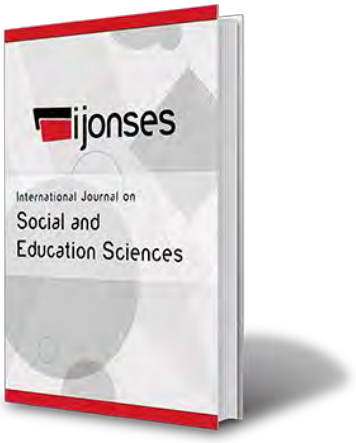

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Using Motivational Theories to Study Imposter Phenomenon among Academics

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Abstract

The present study analyzes Imposter Phenomenon (IP) through the lens of three different motivational frameworks. Expectancy Value Theory, Attribution Theory, and Self-Determination Theory were used to study IP among academics. With 72% of participants experiencing frequent or intense IP levels, IP was prevalent among those sampled. Females experienced higher IP than males, although race and first-generation status did not significantly impact IP levels. Post docs had higher IP scores than tenured faculty and full-time non-tenured faculty had higher IP scores than tenured faculty. Younger academics had higher IP scores. Analyses of the motivational frameworks showed significant differences by IP level.

Imposter Phenomenon

The trouble with the world is that the stupid are cocksure and the intelligent are full of doubt
-Bertrand Russell

Maureen Zappala was a propulsion engineer at NASA for 13 years and, despite being a rocket scientist, Zappala constantly felt self-doubt about her qualifications. She believed that NASA only hired her because they needed a woman to fill demographic quotas, and so she worked excessively to prove herself. Even after being promoted at NASA, she consistently doubted her abilities, leadership capabilities, accomplishments, and decisions (Nance-Nash, 2020). This doubt, formally known as Imposter Phenomenon (IP), is a psychological state in which a person feels like a fraud despite being perfectly qualified for their position (Nance-Nash, 2020). IP was first described by psychologists Suzanne Imes and Pauline Rose Clance in the 1970s, and since then, numerous studies have attempted to identify those affected by IP, the individual and contextual variables that modulate IP, and the consequences of holding IP beliefs. Research shows that IP mostly occurs among successful individuals who feel a chronic sense of self-doubt, hold feelings of inadequacy and intellectual fraudulence, and are unable to accept and attribute their successes to their abilities (Cowman & Ferrari, 2002). Instead, those with IP attribute their accomplishments to excessive hard work, luck, quota systems, or other external factors (Nance-Nash, 2020). IP sufferers often worry that their colleagues will unmask them as a fraud. Sadly, these individuals tend to be highly accomplished, but allow these feelings of doubt to affect their thoughts and behaviors, which can result in negative psychological, behavioral, and social outcomes including anxiety, insomnia, depression, workaholic behaviors,

workplace attrition, and withdrawal from colleagues (Burn-Callander, 2019; Parkman, 2016; McGreggor, Gee, & Posey, 2008; Sakulku & Alexander, 2011). These symptoms have serious effects on mental health and hinder the positive social structure that promotes progress in a workplace.

When first described, Clance and Imes believed IP was restricted to women. Advancements in research, however, reveal that men also suffer from IP but tend to experience it at lower levels than women (Kumar & Jamacinski, 2006). Therefore, most of the work on IP has focused on understanding IP in women, and women of color are expected to be especially susceptible (Trotman, 2009). Scholars believe that damaging implicit and explicit societal messages project ideas that women are not good leaders because they're too emotional, women are weak at math and science, and blacks and other minorities are not qualified for higher level positions (Nance-Nash, 2020) are, in part, responsible for IP among women. These negative perceptions are compounded for black women who are particularly marginalized. In the words of Maya Angelou, "I have written eleven books, but each time I think, Uh, oh, they're going to find out now. I've run a game on everybody, and they're going to find me out."

IP in Academia

IP has mostly been studied as a 'silent career killer' for women in business, industry, marketing, and finance (Burn-Callander, 2019; Parkman, 2016). Imposters' exhaustive pursuit of success and paradoxical inability to accept success when it is attained inevitably leads to increased stress, burnout, decreased motivation to lead, and reduced job performance and fulfillment (Neureiter & Traut-Mattausch 2016; Vergauwe et al. 2015; Whitman & Shanine 2012). The incidence and impact of IP in other fields such as academia has also been of concern (Armstrong & Schulman, 2019). The pervasiveness of IP among university faculty and the loss of faculty, particularly talented faculty because they are at the highest risk of experiencing IP, has been the subject of several articles (Parkman, 2016; Parkman & Beard, 2008). Traditional academic culture, which often encompasses scholarly isolation, vague performance targets, competitiveness among faculty, insufficient mentoring, a need to educate and gratify large groups of students, rigorous research and funding expectations, and a 'publish or perish' mindset, can contribute to IP within this community (Howe-Walsh & Turnbull 2016; Parkman 2016).

Most of the research on IP in academia has been conducted with undergraduate students. Research shows that IP is more prevalent among undergraduate women than men. Among undergraduate students, higher levels of IP were associated with higher GPA and more time spent on academic endeavors for women but not for men (King & Cooley, 1995). A study by Thompson, Davis and Davidson (1998) found that undergraduates with higher IP scores had greater internalization of failure and attributions of failures. Cokley et al. (2015) found a negative relationship between academic self-concept and IP among all undergraduates; IP was positively related to GPA for undergraduate women, but not men.

Some work has studied IP among graduate students (Hutchins & Rainbolt, 2017; Li, Hughes, & Thu, 2014). Research with psychology doctoral students showed that achievement motivation was negatively correlated with IP (Tigranyan et al., 2020). Fraenza (2016) studied graduate students from a variety of disciplines learning either online or face-to-face. She found that the traditional, face-to-face graduate students had significantly higher IP

scores than online graduate students; IP scores were significantly and positively correlated with anxiety for both types of learning. An additional finding was that perfectionism was the most influential predictor of IP scores across both groups.

First-generation undergraduates, who are considered an at-risk group for IP, have been the focus of numerous studies (Canning et al., 2019). Higher IP among this group, due to feelings of not belonging, has been linked to compromised educational outcomes including poorer engagement, attendance, and course grades (Canning et al., 2019; Cataldi, Bennett, & Chen, 2018; Holmes & Slate, 2017). Canning et al. (2019) found that perceived classroom competition, common among STEM college courses, were associated with greater daily in-class imposter feelings among all undergraduate students—but particularly among first-generation students. Imposter feelings predicted lower end-of-term course engagement, attendance, dropout intentions, and course grades. First-generation status was described as an obstacle for successful engagement, performance, and retention of first-generation students in STEM.

Few studies have explored IP among post docs and faculty and how the presence of IP could be linked to sufferers' needs, attributions, values, and expectations. In addition, there is no clear explanation of the role that gender, race, and first-generation status plays in determining IP tendencies among academics beyond the undergraduate and graduate levels (Parkman, 2016). The present study attempts to fill the gap in the research on IP in academics.

