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The Initial Development, Factor Structure, and Psychometric Validation of the Impostor Phenomenon Assessment (IPA): A Novel Assessment of Impostor Phenomenon

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ABSTRACT

Despite growing attention surrounding impostor phenomenon (also known as "*imposter syndrome"*), recent reviews have suggested that current measures may be inadequate in capturing the complex and multifaceted nature of this construct (i.e., thoughts, feelings, and behaviours). The objective of my dissertation research program was to clarify the theoretical conceptualization of impostor phenomenon based on experiences in an achievement-oriented setting, and to develop a novel and psychometrically valid method of measuring this construct. I began by conducting an extensive review of the literature and developing an item pool for a novel impostor phenomenon assessment. I then conducted exploratory factor analyses (Study 1) and confirmatory factor analyses (Study 2) to assess the initial item pool and to determine the factor structure and initial psychometric properties (e.g., convergent and divergent validity) of the novel Impostor Phenomenon Assessment (IPA; Study 2 and 3). As an extension to Study 3, I also examined the longitudinal stability of impostor phenomenon and correlates with trait variables and psychological distress across the academic year (baseline and six follow-up timepoints). Results suggested excellent psychometric properties for the novel IPA. Longitudinal findings demonstrated that impostor phenomenon was relatively stable in individuals over time, with intercepts significantly varying as a function of gender and academic year. Model findings for impostor phenomenon showed that self-esteem, self-critical perfectionism, agreeableness, conscientiousness, neuroticism, and rigid perfectionism were significant predictors. Additionally, cross-lagged panel analyses suggested partial support for a causal effect of impostor phenomenon on psychological distress across time. These findings offer preliminary evidence for the reliability and validity of the IPA as a novel measure of impostor phenomenon and are the first to examine the stability of impostor phenomenon in individuals over time.

SUMMARY FOR LAY AUDIENCE

With growing attention towards the impostor phenomenon (also known as "*imposter syndrome"*), current methods of assessing and identifying this experience are inconsistent and miss out on many of the key characteristics of what it means to "feel like an impostor". The objective of my dissertation research program was to clarify the understanding of this construct (i.e., what does impostor phenomenon involve?), and to develop a new and comprehensive way of assessing for the thoughts, feelings, and behaviours associated with impostor phenomenon. I was also interested in examining how impostor phenomenon changes across the academic year (i.e., does it ebb and flow through periods of higher stress – e.g., exams?). I began by developing a list of items for further review, and then conducted factor analyses to assess the initial items. I then assessed the factor structure and validity of the new Impostor Phenomenon Assessment (IPA) across three studies. As an extension to this research, I also examined the validity of impostor phenomenon and associations with self-esteem, personality, perfectionism, and psychological distress in students over time (i.e., the academic year). The findings of my dissertation offer preliminary evidence for the reliability and validity of the IPA as a novel measure of impostor phenomenon and are the first to examine the longer-term stability of impostor phenomenon over the course of an academic year.

Keywords: impostor phenomenon, impostor syndrome, psychometric validation, test construction, longitudinal

CO-AUTHORSHIP STATEMENT

Studies 1, 2, and 3 (with exception, the longitudinal analyses) represent portions of a journal article that has been submitted for publication and is currently under review at the peer-reviewed journal *Assessment.* Deanna Walker was the primary investigator across this article and was responsible for all aspects of the development, analyses, and writing. References are provided below.

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Finally, to anyone reading this who has ever felt like an impostor, know that you deserve to be where you are, and you are deserving of everything that you have worked so hard to achieve.

This one's for you.

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CHAPTER 1

Introduction and Statement of Problem

"I just look at all these people, and I think, what the heck am I doing here? They've made amazing things. I just went where I was sent." - Neil Armstrong, first man on the moon

The impostor phenomenon, or the experience of feeling like a "fraud," has gained increasing attention not only in the popular media, but in the context of academic and professional settings. People who experience this phenomenon are more likely to doubt their abilities and accomplishments, seeing their own abilities as being incompetent and inferior compared to their peers (despite any evidence to suggest the contrary; Langford & Clance, 1993; Harvey, 1981; Kolligian & Sternberg, 1991). Clance and Imes (1978) coined the term "impostor phenomenon" in the late 70s through observing clinical interviews in a population of highly successful women who had obtained multiple doctoral degrees and recognized academic success. Through examining the experiences of lauded individuals, they found that women often possessed strongly held beliefs that they were "not intelligent", and that they had "tricked" others into believing the that they were (particularly when compared to their male counterparts; Clance & Imes, 1978). Graduate students who identified as women were more likely to attribute their success in academia to external factors, such as luck or a "mistake on the university's part" (Bell, 1990; Clance & Imes, 1978). They coined this experience the "Impostor Phenomenon." Those who felt they were 'impostors' lived with a fear that their peers, or someone in a position of authority, would discover their perceived 'incompetence' – even if they were, in fact, demonstrating outstanding academic and professional achievements representative of successful, and even superior, functioning (Clance & Imes, 1978; Topping & Kimmel, 1985).

Since its inception, research has evolved to identify that impostor phenomenon occurs across both men and women (Bussotti, 1990; Langford, 1990; Topping, 1983), in diverse cultural settings (Chae et al., 1995; Clance et al., 1995), and in nearly 70% of people (Gravois, 2007), regardless of level of achieved success (Harvey, 1981). Researchers have explored impostor phenomenon across a wide range of educational and career contexts including post-secondary students (Bussotti, 1990; Harvey, 1981; Langford, 1990; Topping, 1983), academic faculty (Hutchins, 2015; Hutchins & Rainbolt, 2017; Topping & Kimmel, 1985), librarians (Barr-Walker et al., 2019; Clark et al., 2014), business marketing firms (Fried-Buchalter, 1997; Rohrmann et al., 2016), psychiatrists and doctors (Seritan & Mehta, 2016), medical assistants (Mattie et al., 2008; Prata & Gietzen, 2007), social workers (Urwin, 2018), athletic coaches (Start, 2016), and Veterans (Stein et al., 2019). Findings have suggested that impostor phenomenon is particularly common in competitive and challenging environments, such as within an academic setting (Henning et al., 1998; Legassie et al., 2008; Oriel et al., 2004; Regan et al., 2019; Tigranyan et al., 2020).

Although students in a wide variety of academic fields report feeling alone in their feelings of being an impostor (e.g., "*Everyone has it together but me")*, these feelings are a normative educational experience (Craddock et al., 2011). In recent surveys of undergraduate and graduate students, nearly 90% of respondents indicated feeling less capable compared to their peers (Tigranyan et al., 2020; Villwock et al., 2016). This has led some to refer to impostor feelings as a "formative" experience in one's development of their own professional identity (Hutchins & Rainbolt, 2016); however, cross-sectional research has found that these beliefs are associated with feelings of anxiety, depression, self-doubt, and fear of failure (Chrisman et al., 1995; Cokley et al., 2013; Cozzarelli & Major, 1990; Henning et al., 1998; Kumar & Jagacinski, 2006;

Leary et al., 2000; Topping, 1983). Limited research has examined long-term outcomes associated with impostor phenomenon,

Despite the breadth of research, recent reviews of the impostor phenomenon literature have emphasized the limitations of the current measurement of impostor phenomenon (Bravata et al., 2019; Mak et al., 2019). Current measurements apply unidimensional scoring to what has otherwise been identified as a multidimensional construct, and often categorize individuals into "impostor" vs. "non-impostor" groups based on ill-defined cut-off scores or median split techniques. Similarly, the lack of existing longitudinal research in this area limits conclusions regarding longer-term stability and predictive validity. As such, in my dissertation research program, I sought to develop a clarified conceptualization of impostor phenomenon, to develop a novel, multidimensional assessment for its measurement (i.e., that incorporates cognitive, emotional, and behavioural characteristics), and to validate the novel measure for use in an academic setting. I also sought to explore the longitudinal stability of impostor phenomenon across time (i.e., the academic year), and identify demographic and trait predictors as well as associations with psychological distress.

CHAPTER 2

Measures of Impostor Phenomenon

Clinical psychologists Clance and Imes (1978) defined impostor phenomenon following their own therapeutic observations when working with professional, respected, and high-achieving women. Despite objective evidence of high achievement (i.e., prior recognition, credentials), these clients maintained strong beliefs that they were not intelligent and that they were frauds who would be discovered by their peers and supervisors (Clance & Imes, 1978; Clance & O'Toole, 1987). They observed that women often attributed their achievement to external factors, including luck, mistakes of others, physical attractiveness, or interpersonal skills (Horner, 1972). In other words, people who experienced feelings of being an impostor thought of themselves as being an 'intellectual fraud', and demonstrated a failure to recognize their actual competencies, strengths, and successes (Clance & Imes, 1978; Clance & O'Toole, 1987; Harvey, 1981).

Since then, researchers have suggested many factors involved in the understanding and prediction of impostor phenomenon; however, the factor structure of this construct varies across studies and conceptualizations of impostor phenomenon. Many contrasting findings regarding the key factors associated with impostor phenomenon (discussed in Chapters 3 and 4) may reflect inconsistencies in the assessment of these experiences (Bravata et al., 2019). With the goal of my dissertation being to develop a comprehensive and novel assessment of impostor phenomenon, in this chapter I will examine the existing measures of impostor phenomenon and the limitations of their current factor structures (or lack thereof).

Harvey Impostor Phenomenon Scale (HIPS)

Harvey (1981) first developed a 14-item, 7-point Likert scale (0 – *Not at all true* to 6 – *Very true*) to identify and measure the self-reported intensity of impostor phenomenon in undergraduate and graduate students. The factors included within this measurement related to self-presentation, self-perception, attributional style, self-esteem, and reinforcing effects of situations. Harvey and Katz (1985, as cited in Hellman & Caselman, 2004) used the term "impostor phenomenon" to describe "a psychological pattern rooted in intense, concealed feelings of fraudulence when faced with achievement tasks" (Hellman & Caselman, 2004, p. 161). They proposed that the impostor phenomenon consisted of 3 core factors: (1) the belief that they have fooled other people, (2) the fear of being exposed as an impostor, and (3) the inability to attribute own achievement to internal qualities such as ability, intelligence, or skills. According to Harvey and Katz's (1985) definition, all three criteria must be met to consider someone an "impostor." This definition is more specific than Clance's conceptualisation (1985). However, despite the recognition of these multiple factors, Harvey (1981) indicated that the HIPS represented a "homogeneous theoretical construct" that was unidimensional in its assessment. That is, the HIPS did not assess subscales associated with their proposed core factors. Additionally, the HIPS is scored using a median split technique, whereby respondents with scores below the sample's median are classified as being "non-impostors", and those above the median are classified as "impostors".

Psychometric Properties of the HIPS

Harvey's (1981) scale has shown inconsistent psychometric properties across studies. For example, in many samples, it has demonstrated very low internal consistency ranging from α = .34 to .64 (Fujie, 2010); however, in other samples it has represented reasonable internal

reliability (α = .70; Hellman & Caselman, 2004). Consistent findings across studies have demonstrated concerns surrounding content homogeneity and the missing factor structure associated with an overall composite score suggested by the original scoring (Hellman & Caselman, 2004; Mak et al., 2019). Edwards and colleagues (1987) suggested a three-factor model of the HIPS, though reliability of the subscales ranged from α = .65 to .81. Fried-Buchalter (1992) found a four-factor solution that resulted in several dual loadings and moderate correlations between subscales (subscale alphas were not reported). Hellman and Caselman (2004) also found a four-factor solution using the Kaiser criterion rule and also a three-factor solution using the scree test. However, they also found support for a nine-item (i.e., removing 5 items), two-factor solution ("self-confidence" and "core characteristics of impostor phenomenon"), as a more appropriate method of representing impostor phenomenon scores (α =.80; subscale alphas were not reported). However, Mak and colleagues (2019) reported a wide range of internal consistency across five studies, ranging from α =.34 to .85 across studies (Edwards et al., 1987; Kolligian & Sternberg, 1991). Given these inconsistent findings, many researchers have cautioned against the use of the HIPS given the insufficient evidence for psychometric properties (Hellman & Caselman, 2004).

Clance Impostor Phenomenon Scale (CIPS)

Building upon their clinical observations and responding to criticisms following Harvey's (1981) development of the HIPS, Clance (1985) developed a 20-item, 5-point Likert scale (1 – *Strongly disagree* to 5 – *Strongly agree*) designed to assess clinically observed feelings and attributes of impostor phenomenon that were not addressed by Harvey's Scale. These included the fear of evaluation and feeling less capable than others, and fear of success that could not be repeated (Clance, 1985). Additionally, the CIPS sought to minimize social desirability effects,

and encourage acceptance towards the respondent. Mirroring the HIPS, scores on the CIPS are categorized using the median split technique, whereby scores are summed and contrasted to the median of the sample, and those below the median are deemed as "the non-impostor group", and those above the median are deemed as "the impostor group". Additionally, Clance (1985) suggested categorizing participants into "high", "medium", and "low" impostor groups; however, it is notable that there were no theoretical or empirical justifications provided for these cut-off scores (Cozzarelli & Major, 1990).

Psychometric Properties of the CIPS

Across 11 studies reported by Mak and colleagues (2019), internal consistency for the CIPS ranged from α = .85 to .96. Multiple researchers have suggested the presence of a three-factor model of the CIPS with a reliability ranging from α = .74 to .89 (French et al., 2008; McElwee & Yurak, 2007). For example, through both exploratory and confirmatory factor analysis in multiple samples, both French and colleagues' (2008) and Brauer and Wolf (2016) extracted three factors that included feeling like a fake (α = .84; .84), discounting achievements (α = .79; .73), and attributing success to luck (α =.70; .69). However, there is significant variation in the interpretation of CIPS scores across studies. For example, in some studies, researchers categorized a score of less than 40 as being indicative of "no impostor phenomenon" and categorized each range of subsequent ten points as representing "mild", "moderate", and "severe" impostor feelings, respectively (Bravata et al., 2019; Clance & O'Toole, 1987). However, Clance and O'Toole (1987) alternatively "recommended" a cut-off score of 60 as representing "impostor sufferers". Notably, none of the identified cut-offs have been empirically justified. Meanwhile, other studies have employed the median split method to categorically differentiate "non-impostors" from "impostors". Although the CIPS has demonstrated adequate

internal consistency, evidence for overall construct validity has been mixed. Holmes and colleagues (1993) compared respondent scores on both the CIPS and HIPS within those who they identified as either "non-impostors" or "impostors" (established through unstructured interviews) in both clinical and non-clinical populations. Their findings suggested an overall significant correlation between the CIPS and HIPS (r = .89, p < .001); however, the strength of this relation varied based on the population in which it was assessed (clinical impostor = .55; clinical non-impostor = .78; non-clinical impostor = .26; nonclinical non-impostor = .64). Their results suggested that the CIPS demonstrated higher sensitivity and reliability when compared to the HIPS, whereby it reduced the incidence of Type I (i.e., classifying a non-impostor as an impostor) and Type II (i.e., classifying an impostor as a non-impostor) errors in cut-off scores (Holmes et al., 1993). Despite these concerns, the CIPS is currently the most commonly used measurement of impostor phenomenon in the research literature and clinical settings.

Perceived Fraudulence Scale (PFS)

Kolligian and Sternberg's (1991) sought to update the definition of impostor phenomenon as being 'the self-perception of fraudulence in combination with cognitive and affective components' – which they instead coined as "perceived fraudulence". They subsequently developed a 51-item, 7-point Likert scale (1 – *Strongly disagree* to 7 – *Strongly agree)* as a measurement of perceived fraudulence. The Perceived Fraudulence Scale (PFS) shares many overlapping factors with the CIPS (Clance, 1985), including fraudulent ideation, self-criticism, achievement pressures, and negative emotions. However, the concept of perceived fraudulence further emphasizes the role of self-worth, impression management, and self-monitoring (Kolligian & Sternberg, 1991). The PFS is identified as the only existing measure that considers the multidimensional nature of impostor phenomenon (i.e., thoughts, feelings, actions); however,

the scoring of the PFS maintains a unidimensional total score, similar to both the HIPS and CIPS. That is, despite its consideration of additional characteristics of impostor phenomenon, it does not clearly identify these factors or subscale scores.

Psychometric Properties of the PFS

The PFS has demonstrated good internal consistency. Initial validation of the PFS revealed a two-factor model with an overall alpha of α =.94, and subscale reliabilities of α = .95 (inauthenticity) and α = .85 (self-deprecation; Kolligian & Sternberg, 1991). Given the overlap with factors included in the CIPS, concurrent validity between the CIPS and the PFS is good (α = .78; Chrisman et al., 1995), representing high intercorrelation (Bernard et al., 2002). However, evidence for criterion validity of the PFS has been mixed, ranging from α = .70 to .83 when contrasted with other measures of impostor phenomenon (Kolligian & Sternberg, 1991; Leary et al., 2000). Chrisman and colleagues (1995) sought to apply the Spearman-Brown equation to the PFS to reduce it from the lengthy 51-items down to 20-items, mirroring the CIPS; however, the internal reliability was decreased to α = .57. When comparing the CIPS and the PFS, studies have indicated that the brevity of the CIPS allows for greater utility compared to the PFS (Mak et al., 2019). However, the PFS showed promise in considering a more comprehensive conceptualization of impostor phenomenon compared to existing scales and moved away from categorizing individuals as ‘impostors’ vs. ‘non-impostors’.

Summary and Limitations of Existing Scales

Although there is adequate face and content validity and internal consistency across existing measures of impostor phenomenon, there is still not a clear dimensionality present for any of the impostor phenomenon scales (Mak et al., 2019; Topping & Kimmel, 1985). That is, despite studies suggesting distinct factors emerging from impostor phenomenon scales (e.g.,

Chrisman et al., 1995; Edwards et al., 1987; Rohrmann et al., 2016), none of the existing scales clearly identify subscales associated with impostor phenomenon, nor do they capture the comprehensive presentation of associated thoughts, feelings, and behaviours. Additionally, despite the existing measures being built upon the original conceptualization of impostor phenomenon from Clance (1985), the suggested factor structures vary greatly across measures of impostor phenomenon, and even across validation studies of respective measures. For example, studies examining the factor structure of the CIPS have often revealed a three-factor model: "faking", "luck", and "discounting" (Brauer & Wolf, 2016; Chrisman et al., 1995; Holmes et al., 1993); however, more recent research has suggested that a one-factor model best captures the CIPS (Simon & Choi, 2018). This one-factor model of overall impostor phenomenon is in line with how impostor phenomenon has been measured to date (i.e., discounting the interplay between thoughts, feelings, and emotions). In contrast, studies examining the factor structure of the HIPS have been highly inconsistent, revealing a two-factor model ("self-confidence" and "core characteristics of impostor phenomenon"; Hellman & Caselman, 2004), a three-factor model ("impostor", "unworthiness", and "inadequacy"; Edwards et al., 1987), and a four-factor model ("congruence of achievement and competence", "sense of competence", "not an impostor", and "self-estimate of intellectual ability"; Fried-Buchalter, 1992). In contrast, the PFS has revealed a two-factor model: "inauthenticity" and "self-deprecation" (Kolligian & Sternberg, 1991), with limited replication and factor analyses beyond that of the original authors.

From this research, the CIPS emerges as the most commonly used measure of impostor phenomenon in existing research; however, this frequency of use does not reflect a higher quality of scale. Thus, given the concerns surrounding dimensional clarity, there is still no comprehensive 'gold standard' for measuring impostor phenomenon (Mak et al., 2019). To

establish a comprehensive, multidimensional measure would further clarify the purpose, factor structure, and foundational characteristics of impostor phenomenon, with particular attention to its conceptual clarity and reproducibility across samples. With impostor phenomenon consistently referred to as a multidimensional construct, and research suggesting the presence of multiple factors, it is concerning to note that none of the existing scales incorporate multidimensional measurement. In contrast, the current measures of impostor phenomenon determine respondents' scores through an overall total score, representing a unidimensional conceptualization, even despite consistent evidence to suggest the presence of several dimensions. As a result, much of the multidimensional nature of impostor phenomenon is lost without the examination of subscale scores (Mak et al., 2019). Thus, despite our current understanding and operationalization of this construct, there is currently no existing multidimensional measure to comprehensively assess the cognitive, emotional, and behavioural factors of impostor phenomenon. Similarly, the categorical approach to impostor phenomenon (i.e., categorizing as either "non-impostor" or "impostor") prevents the investigation of dimensionality, and categorizing individuals in this way does not accurately represent the subjective nature of impostor phenomenon. In other words, given the current categorical groupings involved in the measurement of impostor phenomenon, it is not possible to examine nuances associated with varying levels of impostor phenomenon (e.g., whether performance might improve with increases in impostor feelings up to an optimal level, where thereafter performance and growth decreases and anxiety increases; c.f., The Yerkes-Dodson Curve; Yerkes & Dodson, 1908). This also minimizes the experience of individuals who are below the "cut-off", though still experiencing thoughts, feelings, and behaviours associated with impostor phenomenon. Additionally, with knowledge relating to the significant prevalence of impostor

phenomenon in academia (Tigranyan et al., 2020), it is indeed unrealistic to assume that individuals will experience "no" feelings of impostor phenomenon. That is, categorizing as "impostor" vs. "non-impostor" does not accurately reflect the nature of this phenomenon.

Additionally, discriminant validity testing across research studies involving measures of impostor phenomenon has revealed inconsistent relations with other constructs including self-esteem, self-monitoring, depression, and anxiety (e.g., ranging from α = .34 to .69). Similarly, there have been inconsistent findings relating to impostor phenomenon and negative academic and psychological outcomes (Cozzarelli & Major, 1990; LaDonna et al., 2018; Leary et al., 2000; Tao & Gloria, 2018). Holmes and colleagues (1993) suggested that many of the discrepancies reported in empirical investigations of impostor phenomenon may be elicited by: 1) the varying methods of measuring impostor phenomenon and identifying and/or categorizing "impostors"; 2) the use of varying statistical measurement, including median split, to classify "impostors", and 3) the potential bias for studies selecting participants from "impostor prone samples" (i.e., academic samples). Finally, almost all previous research relies on impostor feelings measured at a single time point, with the assumption that these feelings are stable (i.e., trait-like), rather than context-specific (i.e., state-like). However, research has not yet empirically examined the longitudinal variability of measures of impostor phenomenon (Mak et al., 2019), thus leaving the state or trait nature of impostor phenomenon relatively unknown.

In sum, although sufficient evidence exists to suggest the multidimensional / multifactorial nature of impostor phenomenon, none of the existing measures consider this multidimensionality, instead measuring impostor phenomenon as a unidimensional construct (i.e., an overall score, cut-offs, categorically). Thus, given the prevalent nature of impostor phenomenon, as well as the potential damaging effects upon individual mental health and

continued engagement in pursuit of goals, the current research program sought to develop and validate a novel multidimensional assessment of impostor phenomenon to address these existing concerns. That is, within my dissertation program, I sought to develop a more comprehensive assessment of the associated factors contributing to impostor phenomenon, including consideration of cognitive, affective, and behavioural components and subscales. Additionally, given the need for longitudinal analysis to distinguish whether this construct is trait or state-like in nature (Mak et al., 2019), I also sought to examine the longitudinal trajectory of impostor phenomenon across an academic year.

CHAPTER 3

Primary Characteristics of Impostor Phenomenon

Since the development of the concept of impostor phenomenon by Clance and Imes (1978), further attention has been drawn to the experience, with many sensationalizing and resonating with the common symptoms. To demonstrate the commonality of this experience, Kets de Vries (2005) proposed the notion that feeling like an impostor was simply a normal component of human social behaviour, whereby people present what they consider to be an acceptable public self, often differing from their private self, with the goal of abiding with social or societal expectations (Cheung, 2018; Kets de Vries, 2005). Within this conceptualization of impostor phenomenon, feeling like an impostor was outlined as an expectation for individuals to conceal their weaknesses "within socially accepted limits", falling along a continuum outside of what is socially accepted, labelled as "real imposture" and "neurotic imposture" (Cheung, 2018; Kets de Vries, 2005). "Real" impostors are those who intentionally present a false self with the goal of deceiving others. For example, an individual who lies on their resume about their previous employment with the intentional goal of duping interviewers and obtaining a specific occupational role (for which they are not qualified). These people may still experience fears of being exposed for their intentional misrepresentation of the self, but in contrast, "neurotic" impostors experience the subjective personal beliefs that they are a fraud, despite their actual behaviours, achievements, or qualifications. Despite existing research to suggest that significant feelings of being an impostor are a "normal part" of graduate study (Craddock et al., 2011, Kets de Vries, 2005), students often feel isolated in feeling like an impostor. In the present research, I explored experiences of impostor phenomenon as being those aligning with "neurotic imposture" (hereby referred to as "impostor phenomenon"), whereby the thoughts associated with feeling

like an impostor reflect a subjective reality that contrasts the individual's measurable successes (vs. real objective incompetence).

Impostor feelings are often more prominent in transitional situations (e.g., first year of university, first year of graduate studies, first year of faculty assignment (Topping & Kimmel, 1985). Feeling like an impostor can elicit beliefs relating to anxiety, self-doubt, and fear of failure (Cokley et al., 2013; Cozzarelli & Major, 1990; Kumar & Jagacinski, 2006; Leary et al., 2000), which aid in undermining individual autonomy, competence, and relatedness (Vaughn et al., 2020). Although Topping and Kimmel (1985) found that feelings of being an impostor decreased when moving beyond transitional stages, they also found that those experiencing impostor phenomenon were less likely to advance in their careers. That is, feelings of being an impostor often accounted for increased career stress, decreased career growth, and decreased aspiration for success (Topping & Kimmel, 1985; Vaughn et al., 2020).

Although some findings suggested that people experiencing this phenomenon had enduring feelings of being an impostor (Clance & Imes, 1978), conflicting findings suggested that these impostor feelings were only temporary and situational (e.g., academically, occupationally; Topping & Kimmel, 1985). The ability to discern between whether impostor phenomenon is a trait or state factor is limited by the lack of empirical longitudinal investigation impostor phenomenon. That is, no previous studies have explored the trajectory of impostor phenomenon across time, thus motivating this exploration in the current dissertation research program. Given the potential impact of impostor beliefs, researchers have suggested the need for early identification and development of interventions for impostor phenomenon (Topping & Kimmel, 1985). However, as described in Chapter 2, there is currently no 'gold standard' assessment for identifying or treating impostor phenomenon, nor is there a consistent conceptualization of what

impostor phenomenon really involves (i.e., on cognitive, emotional, and behavioural levels; Mak et al., 2019). Additionally, since the conception of impostor phenomenon in the 70s, the academic landscape has evolved significantly in terms of expectations surrounding academic achievement, the need for additional skills (e.g., social media, technology), and the increased competition in the academic culture and subsequent occupational market (e.g., "a bachelor's degree is the new high school diploma"; Selingo, 2017; Valletta, 2016). The following literature review will explore current research relating to the primary characteristics, predictors, and outcomes associated with impostor phenomenon. It is notable that the existing research surrounding key features of impostor phenomenon has been primarily observational in nature, and primarily based on characteristics outlined by Clance (1985). The initial characteristics outlined by Clance (1985) were described as varying depending on the individual, and additional research has built upon these characteristics to further explore impostors' external attribution style, self-esteem, personality, and propensity toward perfectionism (Matthew & Clance, 1985; Sakulku & Alexander, 2011).

Foundations in Attribution Theory

The impostor phenomenon is founded in Attributional Theory (Weiner, 1972), which seeks to explain the way that people perceive and interpret the cause of events, including the locus of control, stability, and controllability of the event. Locus of control refers to a person's perceived control over their personal success or failure. This locus may be external (i.e., outside influences), or internal (i.e., personal control). In an academic population, people higher in impostor phenomenon are more likely to attribute positive events to external, unstable, and specific causes (Pankow-Roets, 1991; Sightler & Wilson, 2001). People with impostor feelings are more likely to generalize and internalize negative events, while externalizing positive events

and viewing them as temporary. People who believe more strongly in an external locus of control (i.e., that what happens to them is up to luck or fate) are more likely to experience impostor phenomenon (Byrnes & Lester, 1995). For example, an individual experiencing impostor phenomenon might attribute successes to the grace of God, while attributing failures to their own personal flaws. Stability refers to a person's perception of the duration of the outcome of an event. For example, someone experiencing impostor phenomenon would be more likely to over-generalize a failure, convincing themselves that this failure will 'last forever', and will impact their self-concept (Thompson et al., 1998). Finally, controllability refers to a person's perception that the cause of an event is either within or beyond their control. For example, an individual experiencing impostor phenomenon might believe that they had little control over their success (i.e., that it is external), attributing accomplishments to forces such as "luck", rather than their own ability or skills (Thompson et al., 1998). The effect of individual experiences and environments has an impact on students' expectations and attribution, particularly when considering factors including difficulty of task, effort, ability, and luck (Cheung, 2018; Weiner, 1972). For example, if a student were to fail a chemistry test in their first year of their undergraduate degree, they may attribute this failure to their lack of intelligence in this area, overgeneralize themselves as being bad at all science courses, and attribute future successful outcomes on chemistry exams to external factors such as luck. This external attribution is a key factor in impostor phenomenon and is critical to its assessment, particularly in incorporating the cognitive aspects of perceptions relating to achievement.

