day you'll realize you don't feel like an outsider anymore.
Don't Quit, Just Try Your Best	• Keep trying regardless- you're more likely to succeed if you try than if you don't. • Be brave and try your best. • Most of all don't give up, no matter how you feel. • Be patient and keep working.

Table 13 (cont.). *Themes from "Advice*

Not Alone	• Everyone has their own doubts about themselves so just know you are not alone in this feeling. • People will tell you others understand and feel the same way. Believe them. You're not alone. • Realize that you are not the only one feeling this way. No one has their life completely together, and everyone feels like an impostor at one point or another. • Recognize it is a common feeling and just because you may feel unworthy doesn't make it so.
Everybody is Unique	• You are not an imposter. You are your own person and if that is good enough for you, it is good enough for the world. • Everybody has their own individual process. • Remember that your path is your own. No one has the exact same experiences, but that doesn't make your experiences less valid. • It's like we're all on different, but equally challenging roller coasters. At the top, down, falling fast, upside-down...but we're all at different places at different times.
Stop Comparing Yourself to Others	• Believe in yourself and stop comparing yourself to people around you. • Don't compare yourself to anyone else. Keep focused on what you need to do. • Stop comparing yourself to others and learn to find self-satisfaction in your work.
You Belong	• If someone is telling you that you are good at something, that you are capable, you should hear that as truth. • Don't doubt yourself; you are here for a reason. You beat out many other people to be here, which already says a lot about your credibility. • You would not have been accepted into your program if you did not have the qualifications your department was looking for in a candidate. • You belong here. You got here based on your merit. Everyone struggles because grad school is hard, but you are smart and strong and you can overcome these challenges.
Reflect on Your Motivation	• Focus in what you like and what you care about in your career. It is key to know exactly why you have chosen this path (for yourself, not your family, society etc). Then channel you inner Beyonce, every single time. It gets easier. • You chose this path for a reason. Just remember the reason.
Involve Other People	
Therapy	• Take a breath and talk to someone impartial like a therapist. • It may help to receive counseling from an 'outside perspective' to objectively evaluate your progress. • Get some cognitive behavioral therapy and figure out your core beliefs.
Honest Feedback	• Trust people who are your seniors (other graduate students, professors) in their assessments of you, and be willing to ask for honest feedback. • Get feedback from your trusted peers/coworkers/mentors. Really listen to their praise and criticisms. You'll find consistencies among them and believe what they tell you.

Table 13 (cont.). *Themes from "Advice*

Share with Someone	• Share these feelings with people you trust. Talking about them gives it less power over you. • Don't be afraid to share your concerns with people you trust. • It definitely helps to share these type of feelings with someone else, especially one that is close to you and knows that you worked hard to achieve success. • Share with others. It is very likely that they feel the same. It helps.
Develop a Support Network	• Form a support network/group with people you trust. • Form a network of people you can talk to, both peers and people older than you. Have candid conversations. It is hard to be the first to say you are struggling, but almost everyone else is thinking it too. • Find one person who doesn't make you feel like an impostor. Grow from there. • Find someone who will help you get better in concrete ways, not someone who will pretend that you just shouldn't feel that way.

Note. The most common themes were: Share with Someone (*n* = 66), Confidence (*n*=61), Not Alone (*n* = 54), and Learning Mindset (*n* = 43)

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APPENDIX A: MIXED METHOD APPROACH

In order to meet the dual goals of (1) developing a deeper understanding of women graduate students' experience of impostor phenomenon (IP) and (2) to compare findings with existing literature and established quantitative survey instruments (e.g., CIPS, perfectionism), a mixed method design was created. A complementarity design is warranted in order to gain a more comprehensive, contextual picture of a single phenomenon, IP, than a single method could achieve. Data were integrated to explore unique insights and varied experiences of respondents. Due to the nature of the research questions, qualitative and quantitative methods were equally weighted at different points in the study (QUAL $\rightarrow$ QUAN + qual $\rightarrow$ QUAL). The methods have complementary strengths to make efficient use of time, sample, and cost. This is consistent with recommendations for mixed methods research in counseling psychology (Hanson et al., 2005) and with previous qualitative research on IP (Lane, 2015; Sanford et al., 2015). Figure 2 shows how mixing happens at multiple points: at the level of paradigm, methodology, and method. Paradigms are the big picture, the set of assumptions framing the overall study. The overall project includes three methods: surveys, interviews, and focus groups.

Purpose of Mixed Method Approach

A complementary mixed methods design allows the results from three different methods to be placed in conversation with one another with equal weight to enrich and enhance understanding of the findings. This serves the purpose of *complementarity* with an element of *development* since the methods will be implemented sequentially. The first phase, focus groups, began with an open-minded exploration of the related features and salient topics that arise when women are asked, in a group setting, about their experiences with the IP. It occurs before the survey because it informs the subsequent phases and allow for refinement.

It is vital to include a qualitative component considering the field of counseling psychology also encompasses a feminist approach which values women's own narratives, meaning making, and strengths. The mixed method design has the added benefit of containing the necessary components to connect to the existing literature on the impostor phenomenon, which has a published mostly studies reporting quantitative data with a handful of studies using qualitative data.

Stance: Dialectic

In mixed methods research, *stances* are sets of interconnected philosophical assumptions about reality, knowledge, methodology, and values. In this study, a *dialectic* stance was chosen because an ongoing dialogue will be beneficial to the aims of the study; the distinct pieces will not be kept separated. In other words, the study will engage a dialogue between paradigms, methodologies and data. This stance affirms that paradigm assumptions guide practical inquiry decisions along with context and theory. It notes that separate philosophical frameworks (paradigms) are valuable, and can be used in respectful conversation to meaningfully engage with difference and generate new insight. Combining philosophies may lead to enhanced understandings or the creation of new knowledge (Greene & Hall, 2010) or more insightful understandings (Jang, McDougall, Pollon, Herbert, & Russell, 2008). This stance is in contrast to much of the existing literature in the field of psychology because often only one stance is selected and combining methods is seen as incompatible (purist stance). Other research stances, particularly triangulation, require keeping data separate in order to not "contaminate" the results when seeking convergence. Triangulation across paradigms is not possible due to incommensurable assumptions.

In implementation, the dialectic stance was observed in the following ways: The surveys and interview invitations happened sequentially. I objectively analyzed the quantitative responses and invited individuals to participate in the qualitative phase to obtain diversity of programs and perspectives for information richness. In the analysis phase, inferences drawn from the quantitative and qualitative strands of the study were integrated in order to provide a holistic interpretation of the findings. The dialectic approach influenced interpretation of the data and implications for future research.

Paradigms

Focus Groups and Interviews. The *constructivist* worldview guides the qualitative phases, which holds there is not an objective truth but instead individuals create their own socially-constructed meaning. Findings are interpreted through the filter of human senses and perception therefore cannot be artificially partitioned into objective/subjective realities (Kant, 1998). This assumes multiple realities of equal validity with special attention to the interaction and co-construction of reality between the investigator and research participants (Ponterotto,

2005). In contrast to other paradigms, in constructivism personal experiences are valued as viable knowledge. Values are acknowledged.

In this study, the personal relevance and meaning of the IP is the construct of interest, therefore, constructivism is an appropriate paradigm for the qualitative phase. This allows women to share what IP means to them when they discuss feeling out of place or the fear of being found out as a fraud, independent of their scores on the Clance Impostor Phenomenon Scale. Previous studies of IP have also used a constructivist approach with the rationale that "the positivist focus on IP has largely ignored the lived experiences of individuals" (Craddock et al., 2011, p. 431).

The focus group interviews are designed to provide insight into the clarity of the questions and to provide information for revision. This method allows participants to answer in an extended and spontaneous manner to open-ended questions. Focus groups are apt for examining "subjective experiences" of participants (Merton & Kendall, 1946). Moreover, this group setting allows individuals to react and respond to each other. Patton has argued that the group helps individuals feel more confident in offering and elaborating on their opinions (Patton, 2005). As this portion of the study is not intended to produce generalizable results but rather explore the phenomenon, a small number of participants are acceptable.

Survey. The quantitative survey is framed by the *postpositivist* paradigm that assumes an objective reality with the caveat of human limitations. This paradigm is the most widely used in quantitative research (Tashakkori & Teddlie, 2010b). Knowledge is considered non-falsified hypotheses that are probable facts or laws. Knowledge is amassed by adding incremental pieces, also generalizing through cause and effect links. Researcher values are excluded and often their influence is denied.

Whenever possible, I chose survey measures based on *a priori* hypotheses and selected for previous validity and established use with the target population. Empirical data from the focus groups also informed measure selection. Data measurement standards such as internal consistency are considered. Generalizability of the findings are reflected upon and valued. However, this study modeled after another one that included open-ended (qualitative) comments onto surveys of IP (Perone Birett, 2007).