A Framework for Studying Imposter Phenomenon

Motivational theories provide a valuable framework for studying the underlying workings of imposter phenomenon. This study uses Self-Determination Theory (SDT), Attribution Theory (AT), and Expectancy Value Theory (EVT) to provide insight into IP because these theories evaluate the needs of academics, their attributions for success, their motives for working, and expectations regarding outcomes. Many of the defining characteristics of these theories are resonated in the research on IP. If we can determine who is at most risk for IP in academia and the motivational characteristics of those with high IP, efforts can be made to intervene to support university faculty and prevent the attrition of talent.

Self-Determination Theory (SDT)

Ryan and Deci (2000) describe three necessary needs for motivation and achievement within Self-Determination Theory (SDT): competence, autonomy, and relatedness (Deci & Ryan 2000). This theory proposes that, in order to foster the highest forms of engagement and motivation, individuals need to feel capable in accomplishing a task, have control over their work, and need to be able to connect with others. The SDT framework suggests that supporting these needs will enhance performance, persistence, and creativity in the workplace, while thwarting these needs will have a detrimental impact on professional growth (Ryan & Deci, 2000). The absence of the variables presented in the SDT framework are echoed in the variables that are reported to contribute to IP in academia, including feeling a lack of competence, self-doubt, having a sense of not belonging, scholarly isolation, a lack of mentoring, and competitiveness. It is expected that those with IP will have lower levels of competence,

autonomy, and relatedness, because of their warped perception as an 'imposter' within the workplace.

Attribution Theory

Attribution theory studies individuals' perceptions of the causality of events (Weiner 2010). Attributions of success to luck and excessive effort are common among those with IP as individuals with high IP rarely attribute success to personal ability, but rather make attributions to external factors like luck (Parkman 2016; Sanford et al. 2015). In the present study, eight attributions for success were examined: personal ability, personal effort, good luck, family, supervisor/advisor, fate, a higher power, and friends. We expected that academics with greater IP to have greater attributions of success to external factors such as good luck, family, supervisor/advisor, and friends.

Expectancy-Value Theory (EVT)

Academics have a variety of reasons for their career choices and for pursuing academic advancement. Expectancy-Value Theory (EVT) examines the reasons an individual is motivated to complete a task (Wigfield & Eccles 2000; Wigfield, Tonks, & Eccles 2004). This present study focused on the four task values: utility, attainment, intrinsic, and cost. Utility value is the perceived usefulness of a task to one's current or future goals. Attainment value is the importance, to the individual, of succeeding at a task. Intrinsic value is personal enjoyment or interest in the task. Cost is the price of completing the task, including financial cost, required efforts, and loss of alternative opportunities.

Present Study

The goal of the present study was to examine IP and the links between IP and the motivational constructs described in the previous section. The present study extended the work by Vaughn, Johnson, and Taasoobshirazi (2020) which investigated IP amongst academic women (graduate students, faculty, and administrators) using motivational theories. This study provided a more comprehensive evaluation of IP by including males in the sample, and by evaluating minority and first-generation academics. Therefore, it is the first study to evaluate IP among men and women in academia beyond the undergraduate level. Investigating IP among academics, using the motivational theories as a framework, is fitting because characteristics of each of the aforesaid motivation theories have been recognized as explanations for why women may become disgruntled and/or leave academia (Nielsen 2016; Howe-Walsh and Turnbull 2016). Understanding the variables linked to IP and identifying the groups most at risk can provide department chairs, deans, and faculty support groups with the information they need to provide resources for faculty support and retention.

Methodology

Participants and Procedures

Participants included 530 (128 male, 391 female, and 11 non-binary) academics. This included master's students, doctoral students, faculty, and administrators in higher education. Participants were recruited via academic

organization listservs and were invited to complete an online IP survey. Participants' mean age was 35.7 (SD = 8.99). The mean age for the men was 37.5 (SD = 9.25) and the mean age for the women was 35.3 (SD= 8.87). Four hundred and thirty-one participants identified as White (82%), 39 (7%) identified as Asian, 26 (5%) identified as Hispanic or Latino, 16 (3%) identified as African American, 11 (2%) identified as other, 4 (0.76%) identified as Native American, and 3 did not report their race. Among the respondents, 173 (32.6%) were doctoral students, 99 (18.6%) were full-time tenure-track faculty, 95 (17.9%) were tenured faculty, 67 (12.6%) were post docs, 42 (7.9%) were full-time non-tenure track faculty (7.9%), 19 (3.6%) participants were Master's students, 16 (3%) were part time/adjunct faculty, and 8 (1.5%) were administrators. Participants came from a range of institutions, including two-year colleges, baccalaureate colleges, master's colleges and universities, and doctoral institutions. Reported field of study included a variety of disciplines: art history, accounting, anthropology, education, psychology, philosophy, public health, sociology, communications, business, chemistry, physics, literature, history, mathematics, nursing, and political science. No differences were found in IP scores by field of study. Informed consent was collected from participants and the study was conducted in compliance with the first author's Institutional Review Board.

Measures

Imposter Phenomenon

The 25 item Clance Imposter Phenomenon Score (CIPS; Clance, 1985) scale was used to assess IP. The CIPS is a five-point Likert scale (1 = not at all true, 5 = very true) survey that assesses IP in two ways: mean IP sum score and IP level (Cusack, Hughes, & Nuhu 2013; Fraenza 2016; Vaughn, Johnson, & Taasoobshirazi, 2020). Sum scores lower than 40 indicate few IP characteristics, 40–60 moderate, 61–80 frequent, and scores greater than 80 indicate intense levels of IP (Clance 1985). Cronbach's alpha for the CIPS for the present study was .93. Sample items are provided in Appendix A. Consistent with previous research on IP and inventories used to measure IP, we studied IP as both a categorical and as a continuous variable (Cusack, Hughes, and Nuhu 2013; Fraenza 2016; Kananifar et al. 2015; Sanford et al. 2015).

Expectancy Value Theory (EVT): Utility, Attainment, Intrinsic, and Cost

Conley's (2012) Subjective Task Value scale was used to assess intrinsic value (six items), attainment value (six items), utility value (four items), and cost (two items). The participants responded to the items on a five-point Likert scale (1= strongly disagree, 5 = strongly agree). Fourteen additional cost value items were added to the two existing cost items resulting in 16 items to measure cost; these items were based on research by Johnson & Safavian (2016) that examined additional aspects of cost such as relational, monetary, non-academic interests, and psychological costs. All were negative costs or losses. Cronbach's alpha was .80 for the interest items, .73 for the utility items, .89 for cost items, and .85 for attainment value items. Sample items are provided in Appendix A.

Self-Determination Theory (SDT): Competence, Autonomy, and Relatedness

The 18 item Work-Related Basic Need Satisfaction (W-BNS) scale was given to participants to measure their

competence, autonomy, and relatedness (Van Den Broeck, et al., 2010). Participants responded using a five-point Likert scale (1 = totally disagree, 5 = totally agree). Cronbach's alpha was calculated for autonomy (six items, α = .80), competence (six items, α = .88), and relatedness (six items, α = .86). Sample items are provided in Appendix A.