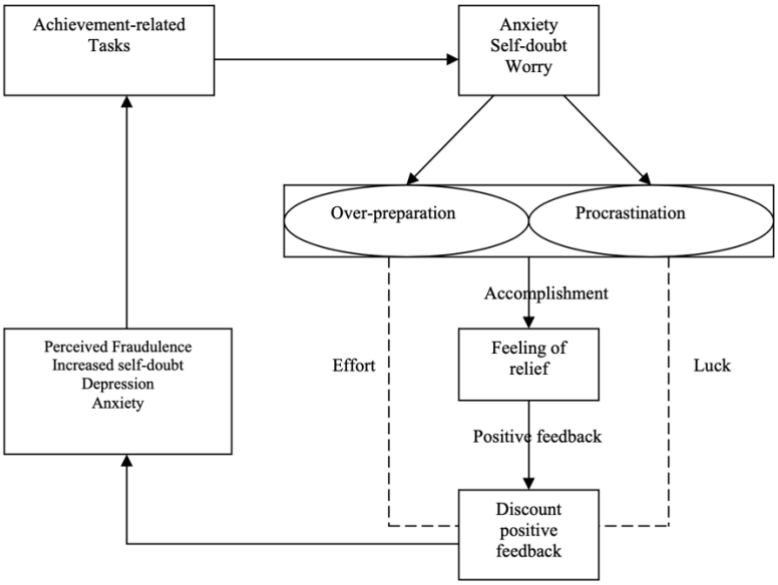
The Impostor Cycle

Clance (1985) characterized "impostors", as presenting with a minimum of two of the following: (1) Characteristics involved in the impostor cycle (Figure 1), (2) The need to be

special or to be the very best, (3) ‘Super-person’ aspects, (4) Fear of failure, (5) Denial of competence and discounting praise, and (6) Fear and guilt about success. In this conceptualization, Clance (1985) highlighted the impostor cycle as an integral component of impostor phenomenon itself. In the impostor cycle, an achievement-related task (i.e., work task, homework) initiates the cycle and elicits anxiety-related symptoms for those who have impostor fears (Chrisman et al., 1995; Clance & Imes, 1978; Thompson et al., 2000). Following these anxiety-related responses, individuals may react through over-preparation (i.e., excessive, behavioural, emotional, and cognitive investment in a task) or procrastination (i.e., avoiding behaviour, postponing work; Rohrmann et al., 2016; Sakulku & Alexander, 2011; Thompson et al., 2000).

Figure 1

The Impostor Cycle (Clance & Imes, 1985; illustrated by Sakulku & Alexander, 2011)



In the impostor cycle, once the task is accomplished, people experience a sense of initial relief and accomplishment; however, these feelings are short-lived, and those who feel like impostors are likely to reject positive feedback provided from others in response to their task accomplishment (Clance, 1985). Those who experience feelings of being an impostor are highly likely to deny the notion that their success is related to their own ability and are likely to reject feedback related to their individual contributions (Sakulku & Alexander, 2011). This may also include the view of feedback as being incongruent to their personal perceptions of achieved success (Casselman, 1991; Sakulku & Alexander, 2011). Those who have overprepared are likely to attribute success to their hard work, whereas those who have procrastinated are likely to attribute their success to luck. These attributions persist as rigidly held beliefs, whereby those with impostor phenomenon strongly believe that their accomplishments do not reflect their personal abilities (Clance, 1985). These people are likely to attempt to outperform their peers to compensate for their feelings of self-doubt and self-perceived fraudulence, and to avoid their exposure as being a "fraud" (Cokley et al., 2013). Thus, these beliefs perpetuate further beliefs about the mechanisms for success and continue to reinforce feelings of depression and anxiety, and the Impostor Cycle, when facing novel achievement-related tasks in the future.

Rather than weakening the cycle in the future, repeated successes simply reinforce the feeling of fraudulence for those with impostor phenomenon, particularly given their high expectations and conceptualization of "ideal success" (Clance, 1985; Clance & Imes, 1978). Instead, those with impostor feelings, although high achievers, develop discrepant and low appraisals of their performance outcomes (Want & Kleitman, 2006). For example, they are more likely to disregard their success when encountering a gap between their personal goals and their highly distorted ideal of their standard for success (Sakulku & Alexander, 2011; Want &

Kleitman, 2006). This distorted thinking enhances their inattention to positive feedback and emphasizes the focus on discrepancies between actual and perceived success, further exacerbating the feelings of being a fraud.

Clance (1985) also observed that those with impostor phenomenon were likely to be the top of their class throughout the course of their early academic years. It was a common trend that when these individuals would transition into a larger setting, such as post-secondary education, they would realize that they were no longer the 'best of the best', and that their skills and talents no longer stood out as being special. A layperson analogy for this transition is often referred to as moving from a perception of being a "big fish in a small pond", to that of being a "small fish in a very big pond", or otherwise negatively viewing oneself in comparison to a new group of individuals (Chayer & Bouffard, 2010). That is, upon entering a larger setting where there are many other successful people, those with impostor phenomenon often discount their own achievements given that they may no longer be the "very best" (Sakulku & Alexander, 2011). This perception and social comparison may lead individuals to question their goals and to consider dropping out of their academic program (Canning et al., 2019). Following periods of transition, those with impostor phenomenon may dismiss their own talents, and experience the perception that they are lacking in intelligence if they are not the very best (Lane, 2015; Polach, 2004). When facing an achievement-related task, they may then subsequently experience significant levels of anxiety due to their fear of failure and self-doubt. In line with this cycle, Hutchins and Rainbolt (2016) found that people reported experiencing significant feelings of professional doubt, lack of confidence, and questions relating to professional legitimacy when they: a) experienced their expertise being questioned (by oneself or others), b) encountered successes, c) faced comparisons with colleagues, and d) were working on scholarly activities

(including receiving feedback and rejection). Thus, repetitions of the impostor cycle reinforce feelings of self-doubt, burnout, emotional exhaustion, loss of intrinsic motivation, poor achievement, and guilt and shame about success (Chrisman et al., 1995; Clance, 1985; Clance & Imes, 1978; Hutchins & Rainbolt, 2016), and is a critical indicator of factors associated with impostor phenomenon.

Fear of Failure (and Success)

In addition to the impostor cycle, Clance (1985) suggested that impostor phenomenon is associated with the desire to portray an image of being a "super-person". In other words, those with impostor feelings hold an expectation that everything in their environment and production must be flawless, perpetuating exceedingly high standards for one's goals and self-evaluation. Given these disproportionate standards, they are commonly left feeling overwhelmed, and overgeneralize perceived failures when they are not able to achieve such high standards (Sakulku & Alexander, 2011; Thompson et al., 1993). However, despite these unrealistically high standards, people experiencing impostor phenomenon experience significant anxiety when exposed to achievement-related tasks that may result in possible failure (Clance, 1985). Clance and O'Toole (1988) observed that the underlying motive of those with impostor feelings was based around the fear of failing, thus resulting in the tendency to demonstrate a pattern of overworking as a means of avoiding risks of possible failure. However, overworking is eventually problematic, particularly when individuals exert an excess amount of effort and energy to complete a task, and when this excess effort also interferes with other priorities (Sakulku & Alexander, 2011). Clance (1985) observed that although people with impostor phenomenon often recognised their pattern of overworking, they often found it difficult to break this cycle. This was often elicited by the strongly held beliefs that they would become a failure if

they did not persist in this working style. Additionally, when they made mistakes, or when they felt that they did not perform to their highest standards, they experienced significant feelings of shame and humiliation, which acted to reinforce their fears of future failures (Clance, 1985).

For those with impostor feelings, although avoidance of failures is prominent, success does not necessarily result in contrasting feelings of accomplishment or happiness (Clance et al., 1995). Impostor phenomenon is also associated with fear, stress, self-doubt, and discomfort in response to achievements. That is, impostor fears interfere with a person's ability to accept and enjoy their abilities and achievements and have a negative impact on their psychological well-being. Fear and guilt surrounding success is one of the key features of impostor phenomenon (Clance, 1985; Kets de Vries, 2005). For example, those with impostor feelings often experience significant guilt and worry about being rejected by close others (i.e., family, peers) should they experience success (Clance, 1985). This was particularly noticeable when success was uncommon in one's family or social circle, eliciting fears surrounding the potential negative social consequences of success (Clance, 1985). Further to these social comparisons were concerns surrounding a potential for increased demands and expectations from others following potential achievements. People with impostor phenomenon reported uncertainty surrounding their personal ability to maintain their current level of performance, and hesitance towards accepting additional responsibility or pressure from others (Clance, 1985). In other words, impostor feelings are also associated with fear and worry that increasing demands following success may lead to them to be revealed as intellectual frauds. Thus, beliefs towards both fear of success and fear of failure are key factors in assessing impostor phenomenon.

Low Self-Esteem

When considering the pervasive pattern of fear of failure (and success) associated with impostor phenomenon, many researchers have suggested a significant relation with low self-esteem and low self-confidence (Chae et al., 1995; Chrisman et al., 1995; Cokley et al., 2018; Schubert & Bowker, 2019; Thompson et al., 1998; Topping & Kimmel, 1985). For example, Cozzarelli and Major (1990) found that low self-esteem significantly differentiated "impostors" from "non-impostors" (when impostors were separated using a median split method). The relation was strong enough that they suggested that impostor phenomenon may simply be an extension of poor self-esteem rather than an independent construct (Cozzarelli & Major, 1990). Sonnak and Towell (2001) also found that low self-esteem predicted impostor phenomenon above and beyond other factors, and that self-esteem and parental protectiveness accounted for more than 50% of the variance in impostor phenomenon. There are indeed many similarities between impostor phenomenon and low self-esteem. For example, those high in impostor phenomenon have demonstrated conditional feelings of worth, requiring validation and defending, similar to those low in self-esteem (Langford & Clance, 1993; Schubert & Bowker, 2019). Aligning with the attribution theory, impostor feelings were associated with an unstable sense of individual self-worth, and thus a reliance on external feedback as a way of maintaining a sense of self. Schubert and Bowker (2019) examined self-esteem instability in an undergraduate population to explore fluctuations in individual self-esteem within a short period of time and across a variety of situations. Their findings suggested that instability in self-esteem exists independently of trait self-esteem (i.e., high or low), and that this instability is influenced by students' reliance on the feedback and approval of others, sensitivity to self-doubt, and compensatory behaviour to bolster the sense of self (i.e., factors associated with impostor

phenomenon; Kernis et al., 2000; Lupien et al., 2012; Schubert & Bowker, 2019). Both those with low self-esteem, as well as those with unstable self-esteem, were particularly vulnerable to experiencing impostor phenomenon (Schubert & Bowker, 2019). One way that those with impostor phenomenon seek to protect their self-esteem is through avoiding situations with the possibility for negative feedback or failure, as discussed above (Clance & O'Toole, 1987; Kumar & Jagacinski, 2006).

Although there are many similarities and associations between impostor phenomenon and low self-esteem, empirical findings for this relation have been mixed (Sonnak & Towell, 2001). For example, Harvey (1981) and Topping (1983) suggested that impostor phenomenon, self-esteem, and self-monitoring were not significantly related. Similarly, Cusack and colleagues (2013) found that there was no significant relation between impostor phenomenon and self-esteem (although this relation was approaching significance, $p = .09$). Additionally, in a recent study of psychology graduate students, Tigranyan and colleagues (2020) found no significant relation between self-esteem and impostor phenomenon, nor between self-efficacy and impostor phenomenon. However, related to their fear of failure, it appears consistent that those with impostor phenomenon often employ protective strategies such as self-handicapping to manage the potential for negative consequences associated with evaluative situations involving feedback from others, and protect their self-esteem (Borton et al., 2012; Langford & Clance, 1993; Schubert & Bowker, 2019; Want & Kleitman, 2006). Additional research is needed to assess the relation between these two constructs, and to further explore low self-esteem as a possible predictor of impostor phenomenon. One further way of examining the relation between self-esteem and impostor phenomenon in the academic context is through academic self-efficacy.

Academic Self-Efficacy

In an academic context, academic self-efficacy refers to a person's belief regarding their ability or perceived competence to perform a school-related task. Academic self-efficacy is a component of Bandura's (1986) social-cognitive theory, which focused on exploring both the social and the cognitive aspects of the learning process associated with causal outcomes. Within self-efficacy is the focus on assessing whether one can perform a certain task (Doménech-Betoret et al., 2017). This assessment ultimately plays a role in the organization of action, and mediates the link between thoughts (i.e., assessment of the task), and actions (i.e., follow-through with the task; Pajares, 1996). People who are higher in self-efficacy are more likely to perceive greater competence, to foresee themselves as being successful, and to have higher expectations and performance compared to those who are lower in self-efficacy (Doménech-Betoret et al., 2017; Sakulku & Alexander, 2011; Sonnak & Towell, 2001).

Differences have emerged in academic self-efficacy between the academic culture of different fields of study. For example, scientific areas including science, technology, engineering, and mathematics (STEM) have been identified as being particularly competitive (Canning et al., 2019; Tao & Gloria, 2019). Such areas have often been associated with greater individualistic goals (including power, achievement, and self-promotion), compared to areas such as the arts and humanities, which have been associated with collectivistic goals (including collaboration and philanthropy; Diekman et al., 2010, 2011). As such, the competitive academic culture may become one of 'pitting students against each other' and incorporating various techniques to communicate competitive strivings to students (e.g., the bell curve; Canning et al., 2019). Consequently, this culture has been shown to cultivate numerous negative consequences for students' sense of academic self-efficacy, and has demonstrated significantly reduced

engagement and attendance, increased rates of dropout, and greater perceptions of being an impostor (Canning et al., 2019). Researchers have suggested that academic environments that emphasize and foster competition between students negatively impact students' confidence, motivation, and learning, and result in increased levels of anxiety and stress (Ames & Archer, 1988; Meece et al., 2006; Urdan, 2004). As such, these tense environments often foster a culture whereby students are more likely to doubt their competence, compare themselves to others, and ultimately experience feelings of being an impostor (Abouserie, 1994; Canning et al., 2019). Notably, the negative effects of a highly competitive environment upon academic self-efficacy are nearly three times more pronounced for first generation students (that is, students who are the first in their family to attend post-secondary education; Canning et al., 2019). These findings relating to competition were also replicated in a population of academic faculty, whereby faculty members reported that the competitive academic environment was a significant factor in eliciting feelings of inadequacy and insecurity surrounding their ability to succeed as an academic (Knights & Clarke, 2014).

Academic Self-Efficacy and Impostor Phenomenon

Altogether, the above findings suggest that academic self-efficacy is highly related to characteristics of impostor phenomenon in university students (i.e., doubting competence, feelings of inadequacy). In recent qualitative investigations of self-efficacy and impostor phenomenon, Cisco (2020) found that graduate students experiencing impostor phenomenon reported feeling significantly academically unprepared. Cozzarelli & Major (1990) assessed students at three time points pre- and post- midterm and classified "impostors" versus "non-impostors" using a median split technique. They found that their population of "impostors" reported significantly higher pessimism and lower self-esteem (compared to "non-impostors").

Additionally, those categorized as impostors reported feeling more anxious, and expecting to perform more poorly on exams (compared to “non-impostors”). These differences remained when controlling for the objective grades of those in each group. Additionally, those in the “impostor” group were significantly more dissatisfied with their grades after a failure compared to “non-impostors”, yet there was no significant difference between groups in their level of satisfaction after a success. These findings suggest that those with impostor phenomenon are more likely to treat themselves poorly following failure, which was also evident in significantly decreased post-exam self-esteem in the impostor group compared to “non-impostors” (regardless of outcome; Cozzarelli & Major, 1990).

Similar to the relation between low self-esteem and impostor phenomenon, findings relating to the effect of academic competition (e.g., across programs) on academic self-efficacy and impostor phenomenon have been mixed. Pankow Roets (1991) found no significant difference in the experience of impostor feelings between academic majors and suggested that academic major accounted for less than one percent of impostor scores. Similarly, although some researchers (e.g., Harvey, 1981) have suggested the role of transition in impostor phenomenon and beliefs relating to one’s academic self-efficacy (i.e., first year graduate students demonstrating greater impostor feelings when compared to undergraduate students and later year graduate students), Pankow Roets (1991) did not find a significant relation between year of academic study and impostor feelings. Similarly, Ares (2018) evaluated the prevalence of impostor feelings in early career clinical nurse specialists and found that impostor phenomenon was not predicted by perceived preparedness for career, experiential preparation for practice, or years of leadership experience. That is, across these studies, impostor phenomenon was present in academics and career regardless of experience level (Ares, 2018; Pankow Roets, 1991).

Altogether, further research is needed to examine the effect of low self-esteem, competition (e.g., academic program), and experience (e.g., academic year) on impostor phenomenon.

Objective Success

One characteristic that often differentiates "real impostors" from those with impostor phenomenon is the presence of identifiable objective success. When considering relations with objective academic success, findings have been mixed relating to the relation between grade point average (GPA) and impostor phenomenon. For example, King and Cooley (1995) found a positive association between high-school GPA and levels of impostor phenomenon in women only, whereas others have found no significant relation between GPA and impostor phenomenon (Sightler & Wilson, 2001). Want and Kleitman (2006) found that those higher in impostor phenomenon demonstrated a significantly greater discrepancy between their achievement (i.e., accuracy on a test of reasoning and verbal skills) and perceived confidence in their response. That is, those higher in impostor phenomenon reported lower self-confidence regardless of accuracy. Given the argument that impostor phenomenon exists in the presence of what is otherwise seen as objective success, further research examining discrepancies between objective success (i.e., GPA) and impostor phenomenon is needed. Thus, research findings continue to demonstrate mixed results surrounding the extent, and the effect, of this relation, particularly in considering relations with GPA.

Perfectionism

Perfectionism is defined as the tendency for an individual to set excessively high standards for oneself, to demonstrate critical self-evaluation, to overvalue the opinions of others, and to experience self-defeating cognitions and behaviours when unable to reach excessive standards (Kets de Vries, 2005). Flett and Hewitt (2022) described perfectionistic concerns as involving

significant rumination on one's performance and outcomes, eliciting significant distress. Researchers have found significant associations between perfectionistic cognitions and impostor phenomenon, including the external attribution of success, the maintenance of unrealistically high standards for self-evaluation, the perception that one needs to be flawless, and the engagement in self-criticism and discounting positive feedback (Clance & O'Toole, 1987; Ferrari & Thompson, 2006; Thompson et al., 1998). However, limited research has sought to distinguish the directionality of the relation between perfectionism and impostor phenomenon– that is, does perfectionism elicit impostor phenomenon, or vice versa? (Or, alternatively, are they one and the same?)

In an academic setting, impostor phenomenon and perfectionism have been significantly associated, with some suggestion that self-esteem might mediate this relation (Cokley et al., 2018; Rice et al., 2013). Thompson and colleagues (2000) supported this relation between impostor phenomenon and perfectionism by suggesting that, like perfectionists, "impostors" demonstrated a greater tendency to underestimate their success, express dissatisfaction with their performance, and express higher concern surrounding their performance. Similarly, researchers have examined the differential contributions of dimensions of perfectionism and associated factors in predicting impostor phenomenon, and have identified that the excessive fear of making errors (concern over mistakes), doubts surrounding the quality of one's performance (doubts about action), and beliefs that others have high expectations of them (socially prescribed perfectionism) were significant predictors of impostor phenomenon (Pannhausen et al., 2020; Rohrmann et al., 2016; Vergauwe et al., 2015). Altogether, excessively high standards, particularly those dependent on the expectations of others, predicted stronger feelings of impostor phenomenon (Pannhausen et al., 2020). These findings suggest that perfectionistic

expectations associated with impostor phenomenon may contribute to feelings of inadequacy and distress, particularly when people perceive that they are unable to meet the standards or expectations set by those around them. Based on these findings, impostor phenomenon may be broadened to include the perspective that individuals with high impostor tendencies may also be driven by the conviction that others have very high expectations of them that they need to fulfill (i.e., self-critical perfectionism), rather than by the need to live up to personal self-set standards (i.e., rigid perfectionism; Dunkley et al., 2003; Pannhausen et al., 2020).

Despite the similarities between impostor phenomenon and perfectionism, researchers have identified them as being two distinct, but overlapping, constructs (Rohrmann et al., 2016). In contrast to perfectionists, who were identified as being driven by internal pressures of high standards, "impostors" were identified as being driven by feelings of shame and guilt (Rohrmann et al., 2016). These findings supported the notion that impostor phenomenon is associated with perfectionism as a way of perceiving unrealistic personal standards (i.e., "perfection"; Clance, 1985; Dudau, 2014; Ross & Krukowski, 2003; Thompson et al., 2000). However, people experiencing impostor phenomenon are more likely to express their feelings surrounding imperfection, whereas perfectionists are more likely to hide their imperfections from others (Ferarri & Thompson, 2006; Sakulku & Alexander, 2011). Thus, impostor phenomenon presents as a subjective, inward experience of self-evaluation, whereas perfectionism incorporates significant external concerns and the desire to impress others. As such, researchers have proposed that higher perfectionistic cognitions are positively associated with increased feelings of impostor phenomenon, but that they continue to be distinct constructs (Ferrari & Thompson, 2006; Henning et al., 1998; Kets de Vries, 2005; Tigranyan et al., 2020). Given the research to suggest the many similarities between these two constructs, in the current research program I

sought to incorporate components associated with perfectionism into a novel impostor phenomenon measure with the goal of capturing cognitive perceptions of high standards and associated behaviours outlined in the impostor cycle (e.g., procrastination and overworking; Clance, 1985).

Summary of Characteristics

Although some of the core characteristics of impostor phenomenon exist across conceptualizations (e.g., external attribution, low self-esteem, perfectionism), much of what we know about impostor phenomenon remains uncertain or inconsistent. That is, consistency across conceptualizations of impostor phenomenon is variable, and no existing measurement of impostor phenomenon incorporates all known characteristics into the context of one measurement (i.e., bringing together thoughts, feelings, and behaviours). Thus, in the current research I seek to develop a comprehensive conceptualization of impostor phenomenon that incorporates the multidimensional measurement of cognitive, emotional, and behavioural factors, while also seeking to examine potential underlying factors that predict the frequency and intensity of impostor feelings.

CHAPTER 4

Predictors of Impostor Phenomenon

There have been a number of factors related to the emergence of impostor phenomenon, including personality (Bernard et al., 2002; Chae et al., 1995; Clance, 1985; Ross et al., 2001; Thompson et al., 1998; Thompson et al., 2000; Ferarri & Thompson, 2006), gender (Badawy et al., 2018; Cusack et al., 2013; Patzak et al., 2017), ethnicity (Ahlfield, 2009; Ewing et al., 1996; Lige et al., 2017; Peteet et al., 2015), and family factors (Bussotti, 1990; Clance, 1985; King & Cooley, 1995; Sonnak & Towell, 2001). However, similar to earlier critiques, many of these predictors have shown inconsistencies and a lack of clarity across time, which could be a factor of the different measurements used (Mak et al., 2019). In this section, I review the existing literature on predictors of impostor phenomenon, including personality, demographic factors, and developmental factors, and highlight current gaps in the research literature.

Personality

Personality is broadly defined as individual differences in patterns of thoughts, feelings, and behaviours that are consistent across time (McCrae & Costa, 2003). The Big Five Factor Model of personality is one of the most comprehensive models for identifying personality factors based on common traits in the English language, and is comprised of extraversion, agreeableness, neuroticism, conscientiousness, and openness to experience (Goldberg, 1990). When considering the relation between impostor phenomenon and the Big Five personality traits, there is evidence to suggest a negative association with extraversion, agreeableness, and conscientiousness, a positive association with neuroticism, and a non-significant association with openness (Bernard et al., 2002; Chae et al., 1995; Moderski, 1995; Ross et al., 2001). In line with these findings, Ross and Krukowski (2003) reported a strong association between impostor

phenomenon and maladaptive personality that they described as emphasizing a pervasive sense of inferiority, fear, and self-deprecation. These findings offer initial insight into the maladaptive nature of impostor phenomenon. For example, those who are less agreeable and more withdrawn from social interactions are more likely to experience impostor feelings. Additionally, the association with neuroticism aligns with findings suggesting that interpersonal inflexibility, low self-discipline, and low perceived competence are highly characteristic of those with impostor feelings (Bernard et al., 2002; Hayes & Davis, 1993). Lower conscientiousness may also be reflected in the lower self-discipline and sense of competence associated with those experiencing impostor phenomenon (Chae et al., 1995; Bernard et al., 2002). For example, Bernard and colleagues (2002) suggested that impostor phenomenon was associated with putting more faith in intelligence rather than effort, which eventually was not sustainable in higher pressure environments where more effort is needed (e.g., in university, careers). That is, high conscientiousness is more highly valued and predictive of success within many careers (Barrick & Mount, 1991; Kern et al., 2009). This pattern of personality traits demonstrated as high neuroticism and low conscientiousness maps onto the theory of self-handicapping and performance inhibition (Piedmont, 1995; Snyder, 1990), which further relates to fear of success, fear of failure, trait anxiety, and hypercompetition (Ross et al., 2001). In the current study, I seek to further examine convergent and divergent validity of the new impostor phenomenon measure with personality measures.

Demographic Factors

Age

Research findings relating to the effect of age on impostor phenomenon have been mixed, whereby some researchers have suggested that impostor phenomenon decreases as people get

older (Brauer & Proyer, 2017; Chae et al., 1995; Thompson et al., 1998), while others have found no significant relation between impostor phenomenon and age (Lester & Moderski, 1995; Oriel et al., 2004; Want & Kleitman, 2006). This discrepancy could be due to the primary sampling within academic settings, which typically comprise a younger population (i.e., undergraduate and graduate students). However, the negative relation between age and impostor phenomenon may also be associated with individuals' ascent in status or position over time (Topping & Kimmel, 1985). Given the limited sampling of older populations and non-academic settings, it is possible that generalization and representation of older age groups has not yet been adequately assessed. Although the population involved in the present study consisted of younger-aged university students, considering the effect of age and impostor phenomenon across academic years is relevant in considerations for intervention.

Gender

Early research in impostor phenomenon was primarily focused on women, with only more recent research beginning to examine the presence of impostor phenomenon in men, and differences in these thoughts and feelings across genders (Clance & Imes, 1978; McGregor et al., 2008; Vaughn et al., 2019). With initial research focusing solely on the experience of impostor phenomenon in women (Clance, 1985), some have posited that women may be likely than men to attribute success to external factors and to attribute failure to internal factors (vs. men who may attribute success to their own qualities; Clance, 1985; Kumar & Jagacinski, 2005). Similarly, Clance (1985) suggest that women may be less likely to take responsibility over their accomplishments when compared to men. Although this view represents a relatively limiting and stereotypical view of women's role in relation to achievement-related positions (Cusack et al., 2013; Langford & Clance, 1993), it is possible that this perception becomes internalized.

However, more recent findings have suggested that impostor phenomenon is not unique to women. For example, Cokley and colleagues (2015) found a significant relation between impostor phenomenon, academic self-concept, and gender stigma consciousness across both women and men. Additionally, Badawy and colleagues (2018) found that men responded with significantly higher anxiety when presented with performance related cues (e.g., negative feedback) when compared to women. Men also showed less effort and poor performance (i.e., withdrawal) when "held accountable", whereas women were more likely to exhibit increased effort and better performance (i.e., overworking) after receiving negative feedback (Badawy et al., 2018). This may map onto the different societal pressures faced by different genders (i.e., the belief that women must work harder; Badawy et al., 2018), and suggests that men and women may cope differently with their impostor feelings (Hutchins et al., 2018). For example, men may be more likely to cope through externalizing behaviours (e.g., substance abuse), while women may be more likely to cope by internalizing behaviours (e.g., depression, anxiety). Additionally, Chayer and Bouffard (2010) found that in a younger population (i.e., ten- to twelve-year-old children), boys were more likely than girls to engage in social comparison and downward comparison (i.e., associating with less capable peers) when experiencing impostor phenomenon.

However, in considering gender differences in impostor phenomenon, Bravata and colleagues (2019) recently found that, over time, results have been mixed. While acknowledging that many articles have suggested that women experience significantly higher rates of impostor phenomenon compared to men (e.g., Cusack et al., 2013; Kumar & Jagacinski, 2006), others have found no significant differences across genders (e.g., Cokley et al., 2015; Cromwell et al., 1990; Leonhardt et al., 2017; Rohrmann et al., 2016). In line with these inconsistent findings, Brauer and Proyer (2019) found that gender effects differed depending on context, whereby

women experienced higher levels of impostor phenomenon than men in an academic context, but that this difference was not significant within a professional context. These findings were also mirrored by Rohrmann and colleagues (2016), who found no significant gender differences in a population of professionals in leadership positions. It is important to note that no empirically reviewed research in the area of impostor phenomenon to date has been inclusive of a LGBTQ+ sample, highlighting the need for further empirical investigation of how this this population may also differ from existing research of impostor phenomenon in those identifying as men and women.

Through further examining the inconsistencies across the literature relating to impostor phenomenon and gender, it is possible that limitations in research samples may play a role in the mixed findings for gender (similar to the above discussion surrounding age differences). For example, although Topping & Kimmel (1985) found that university faculty members who were men reported higher impostor phenomenon compared to their colleagues who were women, they also suggested that this could have also been due to survivor bias (i.e., women with impostor phenomenon having been 'eliminated' before getting to this position). Similarly, many studies that have reported significant gender differences have acknowledged significant differences in sample sizes for gender (i.e., majority women), thus making meaningful comparisons difficult (e.g., Cusack et al., 2013). Thus, further examining gender differences in impostor phenomenon and ensuring representation of gender within samples is important for continuing to understand potential differences in experiences and responses to this construct.

Ethnicity/Culture

In addition to differences in age and gender, existing research has identified significantly higher rates of impostor phenomenon in racial minorities (Cokley et al., 2013; Peteet et al.,

2015). Cokley and colleagues (2013, 2017) examined differences related to minority stress, perceived discrimination, impostor phenomenon, and mental health in ethnic minority students. Across their studies, they found that impostor phenomenon was significantly associated with increased feelings of minority stress and decreased well-being, and that this relation with was particularly prominent in Asian American students. They suggested that impostor phenomenon was a stronger predictor of lower mental health and well-being when compared to minority stress (Cokley et al., 2013; Cokley et al., 2017). Further to this, Wei and colleagues (2020) found that the relation between impostor phenomenon and distress in Asian American students was partially mediated by feelings of shame relating to others viewing them negatively, and fear of dishonouring their family. These feelings of significant distress in Asian American students could be related to stereotypes associated with this population as being "high academic achievers" (Lee, 2009; Wei et al., 2020). Similarly, Austin and colleagues (2009) reported similar findings in a sample of African American students, whereby those who experienced "survivor's guilt" (i.e., guilt relating to making it farther than is "stereotypical" of others in one's culture) experienced greater impostor feelings and depresssion. Thus, when racial minority students internalize perceived stereotypes, or perceive that they are not able to meet the expectations associated with what it means to be successful in their culture, they may be at higher risk of experiencing feelings of inadequacy, self-doubt, and distress (i.e., characteristics of impostor phenomenon; Atkin et al., 2018; Wei et al., 2020).