Evaluating Data Quality

Due to the distinct stances, the same criteria cannot be applied to the quantitative and qualitative methodologies. Findings must be assessed in terms of whether the assertions are warranted based on the data, respective to the criteria for each method.

Qualitative: Focus Groups and Interviews. The goal of the qualitative responses is to obtain rich and diverse narratives, therefore, there is more subjectivity participant selection. Lincoln and Guba (1986) present four criteria to evaluate data quality: *credibility* (confidence in the 'truth of the findings'), *transferability* (showing the findings have applicability in other contexts), *dependability* (showing the findings are consistent and could be repeated), and *confirmability* (degree of neutrality or the extent to which findings are shaped by the respondents and not by researcher bias).

In this study, credibility will be addressed by (a) convergence of findings through group interviews and open-ended responses on the survey and (b) negative case analysis that learns from outliers, leading to more complex understanding. Interviews help establish if IP is described in similar ways by diverse participants. To address transferability, thick description is used to illustrate this sample and similarities to other contexts, circumstances, and situations. To address dependability, consultation with external researchers such as colleagues and committee members provided challenges to the process and findings of the study. External consultation will also support confirmability, in addition to detailed memos and reflexive notes.

Quantitative: Survey. Quality can be assessed through conventional benchmarks such as internal validity, external validity, reliability, and objectivity. In the survey phase, I took precautions to include random sampling within criteria and solicited as large a sample as possible to ensure better generalizability and representation. I selected standardized measures whenever possible to be suitable for the population of interest and possess good internal reliability.

Mixed Method Results. When evaluating the overall quality of the mixed methods, Tashakkori and Teddlie (2010a) suggest focusing on inference quality that is composed of design quality (methodological rigor) and interpretive rigor (accuracy or authenticity of findings, anchored in considerations of consistency and coherence). This is an inherently neutral term. The research questions justify the use of multiple methods, which were selected for their complementarity. Meta-inferences, or large conclusions using both quantitative results and qualitative findings, are presented (Creswell, Klassen, Plano Clark, & Smith, 2011).

APPENDIX B: FOCUS GROUP PROCEDURES

Supplies for Focus Groups
- Name tags
- Permanent markers for name tags
- 10 pens
- 20 copies of Consent Form (colors)
- 10 copies of Brief Demographic Survey
- Clock
- 1 copy of Phase 2 Survey
- IP definitions

Before
- Send reminder email 1 day before
- Prepare packets

Day of
- Put up signs around building
- Set up chairs in a circle
- Set packets and pen at each seat
- Set up recorder
- Set up food (away from tape recorder)

Arrivals
- Greet, direct to any empty seat, instruct to fill out name tag with a pseudonym

Beginning the Focus Group
- Greeting and sign consent form [5 minutes]
  - *"First, I would like to thank everyone for taking the time to be a part of this study. I truly appreciate your willingness to be involved. My name is Jessamyn Perlus and I'm a 4th Year PhD student in Counseling Psychology. With me is Cassandra Colbert, another counseling student who is going to be taking notes today."*
  - *"Please allow me to tell you about this study. As I do, you can follow along on the sheets provided.*
  - *"When you have completed the voluntary consent form on white paper, please fold it in half – so only you know your response – and pass them to the front. Please keep the green voluntary consent form for your own records. You have my email address on these documents, and you are welcome to contact me with any further questions."*
- Give incentives and record receipt of incentives
  - *"Now we will distribute the Starbucks Gift Cards as a thank you for coming today. Please initial this record log when you receive your incentive."*
- Start audio recorder
  - *"Now that you have read and understood the consent form I am going to turn on the audio recorder. I ask that today when you speak, if you could please say your pseudonym first it will help us later."*
- Introductions with pseudonyms and ground rules
  - *"Today we are going to use pseudonyms to help preserve anonymity. Please respect the privacy of other participants and to treat anything said in the group as confidential. Can we all agree that what is said today remains confidential? However, please remember there is no guarantee."*
  - *"Please go around the room and introduce yourself with your pseudonym and if you are comfortable, your department."*
- Brief survey [10 minutes]
  - *"If you haven't already, please fill out this survey and put your fake name on top."*

- o *"This project is the first step in my dissertation. I am interested in developing a deeper understanding (1) How women may experience impostor phenomenon in graduate school and (2) how those experiences may affect them, particularly thinking about coping and careers. Understanding these issues is essential when we think of the long-term impact on individuals, but also the theoretical literature for this construct. I am also preparing a survey to distribute to students so I might ask questions about what should be included in the survey."*
- Provide a definition of IP [1 minute]
  - o *"Many women describe an internal experience of intellectual and professional phoniness despite objective evidence to the contrary, known as the Impostor Phenomenon (IP)." They might feel like praise is not deserved, or that they obtained their present position or gained their present success because they happened to be in the right place at the right time or knew the right people. People like Tina Fey and Maya Angelou have described similar feelings, and the psychology literature suggests is also especially prevalent among female graduate student"* (e.g., McElwee et al 2007).
- Questions [50 minutes]
  - a. *Does this definition resonate with any of you? Could you describe the frequency or circumstances in which you experience it? How long does it typically last?*
  - b. *In what ways do you think your career (or education) has been impacted by feeling like an impostor?*
    - i. Provide examples if needed *(e.g., not apply for awards or promotions because of feeling unworthy).*
  - c. *What, if anything, would be different if you didn't have impostor feelings? Some people who describe impostorism tend to call themselves perfectionists. What perfectionistic behaviors do you engage in?*
    - i. Provide examples if needed *(e.g., excessive double checking work before turning it in)*
    - ii. *What are the consequences to this perfectionism (if any)?*
  - d. *Other people who describe impostor feelings report procrastinating and/or over preparing? Do either of those sound like things you do? What does it look like for you?*
  - e. *Have you experienced any adverse impacts from IP, perhaps to your mental or physical health? How would you describe these?*
- Thanks [4 minutes]
  - o *"Thank you so much for your time. It has been very much appreciated."*
  - o *"A survey will be going out in September but I don't know which graduate students will have access to it, and I won't know if you participate."*
  - o *Again, feel free to contact me if you have follow up questions or thoughts from today's group.*
  - o *"Although the results of this research may be published, your name will not appear in association with the research."*

After

- Debrief w/note taker; Remove signs
- Lock consents in filing cabinet
- Securely store data on encrypted, password protected folder

APPENDIX C: FOCUS GROUP BRIEF SURVEY

1. Please provide a FAKE NAME (pseudonym) _____

2. How do you identify your gender? (Check all that apply)
   - ☐ Male / Man
   - ☐ Female / Woman
   - ☐ Transgender
   - ☐ Prefer not to respond

3. What is your age?
   - o 17 years or younger
   - o 18 - 21
   - o 22 - 25
   - o 26 - 29
   - o 30 - 33
   - o 34 - 37
   - o 38 - 41
   - o 42 years or older

4. What college is your department in?
   - o College of Agricultural, Consumer, and Environmental Sciences (ACES)
   - o Applied Health Sciences (AHS)
   - o College of Media
   - o College of Education
   - o College of Engineering
   - o Fine and Applied Arts (FAA)
   - o School of Labor and Employment Relations
   - o College of Liberal Arts and Sciences (LAS)
   - o School of Information Sciences
   - o School of Social Work
   - o Other (please specify)
   _____

5. Are you an international student?
   - o Yes
       - o If yes, write in Country of Origin _____
   - o No
   - o Prefer not to respond

6. Are you the first in your family to go to *graduate* school?
   - o Yes
   - o No
   - o Prefer not to respond

7. What was your path to graduate school?
   - o I came straight from undergrad
   - o I did not come straight from undergrad, instead I took ____ years to do
   _____
   _____

8. How do you identify your race? (Check all that apply)
   - ☐ Native American / Native Alaskan
   - ☐ Black / African American
   - ☐ Hispanic / Latino(a)
   - ☐ Asian / Pacific American
   - ☐ White / Caucasian
   - ☐ Other, please specify:
   _____
   - ☐ Prefer not to respond

9. Please list 3 professional successes
   1) _____
      _____
   2) _____
      _____
   3) _____
      _____

APPENDIX D: SURVEY MEASURES EXCEPT FOR COPYRIGHTED SCALES

1. What is the highest level of education you have *completed*?
   o Bachelor's degree
   o Master's degree
   o Professional degree
   o Doctorate degree
   o Other (please specify) _____

2. What is the degree program level you are *currently enrolled* in?
   o Master's degree (e.g., MS, MA, MFA)
   o Doctorate degree (e.g., PhD, PsyD, EdD)
   o Professional degree (e.g., MBA, JSD, MD, DVM)