Attribution Theory (AT)

McClure et al.'s (2011) 14 attribution items were used to assess participants' attributions. The items, which were on a four-point Likert-type scale (1 = no influence, 4 = big influence) asked the participants to 'think back to times when you were successful. Now rate the following possible influences on your success. These influences included: my ability, my effort, good luck, my family, supervisor/professors/advisors, fate, a higher power, and friends.

Results

Presence of Imposter Phenomenon

When evaluating IP levels, 5.3% (n = 26) of the participants had few IP characteristics, 23.5% (n = 115) were at moderate IP levels, 49.5% (n = 242) were at frequent IP levels, 21.7% (n = 106) were at intense IP levels, and 41 participants did not respond. The group exhibiting few IP characteristics encompassed 2.86% (n = 14) of all female respondents, 2.25% (n =11) of all male respondents, and .20% (n = 1) of all non-binary respondents. 15.95% (n = 78) of all female respondents, 7.16% (n = 35) of all male respondents, and .41% (n = 2) of all non-binary respondents had moderate levels of IP. The group with frequent IP levels was comprised of 37.6% (n = 184) of all female respondents, 10.84% (n = 53) of all male respondents, and 1.02% (n = 5) of all the non-binary respondents. Those experiencing intense levels of IP comprised of 16.97% (n = 83) of all female respondents, 4.09% (n =20) of all male respondents, and .61% (n =3) of all non-binary respondents. Figure 1 shows a breakdown of gender and IP.

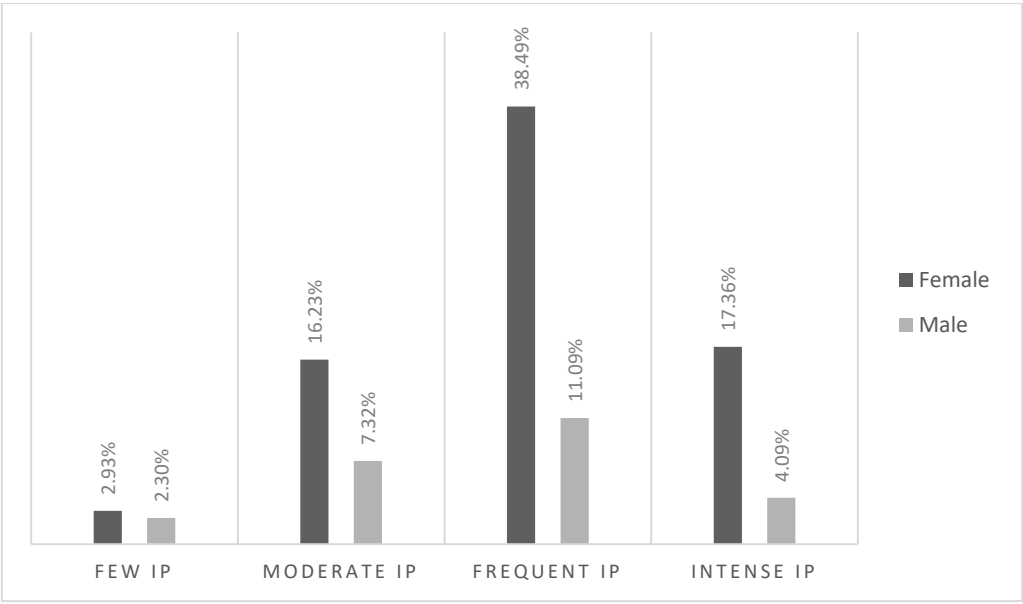

Figure 1. Distribution of Binary Gender Groups by IP Level

A chi-square test was conducted on male and female genders by IP level. The non-binary gender category was excluded from all gender analyses beyond this point due to the group's small sample size. The distribution of binary gender groups by IP level showed that 55% of women in the sample experienced frequent or intense IP compared to 15% of men (see Figure 1), and a chi-square test (3, 478) = 9.58, p = .02 suggested that women were significantly more likely than men to be represented in higher IP level categories (see Table 1). Based on percentages, there also appeared to be more non-binary gender participants at higher levels of IP, but more data is needed on this group to better understand how those who identify as neither exclusively male nor female experience IP. An independent samples t-test indicated that women (M = 69.41, SD = 14.38) had higher IP sum scores than men (M = 64.08, SD = 15.49), t(517) = 3.56, p < .001, Cohen's d = .36.

Table 1. Gender by IP Level. Row Values and Percentages Reported

		Gender	
IP level	Female	Male	Total
Few	14 (2.93%)	11 (2.30%)	25 (5.23%)
Moderate	78 (16.23%)	35 (7.32%)	113 (23.65%)
Frequent	184 (38.49%)	53 (11.09%)	237 (49.58%)
Intense	83 (17.36%)	20 (4.18%)	103 (21.55%)
Total	359 (75.10%)	119 (24.90%)	478 (100%)

There was not a significant relationship between IP Level and race (White, Black, Asian, and Latino or Hispanic) as assessed by a chi-square test. There were no significant differences between the race categories on IP sum score using a one-way ANOVA F(3, 498) = 1.39, p = .24, $\eta 2$ = .001. A two-way ANOVA for gender by race on IP Sum score showed a significant main effect for gender only, F = 11.91, p <.001, $\eta 2$ = .02.

Finally, among our participants, there were 296 individuals who identified as, presently or at some point being, a first-generation student, and 209 non-first-generation students. A chi-square test of first generation-status (yes, no) by IP level was not significant, with a chi square (3, 466) = 1.57, p =.67. An independent samples t-test comparing first-generation students (M= 67.91) to those who were not first-generation students (M = 67.89) indicated that there was no significant difference between the groups on IP sum score, t(503) = .12, p = .90. When the data were segmented by gender, there was not a significant difference between first-generation and non-first generation students on IP sum score for men t(122) =.80, p = .42 or for women t(379) = -.22, p = .83 using independent samples t-tests. A two-way ANOVA with race (White, Black, Asian, and Latino or Hispanic) by first-generation status on IP Sum scores suggested no significant effect for race or first-generation status, F = .77, p = .61, $\eta 2$ = .01.

A chi-square test on gender by academic position was significant: chi-square (7, 508) = 18.54, p = .001. Table 2 shows the breakdown of gender by academic position. The female-leading gender gap decreases as men begin to fill more roles in tenure-based and administrative positions (see Figure 2). Academic position by race (White, Black, Asian, and Latino or Hispanic race categories) was not significant based on a chi-square test (21, 491) = 30.5, p = .08.