Summary of Demographic Factors

Overall, demographic predictors of impostor phenomenon represent a "mixed bag" when considering the consistency of existing findings. As discussed herein, limitations in assessment and sampling could represent one explanation for these discrepancies, along with changes in

societal views and roles over time. That is, although research has suggested the potential and mixed effects of demographic factors in the experience of impostor phenomenon, it is possible that these differences may emerge due to disparities in the way that achievement for women and minorities is viewed at a broader societal level (see Tulshyan & Burey, 2021). Thus, although I sought to incorporate racial and gender diversity within my current research, I acknowledge that there may be greater systematic factors at play which influence the way in which this phenomenon may be experienced at an individual and group level (Feenstra et al., 2020). Altogether, in the present research I sought to identify demographic variables associated with differences in impostor phenomenon, as well as to include factors relating to perceived affirmative action within the newly developed measure.

Developmental Factors

In line with cultural factors are the developmental experiences and family factors that influence beliefs and expectations relating to success, intelligence, and performance. Parental rearing styles, including both parental overprotection and parental lack of care, have been identified as significant predictors of impostor phenomenon (Sonnak & Towell, 2001; Want & Kleitman, 2006). Alvarado (2015) found a significant positive relation between attachment anxiety and impostor phenomenon, suggesting that those who experienced impostor phenomenon reported increased fear and anxiety about being rejected or abandoned. In line with these findings, Castro and colleagues (2004) suggested that parentification in childhood was highly correlated with impostor phenomenon in graduate students, and that this relation was more common in Caucasian students compared to African American students. Similarly, greater parental control, overprotection, lack of warmth, and lack of support and family cohesion have been positively related to impostor feelings (Bussotti, 1990; Sonnak & Towell, 2001). Canning

and colleagues (2019) also found that first-generation students (i.e., those who were the first in their family to attend college) were more likely to experience impostor phenomenon during the transition to an academic setting given a lack of familial guidance and experience. In contrast, expressiveness, emotional communication, and family achievement orientation have been negatively associated with imposter feelings (Bussotti, 1990; King & Cooley, 1995).

Further to developmental experiences, Wei and colleagues (2020) examined the role of family shame and interpersonal shame in impostor phenomenon in a population of Asian American students. Their findings suggested that interpersonal shame (defined as concerns about being negatively evaluated by others, or beliefs about bringing shame to one's family) partially mediated the relation between impostor phenomenon and psychological distress. They suggested that in Asian cultures where collectivism and interpersonal harmony are highly valued, individuals were more vulnerable to feelings of unworthiness, and subsequently invested in living up to an "idealized" self-image in search of validation from others (e.g., family). This not only supports the notion of those with impostor phenomenon experience significant shame that others might view them negatively, but also highlights the occurrence of impostor phenomenon in cultures where collectivism and honour are particularly vital to the culture (Cowman & Ferrari, 2002; Wei et al., 2020). Although together these findings suggest the impact of developmental experiences in the development of impostor phenomenon in later life, no existing research has examined these effects longitudinally to determine the predictive nature of these relations. Within my current research, I will take steps towards assessing impostor phenomenon longitudinally (i.e., across an academic year); however, further research is needed to understand these experiences across one's developmental milestones and lifetime (i.e., before and after university).

Impostor Phenomenon and Psychological Distress

In their initial study of the impostor phenomenon, Clance & Imes (1978) observed associated clinical symptoms of anxiety, lack of self-confidence, depression, and frustration due to not being able to meet one's own standards of achievement. They suggested that depression, frustration, anxiety, fear of failure, guilt, self-doubt, and low self-confidence were common when individuals perceived that they were unable to sufficiently achieve their goals (Clance & Imes, 1978). Depression and anxiety were also observed as outcomes within the Impostor Cycle (Clance, 1985). However, limited research has empirically assessed the directionality of this relation. That is, does impostor phenomenon elicit distress, or does distress elicit impostor phenomenon?

Since its inception, empirical research has sought to further examine the relation between impostor feelings and psychological distress, including anxiety (Cokley et al., 2015; Topping & Kimmel, 1985), global negative affect (Cozzarelli & Major, 1990; Thompson et al., 1998), depression (Chrisman et al., 1995; Cokley et al., 2015; Cokley et al., 2017; Lester & Moderski, 1995; McGregor et al., 2008), and shame (Cowman & Ferrari, 2002). Findings have suggested that, compared to "non-impostors", "impostors" report poorer mental health and more consistent anxiety (Chrisman et al., 1995; Lester & Moderski, 1995; Sonnak & Towell, 2001). Henning and colleagues (1998) found that impostor phenomenon represented the largest proportion of unique variance in measuring psychological distress in an academic population, even when considering factors such as perfectionism, ethnicity, gender, year of study, marital status, and previous mental health treatment. Given this breadth of findings, researchers have suggested that psychological distress and impostor phenomenon are significantly associated (Chrisman et al., 1995; Henning et al., 1998). This is particularly relevant within the academic setting, where

experiences with impostor phenomenon and psychological distress can lead students to consider dropping out of their academic programs (Cisco, 2020).

However, despite evidence to suggest a significant relation between psychological distress and the impostor phenomenon, the directionality of this relation has yet to be examined. Some researchers have conceptualized the development of impostor phenomenon in childhood, with negative affect as an outcome of the stress elicited by feelings of being an impostor (Sonnak & Towell, 2001). In contrast, others have suggested that the presence of higher levels of clinical depression and anxiety, elicited higher levels of impostor phenomenon (Tigranyan et al., 2020). However, no studies to date have *empirically* examined the directionality of this relation (i.e., through assessing impostor phenomenon across time). Additionally, limited research has examined associations between impostor phenomenon and mental health outcomes in diverse populations, with particular attention to minority students (e.g., Cokley et al., 2013; Cokley et al., 2017; Peteet et al., 2015).

To establish directionality in the relation between impostor phenomenon and psychological distress, a recent study of military Veterans explored longer term effects of impostor phenomenon and loneliness on psychological distress (Stein et al., 2019). In this (primarily male) sample, they first assessed Veterans' psychological distress in middle adulthood, and followed up with the same Veterans 27 years later. Their findings suggested that Veterans who reported increased levels of impostor phenomenon and loneliness later in life experienced significantly increased psychological distress (whereas severe combat experiences and negative life events were *not* associated with psychological distress). However, one major limitation in this research was that it did not measure longitudinal change in impostor phenomenon across time (impostor phenomenon was only tested at time 2), thus precluding inferences about causal relations

between variables. Additionally, they found that increased psychological distress at time 1 predicted increased impostor phenomenon, loneliness, and psychological distress at time 2. This could be indicative of carry-over effects, or extraneous factors not included in the current study. Despite these limitations, this study provided some initial support for the possible longer-term impacts and psychosocial limitations of experiencing impostor phenomenon (Stein et al., 2019), further motivating the current exploration of longitudinal data and directionality of the impostor phenomenon-psychological distress relation in my current dissertation research.

Treatment Approaches

Although the association between psychological distress and impostor phenomenon has been well established, limited research has examined the use of specific treatment approaches in response to the presence of symptoms of impostor phenomenon. The few exceptions are an early qualitative description from Matthews and Clance (1985) reporting on their clinical observations in treating clients with impostor feelings, and non-empirical "lay" literature in the media that provides boundless advice on managing impostor phenomenon (Bravata et al., 2019).

Similarly, researchers have sought to examine the likelihood that those with impostor phenomenon would seek out mental health support. However, findings have suggested that individuals who fear being exposed as "real impostors" may experience significant stigma surrounding support-seeking (Stein et al., 2019). Thus, very few people seek out professional support for feelings of being an impostor specifically, but rather for the associated negative effects that commonly build over time, including anxiety, depression, and general dissatisfaction with life (Clance, 1985; Clance & Imes, 1978). Clinicians formerly sought to treat clients who presented with symptoms of impostor phenomenon with strategies for reframing and internalizing one's own accomplishments (i.e., using cognitive behavioural strategies; Clance &

Imes, 1978; Cheung, 2018); however, recent research has suggested that the presence of perfectionism may also impair the success of psychological interventions (Pannhausen et al., 2020). For example, those who are higher in perfectionism are more likely to try to "be the perfect client", to live up to the perceived high expectations of the clinician, thus fearing judgment and resulting in an impaired therapeutic relation, reduced self-disclosure and emotional involvement, and potential withdrawal from help-seeking (Flett & Hewitt, 2002; Hewitt et al., 2017; Pannhausen et al., 2020). Battling these feelings alone may eventually lead to the depletion of one's resources, as demonstrated through feelings of exhaustion and burnout (Legassie et al., 2008).

Although treatment recommendations have been otherwise limited, recent criticisms have suggested that attempted 'solutions' to 'fix' impostor phenomenon lack contextual factors relating to individuals' social and systematic environment (Feenstra et al., 2020; Mullangi & Jagsi, 2019). With limited information surrounding treatment options, combined with individuals' reduced likelihood of seeking out treatment, there is a significant need for prompt assessment of those experiencing impostor phenomenon, as well as improved awareness, response, and treatment of this experience. This involves not only understanding the cognitive, emotional, and behavioural factors associated with impostor phenomenon (a goal of my current research program), but also the contextual factors that maintain these feelings across time.

CHAPTER 5

Research Objectives and Rationale

The goals of my doctoral research program are three-fold: 1) Investigate and operationalize factors associated with impostor phenomenon; 2) Develop and validate a multidimensional assessment of impostor phenomenon, including associated thoughts, feelings, and behaviours, and; 3) Examine the longitudinal stability of impostor phenomenon. I began by developing items that comprised the novel multidimensional assessment for impostor phenomenon and assessing initial factor structure using exploratory factor analysis (Study 1). Following initial development and factor analysis, I further assessed the initial psychometric properties and factor structure using confirmatory factor analysis in an independent sample (Study 2). Then, I sought to replicate the factor structure and psychometric properties (e.g., convergent and divergent validity) of the new impostor phenomenon measure in an independent academic sample (Study 3). Finally, I examined longitudinal data collected over the course of a typical academic year (i.e., September to April) to assess test-retest reliability of the novel measure and longitudinal stability of impostor phenomenon across time (Study 3). Further to the development of a multidimensional and psychometrically valid measure of impostor phenomenon, this longitudinal examination is a novel contribution to the existing impostor phenomenon and has been highlighted as a "consistent gap" in the existing research literature (Mak et al., 2019). The present research was driven by the following research questions and hypotheses:

RQ1. Item development and theoretical foundations (*exploratory*): What factors (cognitive, emotional, and behavioural) define impostor phenomenon?

RQ2. Within-subjects differences: What is the stability of impostor phenomenon across time (i.e., is it a trait-like or state-like construct; what is the rate of change across time)?

I predict that impostor phenomenon will significantly differ across the academic year, with lowest levels observed at the beginning and end of the year, and peak levels observed during exam periods (i.e., times that are higher in achievement-orientation, perceived stress; *H2a*). I also predict that growth trajectories for impostor phenomenon will significantly vary across the academic year based on demographic variables (*H2b*). In particular, I predict that students completing their undergraduate degree will experience significant increases in impostor phenomenon over the course of the year, whereas graduate students will experience significant decreases in impostor phenomenon over the course of the year (*H2c*). I also predict that women will experience significant increases in impostor phenomenon over the course of the year compared to males (*H2d*).

RQ3. Convergent and divergent validity: Is impostor phenomenon conceptually different than other concepts (i.e., perfectionism, self-esteem) and personality traits (i.e., Big Five)?

I predict that impostor phenomenon will be significantly correlated with, but distinct from, other constructs. First, I predict that those lower in self-esteem will experience significantly higher levels of impostor phenomenon compared to those lower in self-esteem (*H3a)*. Then, when considering the Big Five Factors of personality (*H3b),* I predict that those higher (vs. lower) in extraversion, agreeableness, and conscientiousness will experience significantly lower impostor phenomenon. I also predict that those higher (vs. lower) in neuroticism will experience significantly higher impostor phenomenon. Finally, I predict that those higher in perfectionism (rigid, narcissistic, and self-critical, respectively) will experience significantly higher levels of impostor phenomenon compared to those lower in perfectionism (*H3c)*.

RQ4. Predictor model (*exploratory*): What factors best predict impostor phenomenon across time?

RQ5. Between-subjects differences: How does impostor phenomenon differ between groups?

I predict that impostor phenomenon will significantly differ based on demographic factors (*H5*). First, I predict that men will experience significantly lower impostor phenomenon compared to women and trans/nonbinary individuals (*H5a*). Then, I predict that White/Caucasian students will experience significantly lower impostor phenomenon compared to other ethnic groups (*H5b*). I also predict that younger aged participants will report significantly higher levels of impostor phenomenon compared to older participants (*H5c*). Similarly, I hypothesize that students will differ based on degree, where graduate students will experience significantly greater impostor phenomenon compared to undergraduate students (*H5d*), and first year and fourth year students (and above) will report significantly higher levels of impostor phenomenon compared to second and third year students (including when separating for both undergraduate and graduate degrees; *H5e*). Finally, I predict significant differences across academic programs, with those in natural science programs (i.e., those with greater competition) reporting significantly higher impostor phenomenon compared to other groups (*H5f)*.

RQ6. Correlates and directionality: How does impostor phenomenon relate to psychological distress across time?

I predict that impostor phenomenon will demonstrate a significant and positive causal predictive relation with psychological distress across time (where impostor phenomenon will elicit significant psychological distress, but not vice versa; *H6*).

RQ7. Objective success: How does impostor phenomenon relate to reported grade point average (GPA)?

I predict that GPA and impostor phenomenon will be positively associated. That is, I predict that baseline GPA will significantly and positively predict impostor phenomenon across time, whereby those with the highest GPA (i.e., 90-100%) will report the highest levels of impostor phenomenon (*H7)*.

CHAPTER 6

Item and Scale Development

Themes emerging from the initial conceptualization, extant research literature, and existing measures of impostor phenomenon (i.e., HIPS, CIPS, PFS) were used to inform model development[1]. Following an extensive review of the literature, I developed a conceptualization of impostor phenomenon as: *the subjective experience of perceived self-doubt in one's abilities and accomplishments compared to others, despite evidence to suggest the contrary*. Within this conceptualization, I developed a theoretical framework with three primary factors that address cognitive, emotional, and behavioural factors: 1) External Attribution (cognitive), 2) Negative Beliefs about the Self (emotional), and 3) Self-Handicapping Behaviours (behavioural). Additionally, within these factors emerged nine subdomains, as presented in Figure 2. The creation of this new measure was guided by test construction principles outlined by DeVellis (2017), including: 1) Clearly determining what you want to measure, 2) Generating an item pool, 3) Determining the format for measurement, 4) Consulting experts to review the item pool, 5) Considering inclusion of validation items, 6) Administering items to a development sample, 7) Evaluating the items, 8) Optimizing scale length (Devellis, 2017). Following the development of a theoretical framework, deductive methods (i.e., literature review and existing measures) were employed to generate an item pool with 81 items guided by the primary factors. Items included those adapted from existing measures of impostor phenomenon, as well as those which I created and adapted in line with the above theoretical framework.

[1] See Table J1 in Appendix J for a summary table of extant literature used during the item development process.

Initial Item Review

I subjected the initial item pool of 81 items to rigorous psychometric refinement and several subject matter expert reviews. To assess content validity of the novel measure, I consulted a panel of twelve graduate students in the department of psychology to provide feedback regarding the initial items at face validity. This panel of graduate students was representative of the population of interest and had strong theoretical understanding of test construction processes. The panel had the opportunity to provide feedback regarding 'fit' and the ability of items to adequately capture experiences of impostor phenomenon based on the provided conceptualization. They subsequently categorized items into an open number of factors based on the emergence of common themes. The suggested factors closely mirrored the proposed theoretical framework. From this feedback, I modified the item pool to remove redundant and unclear items (n = 9), leaving 72 items falling into three factors that are further described below: A) External Attribution, B) Negative Beliefs about the Self, and C) Self-Handicapping Behaviours (see Table 1, 2).

Figure 2

Initial Theoretical Framework for Impostor Phenomenon

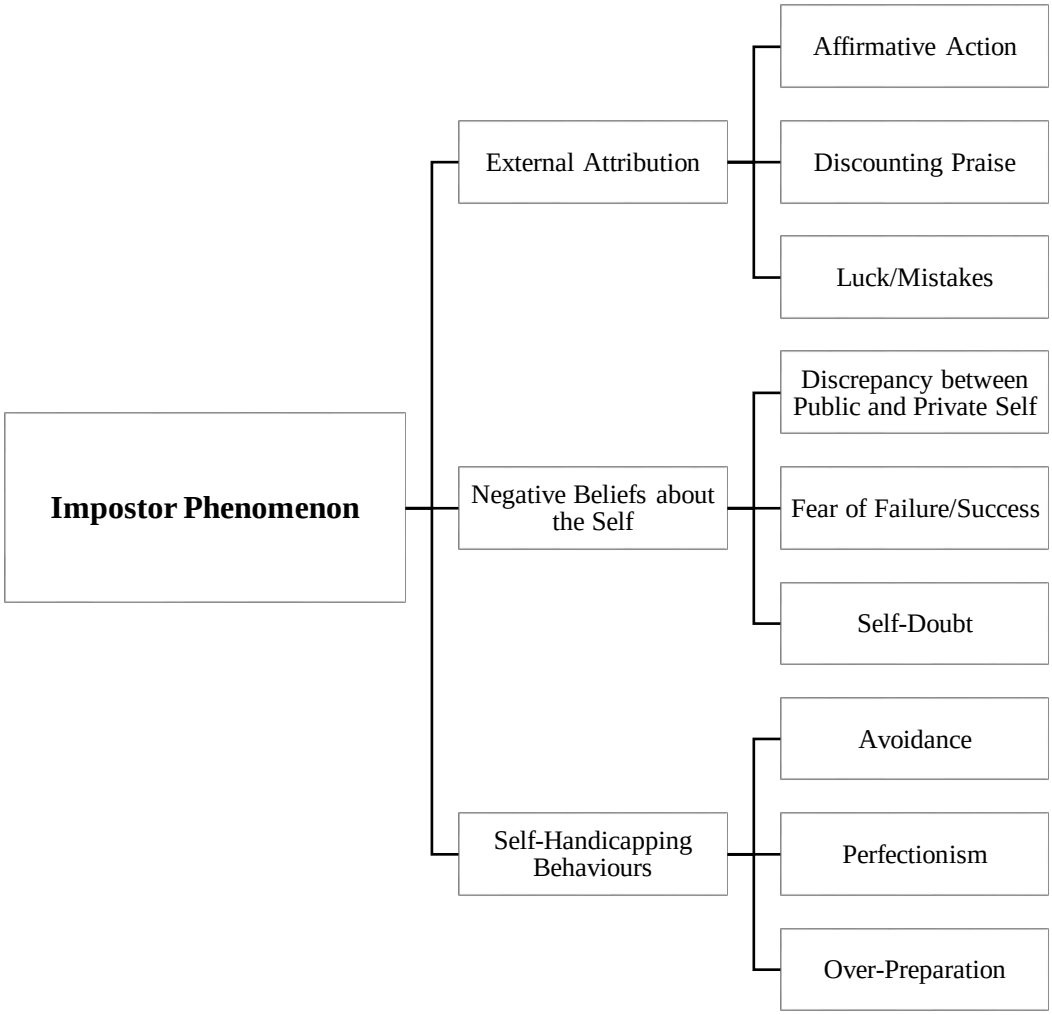


Table 1

Initial Item Pool Factors

Factor	Number of Items
External Attribution	**17**
Discounting Praise	9
Luck/Mistakes	6
Affirmative Action	2
Negative Beliefs about the Self	**36**
Fear of Failure/Success	10
Discrepancy of Private/Public Self	18
Self-Doubt	8
Self-Handicapping Behaviours	**19**
Perfectionism	5
Overpreparation	7
Avoidance	7

External Attribution (17 items)

A consistent theme in impostor phenomenon is externalizing positive events and viewing them as temporary, while internalizing and generalizing negative events. Early research by Clance and Imes (1987) suggested that individuals with impostor phenomenon commonly denied their personal competence in addition to discounting praise from others. This includes significant difficulties internalizing success and accepting praise as being valid or true. Rather, those with impostor phenomenon discount positive feedback despite objective evidence to suggest successful achievements, instead attributing success to external factors (Chae et al., 1995; Harvey, 1981; Thompson et al., 1998; Topping & Kimmel, 1985*).* Attributing successes to luck or mistakes, rather than to their 'true abilities' is what researchers typically describe as being characteristic of impostor phenomenon (e.g., Edwards et al., 1987). Those with impostor phenomenon view this feedback as being incongruent with their personal perceptions of achieved success, and instead hold the belief that they are "not deserving" of their accomplishments

(Casselman, 1991; Edwards et al., 1987; Sakulku & Alexander, 2011). This leads to an unwillingness to accept compliments or praise relating to accomplishments.

Additionally, to incorporate consideration of cultural factors, including the presence of minority stress, cultural expectations, and "survivor's guilt" (e.g., Austin et al., 2009), I included two items assessing perceived views towards the role of affirmative action in current academic position. This factor incorporates societal-level considerations of the way an individual perceives their role based on social hierarchy (e.g., Feenstra et al., 2020). Altogether, the first factor (external attribution) is cognitive in nature and represents a significant effort to diminish one's achievements. Within this theme I included three subdomains: discounting praise (9 items; e.g., "*I often feel I receive praise or grades that I don't deserve*"), luck/mistakes (6 items; e.g., "*At times, I have felt I am in my present position or academic program through some kind of mistake*"), and affirmative action (2 items; e.g., "*I obtained my present position because of something about me that I didn't work for (e.g., coming from an underrepresented group*)").

Negative Beliefs about Self (36 items)

Fear and guilt surrounding failure is one of the key features of impostor phenomenon (Clance, 1985; Kets de Vries, 2005). Those with impostor phenomenon commonly focus attention on evidence suggesting that they do not deserve recognition for their achievements, even if this evidence is limited (Clance, 1985). They demonstrate a significant gap in the emotional assessment and appraisal of their own abilities, particularly when compared to their actual, objective, output (Want & Kleitman, 2006). Thus, the second subdomain taps into low self-confidence relating to one's own competence. Given the disproportionate standards that those with impostor phenomenon set for themselves, along with their lack of confidence in their future self to meet those standards (Edwards et al., 1987), they are commonly left feeling

overwhelmed, and overgeneralize perceived failures when eventually they are not able to achieve such high standards. Additionally, in the presence of mistakes, or when they feel that they did not perform to their highest standards, those with impostor phenomenon experience significant feelings of shame and humiliation, which act to further reinforce their self-doubt and fears of future failures (and successes; Clance, 1985).

People with impostor phenomenon demonstrate discrepant and low appraisals of their performance outcomes (Want & Kleitman, 2006). That is, they are more likely to perceive a ‘‘gap’’ between how they view their performance and how others view their achievements. This maps onto the fear of being discovered, or the perception of oneself as “phony” (Edwards et al., 1987), suggesting negative beliefs and fears of others discovering their perceived incompetence. Thus, the second factor (negative beliefs about self) represents emotional experiences associated with feelings of fear, guilt, and shame (Clance & Imes, 1978). In line with this theme are three subdomains: fear of success/failure (10 items; e.g., “*When I'm praised for something, I sometimes wonder if I will be able to do as well the next time*”), discrepancy between the public and private self (18 items; e.g., “*Sometimes I’m afraid others will discover how much knowledge or ability I really lack*”), and self-doubt (8 items; e.g., “I *often feel that I am "in over my head" or beyond my capabilities in my area of work or study*”).

Self-Handicapping Behaviours (19 items)

Impostor phenomenon has also been associated with behavioural responses (e.g., Lane, 2015) that are not otherwise captured in the existing measurement scales. For example, there are significant patterns of self-handicapping behaviours associated with impostor phenomenon (Cowman & Ferrari, 2002; Ferrari & Thompson, 2006; Ross et al., 2001). These behaviours are represented in the second level of the Impostor Cycle, whereby anxiety, self-doubt, and worry

prompt a behavioural response (i.e., over-preparation and procrastination; Clance, 1985). Self-handicapping is defined as a group of self-deprecating behaviours that an individual engages in as a manner of protecting their personal self-image or self-esteem (Leary et al., 2000; Want & Kleitman, 2006). Self-handicapping represents a self-presentational strategy whereby downplaying one's achievements functions as a strategy to avoid negative interpersonal implications associated with potential failure and negative evaluation (Ferrari & Thompson, 2006; Leary et al., 2000). People who engage in self-handicapping behaviours intentionally introduce an obstacle that is within their control (as a "handicap") to impede chances of success or progress towards a goal, allowing potential failures to be attributed to this handicap, rather than to themselves (Ferrari & Thompson, 2006; Strube, 1986; Want & Kleitman, 2006). Impostor phenomenon is associated with the desire to portray an image of being a "super-person", otherwise seen as perfectionistic cognitions (Clance & Imes, 1978; Ferrari & Thompson, 2006), which elicit behaviours in attempt to outperform peers as one way of compensating for feelings of self-doubt. These self-handicapping behaviours are typically associated with perfectionism, overpreparation, and avoidance that further enhance individuals' perceived inadequacy (Clance & Imes, 1978; Edwards et al., 1987). Impostor phenomenon also perpetuates procrastination behaviours out of an effort to avoid or delay the potential for outcomes that may be less than their ideal standard of success (Ferrari & Thompson, 2006).

Although those with impostor phenomenon may recognize this pattern of self-handicapping behaviours, they often hold the belief that without this approach to work, they would encounter failure (Clance, 1985). However, existing measures of impostor phenomenon typically exclude behavioural components (i.e., what actions are people taking as a result of these thoughts and emotions?). Thus, for the third subdomain (self-handicapping behaviours), I

accounted for behaviours including: perfectionism (5 items; e.g., "*I rarely do a project or task as well as I'd like to do it*"), over-preparation (7 items; "*I often find myself putting more effort into tasks compared to others*"), and avoidance (7 items; e.g., "*I avoid evaluations if possible and have a dread of others evaluating me*"). This behavioural piece is a relatively novel inclusion in the assessment of impostor phenomenon, as previous scales have focused primarily on cognitive and emotional perceptions of the self (e.g., "I feel like a fraud"), rather than identifying behaviours associated with impostor phenomenon.

Summary of Item Development

Altogether these items formed the preliminary 72-item Impostor Phenomenon Assessment (IPA; see Table 2). Item responses represent a 6-point Likert scale, from 1 (Strongly Disagree) to 6 (Strongly Agree). A six-item scale was determined to capture the dimensional nature of this construct and was grounded in previous research to suggest a six-point scale as optimal in self-report assessments (Preston & Colman, 2000). Overall impostor phenomenon, as well as each of the individual subscales, are calculated by obtaining the mean of all items, such that a higher overall score is indicative of higher levels of impostor phenomenon.