3. What department is your graduate program in?
   [write in response]

4. What college is your department in?
   [list of Colleges]

5. What was your path to graduate school?
   o I came straight from undergrad
   o I did not come straight from undergrad, instead I took _____ years to do
      _____

6. How many years of graduate school have you completed?
   [write in number]

7. How do you identify your sex / gender? (Check all that apply)
   ☐ Male / Man
   ☐ Female / Woman
   ☐ Transgender
   ☐ Prefer not to respond
   ☐ Not listed _____

8. What is your age?
   o 17 years or younger
   o 18 - 21
   o 22 - 25
   o 26 - 29
   o 30 - 33
   o 34 - 37
   o 38 - 41
   o 42 years or older

9. Are you an international student?

o No
o Yes, my country of origin is _____
o Prefer not to respond

10. Are you the first in your family to go to *graduate* school?
   o Yes
   o No
   o Prefer not to respond

11. How do you identify your race? (Check all that apply)
   □ Native American / Native Alaskan
   □ Black / African American
   □ Hispanic / Latino/a/x
   □ Asian / Pacific American
   □ White / Caucasian
   □ Other, please specify: _____
   □ Prefer not to respond

New IP Items

12. Some graduate students report feeling like an "impostor", as if their accomplishments are due to luck and worry about being found out as less capable than they are perceived to be. Other students don't report feeling like this. Since starting graduate school, have you ever felt like an "impostor"?
   [yes] or [no]

For each question, please select the number that best indicates how true the statement is of you. Rate the following from 1 (not at all true), 2 (rarely), 3 (sometimes), 4 (often), to 5 (very true).

	Not at all true	Rarely	Someti mes	Often	Very true
13. I think feeling unprepared is a "rite of passage"	1	2	3	4	5
14. Feeling like I don't belong is common for graduate students	1	2	3	4	5
15. I get the sense that everybody is "faking it"	1	2	3	4	5
16. Everyone around me looks like they have it easier	1	2	3	4	5
17. I do not have my career planned out like other students seem to	1	2	3	4	5
18. I feel I'm only here because I fulfilled a gender or diversity requirement	1	2	3	4	5
19. Not bragging about my accomplishments is being modest	1	2	3	4	5

Please respond to the statements based on how often you feel this from 1 = almost never to 5 = almost every time. If a statement is not relevant to you (for example, you did not have an opportunity to apply for an award), please skip it.

As a consequence of feeling like an "impostor," I have…

		Almost Never	Rarely	Sometimes	Often	Almost Every Time
20.	… passed on applying for an award or grant	1	2	3	4	5
21.	… considered dropping out of graduate school	1	2	3	4	5
22.	… changed careers (or area of study)	1	2	3	4	5
23.	… not asked questions when I do not understand	1	2	3	4	5
24.	… had to be talked into taking a big step (like a promotion)	1	2	3	4	5
25.	… remained in a less than ideal situation because I did not think I could get a better one	1	2	3	4	5
26.	… kept silent in a work setting when my opinion differed from the majority	1	2	3	4	5
27.	… avoided something that would be challenging (e.g., a difficult course)	1	2	3	4	5
28.	… avoided leadership opportunities (e.g., leading a project, running for a board member position)	1	2	3	4	5
29.	… hidden a mistake I made	1	2	3	4	5
30.	… not reached my full potential	1	2	3	4	5
31.	… felt lonely or isolated	1	2	3	4	5

Open-Ended Questions

32. Some female graduate students report feeling like an "impostor", as if they don't really deserve their accomplishments. If you have felt this way, please describe it.
[write in response]

33. Do you find yourself making comparisons to others? If so, who do you most often compare to (a peer, a more advanced peer, a professor?)
[write in response]

34. Have you ever shared these feelings with someone else? If so, what was that like?
[write in response]

35. Are there any ways you think your career/education has been impacted by feeling like an "impostor" (e.g., not applied for awards because of feeling unworthy)?
[write in response]

36. Please comment on whether you perceive your gender to have impacted your career choices (e.g., choosing a profession, people's attitudes about your gender, anticipating getting hired, being treated differently in your future workplace).
[write in response]

37. What advice would you give to someone trying to overcome feeling like an impostor?
[write in response]

38. Are you willing to be interviewed in person? If yes, check this box and enter your email address. You *may* be contacted later.
    Email: _____

Thank You

Thank you for taking the time to complete this survey!

39. If you wish to be entered into a raffle to win one of five Amazon Fire Tablets, click enter your email address.

If taking part in the survey brought up any concerns, be aware that you may wish to seek guidance from *the Graduate College Career Services*
http://www.grad.illinois.edu/careers/advising
or *the Counseling Center* https://counselingcenter.illinois.edu.

1. Greeting and explain procedure, sign consent forms [5 minutes]
    a. *"My name is Jessamyn Perlus, and I am a doctoral student at the University of Illinois. As part of a study I am conducting, I would like to ask you some questions related to your career. In particular, I am interested in how you may or may not feel as though feeling like an "impostor" has impacted your career. Your participation in this project is voluntary. You do not have to participate, and you may withdraw from the project at any time. Your identity will be protected – I will write down a fake pseudonym on any notes that I take today. I would like to emphasize that there are no right or wrong answers – I would just like to hear about your experience with your career. I would like to audio record this interview in order to take a record of our conversation. After the interview is transcribed, I will erase the file. Is it ok to record the interview?"*
2. Start audio recorder
3. Provide a definition of IP [1 minute]
    a. *"Many women describe an internal experience of intellectual and professional phoniness despite objective evidence to the contrary, known as the Impostor Phenomenon (IP)." They might feel like praise is not deserved, or that they obtained their present position or gained their present success because they happened to be in the right place at the right time or knew the right people. People like Tina Fey and Maya Angelou have described similar feelings, but the psychology literature suggests is also especially prevalent among female graduate student"* (e.g., McElwee et al 2007).
4. Questions [60 minutes]
    a. *Does this definition resonate with you? Could you describe the frequency or circumstances in which you experience it? How long does it typically last?*
    b. *Have you ever shared these feelings with someone else? If so, what was that like?*
    c. *Are there any ways you think your career or education has been impacted by feeling like an impostor?*
        i. *Provide examples if needed (e.g., not bothered to apply for awards or promotions because of feeling unworthy).*
    d. *What, if anything, would be different if you didn't have IP feelings?*
    e. *Where do you think these feelings came from? / When did you first notice them?*
    f. *Have you experienced any adverse impacts from IP, perhaps to your mental or physical health? How would you describe these?*
    g. *Some people who describe IP tend to call themselves perfectionists. What, if any, perfectionistic behaviors do you engage in?*
        i. *(Provide examples if needed: e.g., excessive double checking work before turning it in)*
        ii. *Are there any consequences to this perfectionism?*
    h. *Do you find yourself making comparisons to others? If so, who do you most often compare to (a peer, a more advanced peer, a professor?)*
    i. *What advice would you give to someone trying to overcome feeling like an impostor?*
    j. *Is there anything else you would like to add that I haven't already asked about?*
5. Give incentives $ / Thanks [2 minutes]
    a. *"Thank you so much for your time. Although the results of this research may be published, your real name will not appear in association with the research."*

APPENDIX F: RESULTS PERTAINING TO GENDER

Because I'm not male, I don't feel that I'm getting as good of an education
or being taken as seriously.

Introduction

Gender[5] arose as a very prominent theme in the open-ended survey responses with over three hundred segments coded. The purpose of Appendix F is to more fully delve into the multiple topics, some directly related to IP and some less so. This appendix shares the resulting themes from the qualitative analysis and provides a contextual discussion.

As noted in the literature review in Chapter 2, the way females are raised greatly influences their understanding of what is acceptable in terms of future interests and achievements, regardless of actual difference between men and women (Hyde, 2005). Family members, perhaps unknowingly, instill these beliefs including stereotypes. Children as young as six endorse stereotypes related to men and women's achievement (Bian et al., 2017). By the time they get to graduate education in their chosen field, numerous factors have directly and indirectly shaped their choices, including gender. Academia been called a "chilly climate" for women (Hall & Sandler, 1982), and the women's examples upheld many challenges they have had to navigate during their educational journey.

Results

These are results from the focus groups, survey, and interviews that specifically touched on aspects of gender. Methods and participants are described in Chapters 3-6. Transcribed conversations were read and analyzed using thematic analysis with emergent codes using NVivo 11. This inductive approach allows the data to form patterns naturally to discover new relationships. Quotes with names are pseudonyms from focus groups and interviews to preserve anonymity. Quotes are in participants' own words except for omitted filler words (e.g., "like" and "umm"), and adjusting punctuation for ease of readability (e.g., capitalizing "i").