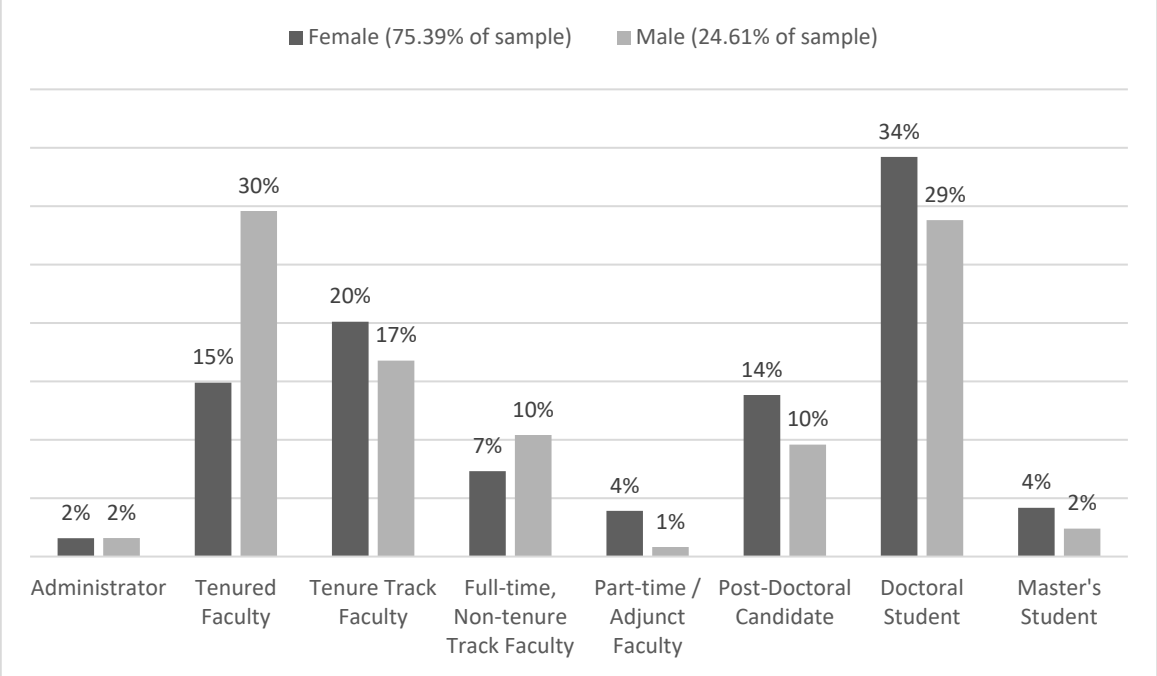

Figure 2. Distribution of Binary Genders by Academic Position

Table 2. Gender by Academic Position. Row Values and Percentages Reported

		Gender	
Academic Position	Female	Male	Total
Master's Student	16 (3.15%)	3 (.59%)	19 (3.74%)
Doctoral Student	131 (25.79%)	36 (7.09%)	167 (31.87%)
Post-Doctoral Candidate	53 (10.43%)	12 (2.36%)	65 (12.80%)
Part time/Adjunct Faculty	15 (2.95%)	1 (0.20%)	16 (3.15%)
Full time, Non-tenure Track Faculty	28 (5.51%)	13 (2.56%)	41 (8.07%)
Tenure Track Faculty	77 (15.16%)	21 (4.13%)	98 (19.29%)
Tenured Faculty	57 (11.22%)	27 (7.28%)	94 (18.50%)
Administrator	6 (1.18%)	2 (0.39%)	8 (1.57%)
Total	383 (75.39%)	125 (24.61%)	508 (100%)

A one-way ANOVA was conducted to examine the effect of academic position on IP sum score. There was a statistically significant difference in IP sum score by academic position, $F(7, 511) = 3.61$, $p = .001$, $\eta 2 = .05$. Tenured faculty had statistically significantly lower IP scores ($M = 63.3$) than post-doctoral candidates ($M = 71.3$). In addition, full-time, non-tenured faculty had higher IP score ($M = 72.9$) compared to tenured faculty (63.3). These findings are consistent with research that shows that IP is often highest among those starting a new position (Parkman 2016; Sanford et al. 2015).

In our sample, 136 (27.09%) participants reported they were single, 353 (70.32%) were married or in a relationship, and 13 (2.59%) were divorced/widowed. A chi-square test $(3, 452) = 7.92$, $p = .04$ with just single and married/relationship categories (over 97% of the sample) (divorced/widowed participants were not merged

into the single relationship category due to additional analyses including age, described below) indicated that there was an association between relationship status and IP level (Table 3). A one-way ANOVA suggested that there were significant differences between different relationship status (single or married/relationship) on IP sum score (1, 487) = 6.51, p = .01, η2 = .01. Specifically, the IP score of single academics (M = 70.48) was significantly higher than those who were married or in a relationship (M = 66.67), p < .05. To better understand this difference, a two–way ANOVA was used to examine IP sum score with gender and relationship status. The interaction term between gender and relationship status was not significant, but overall results were significant due to significance of main effects for gender and relationship status: F(5, 489) = 3.44, p = .004, η2 squared = .03; gender F (2, 488) = 4.89, p = .007, η2 squared = .02; relationship status F(1, 488) = 6.60, p = .01, η2 = .03.

The correlation between age and IP score was r = -18, p < .001, suggesting that as one gets older, IP decreases. The average age of those who were single was (M = 30) and the average age of our married participants was (M = 38). This age difference was significant t(1, 356) = 9.59, p <.001, Cohen's d = 1.03 and may help explain differences in relationship status and IP. When a regression model was run with relationship status predicting IP sum score, the variable was significant (p = .013); however, when age was included in the model, relationship status was no longer significant. This indicates that those who are single also tend to be younger which may be the underlying explanation behind for singles having a higher IP.

Table 3. Relationship Status by IP Level. Row Values and Percentages Reported

	Relationship Status	
IP level	Single	Married/in a Relationship
Few	4 (.88%)	21 (4.65%)
Moderate	23 (5.09%)	88 (19.47%)
Frequent	64 (14.16%)	158 (11.09%)
Intense	34 (7.52%)	60 (13.27%)
Total	125 (27.65%)	327 (72.35%)

Motivation and Imposter Phenomenon

Attributions

A two–way MANOVA was used to explore a significant interaction between gender and IP level, and success attributions. The interaction term proved to be insignificant. There was, however, a significant main effect for gender, which suggested that there were gender differences in respondents' attributions. For readings on gender differences in attributions, please see the work by (Beyer, 1998; Fatemi & Asghari, 2012). The MANOVA also indicated a significant effect of IP levels on attributions of success to ability, effort, luck, family, fate, a higher power, supervisor/advisor, and friends: Wilks' Λ = .778; F (24, 526)= 5.59; p < .001, partial η2 squared = .08. There was a statistically significant difference between IP level (few, moderate, frequent, and intense) on success attributions to ability (F (3,526) = 21.35, p < .001, partial η2= .11), effort (F (3,526) = 7.11, p < .001, partial η2= .04), luck (F (3,526) = 18.72, p < .001, partial η2= .10), and fate (F(3, 526)= 4.54, p <.001, partial η2= .03). Attributions of success to family, friends, advisor, and to a higher power were not significantly different across

IP levels.

Tukey's post-hoc tests indicated that those with 'few' levels of IP reported significantly higher attributions of success to ability than those with frequent ($p < .001$) and intense ($p < .001$) levels. Those with 'moderate' levels of IP had higher attributions of success to ability than those with 'frequent' ($p = .001$) and 'intense' levels ($p < .001$), and those with 'frequent' levels of IP had higher attributions of success to ability than with 'intense' levels ($p < .001$). Figure 3 shows the general trend of respondents' IP levels versus their success attribution toward ability.