Table 2

Impostor Phenomenon Assessment Initial Item Set

Item		Subdomain
EXTERNAL ATTRIBUTION		
1.	I obtained my present position because of something about me that I didn't work for (e.g., coming from an underrepresented group).	Affirmative Action
2.	I obtained my present position solely because of an affirmative action policy.	Affirmative Action
3.	I feel I deserve whatever honors, recognition, or praise I receive. (r)	Discounting Praise
4.	I find it easy to accept compliments about my intelligence. (r)	Discounting Praise
5.	I often feel I receive praise or grades that I don't deserve.	Discounting Praise
6.	If I receive a great deal of praise and recognition for something I've accomplished, I tend to discount the importance of what I've done.	Discounting Praise
7.	It's hard for me to accept compliments or praise about my intelligence or accomplishments.	Discounting Praise
8.	On some occasions when someone has praised me for something, I tend to feel that I fooled them.	Discounting Praise
9.	When I receive a compliment about my academic or professional abilities, I sometimes find myself making excuses for explaining away the compliment.	Discounting Praise
10.	When I receive a compliment, I find it difficult to accept the compliment, and often explain it away or give credit to others.	Discounting Praise
11.	It is easy for me to give myself credit for the good things that happen to me, professionally or socially. (r)	Discounting Praise
12.	I feel that I have attained my present academic or professional position through "pulling strings" or "having connections."	Luck/Mistake
13.	I often feel that my success has been due to some kind of luck.	Luck/Mistake
14.	At times, I have felt I am in my present position or academic program through some kind of mistake.	Luck/Mistake
15.	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.	Luck/Mistake
16.	My achievements have been due more to external factors, such as luck or effort, rather than to my own inherent abilities.	Luck/Mistake
17.	Sometimes I believe that my success in my life or in my job has been the result of some kind of error.	Luck/Mistake
NEGATIVE BELIEFS ABOUT SELF		
18.	I can give the impression that I'm more competent than I really am.	Discrepancy
19.	I feel that there is a significant disparity between the "intellectual self' that others perceive and the "intellectual self" that I really am.	Discrepancy
20.	I have sometimes convinced an important person that I am brighter or more talented than I really am.	Discrepancy
21.	I often feel I am concealing secrets about my abilities from others.	Discrepancy
22.	I often worry about not succeeding on a task, even though others around me have considerable confidence that I will do well.	Discrepancy
23.	I sometimes feel there's something false or misleading about me that others don't notice.	Discrepancy
24.	I would describe myself as an "authentic" person. (r)	Discrepancy
25.	I'm afraid people important to me may find out that I'm not as capable as they think I am.	Discrepancy
26.	If I get a high grade on a work assignment, I tend to feel that I've fooled my teacher or supervisor.	Discrepancy
27.	In general, I act more competently than I feel that I really am.	Discrepancy
28.	People tend to believe I am more competent than I really am.	Discrepancy
29.	Significant people in my life tend to believe that I am more academically or professionally competent than I really am.	Discrepancy
30.	In some situations, I feel like a "great pretender": that is, I'm not as genuine as others think I am.	Discrepancy
31.	My private feelings and perceptions about myself sometimes conflict with the impressions I give others through how I act.	Discrepancy

Item		Subdomain
32.	My public and private self are the same person. (r)	Discrepancy
33.	Sometimes I am afraid I will be discovered for who I really am.	Discrepancy
34.	Sometimes I'm afraid others will discover how much knowledge or ability I really lack.	Discrepancy
35.	At a social event, I sometimes feel that I try to impress people by acting more intelligently than I really feel I am.	Discrepancy
36.	I feel confident that I will succeed in the future. (r)	Fear of Failure/Success
37.	I often foresee failure when entering new situations that require a demonstration of my abilities.	Fear of Failure/Success
38.	I often achieve success on a project or test when I have anticipated that I would fail.	Fear of Failure/Success
39.	I tend to remember the incidents where I have not done my best more than those times that I have done my best.	Fear of Failure/Success
40.	I'm often afraid that I will fail at a new assignment or undertaking even though I generally do well at what I attempt.	Fear of Failure/Success
41.	If I'm going to receive a promotion or gain recognition of some kind, I hesitate to tell others until it is an accomplished fact.	Fear of Failure/Success
42.	When I am about to take on a new and challenging project, task, or responsibility, I am more inclined to remember my past successes rather than my past failures. (r)	Fear of Failure/Success
43.	When I'm praised for something, I sometimes wonder if I will be able to do as well the next time.	Fear of Failure/Success
44.	When I've succeeded at something and received recognition for my accomplishments, I have doubts that I can keep repeating that success.	Fear of Failure/Success
45.	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.	Fear of Failure/Success
46.	Even though I feel that I have a lot of potential, I sometimes feel like an intellectual "fraud" or "phony."	Self-Doubt
47.	I consider my accomplishments adequate for this stage in my life. (r)	Self-Doubt
48.	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.	Self-Doubt
49.	I often feel that I am "in over my head" or beyond my capabilities in my area of work or study.	Self-Doubt
50.	I often worry about whether others will view me as a success or a failure.	Self-Doubt
51.	Even in situations for which I am well-prepared (e.g., studied very hard and long for an examination or worked tirelessly on a project), I still have doubts about my ability to perform well.	Self-Doubt
52.	I am often surprised when I perform well on a project or a test.	Self-Doubt
53.	I often compare my ability to those around me and believe they are more intelligent than I am.	Self-Doubt
SELF-HANDICAPPING BEHAVIOURS		
54.	I avoid evaluations if possible and have a dread of others evaluating me.	Avoidance
55.	I worry about my ability to complete a task, and often end up delaying making decisions about the task until it is too late.	Avoidance
56.	I find myself often leaving tasks to the last minute.	Avoidance
57.	I put off making decisions out of fear that I won't make the right one.	Avoidance
58.	I try not to get too involved in competitive environments, so it won't hurt so much if I lose or do poorly.	Avoidance
59.	I typically delay getting started on tasks because I worry that I'm not up to the challenge.	Avoidance
60.	In preparing for deadlines, I often waste time doing other things.	Avoidance
61.	I become very invested in my assigned tasks and find it difficult to focus on anything else.	Overpreparation
62.	I often feel like I have to put more effort into my tasks because I am not as smart as those around me.	Overpreparation
63.	I often feel that I have to work harder than others to achieve all that I do.	Overpreparation
64.	I often find myself putting more effort into tasks compared to others.	Overpreparation
65.	I often find myself spending more time than necessary in completing tasks or assignments.	Overpreparation
66.	I often tell others that I studied or worked less (i.e., spent less time) on a professional/intellectual project than I actually did.	Overpreparation
67.	Others have told me that I often do more than necessary when it comes to completing a task.	Overpreparation

Item		Subdomain
68.	I feel discouraged if I'm not "the best" or at least "very special" in situations that involve achievement.	Perfectionism
69.	I often get "down on myself' when I perform less than perfectly on a task or a problem.	Perfectionism
70.	I rarely do a project or task as well as I'd like to do it.	Perfectionism
71.	Mostly, I find that I measure up to the standards that I set for myself. (r)	Perfectionism
72.	When it comes to achieving and attaining goals, I suppose one might call me a "perfectionist".	Perfectionism

Note. "(r)" indicates a reverse-scored item.

CHAPTER 7

Study 1: Initial Validation and Exploratory Factor Analysis

Participants and Procedure

To assess the initial factor structure and psychometric properties of the preliminary Impostor Phenomenon Assessment (IPA), I collected a sample of 301 undergraduate students to complete an online questionnaire through the university participant pool. Participants who completed the study received course credit towards an undergraduate psychology course. Participants' ages ranged from 17 to 26 years (M = 18.27, SD = 0.81), and 71% of the population self-identified as women. Participants represented a moderately diverse range of ethnic origins (43.9% Caucasian, 35.9% Asian, 8% Other, 8% Middle Eastern, 3.7% Black, 0.3% Indigenous).

Measures

Impostor Phenomenon was measured using the preliminary 72-item Impostor Phenomenon Assessment (IPA; see Table 2). Participants responded to items on a 6-point Likert scale, from 1 (Strongly Disagree) to 6 (Strongly Agree). I calculated the mean of all items, such that a higher overall score was indicative of higher levels of impostor phenomenon. In addition to the overall score, the mean of items from each subscale was calculated to provide scores on each of the three individual subscales.

Study 1 Results

Exploratory Factor Analyses

I conducted exploratory factor analyses using SPSS Version 26.0 (IBM Corp., 2019) to determine the optimal factor structure to fit the initial IPA data. The Kaiser-Meyer-Olkin measure of sampling adequacy was .91, above the minimum recommended value of .60 (Kaiser,

1974), and Bartlett's test of sphericity was significant (χ^2 (2556) = 11,115, $p < .001$). Taken together, the results of these tests suggested that the current data were suitable for subsequent factor analysis. I then computed inter-item correlations and analyzed the resulting correlation matrix with Principal Axis Factoring extraction. I determined the number of factors to extract by considering of existing theoretical modelling, Kaiser's eigenvalue criterion, and the scree plot, which all suggested a three or four factor solution.

Given the current multidimensional conceptualization of impostor phenomenon, the various dimensions were assumed to be nonorthogonal, and thus I employed an oblique rotation. I tested both the hypothesized three-factor structure (as defined by the scale facets), and the four-factor structure using a promax rotation. A three-factor solution explained 37.3% of the total variance. A four-factor solution explained 40.2% of the variance; however, given the small increase in variance (~3%), increase in cross-loadings, and conceptual similarities, I selected the three-factor solution as the most conceptually and empirically parsimonious structure.

Seventeen items (items 3, 4, 6, 7, 11, 18, 24, 27, 31, 34, 36, 42, 47, 49, 57, 61, 66) were removed as they did not contribute to the simple factor structure and failed to meet the minimum criteria (i.e., loadings less than 0.32 were excluded as they were not considered to be substantial; Comrey & Lee, 1992). Following removal of these items, I conducted a second exploratory factor analysis, and the 55 remaining items loaded cleanly and substantially onto the three factors. A three-factor structure remained the best fit for the data, accounting for 40.0% of the variance.

Principal Components Analyses

For the final stage, I conducted a Principal Components analysis of the remaining 55 items, using promax and oblimin rotations. A promax rotation provided the best-defined factor

structure. One item had a crossloading above .32 (item 48), and low loading on its primary loading, and was thus removed. Five items had a cross-loading above .32 (items 1, 12, 64, 67, 72), but demonstrated strong factor loadings on their primary factor (i.e., above .60), and were thus retained. The factor loading matrix for this final 54-item solution is presented in Table 3, with the final factor structure accounting for 43.6% of the total variance.

Based on the theoretical background and analysis of item loadings, I re-labeled the three factors: 1) Doubts about Achievement (27 items), 2) Perceived Discrepancy (20 items), and 3) Self-Handicapping Behaviours (7 items). See Figure 3 for an updated framework. All factors correlated in the expected direction and were significantly positively correlated with one another (see Table 4). Internal consistency of the 54-item scale was excellent ($\alpha = .95$), and subscales representing the three factors also demonstrated strong internal consistency ($\alpha = .93$, $\alpha = .92$, $\alpha = .81$, respectively). Skewness and kurtosis values for scores on the total 54-item measure and each subscale were in the acceptable range (see Table 5).

Table 3

Pattern Matrix Factor Loadings for the Three-Factor Model using PAF with Promax Rotation

Item	Factor			Uniqueness
	DA	PD	SHB	
51. Even in situations for which I am well-prepared (e.g., studied very hard and long for an examination or worked tirelessly on a project), I still have doubts about my ability to perform well.	**0.830**			0.401
63. I often feel that I have to work harder than others to achieve all that I do.	**0.777**			0.505
69. I often get "down on myself' when I perform less than perfectly on a task or a problem.	**0.747**			0.546
22. I often worry about not succeeding on a task, even though others around me have considerable confidence that I will do well.	**0.743**			0.515
64. I often find myself putting more effort into tasks compared to others.	**0.741**		-0.487	0.527
72. When it comes to achieving and attaining goals, I suppose one might call me a "perfectionist".	**0.733**		-0.421	0.560
67. Others have told me that I often do more than necessary when it comes to completing a task.	**0.690**		-0.609	0.507
53 I often compare my ability to those around me and believe they are more intelligent than I am.	**0.683**			0.527
45. 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.	**0.675**			0.401
44. When I've succeeded at something and received recognition for my accomplishments, I have doubts that I can keep repeating that success.	**0.675**			0.426
62. I often feel like I have to put more effort into my tasks because I am not as smart as those around me.	**0.674**			0.550
40. I'm often afraid that I will fail at a new assignment or undertaking even though I generally do well at what I attempt.	**0.647**			0.582
65. I often find myself spending more time than necessary in completing tasks or assignments.	**0.642**			0.646
43. When I'm praised for something, I sometimes wonder if I will be able to do as well the next time.	**0.629**			0.545
68. I feel discouraged if I'm not "the best" or at least "very special" in situations that involve achievement.	**0.587**			0.680
50. I often worry about whether others will view me as a success or a failure.	**0.560**			0.560
39. I tend to remember the incidents where I have not done my best more than those times that I have done my best.	**0.527**			0.688
37. I often foresee failure when entering new situations that require a demonstration of my abilities.	**0.497**			0.498
54. I avoid evaluations if possible and have a dread of others evaluating me.	**0.493**			0.542
58. I try not to get too involved in competitive environments, so it won't hurt so much if I lose or do poorly.	**0.479**			0.707
52. I am often surprised when I perform well on a project or a test.	**0.467**			0.569
10. When I receive a compliment, I find it difficult to accept the compliment, and often explain it away or give credit to others.	**0.451**			0.756
9. When I receive a compliment about my academic or professional abilities, I sometimes find myself making excuses for explaining away the compliment.	**0.448**			0.646
25. I'm afraid people important to me may find out that I'm not as capable as they think I am.	**0.444**			0.524
46. Even though I feel that I have a lot of potential, I sometimes feel like an intellectual "fraud" or "phony."	**0.437**			0.445
41. If I'm going to receive a promotion or gain recognition of some kind, I hesitate to tell others until it is an accomplished fact.	**0.434**			0.854
38. I often achieve success on a project or test when I have anticipated that I would fail.	**0.367**			0.835
12. I feel that I have attained my present academic or professional position through "pulling strings" or "having connections."		**0.925**	-0.367	0.436
15. 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.		**0.795**		0.571
5. I often feel I receive praise or grades that I don't deserve.		**0.762**		0.477
26. If I get a high grade on a work assignment, I tend to feel that I've fooled my teacher or supervisor.		**0.730**		0.463
1. I obtained my present position because of something about me that I didn't work for (e.g., coming from an underrepresented group).	-0.352	**0.712**		0.639
17. Sometimes I believe that my success in my life or in my job has been the result of some kind of error.		**0.689**		0.409

Item	Factor			Uniqueness
	DA	PD	SHB	
14. At times, I have felt I am in my present position or academic program through some kind of mistake.		**0.683**		0.501
13. I often feel that my success has been due to some kind of luck.		**0.678**		0.522
16. My achievements have been due more to external factors, such as luck or effort, rather than to my own inherent abilities.		**0.672**		0.545
8. On some occasions when someone has praised me for something, I tend to feel that I fooled them.		**0.634**		0.410
30. In some situations, I feel like a "great pretender": that is, I'm not as genuine as others think I am.		**0.582**		0.474
33. Sometimes I am afraid I will be discovered for who I really am.		**0.565**		0.452
2. I obtained my present position solely because of an affirmative action policy.		**0.512**		0.822
21. I often feel I am concealing secrets about my abilities from others.		**0.469**		0.677
23. I sometimes feel there's something false or misleading about me that others don't notice.		**0.445**		0.533
19. I feel that there is a significant disparity between the "intellectual self' that others perceive and the "intellectual self" that I really am.		**0.426**		0.625
20. I have sometimes convinced an important person that I am brighter or more talented than I really am.		**0.404**		0.705
28. People tend to believe I am more competent than I really am.		**0.400**		0.625
35. At a social event, I sometimes feel that I try to impress people by acting more intelligently than I really feel I am.		**0.394**		0.724
29. Significant people in my life tend to believe that I am more academically or professionally competent than I really am.		**0.383**		0.563
56. I find myself often leaving tasks to the last minute.			**0.898**	0.351
60. In preparing for deadlines, I often waste time doing other things.			**0.892**	0.373
59. I typically delay getting started on tasks because I worry that I'm not up to the challenge.			**0.691**	0.421
55. I worry about my ability to complete a task, and often end up delaying making decisions about the task until it is too late.			**0.637**	0.408
71. Mostly, I find that I measure up to the standards that I set for myself. (r)			**0.488**	0.683
32. My public and private self are the same person. (r)			**0.457**	0.767
70. I rarely do a project or task as well as I'd like to do it.			**0.365**	0.736

Note. Values below 0.32 are suppressed; DA=Doubts about Achievement (27 items); PD=Personal Discrepancy (20 items); SHB=Self-Handicapping Behaviours (7 items)

Table 4

Descriptive Statistics and Bivariate Correlation Matrix for IPA Total and Subscales – Study 1

Variable	*M*	*SD*	α	1	2	3	4
1. DA	4.15	0.81	.93	-	-	-	-
2. PD	3.01	0.83	.92	.50**	-	-	-
3. SHB	3.65	0.76	.81	.43**	.51**	-	-
4. Total IPA	3.66	0.67	.95	.88**	.83**	.66**	-

Note. ** $p < .01$; 2-tailed test; DA=Doubts about Achievement; PD=Personal Discrepancy; SHB=Self-Handicapping Behaviours, $N = 283$.

Table 5

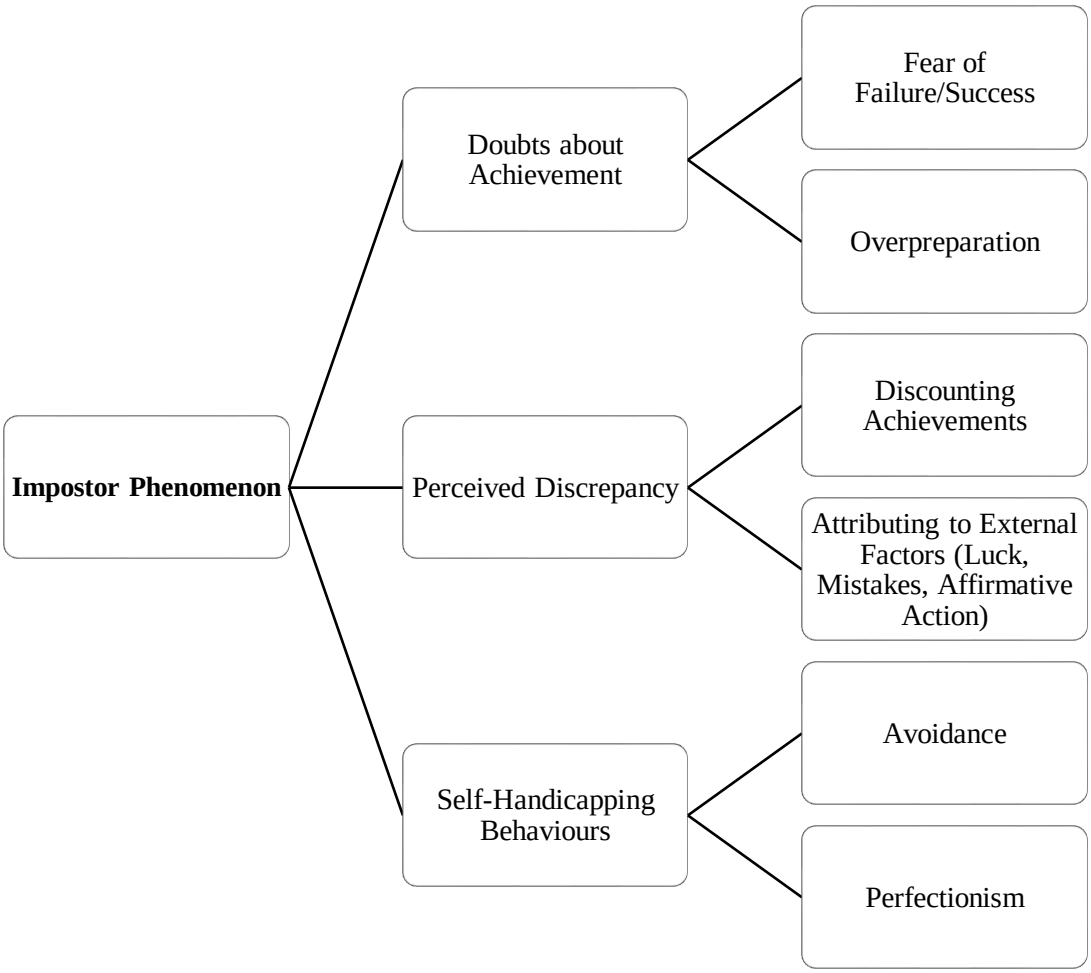
Skewness and Kurtosis of IPA Total and Subscales

	Skewness	*SE*	Kurtosis	*SE*
DA	-.249	.145	-.500	.289
PD	.281	.145	-.369	.289
SHB	-.158	.145	-.462	.289
Total IPA	.035	.145	-.332	.289

Note. DA=Doubts about Achievement; PD=Personal Discrepancy; SHB=Self-Handicapping Behaviours, $N = 283$.

Figure 3

Revised Theoretical Framework for Impostor Phenomenon Based on Exploratory Factor Analyses



Study 1 Discussion

Through panel review and exploratory factor analysis, a three-factor structure emerged for a novel 54-item Impostor Phenomenon Assessment (IPA): 1) Doubts about Achievement, 2) Perceived Discrepancy, and 3) Self-Handicapping Behaviours. The initial scale demonstrated excellent initial psychometric properties.

In comparing the factor structure emerging from the data to the initial proposed framework, it is notable that the factor structure highly resembled the proposed theoretical framework, with particular attention to similarities with Factor 2 (Negative Beliefs About the Self – renamed Perceived Discrepancy) and Factor 3 (Self-Handicapping Behaviours). Factor 2 was renamed Perceived Discrepancy because of the notable difference where items associated with "fear of failure and success" loaded primarily onto Factor 1. Factor 1 emerged as the most variable within the proposed factor structure, incorporating items relating to subdomains including "discounting" and "perfectionism"; however, the main theme of these items represented links with achievement and performance (e.g., "*When I receive a compliment about my academic or professional abilities, I sometimes find myself making excuses for explaining away the compliment.*"; "*I often get "down on myself' when I perform less than perfectly on a task or a problem.*). As such, I relabeled Factor 1 from External Attribution, which was primarily accounted for in Factor 2, to Doubts about Achievement.

CHAPTER 8

Study 2: Confirmatory Factor Analysis

Following the initial factor structure emerging in Study 1, I conducted confirmatory factor analyses to replicate the factor structure and initial psychometric properties of the preliminary Impostor Phenomenon Assessment (IPA) in an independent sample of undergraduate students.

Participants and Procedure

Mirroring Study 1, a sample of 589 undergraduate students completed an online questionnaire through the university participant pool and received course credit towards an undergraduate psychology course. Participants' ages ranged from 18 to 41 years (M = 19.17, SD = 1.62), 66% of the population self-identified as women, and participants represented a moderately diverse range of ethnic origins (44.3% Caucasian, 37.7% Asian, 8.8% Other, 5.9% Middle Eastern, 2.5% Black, 0.7% Indigenous). Data for 35 participants were removed due to incomplete and inattentive responding (i.e., completing less than 75% of questions, failing at least 50% of attention checks), leaving a final sample of 554 participants for analyses.

Measures

Impostor Phenomenon

Participants completed the updated 54-item Impostor Phenomenon Assessment (IPA). Mirroring the initial item set, participants responded to items on a 6-point Likert scale, from 1 (Strongly Disagree) to 6 (Strongly Agree). I calculated a mean for all impostor phenomenon items such that a higher overall score was indicative of higher levels of impostor phenomenon. In addition to the overall score, I calculated the mean of items from each subscale to provide scores on each of the three dimensions (Doubts about Achievement, Perceived Discrepancy, and Self-Handicapping Behaviours).

Study 2 Results

Descriptive statistics and bivariate correlations for the total IPA score and three subscales are present in Table 6. Internal consistency for the IPA Total and its three subscales was excellent (see Table 6).

To assess the initial factor structure, I conducted confirmatory factor analysis and structural equation modeling using Mplus version 8 (Muthén & Muthén, 1998-2010). The fit statistics supported a three-factor model (χ^2 (1374) = 5064, $p < .001$; Figure 4). The root-mean-square error of approximation (RMSEA = 0.07, 90% CI [.069, .072], $p < .001$), and the standardized root-mean-square residual (SRMR = 0.08; Hu & Bentler, 1999; MacCallum et al., 1996; Wheaton et al., 1977), also suggested adequate fit. Some fit statistics suggested acceptable fit (TLI = 0.73, CFI = 0.72). All loadings were significant ($p < .01$).

Table 6

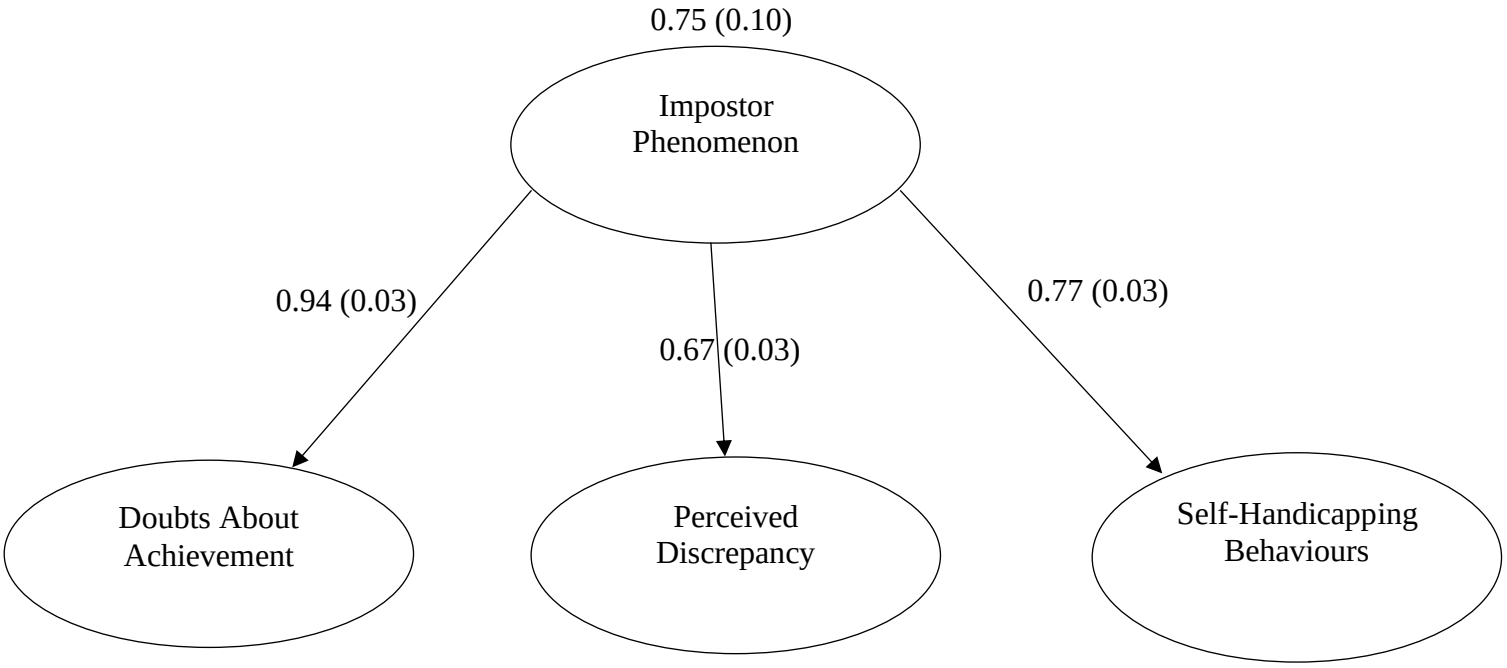
Descriptive Statistics and Bivariate Correlation Matrix for IPA Total and Subscales – Study 2

Variable	*M*	*SD*	α	1	2	3	4
1. Doubts About Achievement	3.93	0.82	.93	-	-	-	-
2. Perceived Discrepancy	3.01	0.84	.92	.55**	-	-	-
3. Self-Handicapping Behaviours	3.96	0.85	.73	.55**	.41**	-	-
4. Total Impostor Phenomenon	3.59	0.70	.95	.91**	.83**	.66**	-

Note. ** $p < .01$; 2-tailed test; $N = 554$

Figure 4

Model Fit for IPA Based on Confirmatory Factor Analysis – Study 2



Exploratory Analyses

To assess for gender differences, I conducted an independent samples t-test. Results suggested significant differences between women and men on all subscales and total impostor phenomenon (marginally significant for Self-Handicapping Behaviours; Table 7).

Table 7

Differences Between Genders on IPA

	Men M(SD)	**Women M(SD)**	***t***	***p***	***d***
Doubts About Achievement	3.57(0.76)	4.12(0.79)	-7.84	.00**	0.71
Perceived Discrepancy	2.90(0.85)	3.06(0.83)	-2.17	.03*	0.19
Self-Handicapping Behaviours	3.87(0.76)	4.01(0.89)	-1.95	.05	0.17
Total Impostor Phenomenon	3.36(0.69)	3.71(0.68)	-5.76	.00**	0.51

Note. ** $p < .01$, * $p < .05$; Men $n = 186$, Women $n = 366$.

CHAPTER 9

Study 3: Replication of IPA Factor Structure: Confirmatory Factor Analysis, Psychometric Validation, and Longitudinal Investigation

Following the confirmed factor structure in Studies 1 and 2, I conducted further confirmatory factor analyses and assessment of convergent and divergent validity to replicate the factor structure and initial psychometric properties of the preliminary IPA in an independent sample (*RQ1*). In addition to replication and validation, I sought to investigate the test-retest reliability of the IPA, the stability of impostor phenomenon across the academic year, and the relations between impostor phenomenon and trait factors and psychological distress across time. I predicted that impostor phenomenon would demonstrate significant fluctuations over the course of the academic year (*H2;* i.e., heightened during periods of transition and examinations, reduced during holiday periods). In support of convergent validity of the new scale, I predicted that there would be a significant positive relation between the IPA and neuroticism and perfectionism, and a significant negative relation between the IPA and extraversion, agreeableness, conscientiousness, and self-esteem (*H3*). Further to this, I was interested in examining a predictive model of impostor phenomenon (*RQ4),* and between-subjects differences in demographic factors (*H5).* I also predicted significant positive and causal relation between impostor and psychological distress across time (*H6*), and that there would be a significant and positive relation with objective success (*H7*).

Participants and Procedure

Mirroring Studies 1 and 2, a sample of 785 undergraduate and graduate students consented to participate in an online questionnaire through the university participant pool and mass email recruitment. Eligible undergraduate student participants received course credit towards an

undergraduate psychology course. Participants collected from mass email recruitment did not receive compensation for their participation. Baseline data assessed demographic information, impostor phenomenon, personality, perfectionism, self-esteem, coping, psychological distress, and burnout, and were collected in September 2022. I removed data for 74 participants who consented to participate and did not complete any additional components of the study, and for 138 participants who completed less than 85% of the study. An additional 17 participants were removed due to inattentive responding (i.e., failing at least 50% of attention checks). Thus, the final sample for analyses consisted of 559 students.