Themes are summarized in Table 14. They are presented beginning with origins and early messages, and then transition into recent experiences in graduate school, how their experiences

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[5] A note about the terms gender and sex. Sex (i.e., female, male) refers to anatomy whereas gender (e.g., man, woman, agender, genderqueer) is based on social roles and can be based on one's own self-identification. Eight survey respondents self-identified as non-binary, gender queer, or transgender. They also noted the additional barriers they might contend with, such as whether or not to disclose their identity or "passing successfully."

have shaped their career path and plans for their future, both within academia and having a family. It delves into sexism and differential treatment, and ends with positive experiences and exceptions to the largely negative examples provided.

Table 14. *Themes and Subthemes Related to Gender*

Origins	Sexism
Female Quota	Presence Is Questioned
Double Standards: Appearance	Unwelcoming Spaces
Double Standards: Behavior	Work Is Questioned
In Class with Men	Ignored or Overlooked
Work Twice as Hard	Demeaned
Gender Ambassador	Differential Treatment
Career Choices	Denial of Sexism
Exodus from Academia	Sexual Harassment
On the Job Market	Positive Experiences in Academia
An Academic Woman with a Family	Not all Women

Origins. Some women talked about receiving early messages about their intellectual capabilities, particularly regarding mathematics and science, because of their gender. They also expressed regrets about this.

> If I could go back in time and ask my dad to encourage me to take math more seriously (instead of teasing me about my aversion from it), I don't think I would be in education. Survey 245, College of Education, doctorate

> In the field that I'm in I was always one of the only girls and I think the pressure being the only girl accelerated the imposter feeling. Because I felt well if I don't feel as capable as my male peers must be maybe because I'm a girl. – Emma, Focus Group, College of Liberal Arts and Sciences

> I sometimes do feel this way because I felt like women just weren't good at math and that was okay so I always told myself that. Now, I wish I would have tried harder and maybe did something in that field or the science field. – Survey 312, College of Education, masters

Female Quota. Many women brought up the idea of meeting a quota. For some, they perceive their gender to be an advantage because they might have an easier time getting admission or a job. For others, this potential shortcut ends up being a "voice in the back of my head like, did I get this because I filled some diversity disability checkbox for them or am I really qualified?" – Cindy, Focus Group, College of Liberal Arts and Sciences. One woman described messages about her denying her effort as a cause of her achievements, "I have been

told before that my successes can be attributed to being a female in a male dominated profession. This to me is seen as hurtful and not the way I want to get through school or life." – Survey 281, College of Fine and Applied Arts, masters

Some others have been outright told that their successes are not due to their own intelligence, which has affected well-being,

> Head of my program flat out told me he was offering me a place b/c he wanted to have a woman in the program. Direct implication was that otherwise he wouldn't have thought I was good enough. – Survey 371, College of Fine and Applied Arts, doctorate

Double Standards: Appearance. The concept of double standards arose in relation to appearance and to behavior. Specifically, women felt held to a higher standard in terms of their physical appearance compared to their male counterparts, often with additional expectations requiring more effort, time, and cost.

> I remember we were in a class once and the professor was talking about how to dress on the job. The instructor told us that she once fired someone because the woman didn't wear a bra. I pushed back against this thinking it was a bit sexist. While the instructor continued to endorse their belief about women's dress code, my cohort member had his underwear sticking out of his pants. I remember thinking, why aren't these two things equivalent? This is just one small example but things like this happen all the time and remind me that it is not equal between genders. – Survey 295, College of Liberal Arts and Sciences, doctorate

Another women added the expectation that she must "always have my hair done and good clothes." This becomes even more challenging for people who do not have an interest in this lifestyle.

> I worry at times about the fact that I have no interest in putting on make up, doing my hair, or wearing heels and skirts to work. There might be times when the phrase "dress for the job you want" - or something similarly annoying - could come up. These kinds of comments are not something you often hear addressed towards men. – Survey 353, School of Social Work, masters

Then there is the added complication mentioned by this participant,

> My boss made weird comments about my style of dress that I also internalised as comments about my body. But men seem to have an easier time in terms of dress code, being heard, and having their ideas taken seriously. – Survey 473, College of Liberal Arts and Sciences, doctorate

Double Standards: Behavior. In addition to double standards about appearance, women described differences in the way they comport themselves and what is deemed acceptable. This

included everything from facial expressions to attitude to assertiveness. "I have been told I lack enthusiasm just because I don't smile, whereas many males here do not smile but are still seen as able presenters/teachers." – Survey 305, School of Labor and Employment Relations, doctorate

> I have been told … that I wasn't "bitchy" enough or that I was incapable of leading as efficiently as a man. I believe that scenario, which occurred early in my career, really impacted my future decisions or risk taking. – Survey 177, College of Education, doctorate

> I also perceive that men who are arrogant or overly confident are perceived as stronger than me, and if I were to act similarly arrogant I would be perceived as arrogant and not strong. But if I don't give off an overly confident persona, I feel I am perceived as weak and less worthy. – Survey 338, College of Liberal Arts and Sciences, doctorate

Confidence can also show up in behaviors, such as asking for a raise which has real, monetary implications,

> I asked for a raise in a roundabout way after a year of working at a wage that was lower than I felt I deserved for the job I was doing. In contrast, one of my male friends has already attained 3 raises in 6 months of a new job (different workplace, but he has no qualms asking for a raise) – Survey 79, College of Agriculture, Consumer, and Environmental Sciences, masters

The differences women described allude to some goldilocks phenomena – their enthusiasm, assertiveness, and leadership has to be just right. Too much or too little and they are perceived negatively and which could result in workplace consequences. This results in them often modifying themselves to fit in. Some women described trying to act more masculine in terms of their style, demeanor, even their tone of voice in order to be "taken seriously." Melissa described the psychological toll that modification takes on her,

> The fact that I had to [tone myself down] has stuck with me a lot… In one way it's a skill I'm very glad I've developed because it's a skill I need and it's useful but it kills me that I've had to develop it because I shouldn't have to tone back my assertiveness and my abilities because people won't like me. But to get ahead sometimes you do. – Melissa, College of Engineering, masters

In Class with Men. Women shared what it was like being in classes with men and differences they noticed in their own behavior compared to their male classmates. The survey participants implied men tend to skew toward believing in quantity over quality, needing to speak for the sake of speaking. For example, "(Senior) male students are much more vocal,

despite having comments that border on the asinine." – Survey 47, College of Liberal Arts and Sciences, doctorate. Similarly, an interviewee described men she has worked with who have a tendency to confidently fake their knowledge, by "just saying a lot of words that are vocabulary from whatever the topic is in some order, but if you listen closely it doesn't make any sense." – Jessica, College of Liberal Arts and Sciences, doctorate.

> I feel like male students look like or act like they actually know the subject better and I can really feel the confidence when they are talking about the technical concept or idea; sometimes I don't even want to talk about technical things in front of peers – Diane, College of Engineering, doctorate

Calliope discussed part of the climate that makes it harder for her to speak up in class,

> I think the way the program is structured and the way that grad school is structured, a little bit if as a women I say something like "I just don't understand this" I feel it isn't met with the same attitude of flexibility or like expectation that eventually you will get it, you will overcome it. So I felt like I never could quite say "I don't understand" in the same way that one of the male students could, because it might be taken as "I'm not capable of understanding" Instead. – Calliope, Focus Group, College of Liberal Arts and Sciences

Women gave examples of other differences they perceived in terms of outward expressions of confidence or bragging that they see in men. "I don't feel like a dude is going to be like 'yes I'm terrified of my work.' A dude is going to be like 'I'm the smartest!' – Cheryl, School of Information Sciences, masters. Others echoed this, noting that men seem "much more inclined to talk about their successes than my female colleagues or myself."

Work Twice as Hard. A handful of women described needing to work "twice as hard" as their male counterparts. Melissa said, "Particularly in STEM, I feel like I have to constantly prove myself because I honestly feel like nobody takes me seriously when I walk into a room." A Linguistics student said, "I feel like I have to prove myself before some people will take me seriously. Like I have to be the best in order to be perceived as mediocre." These two quotes also exemplify this idea of wanting to be "taken seriously" and feeling that this is not a given in their circumstances. Proving oneself is also a subjective evaluation in the eyes of others,' therefore this pressure to "prove" their worth likely adds extreme stress to interactions.

Some respondents noted trends for women to be scrutinized or picked on in their professional environments, thus literally needing to work harder because of their gender. Diane shared, "When giving a talk… female grad students and the faculty seminar speakers tend to get

picked on. People tend to be more critical about their performance" – Diane, College of Engineering, doctorate. One person described her professor's approach to preparing future students for this kind of climate, "Somewhat typically, my female PI treats her female students harsher as a way to prepare them." – Survey 202, College of Liberal Arts and Sciences, doctorate.