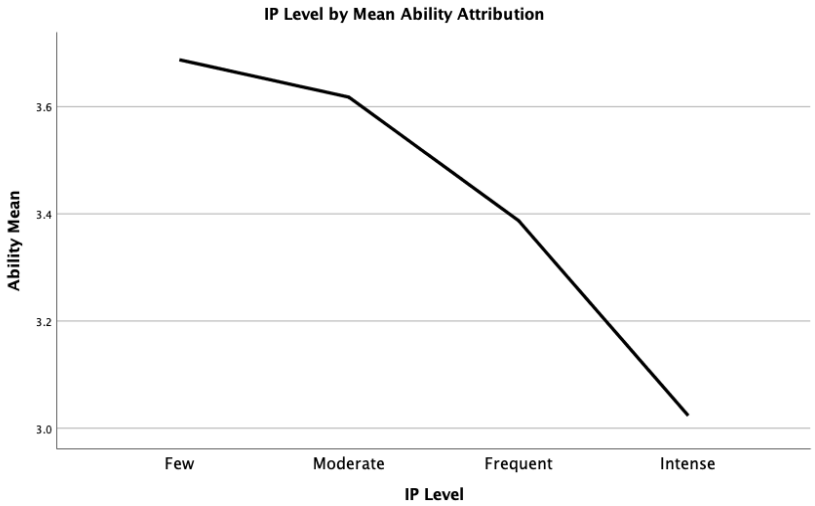

Figure 3. IP by Ability Attributions

Those with 'few' levels of IP had higher success attributions to effort than those with 'frequent' ($p = .02$) and 'intense' levels ($p <.001$). Respondents with 'moderate' IP levels also had higher attributions to success than those with 'intense' ($p < .001$) levels. Additionally, those with 'frequent' levels had greater success attributions to effort than those with 'intense' ($p = .003$) levels of IP. Figure 4 shows IP level by mean effort attribution.

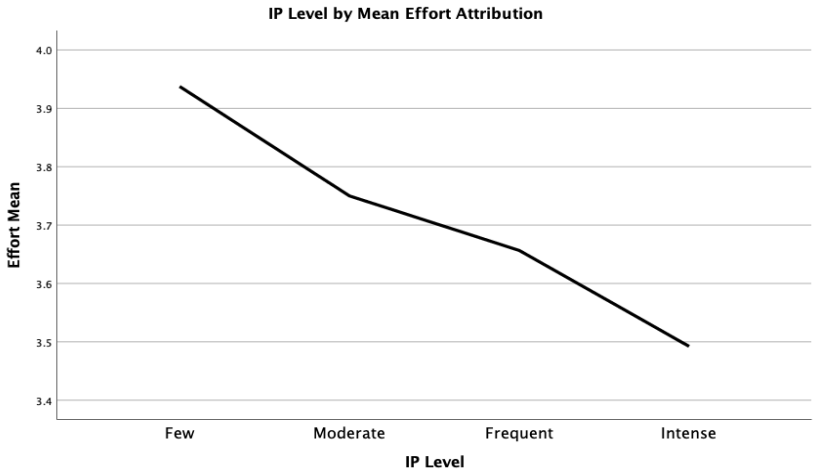

Figure 4. IP Level by Effort Attribution

Respondents with 'few' levels of IP had fewer success attributions to luck than those with 'moderate' (p = .03), 'frequent' (p< .001) and 'intense' levels (p's < .001). Those with 'moderate' levels of IP had fewer success attributions to luck than those with 'frequent' (p = .001) and 'intense' levels (p < .001). Those with 'frequent' levels of IP had fewer success attributions to luck than those in the 'intense' (p <.001) group. Figure 5 shows IP level by Luck Attributions.

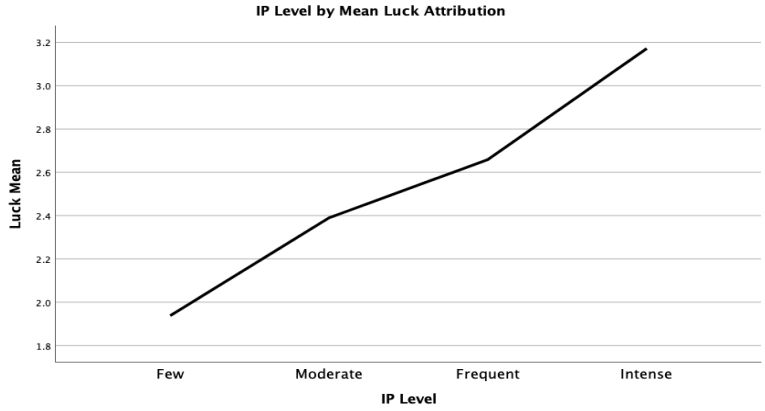

Figure 5. IP by Luck Attribution

Additionally, those with 'few, 'moderate', and 'frequent' IP levels also each had fewer success attributions to fate than those in the 'intense' IP level (all p's < .01). Figure 6 shows IP by Fate.

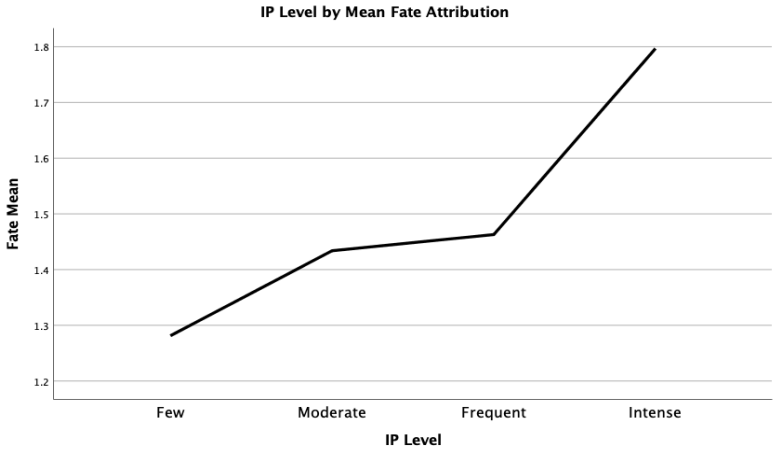

Figure 6. IP by Fate Attribution

Expectancy-Value

A two-way MANOVA on gender and IP Level's effect on Expectancy-Value motivations indicated that only IP Level was significant: Wilks' $\Lambda = .762$; $F(12, 501) = 11.68$; $p < .001$, partial $\eta 2 = .09$. Cost was the only significant outcome: $F(3, 501) = 49.95$, $p<.001$, partial $\eta 2 = .23$. Tukey post-hoc tests indicated that as IP increased by each level, cost increased significantly (all p's less than .001). Figure 7 shows that as IP level increases, participants are more likely to see the costs associated with their work.