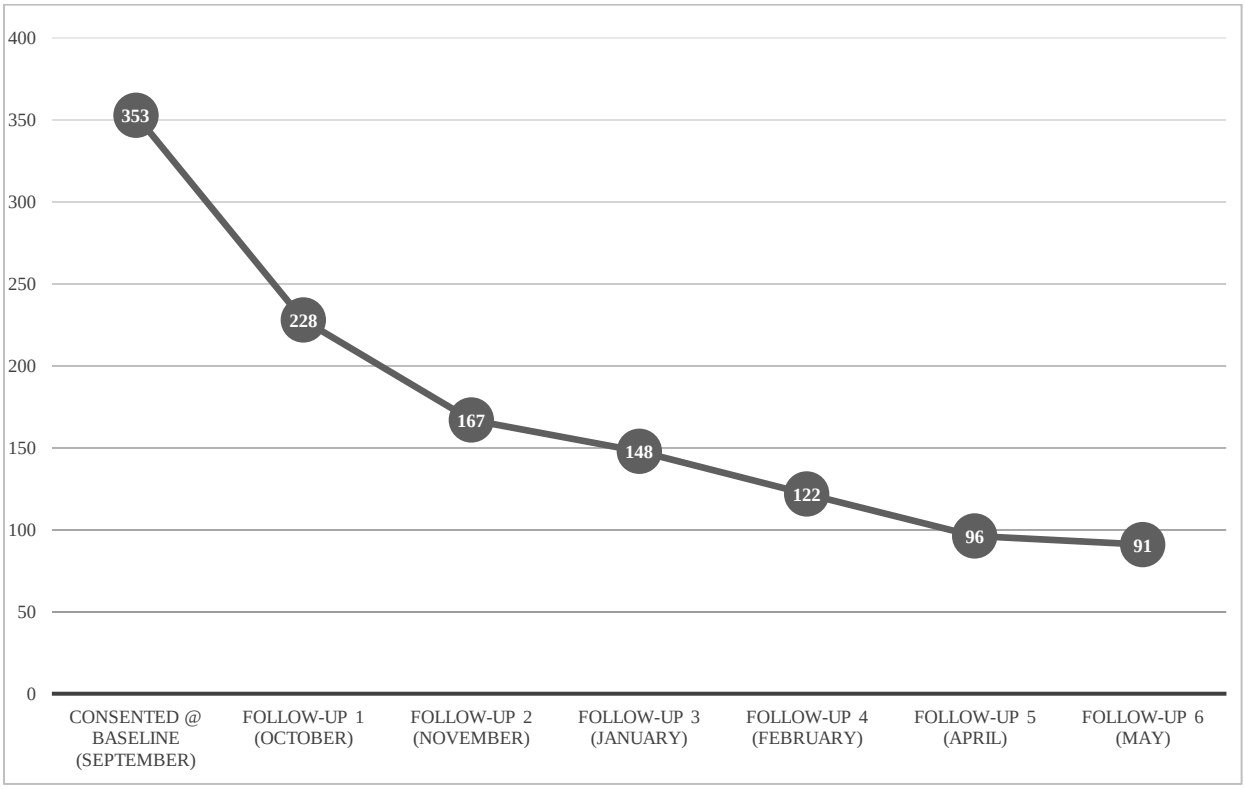
Participants' ages ranged from 17 to 69 years (M = 20.23, SD = 5.41), 69% of the final sample population self-identified as women (27% men, 4% trans/nonbinary), and participants represented a moderately diverse range of ethnic origins (45.0% Caucasian, 37.6% Asian, 8.1% Other, 6.6% Middle Eastern, 2.3% Black, 0.4% Indigenous). To assess objective academic success, I also asked participants to provide their approximate grade point average (GPA) in percentage at baseline (range = 60-100%, M = 85.84%, SD = 7.52%).

In addition to the initial questionnaire, participants were given the option to participate in a follow-up portion of the study consisting of six, monthly, follow-up questionnaires over the course of the academic year (i.e., October to May). Consenting participants (n = 353) provided their email addresses for follow-up and were contacted each month with a link to participate in the respective monthly questionnaire. Those who participated in each follow-up questionnaire were entered into a draw for a chance to win a $10 gift card (i.e., six draws for six gift cards). Additionally, those who participated in *all six* follow-up questionnaires were entered into a draw for a chance to win a $100 gift card. Each online follow-up questionnaire assessed impostor phenomenon, psychological distress, and burnout. Additionally, participants reported their GPA

at the end of the academic year (i.e., follow-up 6). Participation across the six follow-up timepoints is illustrated in Figure 5[2]. Forty-eight participants completed every follow-up questionnaire. Analysis of study attrition (missing data) using independent t-tests revealed that there were no significant differences in baseline impostor phenomenon between those who participated in all follow-up timepoints (n = 48; M = 3.82, SD = 0.83) and those who did not (n = 511; M = 3.66, SD = 0.80; t (557) = -1.34, p = .18).

Figure 5

Summary of Longitudinal Participation



[2] For further detail relating to follow-up timeline and participation, see Table J2 in Appendix J.

Measures

Impostor Phenomenon

Participants completed the updated 54-item Impostor Phenomenon Assessment (IPA), responding to items on a 6-point Likert scale, from 1 (Strongly Disagree) to 6 (Strongly Agree). I then calculated an overall mean impostor phenomenon score such that a higher overall score was indicative of higher levels of impostor phenomenon. In addition to the overall score, I calculated scores on each of the three individual subscales by obtaining the mean of items within the respective subscale (Doubts about Achievement, Perceived Discrepancy, and Self-Handicapping Behaviours). The IPA was administered at baseline and at each of the six follow-up timepoints. Cronbach's alpha reliability for each subscale and the overall scale are presented in Table 8.

Personality

To assess personality, I used the 10-item Big Five Inventory (BFI-10; Rammstedt & John, 2007). Participants responded to items on a 5-point Likert scale from 1 (*Disagree Strongly*) to 5 (*Agree Strongly*), representing extraversion (e.g., "*I see myself as someone who is outgoing, sociable),* agreeableness (e.g., "*I see myself as someone who is generally trusting")*, conscientiousness (e.g., "*I see myself as someone who does a thorough job"*), neuroticism (e.g., "*I see myself as someone who gets nervous easily")*, and openness (e.g., "*I see myself as someone who has an active imagination")*. Scores on each of the subscales were calculated by obtaining a sum of items on each respective subscale. Personality was only assessed at baseline.

Perfectionism

To assess perfectionism, I used the 16-item Big Three Perfectionism Scale - Short Form (BTPS-SF; Feher et al., 2019). Participants responded to items on a 5-point Likert scale from 1 (*Disagree Strongly*) to 5 (*Agree Strongly*). Three perfectionism factors were assessed by the

BTPS-SF: rigid perfectionism (e.g., "*My opinion of myself is tied to being perfect*"), self-critical perfectionism (e.g., "*I have doubts about everything I do*"), and narcissistic perfectionism (e.g., "*I know I am perfect*"). Scores on each individual subscale were calculated through obtaining the mean of scores. Perfectionism was only assessed at baseline.

Self-Esteem

To assess self-esteem, I used the 10-item Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), which is a 4-point Likert scale, from 1 (*Strongly Agree*) to 4 (*Strongly Disagree*). An example item includes "*I certainly feel useless at time*s." The total score for self-esteem was computed by obtaining the sum of all 10 items (including 5 reverse-scored items), such that a higher score on the scale represented higher self-esteem. Self-esteem was only assessed at baseline.

Psychological Distress

To measure psychological distress, I used the 21-item Depression, Anxiety, and Stress Scale (DASS-21; Lovibond & Lovibond, 1995), which uses a 4-point Likert scale, from 1 (*Did not apply to me at all*) to 4 (*Applied to me very much, or most of the time*)[3]. Participants responded to items comprising three subscales: depression (7 items; e.g., "*I couldn't seem to experience any positive feelings at all*"), anxiety (7 items; e.g., "*I experienced trembling*"), and stress (7 items; e.g., "*I found it hard to wind down*"). The total score for each subscale was computed by obtaining a sum of items on each of the three subscales, as well as an overall sum for psychological distress. The DASS-21 demonstrated good internal consistency across each subscale (Anxiety $\alpha = 0.83$, Depression $\alpha = 0.88$, Stress $\alpha = 0.82$), and for total Psychological

[3] In addition to Psychological Distress, I also assessed Positive and Negative Affect using the Positive and Negative Affect Schedule (Watson et al., 1988); however, this measure was excluded from analyses given the current interest in psychological distress beyond affect.

Distress (α = .93). Psychological distress was assessed at baseline, as well as across each of the six follow-up timepoints.

Burnout

To assess burnout, I adapted the 23-item Burnout Assessment Tool - Core Symptoms (BAT-C; Schaufeli et al., 2020) to reflect burnout in a student population. This scale uses a 5-point Likert scale ranging from 1 (*Never*) to 5 (*Always*), and assesses four subscales: emotional exhaustion (e.g., "*Everything I do at school requires a great deal of effort*"), mental distance (e.g., "*I feel indifferent about my academics*"), cognitive impairment (e.g., "*I'm forgetful and distracted at school*."), and emotional impairment (e.g., "*I do not recognize myself in the way I react emotionally at school*."). The total burnout score was calculated as a mean of all 23 items with higher scores indicating high levels of burnout. Internal consistency for the BAT-C was good (Exhaustion α = 0.91, Mental Distance α = 0.79, Cognitive Impairment α = 0.93, Emotional Impairment α = 0.84). According to Schaufeli et al. (2020), although the BAT-C consists of four subscales, these can be combined into a single burnout score, which also showed strong internal consistency (α = 0.94). Burnout was assessed at baseline, as well as across each of the six follow-up timepoints.

Coping

To assess coping, I used the Coping Inventory for Stressful Situations (CISS-21; Endler & Parker, 1994), which is a 21-item self-report scale that assesses coping strategies in response to different stressful situations. Participants responded to items on a 5-point Likert scale from 1 (*Not at All*) to 5 (*Very Much*), and indicated how much they engaged in activities associated with three different types of coping when encountering difficult situations: task-oriented coping (e.g., "*Focus on the problem and how I can solve it")*, emotion-oriented coping (e.g., "*Feel anxious*

about not being able to cope"), and avoidance-oriented coping (e.g., *"Take some time off and get away from the situation")*. Total scores for each subscale were computed through obtaining a sum of the items on each of the three subscales. Coping was only assessed at baseline.

Study 3 Results

Descriptive statistics and Cronbach's alpha reliabilities for all study variables at baseline and across time are presented in Tables 8 and 9. Internal consistency reliabilities for the IPA Total and its three subscales were excellent (see Table 8).

Table 8

Cronbach Alpha Reliability for Scales at Baseline and Follow-Up

Variable	Timepoint						
	Baseline (*n* = 559)	**F1 (*n* = 199)**	**F2 (*n* = 128)**	**F3 (*n* = 109)**	**F4 (*n* = 98)**	**F5 (*n* = 78)**	**F6 (*n* = 78)**
Self-Esteem	.88	-	-	-	-	-	-
Extraversion	.69	-	-	-	-	-	-
Agreeableness	.32	-	-	-	-	-	-
Conscientiousness	.46	-	-	-	-	-	-
Neuroticism	.62	-	-	-	-	-	-
Openness	.24	-	-	-	-	-	-
Rigid Perfectionism	.83	-	-	-	-	-	-
Narcissistic Perfectionism	.73	-	-	-	-	-	-
Self-Critical Perfectionism	.83	-	-	-	-	-	-
Task-Oriented Coping	.85	-	-	-	-	-	-
Avoidance-Oriented Coping	.76	-	-	-	-	-	-
Emotion-Oriented Coping	.84	-	-	-	-	-	-
Depression	.88	.91	.92	.91	.92	.93	.90
Anxiety	.83	.86	.87	.85	.82	.87	.88
Stress	.82	.86	.89	.88	.84	.92	.90
Total Psychological Distress	.93	.94	.95	.94	.93	.95	.95
Exhaustion	.91	.93	.92	.95	.93	.94	.95
Mental Distance	.79	.83	.78	.81	.82	.83	.86
Cognitive Impairment	.93	.92	.93	.95	.93	.94	.93
Emotional Impairment	.84	.88	.86	.89	.87	.85	.88
Total Burnout	.94	.95	.95	.97	.96	.96	.96
Perceived Discrepancy	.93	.94	.95	.95	.95	.95	.93
Doubts about Achievement	.93	.95	.95	.95	.96	.97	.96
Self-Handicapping Behaviours	.82	.80	.83	.85	.85	.83	.80
Total Impostor Phenomenon	.96	.96	.97	.97	.97	.98	.97

Note. A dash indicates that this measure was not assessed at this timepoint.

Table 9

Means and Standard Deviations for Baseline and Follow-Up

Variable	Timepoint						
	Baseline (*n* = 559)	**F1 (*n* = 199)**	**F2 (*n* = 128)**	**F3 (*n* = 109)**	**F4 (*n* = 98)**	**F5 (*n* = 78)**	**F6 (*n* = 78)**
Self-Esteem	26.56(5.52)	-	-	-	-	-	-
Extraversion	2.97(1.12)	-	-	-	-	-	-
Agreeableness	3.52(0.91)	-	-	-	-	-	-
Conscientiousness	3.52(0.88)	-	-	-	-	-	-
Neuroticism	3.70(1.06)	-	-	-	-	-	-
Openness	3.50(0.93)	-	-	-	-	-	-
Rigid Perfectionism	3.12(1.00)	-	-	-	-	-	-
Narcissistic Perfectionism	2.09(0.70)	-	-	-	-	-	-
Self-Critical Perfectionism	3.49(0.82)	-	-	-	-	-	-
Task-Oriented Coping	24.56(5.50)	-	-	-	-	-	-
Avoidance-Oriented Coping	21.05(6.05)	-	-	-	-	-	-
Emotion-Oriented Coping	23.50(6.29)	-	-	-	-	-	-
Depression	13.50(5.03)	15.22(5.48)	15.93(5.80)	14.12(5.47)	15.25(5.65)	15.17(6.03)	13.64(5.28)
Anxiety	13.53(4.88)	13.99(5.07)	13.48(5.03)	11.55(4.39)	12.78(4.39)	13.09(4.88)	11.78(4.64)
Stress	15.42(4.75)	16.55(4.97)	16.82(5.21)	14.41(5.23)	15.79(4.88)	15.90(5.70	14.78(5.21)
Total Psychological Distress	42.44(12.90)	45.77(13.70)	46.23(14.42)	40.08(13.62)	43.83(12.97)	44.15(14.50)	40.19(13.54)
Exhaustion	3.34(0.90)	3.44(0.96)	3.35(0.89)	3.16(1.10)	3.30(0.97)	3.24(1.02)	2.94(1.08)
Mental Distance	2.63(0.84)	2.72(0.90)	2.79(0.83)	2.64(0.90)	2.77(0.94)	2.72(0.91)	2.47(0.97)
Cognitive Impairment	2.89(0.96)	3.02(0.93)	3.06(0.92)	2.82(1.08)	3.08(0.95)	2.80(0.96)	2.71(0.99)
Emotional Impairment	2.35(0.90)	2.20(0.90)	2.20(0.86)	2.22(0.94)	2.12(0.87)	2.13(0.86)	2.11(0.86)
Total Burnout	2.87(0.75)	2.92(0.79)	2.92(0.75)	2.77(0.91)	2.89(0.81)	2.79(0.84)	2.61(0.86)
Perceived Discrepancy	3.03(0.95)	3.21(0.99)	3.27(1.03)	3.14(1.03)	3.23(1.02)	3.27(1.03)	3.30(0.92)
Doubts about Achievement	4.15(0.85)	4.17(0.90)	4.20(0.93)	4.14(0.93)	4.19(1.02)	4.10(1.12)	4.27(0.97)
Self-Handicapping Behaviours	3.67(1.08)	4.04(1.03)	4.09(1.08)	4.02(1.12)	4.04(1.17)	4.01(1.07)	3.96(1.05)
Total Impostor Phenomenon	3.67(0.80)	3.78(0.86)	3.83(0.88)	3.75(0.90)	3.79(0.94)	3.74(1.05)	3.86(0.87)

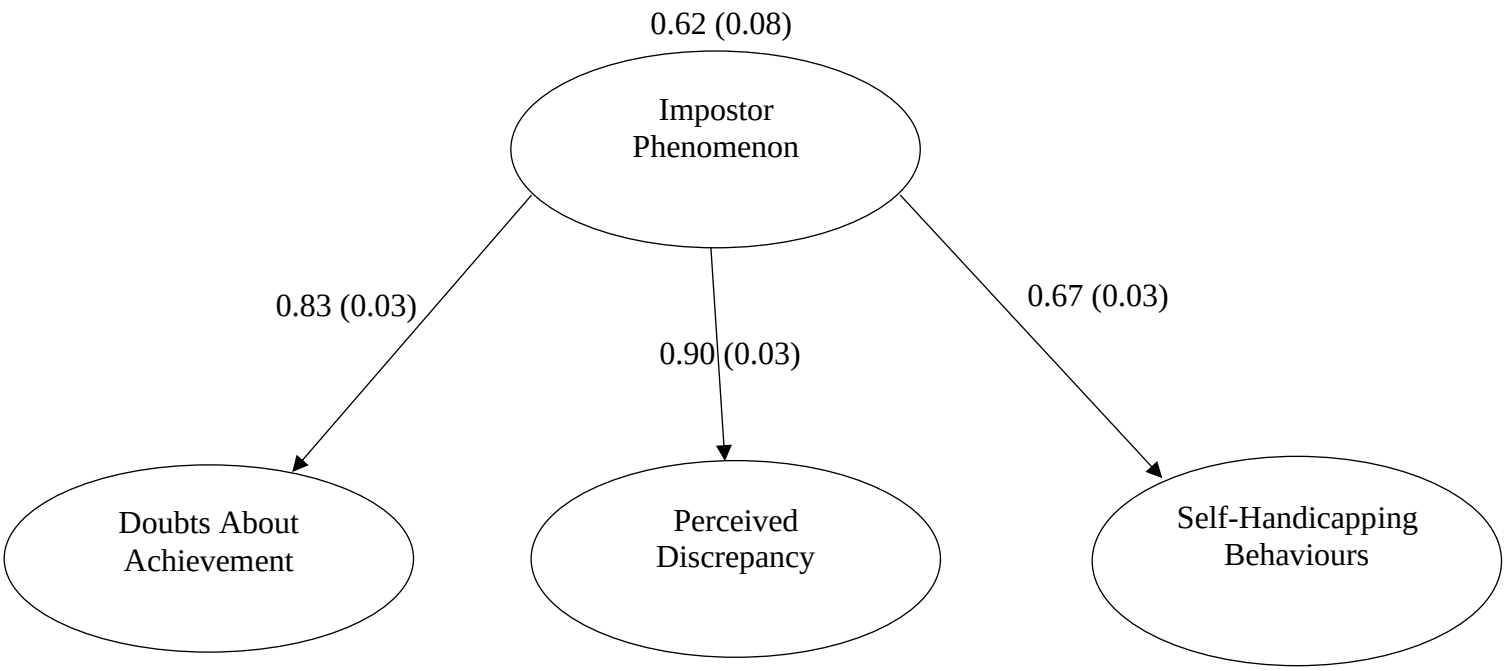
Note. A dash indicates that this measure was not assessed at this timepoint.

Confirmatory Factor Analysis

To assess the factor structure of the IPA, I conducted confirmatory factor analysis and structural equation modeling using Mplus version 8 (Muthén & Muthén, 1998-2010). The fit statistics supported a three-factor model ($\chi^2(1374) = 5178.61$, $p < .001$; Figure 6). Findings suggested adequate fit per the root-mean-square error of approximation (RMSEA = 0.08, 90% CI [0.068, 0.072], $p < .001$), and the standardized root-mean-square residual (SRMR = 0.08; Hu & Bentler, 1999; MacCallum et al., 1996; Wheaton et al., 1977). Some fit statistics suggested less than adequate fit (TLI = 0.74, CFI = 0.75). All loadings were significant at the $p < .01$ level. The factor structure accounted for 45.04% of the total variance.

Figure 6

Model Fit for IPA Based on Confirmatory Factor Analysis – Study 3



Impostor Phenomenon Across Time

In addition to baseline validation, I conducted longitudinal analyses using data collected at baseline and across six follow-up timepoints to further examine the test-retest reliability of the IPA and to assess relations with impostor phenomenon across time. Correlations across time for total IPA scores were statistically significant, demonstrating excellent test-retest reliability across the academic year (Table 10).

Table 10

Bivariate Correlation Matrix for Total Impostor Phenomenon across Time

Variable	Baseline IPA (*n* = 559)	F1 IPA (*n* = 199)	F2 IPA (*n* = 128)	F3 IPA (*n* = 109)	F4 IPA (*n* = 98)	F5 IPA (*n* = 78)	F6 IPA (*n* = 78)
1. Baseline IPA	-						
2. Follow-up 1 IPA	.87**	-					
3. Follow-up 2 IPA	.82**	.91**	-				
4. Follow-up 3 IPA	.83**	.92**	.92**	-			
5. Follow-up 4 IPA	.81**	.87**	.90**	.92**	-		
6. Follow-up 5 IPA	.84**	.85**	.83**	.90**	.91**	-	
7. Follow-up 6 IPA	.80**	.88**	.88**	.91**	.89**	.89**	-

Note. ** $p < .01$; 2-tailed test.

Repeated Measures ANOVA

Using the sample of participants who completed *all* follow-up questionnaires ($n = 48$), I assessed the stability of IPA across time (i.e., baseline and the six follow-up timepoints), by conducting a repeated measures (within-subjects) ANOVA. The repeated measures ANOVA with a Greenhouse-Geisser correction determined that there were no significant within-subjects differences for impostor phenomenon across time (F (4.126, 193.95) = 0.83, $p = .51$). These findings suggested that impostor phenomenon was stable across the academic year and did not demonstrate significant in-person variations.

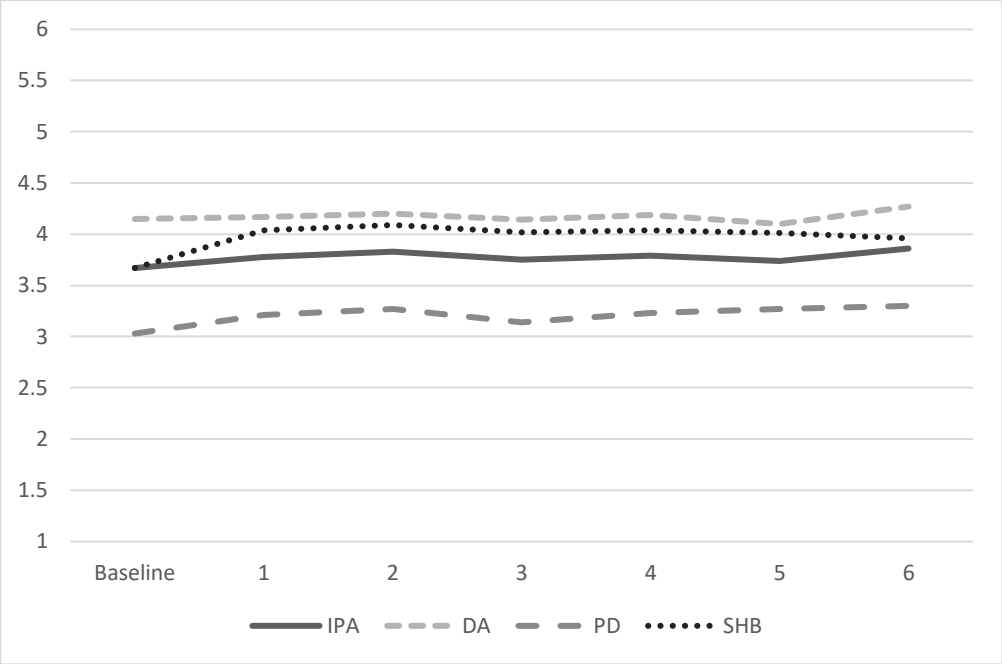
Growth Modelling

To further assess the rate of change in impostor phenomenon over time using all available data (i.e., including those who completed some but not necessarily *all* follow-up questionnaires), I conducted a Growth Model analysis using SPSS Version 26.0 (IBM Corp., 2019) mixed modelling, with total impostor phenomenon as the outcome variable, and time as the predictor/growth variable. Growth models are multilevel models in which changes in an outcome over time (i.e., impostor phenomenon) are modelled using potential growth patterns (Field, 2009). All participants can be included within the analyses when multilevel modeling is used (vs. only 48 participants who completed *all* data in multivariate analyses), thus increasing statistical power given the larger sample size. A larger number of timepoints and participants increases statistical power to enable the detection of higher-level predictors and cross-level interaction effects between within- and between-subjects predictors (Kwok et al., 2008).

Using an autoregressive covariance structure, assuming heterogeneous variances and using a maximum likelihood estimation, results showed that a linear growth trend for impostor phenomenon was not significant across time (F (1, 121.60) = 0.53, p = .47, AIC = 2023.34; Figure 7). However, there was evidence of significant variance at the intercept (Wald Z = 14.71, p < .01) and slopes across individuals (Wald Z = 3.82, p <.01), suggesting the presence of between-subjects variance across time. The covariance parameter between the baseline impostor phenomenon intercept and growth rate was not significantly different from zero (Wald Z = 1.93, p = .05). These findings are contrary to my hypothesis that there would be significant within-subjects differences in trajectories for impostor phenomenon across the academic year (*H2*), and that these trajectories would also vary based on demographic variables (*H3).*

Figure 7

Mean Impostor Phenomenon and Subscales Across Time



Trait Variables and Impostor Phenomenon

Bivariate correlations for trait variables are presented in Table 11. As predicted, total impostor phenomenon was significantly negatively associated with self-esteem, suggesting that those who reported lower self-esteem also reported higher impostor phenomenon (*H1a)*. Additionally, in line with my hypotheses *(H1b, H1c),* impostor phenomenon was significantly positively associated with neuroticism and measures of perfectionism (rigid, self-critical, and narcissistic), and significantly negatively associated with extraversion, agreeableness, and conscientiousness. Impostor phenomenon was not significantly related to openness. These correlations between impostor phenomenon and trait variables were consistent with previous literature (Bernard et al., 2002; Casselman, 1991; Chae et al., 1995; Lester & Moderski, 1995; Ross et al., 2001), and support the convergent and divergent validity of the novel IPA measure.

Table 11

Bivariate Correlation Matrix for Baseline IPA and Trait Measures

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Doubts about Achievement	-												
2. Perceived Discrepancy	.65**	-											
3. Self-Handicapping Behaviours	.52**	.59**	-										
4. Total IPA	.91**	.90**	.71**	-									
5. Extraversion	-.21**	-.19**	-.18**	-.23**	-								
6. Agreeableness	-.14**	-.16**	-.19**	-.18**	.07	-							
7.Conscientiousness	-.06	-.30**	-.47**	-.25**	.07	.06	-						
8. Neuroticism	.45**	.22**	.29**	.39**	-.21	-.10*	.03	-					
9. Openness	.00	.01	.08	.02	.01	.02	.04	.05	-				
10. Rigid Perfectionism	.36**	.22**	.13**	.31**	-.02	-.14**	.16**	.21**	-.03	-			
11. Self-critical Perfectionism	.70**	.49**	.42**	.66**	-.18**	-.14**	-.04	.46**	-.02	.55**	-		
12. Narcissistic Perfectionism	.03	.19**	.08*	.12**	.05	-.35**	-.05	-.00	-.06	.46**	.18**	-	
13. Self-esteem	-.64**	-.64**	-.58**	-.72**	.28**	.16**	.25**	-.39**	.05	-.23**	-.60**	-.01	-

Note. ** $p < .01$; * $p < .05$.

Trait Predictors of Impostor Phenomenon

To assess a predictor model of impostor phenomenon using trait variables (*RQ6*), I began by assessing whether self-esteem predicted impostor phenomenon across time when controlling for personality variables. I conducted a linear regression with self-esteem and personality variables as the independent variables, and impostor phenomenon across time as the dependent variable. Results revealed a significant model (R^2=.47, F (6,1248) = 186.23, p <.01) whereby self-esteem (β = -.09, t = -24.87, p < .01) and agreeableness (β = -.12, t = -6.22, p < .01) were significant negative predictors, and neuroticism (β = .11, t = 5.87, p < .01) was a significant positive predictor of impostor phenomenon across time.

To further assess trait predictors of impostor phenomenon across time including perfectionism, I conducted a forward stepwise linear regression analysis using self-esteem, personality (extraversion, agreeableness, openness, conscientiousness, and neuroticism), and perfectionism (rigid, narcissistic, and self-critical) as predictors and impostor phenomenon across time as the dependent variable. Results suggested that the best fitting model was Model 6 (R^2 = .54, F (6,1248) = 238.31, p <.01), which included self-esteem, self-critical perfectionism, agreeableness, conscientiousness, neuroticism, and rigid perfectionism (Table 12).

Between-Subjects Differences in Demographic Variables

To first assess for gender differences at baseline, I conducted an independent samples t-test. Like Study 2, results suggested significant differences between women and men on overall IPA and Doubts about Achievement; however, contrasting Study 2, no significant differences emerged for Perceived Discrepancy (approaching significance at .05 level) and Self-Handicapping Behaviours (Table 13).

Table 12

Model Findings for Stepwise Linear Regression Analyses

	Predictors	*B*	R^2	*F*	f^2
Model 1			.44	985.12	0.79
	Self-esteem	-.10			
Model 2			.51	656.70	1.05
	Self-esteem	-.07			
	Self-critical perfectionism	.36			
Model 3			.53	460.38	1.13
	Self-esteem	-.07			
	Self-critical Perfectionism	.35			
	Agreeableness	-.10			
Model 4			.53	350.08	1.13
	Self-esteem	-.06			
	Self-critical Perfectionism	.36			
	Agreeableness	-.10			
	Conscientiousness	-.06			
Model 5			.53	284.39	1.13
	Self-esteem	-.06			
	Self-critical Perfectionism	.34			
	Agreeableness	-.10			
	Conscientiousness	-.07			
	Neuroticism	.06			
Model 6			.54	238.31	1.74
	Self-esteem	-.06			
	Self-critical Perfectionism	.31			
	Agreeableness	-.10			
	Conscientiousness	-.07			
	Neuroticism	.06			
	Rigid Perfectionism	.04			

Note. Outcome variable is Total Impostor Phenomenon. R^2 represents the proportion of the variance of IPA that is explained by the variables in the regression model. f^2 represents effect size for regression analyses. All included predictors were significant at $p < .01$, with exception of rigid perfectionism, which was significant at $p < .05$.