Gender Ambassador. A few women described feeling like a representative of their whole gender in every academic setting they were in. "When I'm the only woman in a class, I feel more pressure to not fail. Like if I fail, then it's a reflection on the abilities of Women in [my field] as a whole." – Survey 181, College of Liberal Arts and Sciences, masters. The other two anecdotes show the added level of anxiety or inhibitions these women attribute to being female in their respective settings.

> I had known for years that people thought girls weren't as smart at math and science and I was afraid to let down my whole gender by proving them right by asking for help. I also didn't want to be a bother, because I grew up being a Good Girl, and good girls don't bother people or demand help or blame anyone but themselves when they have problems." – Survey 503, College of Applied Health Sciences, doctorate

> I worked at a consulting firm with mostly PhD-level men, and I felt very insecure about my abilities and was so scared that the men in my office would decide I was stupid and I would reify their stereotypes about women not being good at quantitative research. – Survey 337, College of Liberal Arts and Sciences, doctorate

Career Choices. The aforementioned examples have shown how women graduate students describe their gender and different expectations or behaviors compared to men. The examples have shown how they live this day-to-day. Even before they got to graduate school though, their career choices were shaped by multiple factors. Some women described how they were pushed in a certain career direction.

> I have a very early memory of my mom (who worked part time from home and has dedicated most of her life to raising her children) saying that teaching was a good job for women because they could hold the same schedule as their kids. I'm sure my mom wasn't the only person I've encountered saying something like this. Of course, I've since come to love the profession and am so proud to be in education, but I share this story to illustrate the subtle ways opportunities are communicated to young girls - myself included. – Survey 178, College of Education, doctorate

> As a woman, I was always told to be a teacher or librarian. Especially once I got glasses, it was like everyone assumed I'd be a librarian. When I decided I liked publishing,

everyone assumed I'd be an editor, not a publicist or literary agent or even the director of a publishing house. – Survey 332, School of Information Sciences, masters

I definitely chose a woman-dominated field which is likely not a coincidence. I had a warm female mentor in college and I think I likely gravitated towards her career path because we were kind of similar and I thought "if she can get a PhD in psychology, maybe I can too." I never considered a PhD before working with her because I didn't think I was smart enough – Survey 337, College of Liberal Arts and Science, doctorate

Participants specifically mentioned the sciences a few times. Some were drawn to male-dominated scientific fields, "Being a women in engineering is challenging...I wanted the challenge." Others were put off, "Maybe I didn't go for engineering because it was full of boys in school." Another described how she eliminated fields that were male-dominated,

> I am very interested in my field of study, but I also did not consider male-dominated areas, because culturally, they suck. I don't want to deal with sexual harassment, I don't want to be talked over and have to fight to be heard, and I don't want to feel like I need to watch everything I do and say and wear so I can be taken "seriously". – Survey 68, College of Liberal Arts and Sciences, doctorate

One person described selecting her particular subfield because it had more gender parity. Another participant noted how her undergraduate women's college influenced her choices,

> The nice thing about women's college is that it sort of made gender invisible--the science majors were all women, the art majors were all women, etc., so I felt free to choose a field without fear of bias on account of being a woman. – Survey 265, School of Information Sciences, masters

This person also echoed another common viewpoint of dilemmas with career decision-making due to stereotypes about women, particularly regarding a tendency to teach rather than going for rigorous Research 1 positions.

> I chose to go into education rather than research/academia because I hated doing research as an undergrad, and I find teaching very rewarding. I am aware that this reinforces a gender stereotype about women and I'm still having a hard time coming to terms with that. – Survey 265, School of Information Sciences, masters

> I am afraid that people will think I am choosing to be a lecturer in my future because I am a woman and I don't think I can be an R1 researcher. But I really want that career path. I also don't want to be seen as less intelligent because I want to do that in the future.
> – Survey 3, College of Liberal Arts and Sciences, doctorate

> When I tell people I want to teach instead of research, it seems like that's what people expect me to do, as a woman. So I struggle with "allowing myself" to teach because it's what I want, while also feeling like I have some sort of feminist requirement to rail

against the machine that I should be actively researching to pave the way for other female researchers. – Survey 234, College of Liberal Arts and Sciences, doctorate

This woman describes having made it this far in a tough field she feels an obligation to continue despite where her interests are pushing her,

> The hardest part is that I feel like I've made it through a BS in engineering and so should stick with formal engineering otherwise I'll let future women down. That has held me back from pursuing my interests which lie on the edge of traditional ideas of engineering. – Survey 106, College of Engineering, masters

Some felt stuck with their career choices and circumstances as they looked toward the future,

> I've definitely had breakdowns where I cried to my mom saying I didn't want to be a woman anymore and she was like "Do you want to be transgender?" and I was like "No that's not what I'm getting at mom." … But I think there isn't a solution. I chose engineering and here I am but it sucks sometimes. – Melissa, College of Engineering, masters

> I don't much look forward to a career of being looked down upon, but that's the one I chose, so. – Survey 50, School of Information Sciences, masters

Exodus from Academia. Given the numerous challenges and difficulties faced by women in academia, a few mentioned a decision to leave specifically because of the hostility.

> [A previous graduate student] finally got so fed up with academia and what it was doing to people and what she was going through and being a woman in particular, so she left and works in the industry. That's definitely shaped my view academia and I don't think I want to be in academia. – Melissa, College of Engineering, masters

> I didn't notice my gender until I got to grad school, and now I feel that being female amplifies all the insecurities I have about my abilities. It's so bad I've decided it's just not worth it to stay in academia because I don't want to deal with it, and I've decided I'm making a career switch. – Survey 208, College of Engineering, doctorate

On the Job Market. Graduate student women are thinking about the next step after finishing school, entering the job market. They expressed numerous concerns about potential hiring discrimination that will hurt their chances of being selected. Some mentioned physical concerns, since their field requires physical labor. For example, will a woman be seen as "less physically capable of performing the job?" They described pressure to measure up to male colleagues or navigate complicated, unfair hiring processes without being perceived as "difficult."

I feel like I have to interview twice as well as my male colleagues to be regarded as being half as competent as they are. I also had an experience where the male interviewer wouldn't let me finish answering his questions before he interrupted me to ask the next question. – Survey 306, College of Liberal Arts and Sciences, doctorate

Some women expected to encounter competitive hiring processes and potentially being at disadvantage compared to men they were more qualified than. However, some expected the opposite, that they might have an easy time getting hired in their field (usually engineering). "I think it is an advantage in admissions / getting hired. I chose this career because of my deep love of the subject material and research, despite how much I hate being one of the only women in social situations." – Survey 58, College of Engineering, doctorate

One survey respondent talked about the pull between needing to "play the game" yet try to uphold her own values surrounding activism,

I don't shy away from opportunities to "challenge" institutional racism, sexism, or injustices in many areas, but I am also realistic and I know that there is always a game that has to be played to some extent in order to dismantle the system from within. And I know I have bills to pay regardless. If I leave a job or pass on an opportunity - there will be 100 women (and 25 men) right behind me ready to take my place or step up where I wouldn't. – Survey 363, School of Social Work, masters

A common theme was anticipating future marriage and children affecting employability exemplified by this quote,

I am worried that I am less likely to get hired for a tenure-track position or post-doc because hiring committees may perceive me as flight risk because I am married. I am worried they think I will become pregnant and stop working or will follow my husband wherever his career takes him just because I am a woman. I have been advised to take off my wedding ring when I go to interviews and to not mention that I am married while my male colleagues have been told that wearing their wedding rings looks good because it makes them look like a good, stable hire. – Survey 250, College of Liberal Arts and Sciences, doctorate

An Academic Woman with a Family. The topic of personal vs. work life balance while being a woman in academia was quite common. Academia or work tends to dominate graduate education and many women mentioned worries about eventually having a family.

I am not pursuing a career in academia. I want to be a good wife and I want to be a good eventual mom in the future way over there… I want to have this good life balance and I know that it's not something that comes naturally. I know that I have to work on it. But it's like how am I supposed to work on it when I'm doing all this other shit for grad school? – Cheryl, School of Information Sciences, masters

For some, pressure from family significantly added to the concerns.

> My family thinks less of my impending degree than of my getting married (Choice quote: working at a university will be so nice! You'll have all the vacations to catch up on your housework!). – Survey 293, College of Liberal Arts and Sciences, doctorate

Others also received messages based on other people's ideas of gender roles, "I've been told that … since my fiancé is in STEM he will support me. I worry about the future, because I will want to have a family but I don't want to stop working." – Survey 319, College of Fine and Applied Arts, masters.

Women shared a similar pull to choose between family and academia. One person stated they were leaving academia "because competition involves too much sacrifice and seems incompatible with having a family" – Survey 86, College of Liberal Arts and Sciences. "I feel like I have to sacrifice my personal life as a woman to achieve the success in the field: E.g., marriage, having a child etc. I cannot do both well" – Survey 123, College of Engineering, doctorate. Another summarized the unfairness, "Women should not feel like they have to choose between certain professions and family." – Survey 170, College of Engineering, masters.