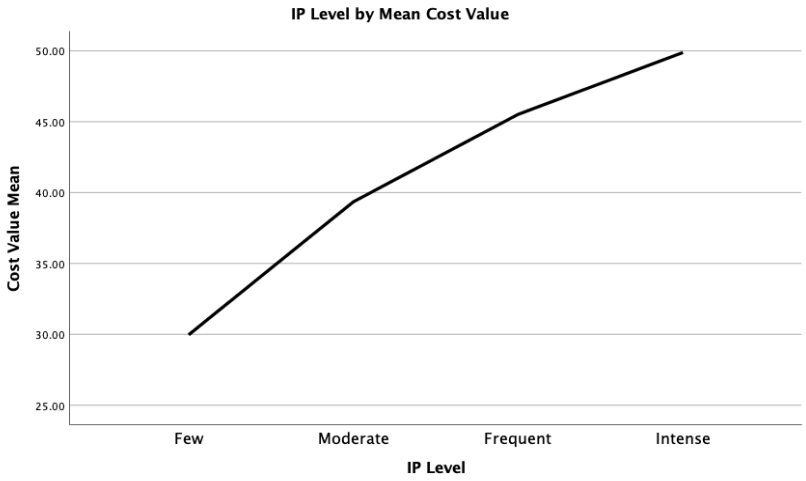

Figure 7. IP Level by Cost

Self-Determination

A two-way MANOVA with gender and IP level was performed to determine the effect of gender and IP level on autonomy, competence, and relatedness. The main effect for IP level was significant: Wilks' Lambda = .675, F(9, 501) = 24.51, p <.001, partial η2 squared = .12. Autonomy F(3, 501) = 11.78, p <.001, partial η2 squared = .06; Competence F(3, 501) = 80.38, p <.001, partial η2 squared = .32; and relatedness F(3, 501) = 7.37, p < .001, partial η2 squared = .04 differed by IP level. Figures 8 through 10 show the trends of IP level by autonomy, competence, and relatedness.

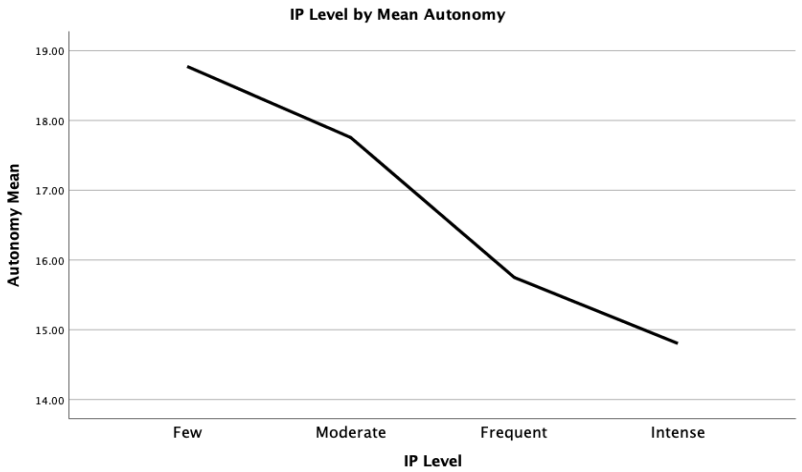

Figure 8. IP by Autonomy

For autonomy, there were significant differences between those with 'few' vs. 'frequent' and "few" vs. 'intense' levels (p's <.001), indicating that as IP level increases, autonomy decreases. These differences were also found between the 'moderate' vs. 'frequent' and 'moderate' vs. 'intense' categories (p < .001), again showing that as IP increases, autonomy decreases.

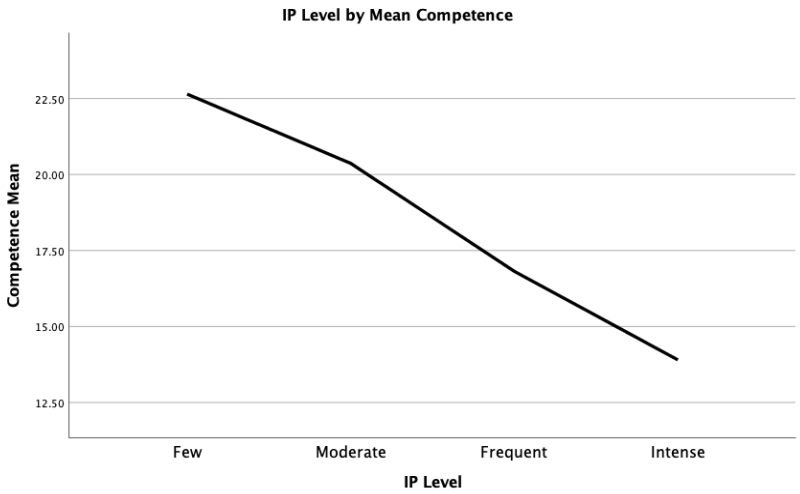

Figure 9. IP by Competence

For competence, the trend was that as IP levels went up, feelings of competence went down. Significant differences were found between all levels of IP (p's < .002). Finally, results showed that for relatedness, as IP levels went up, feelings of relatedness went down: those in the 'few' IP category differed from those in the 'frequent' (p = .003) and 'intense' (p < .001) levels. The 'moderate' IP level differed from the 'frequent' (p = .02) and 'intense' levels (p < .001). The 'frequent' and 'intense' categories also differed (p = .04).

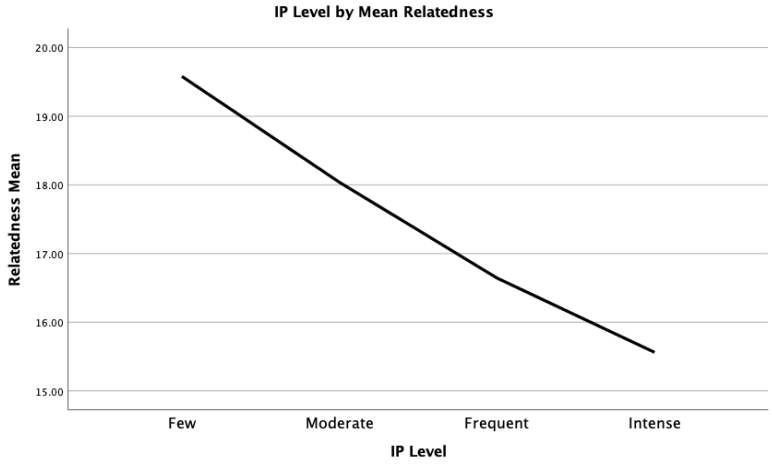

Figure 10. IP by Relatedness

Exploratory Analysis of Perceived Costs and Benefits

Text classification on open-ended responses to the question, '*What are the costs of an academic career for you?*', and question '*What are the benefits of an academic career for you?*', was employed to further investigate expected values of those in academia. Frequently listed keywords and recurring 3-5 word phrases revealed that the most consistent costs and benefits noted by the sample fell into three categories: work life balance, career and financial goals, and personal health. Work life balance costs and benefits were related to the ability to manage one's free

time and relationships outside of work. The career and financial category described one's perceptions of how well a career in academia aligned with their goals of intellectual, monetary, or skill-related growth.