To further examine between-subjects differences in demographic variables across time, I used all available longitudinal data (i.e., univariate multilevel structured dataset), and conducted a series of between-subjects ANOVAs and mixed models with impostor phenomenon across time as the outcome variable using SPSS Version 26.0 (IBM Corp., 2019). Given evidence from growth models suggest between-subjects variance across individuals, I predicted that these differences would be partially explained by demographic variables (*H5)*. Supporting my hypotheses, results indicated that there were significant differences in impostor phenomenon between groups for gender (*H5a; F (*2, 1248) = 26.19, $p < .01$), and academic year (*H5e; F* (4, 1242) = 11.73, $p < .01$)[4]. Contrary to my hypotheses, there were no significant differences in impostor phenomenon between groups based on ethnicity (*H5b; F* (5,1241) = 2.05, $p = .07$), age (*H5c; F* (3, 1165) = 1.65, $p = .18$), degree (*H5d; F* (1,1223) = 0.00, $p = .95$), or program (*H5f; F* (4, 1248) = 2.44, $p = 0.05$) across the academic year.

Table 13

Baseline Differences Between Genders on IPA

	Men M(SD)	**Women M(SD)**	***t***	***p***	***d***
Doubts About Achievement	3.74(0.90)	4.30(0.76)	-7.20	.00**	0.67
Perceived Discrepancy	2.88(0.93)	3.06(0.95)	-1.95	.05	0.19
Self-Handicapping Behaviours	3.68(1.03)	3.65(1.09)	0.33	.74	0.03
Total IPA	3.42(0.82)	3.75(0.76)	-4.53	.00**	0.42

Note - ** $p < .01$; Men $n = 151$, Women $n = 387$.

[4] There were no significant differences in growth rates relating to gender ($\beta = 0.01$, $p = .61$) or academic year ($\beta = -.00$, $p = .76$).

Table 14

Post-Hoc Multiple Comparisons for Gender

Comparison					95% CI	
Group (A)	**Group (B)**	**Mean Difference (A-B)**	***SE***	***p***	**Lower**	**Upper**
Men	Women	-0.34**	0.06	.00	-0.48	-0.21
	Trans/nonbinary	-0.65**	0.11	.00	-0.91	-0.39
Women	Men	0.34**	0.06	.00	0.21	0.48
	Trans/nonbinary	-0.31**	0.10	.01	-0.55	-0.06
Trans/nonbinary	Men	0.65**	0.11	.00	0.39	0.91
	Trans/nonbinary	0.31**	0.10	.01	0.06	0.55

Note. ** $p < .01$. Tukey (HSD); Dependent variable: Total impostor phenomenon.

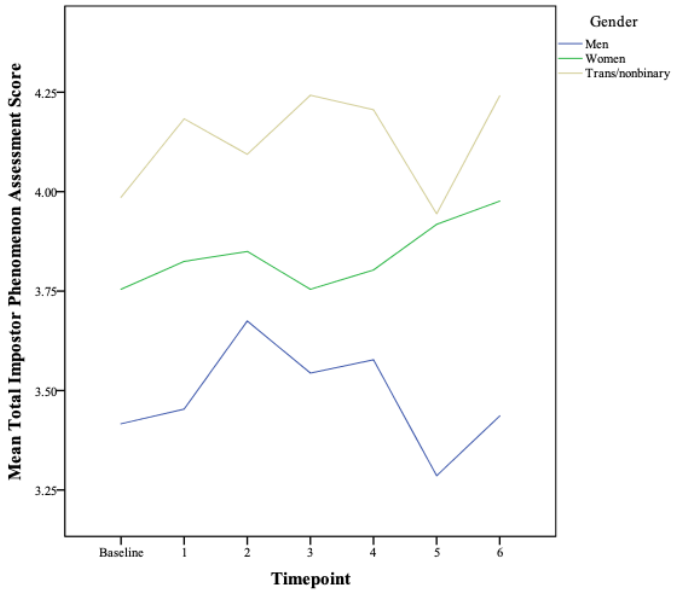
Gender

Post-hoc analyses showed that men experienced significantly lower levels of impostor phenomenon ($M = 3.46$, $SD = 0.95$) compared to women ($M = 3.80$, $SD = 0.81$) and to those who identified as trans/nonbinary ($M = 4.11$, $SD = 0.95$; Table 14). Those who identified as trans/nonbinary experienced significantly higher levels impostor phenomenon compared to other groups (Figure 8)[5].

[5] It is notable that the sample size for those identifying as other than man or woman was small (3.8% of sample).

Figure 8

Mean Impostor Phenomenon by Gender Across Time



Academic Year

To conduct follow-up tests for academic year, I separated analyses by undergraduate and graduate degree. For undergraduate students, results of one-way ANOVA revealed that there were significant differences in impostor phenomenon between academic years (F (4, 983) = 13.45, $p < .01$; Figure 9). Post-hoc analyses suggested that those in their third year undergraduate degree reported significantly lower levels of impostor phenomenon compared to all other years (Table 15). For graduate students, results showed significant differences for impostor phenomenon between academic years (F (4, 233) = 5.08, $p < .01$). Post-hoc analyses revealed that significant differences were primarily identified for fourth year graduate students (Table 16), whereby those in their fourth year graduate degree showed significantly higher levels of impostor phenomenon (M = 4.81, SD = 0.35), compared to other years (Figure 10).

Table 15

Post-Hoc Multiple Comparisons for Undergraduate Academic Year

Comparison					95% CI	
Group (A)	**Group (B)**	**Mean Difference (A-B)**	***SE***	***p***	**Lower**	**Upper**
1st Year	2nd Year	-0.33**	0.09	.00	-0.56	-0.09
	3rd Year	0.40**	0.08	.00	0.18	0.62
	4th Year	-0.17	0.09	.30	-0.40	0.07
	5th Year+	-0.43	0.24	.38	-1.09	0.23
2nd Year	1st Year	0.33**	0.09	.00	0.09	0.56
	3rd Year	0.72**	0.11	.00	0.43	1.02
	4th Year	0.16	0.11	.60	-0.15	0.46
	5th Year+	-0.11	0.25	.99	-0.80	0.58
3rd Year	1st Year	-0.40**	0.08	.00	-0.62	-0.18
	2ndYear	-0.72**	0.11	.00	-1.02	-0.43
	4th Year	-0.56**	0.11	.00	-0.86	-0.27
	5th Year	-0.83**	0.25	.01	-1.52	-0.15
4th Year	1st Year	0.17	0.09	.30	-0.07	0.40
	2nd Year	-0.16	0.11	.60	-0.47	0.15
	3rd Year	0.56**	0.11	.00	0.27	0.86
	5th Year+	-0.27	0.25	.83	-0.96	0.42
5th Year+	1st Year	0.43	0.24	.38	-0.23	1.09
	2nd Year	0.11	0.25	.99	-0.58	0.80
	3rdYear	0.83**	0.25	.01	0.15	1.52
	4th Year	0.27	0.25	.83	-0.42	0.96

Note. ** $p < .01$. Tukey (HSD); Dependent variable: Total impostor phenomenon.

Figure 9

Mean Impostor Phenomenon by Undergraduate Academic Year Across Time

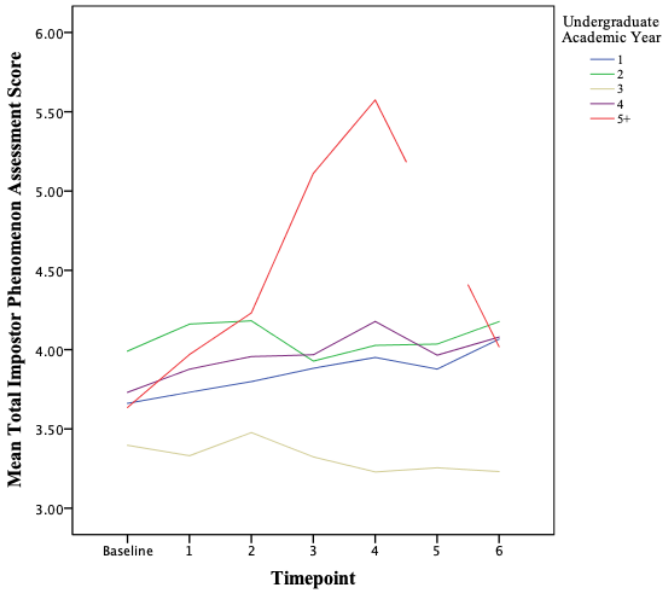


Table 16

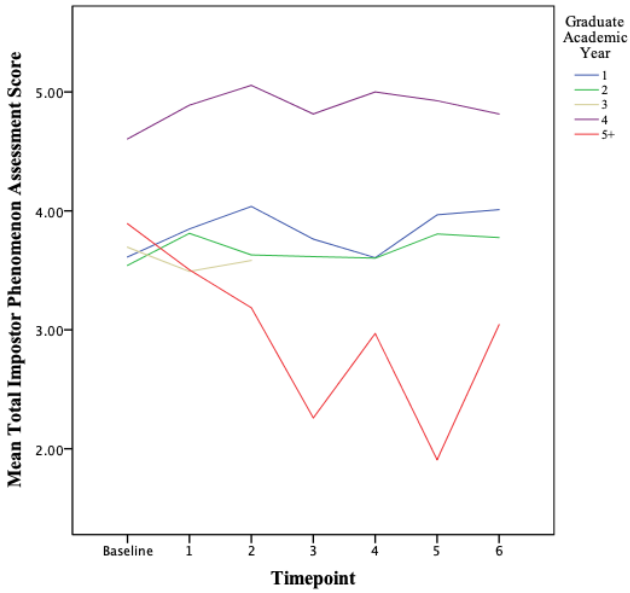
Post-Hoc Multiple Comparisons for Graduate Academic Year

Comparison					95% CI	
Group (A)	**Group (B)**	**Mean Difference (A-B)**	***SE***	***p***	**Lower**	**Upper**
1st Year	2nd Year	0.11	0.01	.92	- 0.25	0.47
	3rd Year	0.17	0.33	1.00	-0.74	1.07
	4th Year	-1.03**	0.31	.01	-1.88	-0.17
	5th Year+	0.54	0.21	.08	-0.04	1.11
2nd Year	1st Year	-0.11	0.13	.92	-0.47	0.25
	3rd Year	0.06	0.33	1.00	-0.86	0.97
	4th Year	-1.14**	0.32	.00	-2.01	-0.27
	5th Year+	0.43	0.22	.28	-0.17	1.02
3rd Year	1st Year	-0.17	0.33	.99	-1.07	0.74
	2ndYear	-0.06	0.33	1.00	-0.97	0.86
	4th Year	-1.20	0.44	.05	-2.40	0.00
	5th Year	0.37	0.37	.86	-0.65	1.39
4th Year	1st Year	1.03**	0.31	.01	0.17	1.88
	2nd Year	1.14**	0.32	.00	0.27	2.01
	3rd Year	1.20*	0.44	.05	-0.00	2.40
	5th Year+	1.57**	0.04	.00	0.59	2.55
5th Year+	1st Year	-0.54	0.21	.08	-1.11	0.04
	2nd Year	-0.43	0.21	.28	-1.02	0.17
	3rdYear	-0.37	0.37	.86	-1.39	0.65
	4th Year	-1.57**	0.36	.00	-2.55	-0.59

Note. ** $p < .01$, * $p < .05$. Tukey (HSD); Dependent variable: Total impostor phenomenon.

Figure 10

Mean Impostor Phenomenon by Graduate Academic Year Across Time



Psychological Distress and Impostor Phenomenon

Bivariate correlations for impostor phenomenon and measures of psychological distress, burnout, and coping are presented in Table 17. As predicted, total impostor phenomenon was significantly and positively associated with psychological distress and burnout. Additionally, impostor phenomenon was significantly and positively correlated with emotion-oriented coping and negatively correlated with task-coping. Impostor phenomenon was not significantly related to avoidance coping.

Repeated measures ANOVA with a Greenhouse-Geisser correction determined that there were significant within-subjects differences for psychological distress across time (F (4.08, 543.11) = 6.05, p < .001). Post-hoc Bonferroni analyses revealed that participants reported significantly reduced distress at follow-up 3 compared to follow-ups 1, 2, and 4 (p = .01, .00, .02). This is possible given that data collection for follow-up 3 occurred near to participants'

"Reading Week". It was also notable that participants also reported significantly reduced distress at follow-up 6 compared to follow-ups 2 and 5 (p = .00, .04). Given that follow-up 6 was the final questionnaire and was collected after the end of the academic term, this finding is in line with a reduction in distress after the academic term has been fully completed.

To assess the relation between impostor phenomenon and psychological distress across time (*H6)*, I first conducted bivariate correlations for psychological distress and impostor phenomenon for each time point (Table 18). Then, to examine the directionality of the relation between psychological distress and impostor phenomenon across time, I conducted a cross-lagged panel analysis using Mplus version 8 (Muthén & Muthén, 1998-2010). The overall fit of the initial measurement model was acceptable (χ^2 (30) = 33.07, p = .32, RMSEA = 0.01, 90% CI [0.00, 0.04], CFI = 0.998, TLI = 0.995). Results suggested that the cross-lagged effect of psychological distress on impostor phenomenon across time was not significant (with exception, psychological distress at follow-up 5 predicted impostor phenomenon at follow-up 6). However, the results suggested a causal effect of impostor phenomenon on psychological distress, whereby impostor phenomenon at baseline significantly predicted psychological distress at time 1, impostor phenomenon at follow-up 2 significantly predicted psychological distress at follow-up 3, and impostor phenomenon at follow-up 3 significantly predicted psychological distress at follow-up 4. Although there were no significant cross-lagged effects of impostor phenomenon on psychological distress between follow-up 1 and 2, 4 and 5, or 5 and 6, these findings provide partial support for my hypothesis that impostor phenomenon would predict psychological distress (vs. psychological distress predicting impostor phenomenon). Findings of the cross-lagged analysis are presented in Figure 11.

Table 17

Bivariate Correlation Matrix for Baseline IPA and Psychological Distress and Coping Measures

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. Doubts About Achievement	-											
2. Perceived Discrepancy	.65**	-										
3. Self-Handicapping Behaviours	.52**	.59**	-									
4. Total Impostor Phenomenon	.91**	.89**	.71**	-								
5. Stress	.48**	.34**	.31**	.46**	-							
6. Anxiety	.43**	.41**	.35**	.47**	.71**	-						
7. Depression	.43**	.47**	.49**	.52**	.65**	.63**	-					
8. Total Psychological Distress	.50**	.46**	.44**	.55**	.89**	.86**	.87**	-				
9. Burnout	.48**	.48**	.49**	.55**	.55**	.56**	.60**	.65**	-			
10. Emotion Coping	.61**	.51**	.45**	.63**	.56**	.51**	.51**	.60**	.55**	-		
11. Task Coping	-.19**	-.21**	-.34**	-.25**	-.19**	-.15**	-.28**	-.24**	-.29**	-.27**	-	
12. Avoidance Coping	-.01	-.03	.06	-.03	.01	.07	-.09*	-.00	.06	-.04	.24**	-

Note. ** $p < .01$, * $p < .05$; 2-tailed test.

Table 18

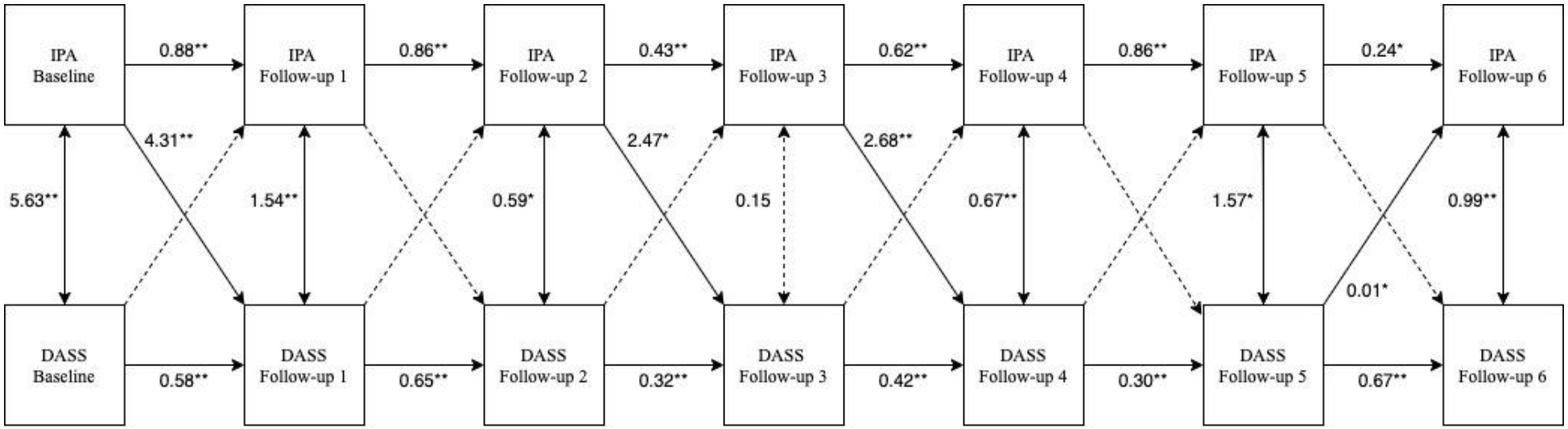
Bivariate Correlations for Impostor Phenomenon and Psychological Distress Across Time

Variable	Baseline IPA	Follow-up 1 IPA	Follow-up 2 IPA	Follow-up 3 IPA	Follow-up 4 IPA	Follow-up 5 IPA	Follow-up 6 IPA
Baseline DASS	.55**	.55**	.54**	.48**	.52**	.55**	.54**
Follow-up 1 DASS	.59**	.64**	.57**	.57**	.52**	.49**	.59**
Follow-up 2 DASS	.56**	.58**	.57**	.53**	.52**	.54**	.59**
Follow-up 3 DASS	.49**	.57**	.61**	.56**	.54**	.50**	.56**
Follow-up 4 DASS	.60**	.62**	.66**	.68**	.66**	.65**	.70**
Follow-up 5 DASS	.53**	.48**	.50**	.53**	.56**	.60**	.57**
Follow-up 6 DASS	.31**	.32**	.38**	.33**	.50**	.35**	.48**

Note. ** $p < .01$; 2-tailed test; DASS = Psychological Distress; Baseline DASS $n = 559$, Follow-up 1 DASS $n = 188$, Follow-up 2 DASS $n = 120$, Follow-up 3 DASS $n = 104$, Follow-up 4 DASS $n = 93$, Follow-up 5 DASS $n = 71$, Follow-up 6 DASS $n = 76$.

Figure 11

Cross-Lagged Analysis of the Relation Between Impostor Phenomenon and Psychological Distress



Note. ***p* < .01, * *p* < .05**;** Dotted lines represent non-significant paths.

Objective Academic Success and Impostor Phenomenon

To explore the relation between baseline objective academic success (GPA) and impostor phenomenon, I conducted a Pearson Correlation analysis. Findings suggested that there were no significant relations between GPA and Total Impostor Phenomenon (r = -0.04, p = .35), Doubts about Achievement (r = .02, p = .69), or Perceived Discrepancy (r = -.06, p = .17). However, findings did show a significant negative relation between GPA and Self-Handicapping Behaviours, suggesting that those who reported engaging in more self-handicapping behaviours also reported lower GPA (r = -.14, p < .01).

To assess whether reported GPA at the beginning of the year (i.e., baseline) predicted impostor phenomenon across the academic year (*H7*), I conducted a linear regression analysis. Although baseline correlations suggested that GPA was not significantly associated with IPA (with exception, Self-Handicapping Behaviours), longitudinal results showed that GPA significantly and negatively predicted impostor phenomenon across time (R^2 = .01, F (1,1175) = 8.45, p < .01). Contrary to my hypothesis, post-hoc analyses revealed that those who reported the lowest GPA at the beginning of the year experienced the highest levels of impostor phenomenon across time (M = 4.61, SD = 0.51; Table 19). Interestingly, levels of impostor phenomenon for those between 70-79% and 80-89% were nearly identical. Given that many participants had not yet received grades at the baseline assessment (i.e., reported based on high school averages), I also examined differences based on reported GPA at the end of the year.

Table 19

Post Hoc Multiple Comparisons for GPA at Start of Year

Comparison					95% CI	
Group (A)	**Group (B)**	**Mean Difference (A-B)**	***SE***	***p***	**Lower**	**Upper**
60-69%	70-79%	0.82*	0.27	.01	0.13	1.51
	80-89%	0.82*	0.26	.01	0.14	1.50
	90-100%	0.94**	0.26	.00	0.26	1.62
70-79%	60-69%	-0.82*	0.27	.01	-1.51	-0.13
	80-89%	0.00	0.07	1.00	-0.19	0.19
	90-100%	0.12	0.08	.36	-0.07	0.32
80-89%	60-69%	-0.82	0.26	.01	-1.51	-0.14
	70-79%	-0.00	0.07	1.00	-0.19	0.19
	90-100%	0.12	0.06	.14	-0.02	0.26
90-100%	60-69%	-0.94**	0.26	.00	-1.62	-0.26
	70-79%	-0.12	0.08	.36	-0.32	0.07
	80-89%	-0.12	0.06	.14	-0.26	0.02

Note. ** $p < .01$, * $p < .05$ Tukey (HSD); Dependent variable: Total impostor phenomenon.

To assess whether impostor phenomenon would differ across groups based on reported GPA at the *end* of the year (i.e., a more accurate representation of university GPA in the current sample; *H7*), I conducted a one-way ANOVA. Results showed that impostor phenomenon across time significantly differed across groups based on reported GPA at the end of the year (F (3, 479) = 5.58, $p < .01$). Contrary to my hypotheses (*H7*), post-hoc analyses revealed that those who reported the highest GPA (i.e., between 90-100) experienced significantly lower impostor phenomenon (M = 3.62, SD = 1.11; Table 20) compared to those within the 70-89 range.

Notably, results of mixed linear modelling showed that there was a significant interaction between time and reported GPA at the end of term on impostor phenomenon (F (1, 403.78) = 14.32, β = -0.03, $p < .01$). These findings were particularly observable for those who reported the lowest GPA at the end of the year (Figure 12). It is possible that this maps onto objective experiences of a lack of academic success (i.e., failure), rather than the subjective experience of

impostor phenomenon (i.e., where there is objective evidence to suggest). In contrast, those with GPA falling between 70-89 reported significantly higher impostor phenomenon compared to those with the highest GPA (90-100). One could suggest that the perceptions of these individuals, who are otherwise achieving average grades, leads to greater perceived feelings of being an impostor.

Table 20

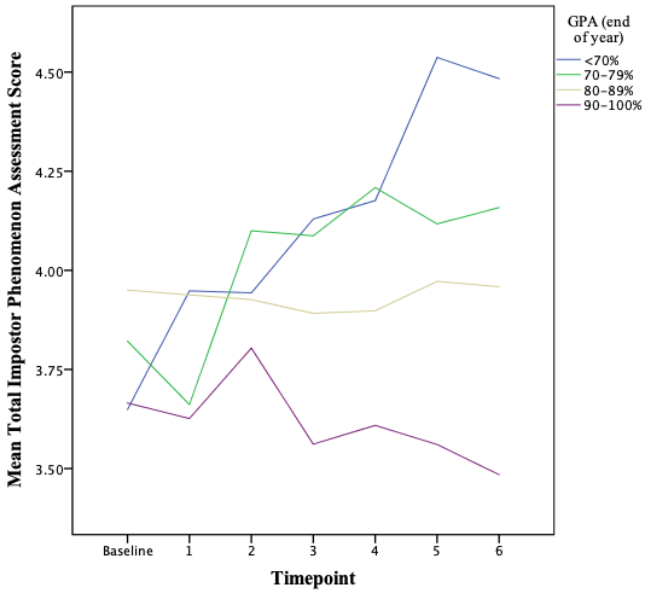
Post-Hoc Multiple Comparisons for GPA at End of Year

Comparison					95% CI	
Group (A)	**Group (B)**	**Mean Difference (A-B)**	***SE***	***p***	**Lower**	**Upper**
<70%	70-79%	0.05	0.19	.99	-0.43	0.54
	80-89%	0.12	0.18	.90	-0.34	0.58
	90-100%	0.44	0.19	.08	-0.04	0.92
70-79%	<70%	-0.05	0.19	.99	-0.54	0.43
	80-89%	0.07	0.10	.90	-0.19	0.32
	90-100%	0.39**	0.11	.00	0.10	0.67
80-89%	<70%	-0.12	0.18	.90	-0.58	0.34
	70-79%	-0.07	0.10	.90	-0.32	0.19
	90-100%	0.32**	0.10	.00	0.08	0.56
90-100%	<70%	-0.44	0.19	.08	-0.92	0.04
	70-79%	-0.39**	0.11	.00	-0.67	-0.10
	80-89%	-0.32**	0.09	.00	-0.56	-0.08

Note. ** $p < .01$. Tukey (HSD); Dependent variable: Total impostor phenomenon.

Figure 12

Mean Impostor Phenomenon by End of Year GPA Across Time



CHAPTER 10

General Discussion

Despite growing attention regarding the experience of feeling like a "fraud", impostor phenomenon has received little empirical attention in terms of psychometric assessment and the dimensionality of its factors. With limited psychometric validation and factor structure present within existing measures of impostor phenomenon (Mak et al., 2019), there have been concerns relating to the conceptualization, associations, and stability of this phenomenon. As such, the goal of the present research was to first clarify the conceptualization of impostor phenomenon (incorporating cognitive, emotional, and behavioural components), and then develop and validate a comprehensive multidimensional measure to assess the described factor structure and comprehensive characteristics. Further to this, I sought to examine the longitudinal stability of impostor phenomenon across time (i.e., the academic year).

To do so, I developed a theoretical framework through integrating themes present in the existing research literature. This led to conceptualizing impostor phenomenon as: *the subjective experience of perceived self-doubt in one's abilities and accomplishments compared to others, despite evidence to suggest the contrary*. In line with this conceptualization is a transcendent theme of self-doubt and comparison to others as motivating thoughts, feelings, and actions. This conceptualization, as well as the theoretical framework of impostor phenomenon further guided subsequent item and scale development based on principles outlined by Devellis (2017). The proposed factor structure of the new scale that emerged in Study 1 was replicated through confirmatory factor analysis in Studies 2 and 3 and supported three first-order factors (Doubts about Achievement, Perceived Discrepancy, and Self-Handicapping Behaviours). There is

significant benefit to the development of this clarified conceptualization and assessment of impostor phenomenon. Having a cohesive and multidimensional scale will allow for an increased understanding of the multifaceted nature (i.e., cognitive, emotional, and behavioural) of impostor phenomenon in a psychometrically valid format (*RQ1*). In doing so, researchers and clinicians will be able to identify impostor phenomenon more accurately and in a dimensional way, thus capturing the diverse presentations of this phenomenon that represent thoughts, emotions, and behaviours. Thus, the current scale enables the assessment of overall impostor phenomenon, along with individual subscales that provide further information relating to specific presentation and target areas for intervention. Different from existing measures, the present scale incorporates a focus on behaviours associated with impostor phenomenon (i.e., beyond thoughts and emotions). Identifying potential underlying causes for self-handicapping behaviours will also aid in increased identification and understanding of impostor phenomenon. Altogether, this comprehensive conceptualization will allow for improved clinical identification, thus allowing for greater targeting within clinical treatment planning and personal goal setting (e.g., with a focus on tailored interventions depending on areas of need based on subscale scores), and the future development of mentorship and awareness programs relating to impostor phenomenon. With particular attention to the nature of the various subdomains, this is promising in terms of theorizing successful treatment approaches, an area that has received little to no attention in the existing impostor phenomenon literature (Bravata et al., 2019).

A significant strength of my dissertation research was the longitudinal analyses of the novel IPA measure over time (i.e., across the academic year; *RQ2*). To my knowledge, this was the first research in the area of impostor phenomenon to gather consistent data across multiple timepoints (Mak et al., 2019). These data enabled further validation of the test-retest reliability,

and exploration of the stability of impostor phenomenon across time. Further to this, more timepoints for assessment allowed for greater description of the change trajectory, including examination of more complex growth functions and a more reliable exploration of growth parameters (Kwok et al., 2008). This increased the accuracy of the estimation of individual differences and thus increased the power of the current findings. Longitudinal analyses also allowed for further investigation of within-person variation (intra-individual differences) that are not otherwise possible with cross-sectional data (in addition to between-person variation of baseline data; Heck et al., 2014). Given this investigation, the findings of the current longitudinal analyses suggested that, contrary to my hypotheses, impostor phenomenon was relatively stable across time, thus mirroring what we would consider to be a "trait" construct. That is, despite periods of time throughout the year where psychological distress was significantly higher or lower (e.g., exam period vs. reading week), growth trajectories for impostor phenomenon remained consistent. Significant variance emerged in intercepts based on key demographic factors (gender, academic year), and trait factors; however, even for these different groups, impostor phenomenon demonstrated stability across time.

Further to identifying the stable trajectory across time, the current findings support the notion that impostor phenomenon is a related, but distinct, phenomenon when considering trait variables including self-esteem, personality, and perfectionism (*RQ3*). Convergent validity was consistent with previous studies to suggest that the novel IPA was positively related with neuroticism, perfectionism which have previously been identified as "maladaptive" traits (Bernard et al., 2002; Casselman, 1991; Chae et al., 1995; Lester & Moderski, 1995; Ross & Krukowski, 2003; Ross et al., 2001). Mirroring previous research (e.g., Bernard et al., 2002; Chae et al., 1995; Ross et al., 2001), I found that impostor phenomenon was negatively related

with self-esteem, extraversion, agreeableness, and conscientiousness, and not significantly related to openness. Together, these findings support the initial convergent and divergent validity of the novel IPA measure.

Building upon the relationships with trait variables, identifying predictors of impostor phenomenon and understanding potential risk factors is also key for developing coping strategies prior to the onset of psychological distress associated with impostor phenomenon (*RQ4*). The present findings suggested the significant role of self-esteem, self-critical perfectionism, agreeableness, conscientiousness, neuroticism, and rigid perfectionism in predicting impostor phenomenon in the academic setting. In addition to understanding differences in trait factors, it is also critical to take into account individual differences in demographics that may factor into treatment approaches. Although impostor phenomenon did not vary as a result of timepoint during the academic year, different groups experienced significantly different levels of impostor phenomenon (i.e., gender, academic year; *RQ5*). For example, findings for gender were in line with my hypotheses and existing research to suggest that gender differences in impostor phenomenon are significant in an academic setting (*H5a;* e.g., Cokley et al., 2015; Hutchins & Rainbolt, 2017). That is, men experienced significantly lower levels of impostor phenomenon compared to women and trans/nonbinary individuals. Additionally, there was evidence to suggest differences in impostor phenomenon across academic years (*H5e*). This included increased impostor phenomenon during times of transition, namely for graduate students in their fourth year, who reported significantly greater impostor phenomenon compared to other graduate years. This heightened level of impostor phenomenon could be associated with the pressure of fourth (typically final) year graduate students as they navigate the upcoming transition to professional life (Lane, 2015), while also completing course and dissertation requirements.