One person shared the complicated layers of the explicit and implicit expectations about women with children in her field plus the added complication of sexual orientation,

> The feeling of having children is unacceptable and a liability for any PI...hard to navigate in the future. Makes me question my plan for the future (maybe I don't need to have kids...). When I was a technician, the male PIs trashed pregnant women to their other students/postdocs/staff. Mainly other males, but also myself as a gay woman (because apparently I don't count as a potentially reproductive woman. Thanks asshole.) – Survey 202, College of Liberal Arts and Sciences, doctorate

One focus group participant described a good role model, which influenced her choices.

> I think in undergrad I was very fortunate to have a really good female advisor who I just think seeing her example, like she's a mother of two very young kids. Seeing she was able to balance her work life and family life fairly well. We even had conversations of her issues of being a woman in academia and like the obstacles she had to face, but seeing her able to succeed has helped me decide this is a path that I want to take." – Sarah, Focus Group, College of Applied Health Sciences

Many graduate students already had children themselves. One woman described the ongoing struggle to find balance,

> As a female grad student with children I have felt pressure not to be the primary caregiver to my children in favor of doing more professionally, i.e. Teaching courses, collaborating

on research projects, serving on search committees, etc. – Survey 165, College of Education, doctorate

Sexism. In addition to some of the examples already provided, women described dozens of examples of sexism and their frustration with differential treatment. One woman summarized, "I chose my career to try to bring more women into it, but now I see why most women do not make it in this career. Working with males who fully believe in the existing sexism is very difficult." – Survey 219, College of Fine and Applied Arts, masters.

Presence Is Questioned. Women gave examples of how they were not respected in their chosen profession. One pointed out, "I think women in science are still viewed as anomalies" – Survey 26, College of Liberal Arts and Sciences, masters. Another stated that even the act of adding the world 'female' before the profession treats it "as if it is somehow novel". One woman shared,

> When I was in industry, I traveled a lot. Every time I went through customs, I would tell them I was there for business and the agent would ask me my profession. When I told them engineer, I was almost always met with disbelief and more questions. Not just in countries in Africa or Asia, but in Europe and re-entering the United States. – Survey 470, College of Engineering, masters

Unwelcoming Spaces. Another subtheme that arose was related to the culture in certain working environments. Essentially, the "boys club" was unwelcoming.

> I really felt like in my previous research group I wasn't performing well or also I wasn't actually fitting well in the group culture either. I guess I couldn't admit it because everybody else worked fine and they were working well with the professor but they were like all males and I was the only female. – Diane, College of Engineering, doctorate

> I'm an individual contributor in tech and unless I'm willing to fight every single day for my right to be in that space I will have to go into management. I've been teased, put down, insulted, sexually assaulted, and told that I didn't deserve to be making more than the men around me (when I was a higher level than them). – Survey 442, School of Information Sciences, masters.

Work Is Questioned. Women described that when they do speak up or share their answers, they are sometimes met with disbelief or questioning. "People definitely argue with me more -- they second guess my choices and points, don't listen to me or don't give me the same authority as my male peers." – Survey 134, College of Liberal Arts and Sciences, doctorate.

> Academia is dominated by men. You'll get a man who walks up to your desk and you give him the answer and he's like "hmm, okay" and he won't believe you… Your male

colleague will tell you the same thing and you'll be happy. – Cheryl, School of Information Sciences, masters

I started to notice being treated differently by some of my male peers (i.e. they wouldn't believe my opinion on chemistry questions) and how they didn't always respect my female boss. – Survey 306, College of Liberal Arts and Sciences, doctorate

Ignored or Overlooked. Many students shared stories of being talked over or not receiving the same respect their male classmates were shown. "I have had ideas misattributed to male students and had ideas not taken seriously by others simply because I had a different opinion." – Survey 297, College of Liberal Arts and Sciences, doctorate.

The moment the other male participant joins us I'm left out of the conversation. Like immediately, no matter what I had to contribute it was ignored and they just kept talking to each other. – Mary, Focus Group, College of Liberal Arts and Sciences

My ideas are listened to less than male students' in research meetings. I feel like I have to work on the way that I communicate to be more direct so that male colleagues and faculty listen to me. On our research team, the male student gets all of the resources and attention. – Survey 120, College of Engineering, doctorate

The other woman in my cohort have definitely noticed times where either of us will say something and the man in our cohort will say something very similar, though only his response gets acknowledged. He has commented on this as well. I've also been in settings where a man will basically repeat me and another man will point out that I said that, too (which is nice, but annoying it has to be pointed out by another dude) – Survey 481, College of Liberal Arts and Sciences, doctorate

Demeaned. Unfortunately, women described many outright examples where they felt mistreated. They provided examples of male colleagues, professors, advisors, and other professionals. One biologist said, "I have been told that I am not as smart or capable as male colleagues and it was insinuated that I would not succeed in science."

I work in the STEM field which can be belittling for women sometimes. Even when presenting empirical data on the work I do, colleagues will tell me that my work is "cute" or my style is "bubbly" or "adorable". I've never heard statements like that directed towards my male colleagues. – Survey 118, College of Education, doctorate

I have been talked down to by male professors, with incidents ranging from having been called "honey" and "sweetheart" to having a man question my intelligence as a student and scholar as I taught him how to type a URL in to an Internet browser. – Survey 50, School of Information Sciences, masters

I've had people straight up tell me "Oh I forget you're intelligent" while at an honor society conference. – Melissa, College of Engineering, masters

I also believe that part of my previous advisor's attitude towards me was gender-based; I can't prove it, but it was a common opinion among my fellow doc students that he did not respect women. I certainly felt like I had to present a totally perfect, professional front to him at all times lest I be judged frivolous, flighty, insufficiently committed, not smart enough, whatever. – Survey 503, College of Applied Health Sciences, doctorate

Women shared many other ways they were perceived unfair differences between the sexes in the workplace or academia. Table 15 shows example quotes about pay differences, course evaluations, promotion, and work tasks.

Table 15. *Areas in Which Women Identified Differential Treatment Based on Gender*

Theme	Quotes
Pay Differences	• I know that if that man does get the job - his starting pay is likely to be higher than mine would have been despite us having the same experience and credentials. • Even when my husband and I worked in the same field, he always made more money than I did despite having less education. • I'm frustrated that here I am working on my 2nd master's and my husband who has only a bachelors makes almost $40,000 more than me. Very irritating.
Course Evaluations	• I taught my first online class the same summer that my boyfriend taught a similar course online. He put likely half the effort that I did into my course and he received far better evaluations. It was incredibly frustrating knowing that my gender likely negatively affected my scores. • From what I heard, [the department] is trying to do some kind of research or survey to see if there is any bias existing among students when they are rating their professor's performance, their class performance. … But to me it sounds like [the women faculty] are not evaluated purely based on their performance or they really felt like something was threatening them.
Promotion	• [My field] tends to be a "glass escalator" profession where men are promoted quicker and more easily than women. Already, I've seen bias, where men have been hired despite more qualified female candidates were available. • Men got promoted, women didn't get promoted and I saw it happen around me. I saw very incompetent women get promoted and I saw very incompetent men get promoted. I saw one really competent woman get promoted in my career. A lot of really competent women just like being really grumpy. And like trying really hard and trying to use the system and then not getting anywhere.
"Women's Work"	• The type of work we receive in the office is unfortunately linked to gender at times (more undesirable work sometimes goes to women). • I also anticipate being asked to/ending up doing more service work than male colleagues in a future workplace. Which I'm conflicted about, because I really enjoy service and think it's something everyone in the department/workplace should be contributing equally to, but it seems as though a lot of people (particularly men or people on tenure committees) devalue it. • [There was an] expectation that I would do the secretarial work ("women's work). • In academia specifically, I have observed that female scholars are often held to a higher standard, or have to pick up slack for others, which is troubling.

The ideas from Table 15 are underlined by one woman's statement, "There are times when I feel like I would be more successful if I were male." – Survey 106, College of Agriculture, Consumer, and Environmental Sciences, masters.

Denial of Sexism. To add insult to injury, women also provided examples of invalidation about these sexist experiences.

> [In] a conversation with a guy who was telling me that women don't have to change the way that they are, like being assertive and stuff. And I was like "No, you don't understand, I live this on a daily basis," and he's like "no, you don't understand" … and I'm like "I literally live this on a daily basis!" And I was so upset at the end of the conversation. – Melissa, College of Engineering, masters

> I felt isolated because so much of my program was men, who think that sexism is a thing of the past at the same time that they themselves perpetuate it (e.g. by discounting my opinion b/c I am a woman.). – Survey 371, College of Fine and Applied Arts, doctorate

Sexual Harassment. Many women described uncomfortable experiences, often of outright sexual harassment in the form of hostile work environments.