Personal health as a cost referred to mental (i.e. stress, anxiety, depression) or physical (i.e. no time to exercise, lack of sleep) consequences of academia. Personal health as a benefit was the positive and intrinsic fulfillment one experiences from their work. Respondents were identified as perceiving one or more of these costs or benefits if they mentioned any of the coded non-neutral and distinct keywords recurring within each category.

The response, *"Lack of time with friends and family'* is an example of a work life balance cost, and the comment '*Not enough time to exercise'* is an example of a cost to personal health. Furthermore, '*Time flexibility/availability to make your own schedule*' is an example of a work life balance career benefit. Respondents could also be classified as mentioning multiple categories, and the quote below identifies the academic as perceiving both career and personal health benefits from academia:

> *'It is invigorating; I am able to spend my days conducting research in areas that are very meaningful to me and have the potential to improve other peoples' lives. I have wonderful peers and other professional colleagues who make the workplace a vibrant and supportive environment, full of interesting and creative discussions and projects.'*

Tables 4 – 9 show the mentions of each cost and benefit category by IP level and gender. There were statistically significant differences in the frequency of all cost and benefit categories, except for personal health and work life balance benefits which were marginally insignificant from one another (Table 10). These results indicate that work life balance costs were noted the most frequently among academics, followed by career/financial costs and then personal health costs. Moreover, personal health benefits were mentioned by 55% of respondents, and followed in frequency by career/financial goals and then work life balance benefits.

Table 4. Personal Health Cost Mentions

	Binary Gender Groups		
IP level	Female	Male	Total Mentions
Few	3 (2.27%)	2 (6.06%)	5 (3.03%)
Moderate	28 (21.21%)	6 (18.18%)	34 (20.61%)
Frequent	67 (50.76%)	14 (42.42%)	81 (49.09%)
Intense	34 (25.76%)	11 (33.33%)	45 (27.27%)
Total	132 (80%)	33 (20%)	165 (100%)

We examined costs and benefits by IP and gender using chi-square tests. Perceived work life balance costs by IP level was significant with chi-square (3, 399) = 11.160, p = .011, and was mentioned by 66.24% of those with frequent IP and 66.99% of those with intense IP. Career and financial costs by IP level and gender were not significant, but were significant with gender alone, with Fisher's Exact Test = .05. Proportionally fewer women (36.76%) than men (41.18%) commented on costs relating to career or financial goals. The distribution of personal health costs was statistically significant within males, but not within females, or IP levels, with chi-square (3,

399), p = .008, and 55% of males with intense IP mentioning health related costs. There were no statistically significant differences in the benefits mentioned between gender groups or IP levels.

Table 5. Career/Financial Cost Mentions

	Binary Gender Groups		
IP level	Female	Male	Total Mentions
Few	3 (2.21%)	4 (8.16%)	7 (3.78%)
Moderate	30 (22.06%)	17 (34.69%)	47 (25.41%)
Frequent	69 (50.74%)	23 (46.94%)	92 (49.73%)
Intense	34 (25%)	5 (10.2%)	39 (21.08%)
Total	132 (73.51%)	49 (26.49%)	185 (100%)

Table 6. Work Life Balance Cost Mentions

	Binary Gender Groups		
IP level	Female	Male	Total Mentions
Few	6 (2.58%)	3 (4.92%)	9 (3.06%)
Moderate	44 (18.88%)	15 (24.59%)	59 (20.07%)
Frequent	125 (53.65%)	32 (52.46%)	157 (53.4%)
Intense	58 (24.89%)	11 (18.03%)	69 (23.47%)
Total	233 (79.25%)	61 (20.75%)	294 (100%)

Table 7. Personal Health Benefit Mentions

	Binary Gender Groups		
IP level	Female	Male	Total Mentions
Few	7 (3.35%)	6 (11.11%)	13 (4.94%)
Moderate	49 (23.44%)	16 (29.63%)	65 (24.71%)
Frequent	106 (50.72%)	22 (40.74%)	128 (48.67%)
Intense	47 (22.49%)	10 (18.52%)	57 (21.67%)
Total	209 (79.47%)	54 (20.53%)	263 (100%)

Table 8. Career/Financial Benefit Mentions

	Binary Gender Groups		
IP level	Female	Male	Total Mentions
Few	6 (3.31%)	3 (5.26%)	9 (3.78%)
Moderate	40 (22.10%)	20 (35.09%)	60 (25.21%)
Frequent	92 (50.83%)	23 (40.35%)	115 (48.32%)
Intense	43 (23.76%)	11 (19.30%)	54 (22.69%)
Total	181 (76.05%)	57 (23.95%)	238 (100%)

Table 9. Work Life Balance Benefit Mentions

	Binary Gender Groups		
IP level	Female	Male	Total Mentions
Few	3 (2%)	5 (10.2%)	8 (4.02%)
Moderate	35 (23.33%)	15 (30.61%)	50 (25.13%)
Frequent	78 (52%)	23 (46.94%)	101 (50.75%)
Intense	34 (22.67%)	6 (12.24%)	40 (20.1%)
Total	150 (75.38%)	49 (24.62%)	199 (100%)

Table 10. Chi-Square Comparison of Category Frequencies

Cost/Benefit Categories Compared	**Degrees of Freedom**	**Sample Size**	**P-value**
Costs: personal health and career/financial goals	1	404	.002
Costs: personal health and work life balance	1	404	.055
Costs: work life balance and career/financial goals	1	404	.017
Benefits: personal health and career/financial goals	1	399	.004
Benefits: personal health and work life balance	1	399	.013
Benefits: work life balance and career/financial goals	1	399	.018

Variables Predicting Impostor Phenomenon

A stepwise multiple linear regression was used to predict IP sum score with interest, utility, attainment, cost, feelings of autonomy, competence, and relatedness, as well as attributions of success to ability, effort, luck, family, supervisor/advisor, fate, a higher power, and friends. Test of significance of regression was: $F(6, 464) = 105.14$, $p < .001$), with an R-squared of .58. Significant predictors and betas can be found in Table 11. These findings showed that, when all motivational variables were considered together, that as attainment and cost increase, so does IP. Also, as attributions of success to fate and luck increase, so does IP. Attributions of success to ability were linked to lower IP. Finally, higher feelings of competence were linked to lower IP.

Table 11. Results from Stepwise Multiple Regression

Variable	Parameter Estimate	F Value	P-value
Intercept	64.56754	134.34	<.0001
Attainment Value	0.60407	13.10	0.0003
Competence	-1.71671	140.69	<.0001
Cost Value	0.46546	59.81	<.0001
Success Ability	-3.17755	14.05	0.0002
Success Fate	1.29964	4.74	0.0300
Success Luck	3.17510	33.21	<.0001

Discussion

This study extended the work by Vaughn, Johnson, and Taasoobshirazi (2020) to study IP among academics using three motivational theories as a framework for interpreting the impact of IP among academics. This study is the first to evaluate gender differences, race, and first-generation status on IP and to use the SDT, EVT, and AT theories to assess and interpret IP. We chose to study IP using a motivational framework because the three theories provide a comprehensive lens for understanding academics' needs, values, and attributions, and how variations in these needs, values, and attributions can exasperate or attenuate IP. We do, however, recommend that future research also consider additional motivational constructs such as self-efficacy theory and cognitive dissonance theory.