During this period of transition from academia into professional and occupational roles, perceptions relating to competency may be a greater focus. In contrast, third year undergraduate students, who may otherwise fall in the middle of their academic careers, demonstrated significantly lower impostor phenomenon compared to other undergraduate years. This could suggest the lack of 'transitional period' associated with being halfway through one's undergraduate career (i.e., without the pressure of the first-year transition, nor the expectation of transitioning from fourth year to graduate studies and/or career options). Altogether, there is evidence that impostor phenomenon happens across all levels, mirroring recent research suggesting the importance of considering all career stages when addressing impostor phenomenon (e.g., Vaughn et al., 2020). Future research may seek to expand this investigation to longitudinally examine the developmental trajectory of impostor phenomenon across one's lifetime, particularly given early evidence of impostor phenomenon emerging in early academia (i.e., grade five and six; Chayer & Bouffard, 2010).

Longitudinal analyses also enabled the examination of the relation between impostor phenomenon and psychological distress across time (*RQ6*). These findings suggested that impostor phenomenon significantly predicted greater levels of psychological distress, supporting previous research to suggest a negative relation between impostor phenomenon and positive coping skills (Brauer & Proyer, 2017). Additionally, given the examination of cross-lagged analyses, I found partial support to suggest a causal effect of impostor phenomenon on psychological distress. Although these findings were not consistent across the year, the lack of bidirectional effect (i.e., psychological distress on impostor phenomenon) suggests that impostor phenomenon elicits psychological distress (vs. distress eliciting impostor phenomenon). This provides initial support for the directionality of this relation and prompts further study of these

constructs across time. Additionally, these findings have implications for clinical intervention, whereby seeking to diminish impostor phenomenon may also have the preventative effect of reducing psychological distress and burnout in students. For example, Wei and colleagues (2020) found that when individuals responded to impostor phenomenon with greater self-compassion and less self-judgment, as well as understanding of these feelings as being a part of the human experience, they were less likely to experience shame and psychological distress. Further developing an understanding of one's thoughts, feelings, and behaviours relating to impostor phenomenon may be key in reducing associated feelings of distress.

Findings for the relation between objective achievement (GPA) and impostor phenomenon suggested that those with the lowest GPAs experienced the highest levels of impostor phenomenon (*H7*). This was in contrast to my prediction that those with the highest GPAs would demonstrate greater impostor phenomenon and may be in line with the fact that those with the lowest GPAs are not actually demonstrating evidence of objective success (as noted within the current conceptualization of impostor phenomenon). Previous recommendations have suggested greater specificity in identifying those with impostor phenomenon based on a GPA cut-off, primarily to ensure that those captured as "impostors" were also those who reported objective achievement (Cozzarelli & Major, 1990). Yet notably within the current results, those within the 70-89% range, considered as "average", demonstrated significantly higher impostor phenomenon compared to those with GPAs above 90%. These findings represent a group of individuals where achievement is present, and yet the subjective experience of perceived self-doubt in one's abilities and accomplishments compared to others was high. This suggests that in the presence of ambiguity relating to success (i.e., not the *highest* achievers), the subjective experience of impostor phenomenon is more prominent (i.e., experiences of self-doubt, comparisons to others).

These findings are key in terms of advancing the target population of students for intervention, that is, those who may be more vulnerable to impostor phenomenon are those in the "average" range of objective academic success.

Altogether, this research extends the current understanding of individual differences in impostor phenomenon across groups and over the course of the academic year. This increased clarity and improved conceptualization (i.e., incorporating cognitive, emotional, and behavioural dimensions) will aid individuals and institutions in developing education and intervention programs that target specific groups and strategies early in students' academic career, ideally prior to facing the significant stressors of academia that elicit psychological distress (e.g., rejection, social comparison, reviews, and criticism; Hutchins & Rainbolt, 2017). Effective strategies for managing impostor phenomenon may include increasing social support, validating successes, correcting cognitive distortions, and developing positive reappraisal and self-talk (Hutchins & Rainbolt, 2017). These strategies align with the novel subscales developed in the context of the current research. For example, "Doubts about Achievement" may be ideal for cognitive and emotion-focused intervention (e.g., self-validation), "Perceived Discrepancy" may be well suited for cognitive restructuring and reappraisal (e.g., challenging cognitive distortions), and the "Self-Handicapping Behaviours" might be more effectively addressed through behavioural interventions including behavioural activation (e.g., social skills training). In also considering gender differences in impostor phenomenon, women may be more responsive to coping using social support and therapeutic intervention (and represent a target population who experience higher levels of impostor phenomenon), whereas men may engage in more avoidance behaviours (e.g., substance use) and are likely to report lower levels of impostor phenomenon (Hutchins & Rainbolt, 2016). In considering the needs of LGBTQ2+ individuals, limited

research suggests that this population may be more responsive to peer support and community-based interventions, particularly given their likelihood of experiencing the highest levels of impostor phenomenon (though further research in intervention responses for this population is needed; Coulter et al., 2019; Fish, 2020). Similarly, given the findings to suggest significant variations in impostor phenomenon across academic years, interventions should not just target those in periods of transition, but rather across all stages of academia. Extensions of the current literature beyond the academic setting would be warranted to further examine these differences and ways of tailoring individual treatment approaches.

Despite attempts to intervene with impostor phenomenon through treatment, people may persist in experiencing these thoughts, feelings, and behaviours (Hutchins & Rainbolt, 2016). My findings suggested that those who experience higher levels of impostor phenomenon are more likely to engage in emotion-oriented coping (i.e., feeling anxious or upset about perceptions of 'not being able to cope', blaming themselves for feeling distressed), and less likely to engage in task-oriented coping (i.e., focusing on how to overcome the problem, taking reflective action). Thus, given the existing knowledge about impostor phenomenon thus far, it is critical to develop programs for early understanding and identification of this experience. For example, developing early mentoring programs for students may be key in early intervention and education relating to impostor phenomenon. Vaughn and colleagues (2020) suggested that effective mentoring programs should target assisting academics in integrating the values that they place on their academics with the feedback they receive from others (i.e., aligning values, perceptions, and objective success). Similarly, mentorship may elicit a constructive and realistic view of expectations relating to competence that is specific to one's own goals and domain, rather than comparing to external expectations or unrelated others (Badawy et al., 2018). Normalizing

impostor phenomenon as a common and formative part of one's identity development, and validating thoughts, feelings, and behaviours associated with impostor phenomenon, is key to encouraging action and reducing psychological distress (Hutchins & Rainbolt, 2016). For example, Lane (2015) found that learning about impostor phenomenon and discovering the common nature of these fears, elicited a sense of relief in students. Continued self-reflection within the context of strong social support networks should highlight the importance of sharing experiences with others, normalizing the experience of impostor phenomenon, connecting with mentors, and developing greater self-awareness within academic settings (Lieff et al., 2012; Wald, 2016). Given the prominent feelings of isolation associated with impostor phenomenon (i.e., "Everyone else has it together but me"), social support and connections are critical in challenging beliefs relating to self-doubt, inadequacy, and perceived lack of belonging (Vaughn et al., 2020). Altogether, this highlights the importance of building key factors associated with motivation (i.e., relatedness, competence, and autonomy) early, and over the course of one's career, to further encourage internalization of one's successes and competencies (Howe-Walsh & Turnbull, 2016; Vaughn et al., 2020). In addition to connections with others to increase one's sense of belonging, it is also key for individuals to develop a sense of personal self-compassion for combating impostor phenomenon (Wei et al., 2020). This would include not only encouraging increased understanding of the thoughts, feelings, and behaviours associated with feeling like an impostor (as further established in the current research), but also encouraging a non-judgmental view towards the self, perceiving their experiences as a common part of the human experience, and taking a balanced view of their situation (Raes et al., 2011; Wei et al., 2020). For example, institutions and interventions could reduce distress associated with impostor phenomenon by focusing on fostering an open mindset (i.e., focused on growth and learning) and

reducing fears of failure and avoidance (Noskeau et al., 2021). Altogether, institutions should seek to incorporate more programming and education focused on increased understanding, identification, and validation surrounding impostor phenomenon in academia.

Limitations and Future Directions

Although the current research has significant benefits for the study of impostor phenomenon, it is not without some notable limitations. First, the current scale does not seek to differentiate those experiencing the subjective experience of *feeling* like a 'fraud' from those who may be "real impostors." To clarify, my conceptualization operationalizes impostor phenomenon as the subjective perception of not being competent *despite significant evidence to suggest otherwise*. This excludes those who are objectively, and intentionally, faking their accomplishments. "Real impostors" are those who intentionally present a false self with the goal of deliberately deceiving others (Kets de Vries, 2005; McElwee & Yurak, 2007). For example, a "real impostor" would be someone who lies on their resume about their educational qualifications with the intention of obtaining a specific occupational role for which they are not actually qualified. "Real impostors" may still experience fears of being exposed for their intentional misrepresentation of the self (Kets de Vries, 2005); however, this fear is objective in nature compared to the subjective and perceived incompetence of those experiencing impostor phenomenon who are otherwise objectively qualified. There is some evidence of this in the current study, whereby those with the lowest GPA reported the highest levels of impostor phenomenon; however, these students' intentions may not be to 'intentionally fake competence', which would be in line with "real impostors". Thus, it is possible that having further information regarding objective achievement may allow further contrast to individuals' attribution, beliefs

about the self, and behaviours when experiencing either impostor phenomenon or “real impostorism”.

Second, although the present research represents a step forward in examining the longitudinal nature of impostor phenomenon, given the possible implications of the current scale for clinical intervention, it would be beneficial to develop a method of experientially tracking impostor phenomenon more regularly over time (i.e., over the course of a given day, across transitional periods). This expansion upon current longitudinal measures to assess experiential impostor phenomenon would further aid in informing the developmental trajectory, stability of impostor phenomenon, and predictive utility, and provide further information about the state or trait nature of this construct. Additionally, this would aid in reducing attrition across time points (as observed within the current study) and encourage more consistent responding across time. Further longitudinal research should seek to validate the current longitudinal examination of impostor phenomenon and the new IPA measure, as well as to identify within-subjects variation across one’s academic career beyond one academic year (i.e., from their first-year undergraduate through to completion of undergraduate degree and considering potential transition through to graduate degree completion – i.e., 10 years or more). Additionally, replication and additional validation of the novel IPA is warranted in moving forward to further support the psychometric properties of this novel measure in independent samples.

Additionally, the current sample represents a limited demographic population, as well as an impostor-prone sample in an academic setting. Although there is minimal cross-sectional research suggesting mixed findings surrounding age effects (Bravata et al., 2019), there is some evidence to suggest that periods of transition typically represent increased stress and subjective difficulties adapting to new expectations and demands (Keefer, 2015). Recognizing the current

samples of primarily younger aged, first year undergraduate students, the generalizability of this sample to the larger population is limited. Similarly, with the first-year undergraduate population, it is likely that reported GPA at baseline was not an accurate representation of individual achievement (particularly given that many first-year undergraduate students had not yet received grades when baseline data were collected, and thus reported their high school GPA at the beginning of their university degree). There is some debate surrounding the extent to which high school GPA is related to university GPA (e.g., Elias & Macdonald, 2007). Previous research suggests that external factors including gender, stress, and self-esteem can differentiate academic success during the transition from high school to university (Wintre et al., 2011). To address this concern, I also collected participants' GPA at the end of the year and found a similar pattern of associations with impostor phenomenon. However, recognizing alternative ways of measuring success across academic programs (and particularly when considering undergraduate vs. graduate studies), it would be beneficial to compare individuals based on additional objective measures (i.e., performance review, observer/external rating) to gain further insight into the impact and prevalence of impostor phenomenon across different levels of objective achievement. Similarly, future research should seek to assess the validity of the current scale across time in external achievement-related settings (e.g., employees in a workplace), to contrast and establish reliability outside of the academic setting.

Although the current study is limited in its demographic representation, initial findings provide support to suggest that students who identify as women (Brauer & Proyer, 2017; Cokley et al., 2015), and who identify their gender as trans/nonbinary (i.e., LGBTQ2+) report the highest levels of impostor phenomenon. To my knowledge, this was the first study to investigate impostor phenomenon in those identifying as LGBTQ+ (despite the sample size for this group

being limited in the current population – i.e., only ~4%). This population often represents a gap when considering prevention and intervention programs targeting improving mental health (Fish, 2020), and thus further investigation of impostor phenomenon in this population is critical. The current results also suggest possible, though not statistically significant, differences for other ethnicities, including those identifying as Indigenous, and those identifying as Asian American (Cokley et al., 2013, 2017; Wei et al., 2020). However, given the primarily White and women-identifying demographic of the current samples, future research should further examine the experience of impostor phenomenon across a more diverse sample of gender and culture to further elucidate these differences. Additionally, given existing research to suggest gender differences across domains (i.e., academia vs. professional settings; Brauer & Proyer, 2017; Rohrmann et al., 2016), future investigation of gender differences in impostor phenomenon outside of academia is also needed. Moreover, these findings and recommendations support recent criticism of impostor phenomenon suggesting that societal pressures and expectations relating to success disproportionately impact women and minority populations (Mullangi & Jagsi, 2019; Tulshyan & Burey, 2021). More recently, there have been calls for increased diversity in institutional mentorship, particularly surrounding identifying and challenging impostor phenomenon when it occurs (Chrousos & Mentis, 2020). Thus, further investigation and understanding of systematic influences on impostor phenomenon, and prioritizing considerations of individual and demographic factors in the context of education and intervention programs is needed.

CONCLUSION

The present research represented an important step forward in the understanding of impostor phenomenon and its assessment. Through my current dissertation, I sought to further the understanding of impostor phenomenon by developing a clear conceptualization and theoretical framework, and then developing a new measurement of the proposed factors and subdomains associated with the experience of feeling like an impostor. Additionally, longitudinal examination of impostor phenomenon across the academic year provided initial evidence for this construct as being stable across time and differing across groups based on demographic factors (i.e., gender and academic year) and trait variables. Initial evidence also suggested a significant causal effect of impostor phenomenon on psychological distress across time. Future research should continue to examine the developmental trajectory of impostor phenomenon to aid in further understanding these associations across the lifespan and outside of an academic setting. Additional focus should investigate more diverse samples of gender and culture to further understand differences in impostor phenomenon across groups. The current progress towards conceptual clarity, factor structure, and initial psychometric validation of the proposed IPA will support continued study and understanding of impostor phenomenon and factors that may aid in comprehensively identifying and responding to these thoughts, feelings, and behaviours. Altogether, this research sought to aid clinical understanding of impostor phenomenon, and advance efforts in developing effective education and intervention strategies for reducing psychological distress in an academic population.

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APPENDICES

Appendix A

Institutional Ethics Review Board Approval

Study 1 and 2

Western Research

Date: 9 January 2021

To: [redacted]

Project ID: 118033

Study Title: Feeling Like a Fraud: Developing a Multidimensional Measurement of Impostor Phenomenon

Short Title: IPSD: Student Beliefs and Experiences (118033)

Application Type: NMREB Initial Application

Review Type: Delegated

Full Board Reporting Date: 05/Feb/2021

Date Approval Issued: 09/Jan/2021 15:56

REB Approval Expiry Date: 09/Jan/2022

Dear [redacted]

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the above mentioned study, as of the date noted above. NMREB approval for this study remains valid until the expiry date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

This research study is to be conducted by the investigator noted above. All other required institutional approvals must also be obtained prior to the conduct of the study.

Documents Approved:

Document Name	Document Type	Document Date	Document Version
Questionnaire, Dec 4C	Online Survey	04/Dec/2020	2
Debriefing, Dec 4C	Debriefing document	04/Dec/2020	2
Recruitment, Dec 21	Recruitment Materials	21/Dec/2020	3
LOI & Consent, Dec 21C	Implied Consent/Assent	21/Dec/2020	3

No deviations from, or changes to the protocol should be initiated without prior written approval from the NMREB, except when necessary to eliminate immediate hazard(s) to study participants or when the change(s) involves only administrative or logistical aspects of the trial.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Please do not hesitate to contact us if you have any questions.

Sincerely,

[redacted], Research Ethics Officer on behalf of [redacted], NMREB Chair

Note: This correspondence includes an electronic signature (validation and approval via an online system that is compliant with all regulations).

Study 3

Western Research

Date: 27 August 2021

To: [redacted]

Project ID: 118033

Study Title: Feeling Like a Fraud: Developing a Multidimensional Measurement of Impostor Phenomenon

Application Type: NMREB Amendment Form

Review Type: Delegated

Full Board Reporting Date: 01/Oct/2021

Date Approval Issued: 27/Aug/2021 13:57

REB Approval Expiry Date: 09/Jan/2022

Dear [redacted]

The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the WREM application form for the amendment, as of the date noted above.

Documents Approved:

Document Name	Document Type	Document Date	Document Version
Questionnaire, July9	Online Survey	09/Jul/2021	1
Follow-up, June28	Online Survey	28/Jun/2021	2
LOI & Consent RevisedClean, Aug9	Implied Consent/Assent	09/Aug/2021	2
Follow-up LOI & Consent RevisedClean, Aug9	Implied Consent/Assent	09/Aug/2021	3
Mass Email Recruitment RevisedClean- Aug9	Recruitment Materials	09/Aug/2021	3
SONA Recruitment RevisedClean, Aug9	Recruitment Materials	09/Aug/2021	3
Debriefing RevCl, Aug9	Recruitment Materials	09/Aug/2021	2
Follow-up DebriefingCl - Aug9	Recruitment Materials	09/Aug/2021	2

REB members involved in the research project do not participate in the review, discussion or decision.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario. Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB. The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.

Please do not hesitate to contact us if you have any questions.

Sincerely,

[redacted] Research Ethics Officer on behalf of [redacted] NMREB Chair

Note: This correspondence includes an electronic signature (validation and approval via an online system that is compliant with all regulations).

Appendix B

Study 1 and 2 Letter of Information and Consent

Western

Letter of Information & Consent

Project Title: IPSD: Student Beliefs and Experiences (118033)

Principal Investigator:
[redacted]
Department of Psychology, UWO
Email: [redacted]

Additional Researchers:
[redacted] PhD Candidate: [redacted]

You are invited to participate in a study investigating university students' beliefs. This project is conducted under the supervision of [redacted] in the department of Psychology. The purpose of this letter is to provide you information to make an informed decision regarding participation in this research.

Study Information:
The objective of this study is to develop a better understanding of students' beliefs about their academic experiences. If you consent to participate, your participation will involve completing an online survey that will take approximately 20 minutes.

Potential Risks and Resource Information:
There are no known major risks associated with participation in this study. However, if you feel distressed while reflecting on your experiences as a student, some available on-campus services are listed here: **Psychological Services (Student Development Centre)** is available at [redacted] or **Student Health Services** at [redacted] If you feel you need academic support, the **Student Success Centre** is available at [redacted] and **Peer Support Network** is available at [redacted] Additional detailed information and contact details for both community and on-campus resources will also be provided in the debriefing document.

Benefits to Participation:
Your participation in this study will provide valuable information regarding the student experience. The research may also be published in an academic journal article and may inform program administrators and institutions about the unique experiences of students and how to better support them.

Compensation:

Participants enrolled in the introductory psychology course will be rewarded with a 0.5 research credit toward this course. For students in other non-introductory psychology courses, you will be compensated as indicated on your relevant course outline.

Your Rights as a Participant:
Your participation is voluntary, and you have the right to cease your participation at any time, for any reason. If you find a question uncomfortable you do not need to answer it. You have the right to exit the questionnaire at any time without penalty. You do not waive any legal right by consenting to this study. If

you decide to withdraw from the study, you may do so at any time by exiting the survey window. Any data collected prior to exiting the survey will be discarded from analyses. Due to the anonymous nature of your data, once your survey responses have been submitted, the researchers will be unable to withdraw your data.

Confidentiality:
All data collected will remain confidential and accessible only to the investigators of this study. Delegated institutional representatives of Western University and its Non-Medical Research Ethics Board may require access to study-related records to monitor the conduct of the research in accordance with regulatory requirements. Your survey responses will be collected anonymously through the online survey platform Qualtrics. Qualtrics uses encryption technology and restricted access authorizations to protect all data collected. In addition, Western's Qualtrics server is in Ireland, where privacy standards are maintained under the European Union safe harbour framework. The data will then be exported from Qualtrics and securely stored on Western University's server.

Contacts for Further Information
If you have any questions about your rights as a research participant or the conduct of this study, you may contact The Office of Human Research Ethics [redacted] or toll-free at [redacted] email: [redacted]

You may also choose to direct any questions about this research or to address any concerns about your participation to [redacted] at The University of Western Ontario, in London Ontario by email at: [redacted].

Please feel free to print a copy of this letter for your records. You may also contact the researchers above for further information or a copy of the above information.

Consent (For Participant to Complete)
Please select one of the below options:
☐ I have read the Letter of Information for the study, and I agree and wish to participate. (*participants directed to remainder of survey)*

☐ I do not consent to participate in the study. (*participants directed to end of survey)*

Appendix C

Study 3 Baseline Letter of Information and Consent

Initial - Letter of Information & Consent

Project Title: IPSD: Student Beliefs and Experiences across Time (118033)

Principal Investigator:
[redacted]
Department of Psychology, UWO
Email: [redacted]

Additional Researchers:
[redacted] PhD Candidate: [redacted]

You are invited to participate in a study investigating university students' beliefs and experiences across time. This project is conducted under the supervision of [redacted] in the department of Psychology. The purpose of this letter is to provide you information to make an informed decision regarding participation in this research.

Study Information:
The objective of this study is to develop a better understanding of students' beliefs about their academic experiences over the course of the academic year. If you consent to participate in the initial phase of this study, your participation will involve completing an online survey that will take approximately 40 minutes. If you are interested in participating in the second phase of this study, you will be asked to provide your email to receive monthly follow-up surveys during the academic year (i.e., once a month for six months).

Potential Risks and Resource Information:
There are no known major risks associated with participation in this study. However, if you feel distressed while reflecting on your experiences as a student, some available on-campus services are listed here: **Psychological Services (Student Development Centre)** is available at [redacted] or **Student Health Services** at [redacted] If you feel you need academic support, the **Student Success Centre** is available at [redacted] and **Peer Support Network** is available at [redacted] Additional detailed information and contact details for both community and on-campus resources will also be provided in the debriefing document.

Benefits to Participation:
Your participation in this study will provide valuable information regarding the student experience. The research may also be published in an academic journal article and may inform program administrators and institutions about the unique experiences of students and how to better support them.

Compensation:

Participants enrolled in the introductory psychology course will be rewarded with a 1.0 research credit toward this course. For students in other non-introductory psychology courses, you will be compensated as indicated on your relevant course outline. For students without research credit requirements for their courses, while your participation is greatly appreciated, there will be no compensation or incentive given

to participate in the initial phase of this study. If you are interested in participating in the follow-up portion of the study, for each follow-up survey in which you participate, you will receive an entry into a draw to win a $10 gift card (six individual draws – one per follow-up survey). Those who participate in all six follow-up questionnaires will be entered into a draw to win a grand prize of a $100 gift card.

Your Rights as a Participant:
Your participation is voluntary, and you have the right to cease your participation at any time, for any reason. If you find a question uncomfortable you do not need to answer it. You have the right to exit the questionnaire at any time without penalty. You do not waive any legal right by consenting to this study. If you decide to withdraw from the study, you may do so at any time by exiting the survey window. Any data collected prior to exiting the survey will be discarded from analyses. Due to the anonymous nature of your data, once your survey responses have been submitted, the researchers will be unable to withdraw your data.

Confidentiality:
If you are interested in participating in the follow-up surveys, your email address will be collected at the end of today's survey. Participation in the follow-up phase is optional, and your email address will be stored separately from your data. For follow-up purposes, you will be assigned a randomized and unique ID code that will link your follow-up surveys. This code will be removed from the data following the end of the study. All data collected will remain confidential and accessible only to the investigators of this study. Delegated institutional representatives of Western University and its Non-Medical Research Ethics Board may require access to study-related records to monitor the conduct of the research in accordance with regulatory requirements. Your survey responses will be collected through a third-party, secure online survey platform called Qualtrics. Qualtrics uses encryption technology and restricted access authorizations to protect the privacy and security of all data collected and retained, including personal information. In addition, Western's Qualtrics server is in Ireland, where privacy standards are maintained under the European Union's General Data Protection Regulation, which is consistent with Canada's privacy legislation. Please refer to Qualtrics' Privacy Policy (https://www.qualtrics.com/privacystatement. The data will then be exported from Qualtrics and securely stored on Western University's server.

Contacts for Further Information
If you have any questions about your rights as a research participant or the conduct of this study, you may contact The Office of Human Research Ethics [redacted] or toll-free at [redacted], email: [redacted]

You may also choose to direct any questions about this research or to address any concerns about your participation to [redacted] at The University of Western Ontario, in London Ontario by email at: [redacted].

Please feel free to print a copy of this letter for your records. You may also contact the researchers above for further information or a copy of the above information.

Consent (For Participant to Complete)

Please select one of the below options:

☐ I have read the Letter of Information for the study, and I agree and wish to participate. (*participants directed to remainder of survey)*

☐ I do not consent to participate in the study. (*participants directed to end of survey)*

Appendix D

Study 3 Follow-Up Letter of Information and Consent

Western

Follow-Up Survey - Letter of Information & Consent

Project Title: IPSD**:** Student Beliefs and Experiences across Time (118033)

Principal Investigator:
[redacted]
Department of Psychology, UWO
Email: [redacted]

Additional Researchers:
[redacted] PhD Candidate: [redacted]

Thank you for your interest in participating in the second phase of this research. Please read the below information to make an informed decision regarding your ongoing participation in this month's follow-up survey.

Study Information:
The objective of this study is to develop a better understanding of students' beliefs about their academic experiences over the course of the academic year. You have participated in the initial phase of this study, which involved completing an online survey. You have received this link as you consented to participating in the second phase of the study and provided your email address. This phase of the study consists of six monthly follow-up surveys during the academic year. This survey will take approximately 20 minutes to complete.

Potential Risks and Resource Information:
There are no known major risks associated with participation in this study. However, if you feel distressed while reflecting on your experiences as a student, some available on-campus services are listed here: **Psychological Services (Student Development Centre)** is available at [redacted] or **Student Health Services** at [redacted] If you feel you need academic support, the **Student Success Centre** is available at [redacted] and **Peer Support Network** is available at [redacted] Additional detailed information and contact details for both community and on-campus resources will also be provided in the debriefing document.

Benefits to Participation:
Your participation in this study will provide valuable information regarding the student experience. The research may also be published in an academic journal article and may inform program administrators and institutions about the unique experiences of students and how to better support them.

Compensation:

For each follow-up survey in which you participate, you will receive an entry into a draw to win a $10 gift card (six draws). Additionally, those who participate in all six follow-up surveys will be eligible for entry into a draw to win a $100 gift card.

Your Rights as a Participant:
Your participation is voluntary, and you have the right to cease your participation at any time, for any

reason. If you find a question uncomfortable you do not need to answer it. You have the right to exit the questionnaire at any time without penalty. You do not waive any legal right by consenting to this study. If you decide to withdraw from the current follow-up survey, you may do so at any time by exiting the survey window. If you wish to withdraw from receiving any further follow-up surveys, you may do so by contacting the principal investigator and/or opting out of the Qualtrics survey email. Any data collected prior to exiting the survey will be discarded from analyses. Due to the anonymous nature of your data, once your survey responses have been submitted, the researchers will be unable to withdraw your data.

Confidentiality:
For follow-up purposes, you will be assigned a randomized and unique ID code that will link your follow-up surveys. This code will be removed from the data following the end of the study. All data collected will remain confidential and accessible only to the investigators of this study. Delegated institutional representatives of Western University and its Non-Medical Research Ethics Board may require access to study-related records to monitor the conduct of the research in accordance with regulatory requirements. Your survey responses will be collected through a third-party, secure online survey platform called Qualtrics. Qualtrics uses encryption technology and restricted access authorizations to protect the privacy and security of all data collected and retained, including personal information. In addition, Western's Qualtrics server is in Ireland, where privacy standards are maintained under the European Union's General Data Protection Regulation, which is consistent with Canada's privacy legislation. Please refer to Qualtrics' Privacy Policy (https://www.qualtrics.com/privacystatement. The data will then be exported from Qualtrics and securely stored on Western University's server.

Contacts for Further Information
If you have any questions about your rights as a research participant or the conduct of this study, you may contact The Office of Human Research Ethics [redacted] or toll-free at [redacted] email: [redacted]

You may also choose to direct any questions about this research or to address any concerns about your participation to [redacted] at The University of Western Ontario, in London Ontario by email at: [redacted].

Please feel free to print a copy of this letter for your records. You may also contact the researchers above for further information or a copy of the above information.