> I received numerous comments about my looks from professors. Which makes me think that some PI's look at factors other than my competence when they talk to me. – Survey 78, College of Liberal Arts and Sciences, doctorate

> The way that certain male colleagues treat me changes based on whether or not they think I am single. I have had male colleagues ignore or disregard me after learning that I am not romantically/sexually available. This makes me feel as if my gender prevents me from being viewed as having intellectual value in the workplace. – Survey 464, College of Fine and Applied Arts, doctorate

> Every time I walk in a room, like all the guys are just thinking about "Oh I wonder what she would be like to have sex with" and … it's not quite like I don't deserve to be there but like, I don't *want* to be there because I'm not accepted in the field. – [Interviewee]

> I've occasionally been offered recital spaces or gigs mainly because a man found me attractive. I didn't realize it at the time and quickly rejected the career help when I realized the intentions behind the generosity. I've chosen to study with men who respect me and are known for being very professional. – Survey 231, College of Fine and Applied Arts, doctorate

> Sensing attraction from a male professor threw me off and I had to push myself to get through the classes I had to take that were taught by him. – Survey 402, College of Education, doctorate

I've had men at work that I felt they can attack my opinions, and in one case realized I was hurt by /his/ opinion, and felt that going in for an unwanted and unasked for hug, would fix everything. – Survey 431, School of Information Sciences, doctorate

Cheryl, one of the interviewees, had a lot of examples to share. Given the nature of the interview there was more space for her to describe her experiences.

My appearance is constantly commented on by patrons. Patrons ask me out, follow me on the bus, harass me in coffee shops, give me love notes at the desk... When I point out I'm married or the interaction is inappropriate the comments go from "you're all dolled up today" to "gosh you've got such a red face all the time what's wrong with you?"

She described her frustrations with this and also her immediate actions of filing incident reports, including her most upsetting interaction from years ago,

I was working at a used book store, … And so I got there early and my boss was like hey come to the back with me, and I was like "oh no" … he's like, "So, I want to have sex with you."

Unfortunately, sexism—from overt and extreme cases such as the incident shared by Cheryl, to microaggressions—is a regular part of women's experiences, including graduate studies. In Cheryl's case, she confidently described moving beyond that negative experience, yet how it remains a part of her, continuing to frustrate her. It is not hard to imagine that other women may carry such frustrations. Fortunately, not all women encounter such experiences, as discussed in the next section.

Positive Experiences in Academia. There were some examples of very positive learning moments. "I'm part of a couple "women in sciences" groups and my department has a strong group of female faculty, so although I'm nervous, I see evidence of strong women in my field and that makes me feel better." – Survey 211, School of Veterinary Medicine, doctorate. Others discussed a sense of camaraderie, collaboration and friendship with the women in their program. One participant shared a touching story of speaking with her male advisor,

I actually told my advisor once because I was reading a book on [complicated topic] and felt the writing was dripping with an overtone of cocky maleness (pretentious writing, assuming the reader knew things that hadn't been explained). I told him I felt really intimidated by the book because I was picturing this sense guys explaining something to me that I wasn't getting, and that people would think it was because I'm a woman. This launched a larger conversation about my insecurities around male-dominated areas of psychology and research, and my advisor was incredibly supportive. He mentioned that he, too, feels confused when reading about stats for the first time. He then walked to his bookshelf and pointed out every stats book written by a woman, and described who those

women were, what school they were teaching at, and how their careers had gone. I felt really supporter and validated that my fears were just because of stereotypes and not my actual abilities. – Survey 337, Liberal Arts and Sciences, doctorate

Not all Women. Nearly 100 examples emerged of women not tying IP to their gender, often indicating it had no impact on their career choices. This was true for those who went into male dominated and female dominated professions. "The career path I chose is female dominated, however I did not know that before going into it" – Survey 43, College of Applied Health Sciences, doctorate. "I do not think my gender has impacted my career choice. I am actually in a very male-dominated field, but I know that I belong here and am worthy of being here" – Survey 45, College of Applied Health Sciences, doctorate.

Similarly, some use gender to motivate them, "If anything my gender has made me work harder and feel more accomplished for being where I am today. It has never held me back" – Survey 440, College of Agriculture, Consumer, and Environmental Sciences, masters. Women described simply following their interests or passions regardless of awareness of other systematic gender factors. Others were just not sure the degree of influence, "I am sure that my gender socialization affected my career choice in ways that I cannot fully recognize." – Survey 150, College of Liberal Arts and Sciences, doctorate.

Discussion

Summary of findings. This appendix was dedicated to exploring more fully the ways women viewed how their gender may have influenced their education and career, above and beyond just the impostor phenomenon. Women from all disciplines, from music performance to engineering, shared their views. Starting from an early age they received messages about gender roles and expectations for their future. They questioned whether they got to their current standing by meeting a quota or by their own merits. They shared examples of being held to different standards than their male counterparts in terms of acceptable appearance, demeanor, and attitude. For example, they struggled to be taken seriously and to find a balance with how assertive to be. Women described a compulsion to work twice as hard as others and also feeling like an ambassador for their gender, constantly being scrutinized.

Many gender findings are summed up in a quote by Melissa where she mentions her feminine appearance and double standards about women's behavior.

I've had a lot of guys tell me that I am really intimidating. I wear bows I'm not intimidating! Where are you getting this? But I think being a powerful woman, using that phrase kills me because it comes off as a negative when you say "a powerful woman", people don't like powerful women. And that kills me because powerful is a good word!" – Melissa, College of Engineering.

Although many started with an intention to remain in academia, some decided to leave, citing examples of hostility or incompatibility with their desired lifestyle. Many discussed going on the job market and worries about how they will be seen as a woman, anticipating discrimination particularly being viewed as a liability if they have or wish to have children. Many women worried about being a woman in academia and a pressure to excel at all roles.

Women described numerous examples of sexism they experienced in their educational and workplace settings. Their work was often questioned, they felt unwelcome in their environments and they felt ignored or overlooked often being left out of important conversations. They were sometimes demeaned or degraded. Other examples of perceived differential treatment included pay, course evaluations, promotion, and task allocation. There was an overarching theme of disrespect and in some cases denial of sexism by the male perpetuators. Numerous women gave examples of sexual harassment influencing their experiences and exacerbating negative feelings. Despite these negatives, some women found no link between their gender and their career and others had positive examples to share.

Stereotypes about Abilities. Others have documented the common experience of women being socialized to internalize messages and stereotypes about their abilities (e.g., Eccles, 1994; Stein & Bailey, 1973). This begins in infancy and is continually reinforced. They are taught men are more important, intelligent, and valued (Chodorow, 1995). Children as young as six endorse stereotypes related to men and women's achievement (Bian et al., 2017). It is common that women are discouraged from pursuing some line of intellectual work on the grounds that it was "unfeminine" or incompatible with female capabilities" (Belenky et al., 1986, p. 5).

The women in this study gave varied examples of how stereotypes shaped the direction of their careers either pushing them to traditional paths or inspiring them fight expectations. They described threats to their credibility as scholars and regular worries that they were somehow reinforcing stereotypes about all women if they demonstrated weakness. A previous interview study of undergraduate women found all participants implicated (1) expectations and stereotypes about women and (2) the status of women in society as perpetrators of their impostor feelings

(Wiener, 2008). A focus group study of graduate women in a European university uncovered negative genders stereotyping to be the root of discriminatory practices (Alpay, Hari, Kambouri, & Ahearn, 2010).

__Women's Status in Academia.__ There is much previous research showing that for women academia is a "chilly climate" (Hall & Sandler, 1982). Women are historically underrepresented as faculty in higher education, especially the higher up they go (e.g., Collins, Chrisler, & Quina, 1998). Others have stated that women advance up the academic hierarchy more slowly than their male counterparts and are less likely to advance to the top (Vasil, 1992). Most recent estimates indicate 49% of faculty in degree-granting post-secondary institutions were female (National Center for Education Statistics, 2016). However, women are concentrated at the lower positions (e.g., 55% lecturers, 57% instructors) compared to the associate professors (45%) and full professors (32%; National Center for Educational Statistics, 2016). Bonawitz and Andel (2009) call this the "concrete ceiling" instead of the "glass ceiling" because it has been extremely difficult to chip away at it and the differential outcomes are blatant. See Bonawitz and Andel (2009) for advice about activism for equality within academia.