IP was widespread among our participants: 72% were at the frequent or intense IP levels. In addition, women had higher IP levels and sum IP scores than men. Research shows that IP is more prevalent among women, minorities, and first-generation students (Parkman, 2016; Clance et al., 1995). While this study found those factors to be unrelated to IP, the sample only included a small number of minority students (3% African American, 5% Hispanic or Latino, and 7% Asian). Segmented by gender, there were only 14 African American women to 335 Caucasian women and so any inferential comparison would be inappropriate. Previous studies not only show that African American women are at a particular risk for IP, but researchers Cokley, McClain, Enciso and Martinez (2013) found, when studying IP among undergraduates, that Asian students experienced higher levels than any other minority group. It is recommended that data be collected for further study of IP among minority academics.

Post-doctoral candidates had higher IP scores than tenured faculty and full-time non tenured faculty had higher IP scores than tenured faculty. Those who were younger also had higher IP scores. Thus, it seems that tenure mitigates some of the issues with IP. There is research that shows that graduate students and new faculty are more susceptible to IP (Vaughn, Johnson, & Taasoobshirazi, 2020), but the present study is novel in studying academic ranks and IP. The combination of these effects suggest that overall life or professional experiences may decrease IP within some individuals, and further research is recommended to understand the progression of IP over time.

Differences were found across IP levels on success attributions to ability, effort, luck, and fate. Those with higher IP scores were less likely to attribute their successes to ability and effort; those with higher IP scores were more likely to attribute their successes to luck and fate. An unanticipated finding was that those with higher IP levels were less likely to attribute their successes to effort. Previous research, in business and industry, indicates that those holding IP beliefs tend to work more aggressively and attribute any successes to hard work (Howe-Walsh & Turnbull, 2016). In this study, external factors alone were responsible for the success attributions of IP sufferers. This is an area that should be further explored to understand why effort attributions differ for academics and non-academics.

Results also showed that as IP increases, perceptions of cost increase. Academics perceived work life balance costs the most frequently, and perceptions of costs in this category increased as IP level increased. This suggests that those with high IP are especially susceptible to feeling that they do not have enough free time for their own

personal interests or to build relationships outside of work. Career and financial goals were the next most frequently noted cost, and men were generally more likely to note this cost than women. This cognitive dissonance in males may be one of the motivations that drives the group to seek the more coveted, tenured positions over time. Personal health costs were mentioned the least, and IP level did not appear to have an effect in this area. This is a surprising discovery, as those with high IP are typically depicted as depressed or anxious that they will be 'outed' as an imposter at any moment. The majority of those in academia gain some degree of personal fulfillment out of their work and increase in IP level does not seem to hinder one's ability to acknowledge those positive attributes.

An important finding was that there were no statistically significant differences in the benefits of work life balance, career and financial goals, and personal health by gender or IP level. This is an area that merits further study and has implications for expectancy-value cost theory and IP. Results indicated that as IP increased, feelings of autonomy, competence, and relatedness went down. Academics that hold higher IP levels feel less autonomous, less capable, and less likely to relate to their colleagues. This may be why those with IP are more likely to disengage, feel frustration and burnout, and leave their positions (Burn-Callander, 2019). Future research should study the academic culture and personality traits of faculty that attenuate or exasperate IP and, in turn, perceptions of autonomy, competency, and relatedness. For example, perfectionism, a trait that many academics hold, has been a strong, positive predictor of IP (Fraenza, 2016). Research should study the contextual and personality traits that impact IP to determine when they may attenuate or exasperate IP as individuals move along an academic trajectory. The research in educational psychology can help identify these variables, including variables that have not yet been linked to IP such as motivational constructs such as goal orientation, emotions, resilience, metacognition, and social support. Statistical modeling, including structural equation modeling, latent growth modeling, and hierarchical linear modeling can help answer questions about the mediating, moderating, and nested effects of these variables across time.

In the present study, IP was studied as a negative trait, but there has been some recognition of the upsides of having IP, including that a fear of failure can be motivating (Chamoro-Premuzic, 2020). From a motivational, goal orientation, perspective, this sounds like achievement approach orientation, which has been linked to positive educational outcomes (Taasoobshirazi & Sinatra, 2011). This is an area of future exploration for IP researchers.

When studying the motivational constructs, gender did not play a role in the tested two-way MANOVAs. We also included race in the models and found no effect for race or interaction for race by IP level. Additional research, with larger numbers of minority academics, can help confirm or contradict our findings.

Implications for Academia

Department chairs, deans, and administrators can help attenuate IP and its effects by holding workshops and discussions for students and faculty that define IP, describe those most commonly affected, and present the empirical research that is available and shows the link between IP and attributions, perceptions of negative cost, and feelings of autonomy, competence, relatedness, anxiety, and perfectionism. Collecting information from

students and faculty in a department about their experiences with IP and suggestions from them about how to minimize the contextual impacts of IP is a huge step towards mitigating the negative physical, psychological, and behavioral outcomes associated with IP. Traditional academic culture, which often encompasses scholarly isolation, vague performance targets, competitiveness among faculty, insufficient mentoring, a need to educate and gratify large groups of students, rigorous research and funding expectations, and the 'publish or perish' mindset, can all exasperate IP among academics (Howe-Walsh & Turnbull 2016; Parkman 2016). Studies can evaluate how departmental culture and interventions to reduce IP in department translate to changes in IP and individual difference variables linked to IP.

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Appendix A

Clance Imposter Phenomenon Score: Sample Items.

I have often succeeded on a test or task even though I was afraid that I would not do well before I undertook the task.

I can give the impression that I'm more competent than I really am.

I avoid evaluations if possible and have a dread of others evaluating me.

Sometimes I'm afraid others will discover how much knowledge or ability I really lack.

Subjective Task Value Scale: Sample Items.

My work as an academic is valuable because it will help me in the future. (UTILITY)

My work as an academic is important for my short-term goals. (UTILITY)

Being good at my work in academia is part of who I am. (ATTAINMENT)

My academic work gives me a sense of purpose. (ATTAINMENT)

Scholarship is exciting to me. (INTEREST)

I enjoy my work as an academic. (INTEREST)

I am concerned that my academic life may lead to me becoming ostracized by members of my community. (COST)

I have lost out on other opportunities because of my academic career. (COST)

My health has suffered as a result of my academic work. (COST)

Success in academia requires that I give up other activities I enjoy. (COST)

Work-Related Basic Need Satisfaction: Sample Items.

At my institution, I can talk with people about things that really matter to me. (RELATEDNESS)

I often feel alone when I am with my colleagues. (RELATEDNESS)

I am good at the things I do in my position as a (position filled based on who is completing the questionnaire). (COMPETENCE)

I doubt whether I am able to execute my work as a (position) properly. (COMPETENCE)

In my position as a (position) I feel forced to do things I do not want to do. (AUTONOMY)

The tasks I have to do in my position as a (position) are in line with what I really want to do. (AUTONOMY)