This study found that many graduate student women experienced settings where they felt disrespected or unwelcome. For example, the classroom is not a safe environment for women, which means they often stay silent (Sadker & Sadker, 2010). Women in this study described remaining quiet in the sense they did not ask questions, or they did not point out errors or flaws in others' reasoning. Fassinger's (1995) study of undergraduates found females were less likely than males to offer comments or raise questions in their classes. Additionally, confidence affected the females' participation. This is despite the finding that compared to the males, females saw themselves as more prepared for class, more interested in the subject matter, and more interested in peers' comments and questions (Fassinger, 1995).

Another study of IP among undergraduate women uncovered that half the women interviewed identified the system of academia to influence their feelings of fraudulence, condemning the hierarchy and exclusionary environments they perceived (Wiener, 2008). When they felt unwelcome, the graduate student women in this study often described trying to "fly under the radar" or they leaving altogether.

The graduate student women discussed fears about when they go on the job market. An interview study of women faculty at 13 institutions did uncover themes of women having to do

more "academic housekeeping" (Britton, 2017). This provides some evidence substantiating the women in the current study's fears. However, the author also found that women faculty did not universally see gender as a systemic institutional problem that directly oppressed them but their perceptions varied based on context and salience of their gender.

Exiting Academia. Hunt (2016) found that the higher the concentration of men in the field, the more likely women are to exit it. Among the science fields, women in engineering left at the highest rates due to dissatisfaction with pay and promotion opportunities. This is sometimes referred to as a leaking pipeline. One study found that despite higher entry grades and equal self-confidence to males, graduate women in chemistry and biology had higher drop-out rates (Ferreira, 2003). Students in the departments reported different climates, with chemistry being based on traditional male norms of individualistic competition and aggressiveness. In contrast, the biology students reported more conflict with balancing career and family.

Others have noted that graduate student women may choose to leave academia in response to perceived systemic barriers related to parenthood (van Anders, 2004). Women with plans to have children sometimes opt out of tenure-track research intensive jobs to select a teaching intensive or adjunct position (Mason, Goulden, & Frasch, 2009). Others have described a "child salary penalty" for women in the labor market, yet men get a "marriage and child premium" (Budig & England, 2001). The current study also found trends of women leaving academia, and numerous challenges related to having a family either currently or in the future.

Ceci and colleagues (2014) published an extensive monograph reviewing sex differences in the sciences. Their findings uphold many expectations women in the current sample described such as having stereotypes about math ability evident by kindergarten. However, they also found some differences. In fields where women are more prevalent (psychology, life sciences, social sciences) women have a more challenging time advancing to assistant professorships than women in math-intensive fields. Those women PhDs in math-intensive fields receive the same number of invitations to interview for tenure-track and offers as their male counterparts (2014). Ceci and colleagues (2014) conclude that gender discrimination is no longer a valid cause of women's underrepresentation in math intensive fields. They implicate pre-college factors influencing likelihood of entering math fields and other external and internal barriers.

Attributions of Success. There are demonstrated sex differences in attributions of causality to success - men tend to attribute successes to internal ability and women tend to

attribute it to luck (Deaux, 1976). Aligned with this, a study of faculty found that males reported stronger research self-efficacy beliefs than did females. However, attributing a successful outcome to one's own ability significantly increased perceptions of self-efficacy (Vasil, 1992). This study did not collect data on male respondents however it did demonstrate a trend for women to attribute successes to luck or external factors such as meeting quotas.

Sexism. This study generated numerous examples of sexism and sexual harassment that women graduate students had experienced. This echoes findings of women graduate students receiving unwanted sexual attention (Mehta, Keener, & Shrier, 2013) and being cautious around male professors (Belenky et al., 1986). Clance noted that women with IP are more likely to tolerate sexual harassment (Clance, 1985). This is likely tied to the reluctance to draw attention to oneself and worry that any situation will not be better, therefore maintaining the status quo becomes the norm. The treatment of women in academia has also been termed ambivalent sexism, which is men expressing ambivalence towards women given they may not approve of women in certain roles but do not want to be completely rid of them (Glick & Fiske, 1997). Female graduate students who display more stereotypical feminine gender roles may benefit from being liked, yet are taken less seriously (Mehta et al., 2013).

Compared to males, women graduate students in science and engineering reported more gender discrimination, more sense of isolation, too quick a pace, and overwhelming workload (Litzler, Lange, & Brainard, 2005). It is almost inevitable that the cumulative effects of negative messages have been internalized by many women and in turn influence their own self-perceptions of competence and self-efficacy.

Theoretical and practical implications are discussed in Chapter 10.

Summary of Appendix F

This section provided additional context for the findings pertaining to gender. Not all women felt disadvantaged by their gender, however, there were hundreds of examples of how women felt negatively affected. They described how early messages about ability shaped their subsequent choices. Now in graduate school, many put up with hostile working environments where they are not taken as seriously as their male peers. A sense of not belonging to academia, their specific subfield, or their specific group may contribute to feelings of being an impostor.

APPENDIX G: STATEMENT OF SELF

In qualitative research, it is customary for the researcher to provide a reflective statement about factors that may influence decisions and interpretations. The researcher's qualifications and experience should be reported in order to establish confidence in data collected and to enhance "researcher credibility" (Patton, 2002).

Topic Inspiration

I cannot recall when I first became aware of "imposter syndrome" but it has always seemed a perplexing and fascinating puzzle. When women I respect like Meryl Streep, Michelle Obama, and Sonya Sotomayor—from diverse disciplines—admit to it publicly, it takes on a more urgent fascination. Working with my counseling and career-coaching clients also shed light on painful experiences of feeling like an impostor and being unable to internalize successes. This tended to come up with my female clients more than male. They would describe awards or huge milestones then discount the achievement and immediately jump to the next hurdle. Observing female academics in therapy is the same way Clance and Imes originally coined the term "impostor phenomenon" (1978). My conversations with classmates, friends, and colleagues also began to uncover that perhaps this phenomenon is more common and more problematic than I had originally perceived.

My Own Experiences With IP

I am a female, doctoral-level trainee in Counseling Psychology. I vacillate on whether or not I feel like an "impostor." At times the descriptors of downplaying success or phrases like "being in the right place at the right time" are quite easy to identify with and I have scored high on the CIPS. At other times I feel the opposite of an impostor. My educational path was non-traditional, attending schools that used narrative evaluations instead of grades so I was able to avoid the constant ranking and comparisons some of my peers experienced. It was not until starting college that competition became more apparent. However, after going through a rigorous PhD program I largely feel like I have earned my achievements.

What Draws Me to Studying IP?

I like tying disparate literatures together: impostor phenomenon has links to personality psychology, counseling psychology and now with the career aspects I am adding vocational psychology. There are implications for higher education broadly. I am fascinated by the puzzle of the paradox: if they are so high achieving how come these people cannot internalize it? I am frustrated by the lack of research and clarity on the topic given its popularity in the media. I am excited it is something many people seem to want to talk about and share their own experiences.

Lastly, in a sense it follows with the theme of my masters' thesis: do birds of a feather flock together? In that project I examined similarity of vocational interests within the same occupation. My dissertation project begins to address how people feel like they might not fit in with their professional peers and colleagues.

Experience and Training

My first three research experiences at SUNY Geneseo, Cornell University, and Ithaca College all focused on coding qualitative data. I came to appreciate the systematic approach to subjective coding – from everything to sibling-peer interactions to TV commercials – and the importance of reliability. I spent two years after college doing research at the National Institute of Child Health and Human Development where we engaged in primarily quantitative survey data but again I gravitated toward the qualitative work resulting in mixed method studies (e.g., Hilliard et al., 2014). The interview method also aligns with my 3+ years of training as a clinician to engage in one-on-one conversations. I feel it was almost inevitable that I gravitated to a research question necessitating a mixed-method design.

Personal Connections to the People and the Topic

Because I am a graduate student involved in teaching and providing psychotherapy, only students previously unknown to me were invited to participate in the qualitative phases. I have a strong interest in students formulating successful career and academic plans. Due to my counseling training I was worried about slipping into therapist mode so I took efforts to not respond or validate participants unless necessary.

My original plan included surveying female and male graduate students, but after consultation with committee members and digging into the literature I decided to make some delimitations of the study. While I do not believe female graduate students exclusively experience IP, I wanted to give voice to women. The benefit of selecting female graduate students is that I hope it helps even out the power dynamic between the interviewees and myself.

My counseling training and valuing of experiences informed the choice to mix at the paradigm level, giving equal weight to the constructivist and postpositivist paradigms.

Final Reflections

Having spent months involved in this topic I observed some behavior changes in myself. I tried to make more intentional efforts to share good news with people and truly compliment others when I heard their good news. I was more attentive to gut reactions to downplay my accomplishments. I also tried to share examples of my disappointments (e.g., not getting grants or not having abstracts accepted) because I think creating a culture of sharing both the good and the bad can help others feel less isolated.