<u>Consent (For Participant to Complete)</u>
Please select one of the below options:
☐ I have read the Letter of Information for the study, and I agree and wish to participate. (*participants directed to remainder of survey)*

☐ I do not consent to participate in the study. (*participants directed to end of survey)*

Appendix E

Study 1 and 2 Questionnaire

Participant Questionnaire – Qualtrics

Project Title: IPSD: Student Beliefs and Experiences (118033)

Principal Investigator:
[redacted]
Department of Psychology, UWO
Email: [redacted]

Additional Researchers:
[redacted] PhD Candidate: [redacted]

1. What is your age (in years)?_____

2. What is your gender identity?
    a. Man
    b. Woman
    c. Trans
    d. I self-identify as … _____
    e. Prefer not to answer

3. What is your ethnic identity?
    a. Caucasian/White
    b. Indigenous/Native American
    c. African-American/Black
    d. Middle Eastern
    e. Asian
    f. I self-identify as… _____

4. Are you currently completing your…
    a. Undergraduate Degree
    b. Masters Degree
    c. Doctoral Degree
    d. Other, please specify:

5. What year are you currently in?
    a. 1
    b. 2
    c. 3
    d. 4
    e. 5
    f. 6+

6. What program are you enrolled in?
    a. Arts & Humanities
    b. Social Science
    c. Natural Science
    d. Health Sciences
    e. Engineering
    f. Music
    g. Medical Sciences
    h. Business
    i. Other, please specify: _____

7. What is your current relationship status?
    a. Single
    b. Casually Dating
    c. In an Exclusive Relationship
    d. Engaged
    e. Married/Common-law
    f. Divorced
    g. Widowed

Imposter Phenomenon Assessment

Please read each of the following statements carefully and indicate how characteristic it is of your own experiences.

Strongly Disagree 1	Moderately Disagree 2	Somewhat Disagree 3	Somewhat Agree 4	Moderately Agree 5	Strongly Agree 6

1. I avoid evaluations if possible and have a dread of others evaluating me.
2. At a social event, I sometimes feel that I try to impress people by acting or behaving more intelligently than I really feel I am.
3. At times I feel that I have attained my present academic or professional position through "pulling strings" or "having connections."
4. At times, I feel my success has been due to some kind of luck.
5. At times, I have felt I am in my present position or academic program through some kind of mistake.
6. At times, I'm disappointed in my accomplishments and think I should have accomplished much more.
7. Even in situations for which I am well-prepared (e.g., studied very hard and long for an examination or worked tirelessly on a project), I still have doubts about my ability to perform well.
8. Even though I feel that I have a lot of potential, I sometimes feel like an intellectual "fraud" or "phony."
9. I am certain my present level of achievement results from true ability.
10. I am often surprised when I perform well on a project or a test.
11. I become very invested in my assigned tasks and find it difficult to focus on anything else.
12. I can give the impression that I'm more competent than I really am.
13. I consider my accomplishments adequate for this stage in my life.
14. I delay making decisions until it is too late.
15. I feel bad and discouraged if I'm not "the best" or at least "very special" in situations that involve achievement.
16. I feel bad if I'm not "the best" or at least "very special" in situations that involve achievement.
17. I feel confident that I will succeed in the future.
18. I feel I deserve whatever honors, recognition, or praise I receive with regard to my academic or professional pursuits.
19. I feel I deserve whatever honors, recognition, or praise I receive.
20. I feel that there is a significant disparity between the "intellectual self' that others perceive and the "intellectual self" that I really am.
21. I find it easy to accept compliments about my intelligence.
22. I find myself often leaving tasks to the last minute.
23. 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.

24. I have sometimes convinced an important person that I am brighter or more talented than I really am.
25. I have visions of failure that often accompany new situations requiring a demonstration of my abilities.
26. I obtained my present position because of someone I knew.
27. I obtained my present position because of something about me that I didn't work for (e.g. coming from an underrepresented group).
28. I obtained my present position solely because of an affirmative action policy
29. I often achieve success on a project or test when I have anticipated that I would fail.
30. I often compare my ability to those around me and think they may be more intelligent than I am.
31. I often feel I am concealing secrets about my abilities from others.
32. I often feel I receive praise or grades that I don't deserve.
33. I often feel like a phony.
34. I often feel like I have to put more effort into my tasks because I am not as smart as those around me.
35. I often feel that I am "in over my head" or beyond my capabilities in my line of work or course of study.
36. I often feel that I have to work harder than others to achieve all that I do.
37. I often find myself putting more effort into tasks compared to others.
38. I often find myself spending more time than necessary in completing tasks or assignments.
39. I often get "down on myself' when I perform, what I consider, less than perfectly on a task or a problem.
40. I often tell others that I studied or worked less (i.e., spent less time) on a professional/intellectual project than I actually did.
41. I often worry about not succeeding with a project or examination, even though others around me have considerable confidence that I will do well.
42. I often worry about whether others will view me as a success or a failure.
43. I put off making decisions out of fear that I won't do well.
44. I rarely do a project or task as well as I'd like to do it.
45. I sometimes feel there's something false or misleading about me that others don't notice.
46. 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.
47. I tend to remember the incidents in which I have not done my best more than those times I have done my best.
48. I try not to get too involved in competitive environments, so it won't hurt so much if I lose or do poorly.
49. I typically delay getting started on tasks because I worry I'm not up to the challenge.
50. I would describe myself as an "authentic" person.
51. I'm afraid people important to me may find out that I'm not as capable as they think I am.
52. I'm often afraid that I may fail at a new assignment or undertaking even though I generally do well at what I attempt.

53. If 1 receive a great deal of praise and recognition for something I've accomplished, I tend to belittle the significance of what I have done.
54. If I get a high grade on a work assignment, I tend to feel that I fooled my teacher or supervisor.
55. If I receive a great deal of praise and recognition for something I've accomplished, I tend to discount the importance of what I've done.
56. If I'm going to receive a promotion or gain recognition of some kind, I hesitate to tell others until it is an accomplished fact.
57. In general, I often act more competently than I feel that I really am.
58. In general, people tend to believe I am more competent than I really am.
59. In general, significant people in my life tend to believe that I am more academically or professionally competent than I really am.
60. In preparing for deadlines, I often waste time doing other things.
61. In some situations I feel like a "great pretender": that is, I'm not as genuine as others think I am.
62. In some situations, I act like an imposter.
63. It is easy for me to give myself credit for the good things that happen to me, professionally or socially.
64. It's hard for me to accept compliments or praise about my intelligence or accomplishments.
65. Mostly, I find that I measure up to the standards that I set for myself.
66. My achievements have been due more to external factors, such as luck or effort, rather than to my own inherent abilities.
67. My private feelings about, and perceptions of, myself sometimes conflict with the impressions I give others through my public actions or behaviors.
68. My public and private self are the same person.
69. On some occasions when someone has praised me for something, I tend to feel that I fooled them.
70. Others have told me that I often do more than necessary when it comes to completing a task.
71. Sometimes I am afraid I will be discovered for who I really am.
72. Sometimes I feel or believe that my success in my life or in my job has been the result of some kind of error.
73. Sometimes I'm afraid others will discover how much knowledge or ability I really lack.
74. When I am about to take on a new and challenging project, task, or responsibility, I am more inclined to remember my past successes rather than my past failures.
75. When I receive a compliment about my academic or professional abilities, I sometimes find myself making excuses for explaining away the compliment.
76. When I receive a compliment, I find it difficult to accept the compliment, and often explain it away or give credit to others.
77. When I'm praised for something, I sometimes wonder if I will be able to do as well the next time.

78. When I’ve succeeded at something and received recognition for my accomplishments, I have doubts that I can keep repeating that success.
79. When it comes to achieving and attaining goals, I suppose one might call me a "perfectionist".
80. When people praise me for something I've accomplished, I usually have no doubts that I will be able to live up to their expectations of me in the future.
81. 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.

Appendix F

Study 3 Baseline Questionnaire

Participant Initial Questionnaire – Qualtrics

Project Title: IPSD: Student Beliefs and Experiences across Time (118033)

Principal Investigator:
[redacted]
Department of Psychology, UWO
Email: [redacted]

Additional Researchers:
[redacted] PhD Candidate: [redacted]

8. What is your age (in years)?_____

9. What is your gender identity?
    a. Man
    b. Woman
    c. Trans
    d. I self-identify as … _____
    e. Prefer not to answer

10. What is your ethnic identity?
    a. Caucasian/White
    b. Indigenous/Native American
    c. African-American/Black
    d. Middle Eastern
    e. Asian
    f. I self-identify as… _____

11. Are you currently completing your…
    a. Undergraduate Degree
    b. Masters Degree
    c. Doctoral Degree
    d. Other, please specify:

12. What year are you currently in?
    a. 1
    b. 2
    c. 3
    d. 4
    e. 5
    f. 6+

13. What program are you enrolled in?
    a. Arts & Humanities
    b. Social Science
    c. Natural Science
    d. Health Sciences
    e. Engineering
    f. Music
    g. Medical Sciences
    h. Business
    i. Other, please specify: _____

14. What is your current relationship status?
    a. Single
    b. Casually Dating
    c. In an Exclusive Relationship
    d. Engaged
    e. Married/Common-law
    f. Divorced
    g. Widowed

15. What is your approximate academic average, in percentage? (e.g., 75%, 85%)
    _____

Impostor Phenomenon Assessment (IPA)

Please read each of the following statements carefully and indicate how characteristic it is of your own experiences.

1 Strongly Disagree	2 Moderately Disagree	3 Somewhat Disagree	4 Somewhat Agree	5 Moderately Agree	6 Strongly Agree

Doubts about Achievement	
1.	Even in situations for which I am well-prepared (e.g., studied very hard and long for an examination or worked tirelessly on a project), I still have doubts about my ability to perform well.
2.	I often feel that I have to work harder than others to achieve all that I do.
3.	I often get "down on myself' when I perform less than perfectly on a task or a problem.
4.	I often worry about not succeeding on a task, even though others around me have considerable confidence that I will do well.
5.	I often find myself putting more effort into tasks compared to others.
6.	When it comes to achieving and attaining goals, I suppose one might call me a "perfectionist".
7.	Others have told me that I often do more than necessary when it comes to completing a task.
8.	I often compare my ability to those around me and believe they are more intelligent than I am.
9.	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.
10.	When I've succeeded at something and received recognition for my accomplishments, I have doubts that I can keep repeating that success.
11.	I often feel like I have to put more effort into my tasks because I am not as smart as those around me.
12.	I'm often afraid that I will fail at a new assignment or undertaking even though I generally do well at what I attempt.
13.	I often find myself spending more time than necessary in completing tasks or assignments.
14.	When I'm praised for something, I sometimes wonder if I will be able to do as well the next time.
15.	I feel discouraged if I'm not "the best" or at least "very special" in situations that involve achievement.
16.	I often worry about whether others will view me as a success or a failure.
17.	I tend to remember the incidents where I have not done my best more than those times that I have done my best.
18.	I often foresee failure when entering new situations that require a demonstration of my abilities.
19.	I avoid evaluations if possible and have a dread of others evaluating me.
20.	I try not to get too involved in competitive environments, so it won't hurt so much if I lose or do poorly.
21.	I am often surprised when I perform well on a project or a test.
22.	When I receive a compliment, I find it difficult to accept the compliment, and often explain it away or give credit to others.
23.	When I receive a compliment about my academic or professional abilities, I sometimes find myself making excuses for explaining away the compliment.
24.	I'm afraid people important to me may find out that I'm not as capable as they think I am.
25.	Even though I feel that I have a lot of potential, I sometimes feel like an intellectual "fraud" or "phony."
26.	If I'm going to receive a promotion or gain recognition of some kind, I hesitate to tell others until it is an accomplished fact.
27.	I often achieve success on a project or test when I have anticipated that I would fail.
Perceived Discrepancy	
28.	I feel that I have attained my present academic or professional position through "pulling strings" or "having connections."
29.	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.

30. I often feel I receive praise or grades that I don't deserve.
31. If I get a high grade on a work assignment, I tend to feel that I've fooled my teacher or supervisor.
32. I obtained my present position because of something about me that I didn't work for (e.g., coming from an underrepresented group).
33. Sometimes I believe that my success in my life or in my job has been the result of some kind of error.
34. At times, I have felt I am in my present position or academic program through some kind of mistake.
35. I often feel that my success has been due to some kind of luck.
36. My achievements have been due more to external factors, such as luck or effort, rather than to my own inherent abilities.
37. On some occasions when someone has praised me for something, I tend to feel that I fooled them.
38. In some situations, I feel like a "great pretender": that is, I'm not as genuine as others think I am.
39. Sometimes I am afraid I will be discovered for who I really am.
40. I obtained my present position solely because of an affirmative action policy.
41. I often feel I am concealing secrets about my abilities from others.
42. I sometimes feel there's something false or misleading about me that others don't notice.
43. I feel that there is a significant disparity between the "intellectual self' that others perceive and the "intellectual self" that I really am.
44. I have sometimes convinced an important person that I am brighter or more talented than I really am.
45. People tend to believe I am more competent than I really am.
46. At a social event, I sometimes feel that I try to impress people by acting more intelligently than I really feel I am.
47. Significant people in my life tend to believe that I am more academically or professionally competent than I really am.
Self-Handicapping Behaviours
48. I find myself often leaving tasks to the last minute.
49. In preparing for deadlines, I often waste time doing other things.
50. I typically delay getting started on tasks because I worry that I'm not up to the challenge.
51. I worry about my ability to complete a task, and often end up delaying making decisions about the task until it is too late.
52. Mostly, I find that I measure up to the standards that I set for myself. (r)
53. My public and private self are the same person. (r)
54. I rarely do a project or task as well as I'd like to do it.

Personality: Big Five Inventory – 10
(Rammstedt & John, 2007)

Please take a moment to consider how well the following statements describe your personality.

Disagree Strongly 1	Disagree a Little 2	Neither Agree nor Disagree 3	Agree a Little 4	Agree Strongly 5

I see myself as someone who….

1. … is reserved. _____
2. … is generally trusting. _____
3. … tends to be lazy. _____
4. … is relaxed, handles stress well. _____
5. … has few artistic interests. _____
6. … is outgoing, sociable. _____
7. … tends to find fault with others. _____
8. … does a thorough job. _____
9. … gets nervous easily. _____
10. … has an active imagination. _____

Perfectionism: Big Three Perfectionism Scale – Short Form (BTPS-SF)
(Feher et al., 2019)

Instructions: *Please indicate how much you agree or disagree with each of the following statements.*

Disagree Strongly	Disagree	Neither agree nor disagree	Agree	Agree Strongly
1	2	3	4	5

Rigid perfectionism
1. I have a strong need to be perfect.
2. It is important to me to be perfect in everything I attempt.
3. Striving to be as perfect as possible makes me feel worthwhile.
4. My opinion of myself is tied to being perfect.

Self-critical perfectionism
5. The idea of making a mistake frightens me.
6. When I notice that I have made a mistake, I feel ashamed.
7. I have doubts about everything I do.
8. I judge myself harshly when I don't do something perfectly.
9. I feel disappointed with myself, when I don't do something perfectly.
10. People are disappointed in me whenever I don't do something perfectly.

Narcissistic perfectionism
11. I expect those close to me to be perfect.
12. I am highly critical of other people's imperfections.
13. I feel dissatisfied with other people, even when I know they are trying their best.
14. It bothers me when people don't notice how perfect I am.
15. I deserve to always have things go my way.
16. I know that I am perfect.

Self-Esteem: Rosenberg Self-Esteem Scale (RSES)
(Rosenberg, 1965)

Instructions: *Below is a list of statements related to your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.*

Strongly Agree	Agree	Disagree	Strongly Disagree
1	2	3	4

1. On the whole, I am satisfied with myself.
2. At times I think I am no good at all.
3. I feel that I have a number of good qualities.
4. I. am able to do things as well as most other people.
5. I feel I do not have much to be proud of.
6. I certainly feel useless at times.
7. I feel that I'm a person of worth, at least on an equal plane with others.
8. I wish I could have more respect for myself.
9. All in all, I am inclined to feel that I am a failure.
10. I take a positive attitude toward myself.

Psychological Distress: Depression, Anxiety, and Stress Scale (DASS-21)
(Lovibond & Lovibond, 1995)

Instructions: Please read each statement and select a number that indicates how much the statement applied to you **over the past week**. There are no right or wrong answers. Do not spend too much time on any statement.

Did not apply to me at all	Applied to me to some degree, or some of the time	Applied to me to a considerable degree, or a good part of the time	Applied to me very much, or most of the time
0	**1**	**2**	**3**

1. I found it hard to wind down
2. I was aware of dryness of my mouth
3. I couldn't seem to experience any positive feeling at all
4. I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)
5. I found it difficult to work up the initiative to do things
6. I tended to over-react to situations
7. I experienced trembling (e.g., in the hands)
8. I felt that I was using a lot of nervous energy
9. I was worried about situations in which I might panic and make a fool of myself
10. I felt that I had nothing to look forward to
11. I found myself getting agitated
12. I found it difficult to relax
13. I felt down-hearted and blue
14. I was intolerant of anything that kept me from getting on with what I was doing
15. I felt I was close to panic
16. I was unable to become enthusiastic about anything
17. I felt I wasn't worth much as a person
18. I felt that I was rather touchy
19. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)
20. I felt scared without any good reason
21. I felt that life was meaningless

Emotion Regulation: Coping in Stressful Situations Short Form (CISS-21)
(Endler & Parker, 1994)

Instructions: The following are ways people react to various difficult, stressful, or upsetting situations. Please select a number from 1 to 5 for each item. Indicate how much you engage in these types of activities when you encounter a difficult, stressful, or upsetting situation.

Not at All				**Very Much**
1	**2**	**3**	**4**	**5**

1. Focus on the problem and see how I can solve it
2. Blame myself for having gotten into this situation
3. Treat myself to a favourite food or snack
4. Think about how I have solved similar problems
5. Feel anxious about not being able to cope
6. Go out for a snack or meal
7. Determine a course of action and follow it
8. Blame myself for being too emotional about the situation
9. Buy myself something
10. Work to understand the situation
11. Become very upset
12. Visit a friend
13. Take corrective action immediately
14. Blame myself for not knowing what to do
15. Spend time with a special person
16. Think about the event and learn from my mistakes
17. Wish that I could change what had happened or how I felt
18. Phone a friend
19. Analyze the problem before reacting
20. Focus on my general inadequacies
21. Take time off and get away from the situation

Affect: Positive and Negative Affect Schedule (PANAS)
(Watson et al., 1988)

This scale consists of a number of words and phrases that describe different feelings and emotions. Please read each item and then indicate to what extent you have felt this way **during the past week**. Use the following scale to record your answers:

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1	2	3	4	5

Interested _____	Distressed_____	Excited _____
Upset _____	Strong _____	Guilty _____
Scared _____	Leave Blank _____	Enthusiastic _____
Proud _____	Irritable _____	Alert _____
Ashamed _____	Inspired _____	Nervous _____
Determined _____	Attentive _____	Jittery _____
Active _____	Hostile _____	Afraid _____

Burnout: Burnout Assessment Tool – Core Symptoms (BAT-C) - Adapted
(Schaufeli et al., 2020)

The following statements are related to your academic situation and how you experience this situation. Please state how often each statement applies to you **right now**.

Never	Rarely	Sometimes	Often	Always
1	2	3	4	5

Exhaustion

1. At school, I feel mentally exhausted
2. Everything I do at school requires a great deal of effort
3. After a day at school, I find it hard to recover my energy
4. At school, I feel physically exhausted
5. When I get up in the morning, I lack the energy to start a new day at school
6. I want to be active at school, but somehow, I am unable to manage
7. When I exert myself at school, I quickly get tired
8. At the end of my school day, I feel mentally exhausted and drained

Mental Distance

9. I struggle to find any enthusiasm for my schoolwork
10. At school, I do not think much about what I am doing and I function on autopilot
11. I feel a strong aversion towards my schooling
12. I feel indifferent about my academics
13. I'm cynical about what my academics means to others

Cognitive impairment

14. At school, I have trouble staying focused
15. At school I struggle to think clearly
16. I'm forgetful and distracted at school
17. When I'm at school, I have trouble concentrating
18. I make mistakes in my schoolwork because I have my mind on other things

Emotional impairment

19. At school, I feel unable to control my emotions
20. I do not recognize myself in the way I react emotionally at school
21. During my schoolwork I become irritable when things don't go my way
22. I get upset or sad at school without knowing why
23. At school I may overreact unintentionally

Appendix G

Study 3 Follow-up Questionnaire

Participant Follow-Up Questionnaire – Qualtrics

Project Title: IPSD: Student Beliefs and Experiences across Time (118033)

Principal Investigator:
[redacted]
Department of Psychology, UWO
Email: [redacted]

Additional Researchers:
[redacted], PhD Candidate: [redacted]

Impostor Phenomenon Assessment (IPA)

Please read each of the following statements carefully and indicate how characteristic it is of your own experiences.

1 Strongly Disagree	2 Moderately Disagree	3 Somewhat Disagree	4 Somewhat Agree	5 Moderately Agree	6 Strongly Agree

Doubts about Achievement	
1.	Even in situations for which I am well-prepared (e.g., studied very hard and long for an examination or worked tirelessly on a project), I still have doubts about my ability to perform well.
2.	I often feel that I have to work harder than others to achieve all that I do.
3.	I often get "down on myself' when I perform less than perfectly on a task or a problem.
4.	I often worry about not succeeding on a task, even though others around me have considerable confidence that I will do well.
5.	I often find myself putting more effort into tasks compared to others.
6.	When it comes to achieving and attaining goals, I suppose one might call me a "perfectionist".
7.	Others have told me that I often do more than necessary when it comes to completing a task.
8.	I often compare my ability to those around me and believe they are more intelligent than I am.
9.	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.
10.	When I've succeeded at something and received recognition for my accomplishments, I have doubts that I can keep repeating that success.
11.	I often feel like I have to put more effort into my tasks because I am not as smart as those around me.
12.	I'm often afraid that I will fail at a new assignment or undertaking even though I generally do well at what I attempt.
13.	I often find myself spending more time than necessary in completing tasks or assignments.
14.	When I'm praised for something, I sometimes wonder if I will be able to do as well the next time.
15.	I feel discouraged if I'm not "the best" or at least "very special" in situations that involve achievement.
16.	I often worry about whether others will view me as a success or a failure.
17.	I tend to remember the incidents where I have not done my best more than those times that I have done my best.

18. I often foresee failure when entering new situations that require a demonstration of my abilities.
19. I avoid evaluations if possible and have a dread of others evaluating me.
20. I try not to get too involved in competitive environments, so it won't hurt so much if I lose or do poorly.
21. I am often surprised when I perform well on a project or a test.
22. When I receive a compliment, I find it difficult to accept the compliment, and often explain it away or give credit to others.
23. When I receive a compliment about my academic or professional abilities, I sometimes find myself making excuses for explaining away the compliment.
24. I'm afraid people important to me may find out that I'm not as capable as they think I am.
25. Even though I feel that I have a lot of potential, I sometimes feel like an intellectual "fraud" or "phony."
26. If I'm going to receive a promotion or gain recognition of some kind, I hesitate to tell others until it is an accomplished fact.
27. I often achieve success on a project or test when I have anticipated that I would fail.
Perceived Discrepancy
28. I feel that I have attained my present academic or professional position through "pulling strings" or "having connections."
29. 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.
30. I often feel I receive praise or grades that I don't deserve.
31. If I get a high grade on a work assignment, I tend to feel that I've fooled my teacher or supervisor.
32. I obtained my present position because of something about me that I didn't work for (e.g., coming from an underrepresented group).
33. Sometimes I believe that my success in my life or in my job has been the result of some kind of error.
34. At times, I have felt I am in my present position or academic program through some kind of mistake.
35. I often feel that my success has been due to some kind of luck.
36. My achievements have been due more to external factors, such as luck or effort, rather than to my own inherent abilities.
37. On some occasions when someone has praised me for something, I tend to feel that I fooled them.
38. In some situations, I feel like a "great pretender": that is, I'm not as genuine as others think I am.
39. Sometimes I am afraid I will be discovered for who I really am.
40. I obtained my present position solely because of an affirmative action policy.
41. I often feel I am concealing secrets about my abilities from others.
42. I sometimes feel there's something false or misleading about me that others don't notice.
43. I feel that there is a significant disparity between the "intellectual self' that others perceive and the "intellectual self" that I really am.
44. I have sometimes convinced an important person that I am brighter or more talented than I really am.
45. People tend to believe I am more competent than I really am.
46. At a social event, I sometimes feel that I try to impress people by acting more intelligently than I really feel I am.
47. Significant people in my life tend to believe that I am more academically or professionally competent than I really am.
Self-Handicapping Behaviours
48. I find myself often leaving tasks to the last minute.
49. In preparing for deadlines, I often waste time doing other things.
50. I typically delay getting started on tasks because I worry that I'm not up to the challenge.
51. I worry about my ability to complete a task, and often end up delaying making decisions about the task until it is too late.
52. Mostly, I find that I measure up to the standards that I set for myself. (r)
53. My public and private self are the same person. (r)
54. I rarely do a project or task as well as I'd like to do it.

Psychological Distress: Depression, Anxiety, and Stress Scale (DASS-21)
(Lovibond & Lovibond, 1995)

Instructions: Please read each statement and select a number that indicates how much the statement applied to you **over the past two weeks**. There are no right or wrong answers. Do not spend too much time on any statement.

Did not apply to me at all	Applied to me to some degree, or some of the time	Applied to me to a considerable degree, or a good part of the time	Applied to me very much, or most of the time
0	**1**	**2**	**3**

1. I found it hard to wind down
2. I was aware of dryness of my mouth
3. I couldn't seem to experience any positive feeling at all
4. I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion)
5. I found it difficult to work up the initiative to do things
6. I tended to over-react to situations
7. I experienced trembling (e.g., in the hands)
8. I felt that I was using a lot of nervous energy
9. I was worried about situations in which I might panic and make a fool of myself
10. I felt that I had nothing to look forward to
11. I found myself getting agitated
12. I found it difficult to relax
13. I felt down-hearted and blue
14. I was intolerant of anything that kept me from getting on with what I was doing
15. I felt I was close to panic
16. I was unable to become enthusiastic about anything
17. I felt I wasn't worth much as a person
18. I felt that I was rather touchy
19. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat)
20. I felt scared without any good reason
21. I felt that life was meaningless

Affect: Positive and Negative Affect Schedule (PANAS)
(Watson et al., 1988)

This scale consists of a number of words and phrases that describe different feelings and emotions. Please read each item and then indicate to what extent you have felt this way **during the past two weeks**. Use the following scale to record your answers:

Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1	2	3	4	5

Interested _____	Distressed _____	Excited _____
Upset _____	Strong _____	Guilty _____
Scared _____	Leave Blank _____	Enthusiastic _____
Proud _____	Irritable _____	Alert _____
Ashamed _____	Inspired _____	Nervous _____
Determined _____	Attentive _____	Jittery _____
Active _____	Hostile _____	Afraid _____

Burnout: Burnout Assessment Tool – Core Symptoms (BAT-C) - Adapted
(Schaufeli et al., 2020)

The following statements are related to your academic situation and how you experience this situation. Please state how often each statement applies to you **in the past two weeks**.

Never	Rarely	Sometimes	Often	Always
1	2	3	4	5

Exhaustion

1. At school, I feel mentally exhausted
2. Everything I do at school requires a great deal of effort
3. After a day at school, I find it hard to recover my energy
4. At school, I feel physically exhausted
5. When I get up in the morning, I lack the energy to start a new day at school
6. I want to be active at school, but somehow, I am unable to manage
7. When I exert myself at school, I quickly get tired
8. At the end of my school day, I feel mentally exhausted and drained

Mental Distance

9. I struggle to find any enthusiasm for my schoolwork
10. At school, I do not think much about what I am doing and I function on autopilot
11. I feel a strong aversion towards my schooling
12. I feel indifferent about my academics
13. I'm cynical about what my academics means to others

Cognitive impairment

14. At school, I have trouble staying focused
15. At school I struggle to think clearly
16. I'm forgetful and distracted at school
17. When I'm at school, I have trouble concentrating
18. I make mistakes in my schoolwork because I have my mind on other things

Emotional impairment

19. At school, I feel unable to control my emotions
20. I do not recognize myself in the way I react emotionally at school
21. During my schoolwork I become irritable when things don't go my way
22. I get upset or sad at school without knowing why
23. At school I may overreact unintentionally

Appendix H

Study 1 and 2 Debriefing

Western

Debriefing Form

Project Title: IPSD: Student Beliefs and Experiences (118033)

Principal Investigator:
[redacted]
Department of Psychology, UWO
Email: [redacted]

Additional Researchers:
[redacted] PhD Candidate: [redacted]

Thank you for your participation in this study. The purpose of the current study is to examine the beliefs and experiences of students with the goal of developing a new measurement for the experience of Impostor Phenomenon. People who experience Impostor Phenomenon, also known as the experience of "feeling like a fraud", often doubt their abilities and accomplishments, seeing their own abilities as being incompetent (despite any evidence to suggest the contrary), or attributing their successes to external factors such as luck. The data collected for the present study will be used in the development of a new measurement of Impostor Phenomenon.

Please feel free to consult the below references for further information about Impostor Phenomenon:

- Bravata, D. M., Watts, S. A., Keefer, A. L., Madhusudhan, D. K., Taylor, K. T., Clark, D. M., Nelson, R. S., Cokley, K. O., & Hagg, H. K. (2020). Prevalence, Predictors, and Treatment of Impostor Syndrome: A Systematic Review. *Journal of General Internal Medicine*, *35*(4), 1252–1275. https://doi.org/10.1007/s11606-019-05364-1
- Clance, P. R., & Imes, S. A. (1978). The imposter phenomenon in high achieving women: Dynamics and therapeutic intervention. *Psychotherapy: Theory, Research & Practice*, *15*(3), 241–247. https://doi.org/10.1037/h0086006
- Parkman, A. (2016). The imposter phenomenon in higher education: Incidence and impact. *Journal of Higher Education Theory and Practice, 16*(1), 51-60.

If you have any questions or concerns, please contact [redacted] by email at: [redacted]
If you are experiencing distress in any way, please see below for a list of resources at Western and in the London community that can assist you.
Thank you,

[redacted] **PhD Candidate**
Department of Psychology
Email: [redacted]

If you or someone you know is experiencing distress, there are several resources here at Western to assist you. Please visit: http://www.uwo.ca/uwocom/mentalhealth/ for more information on these resources and on mental health. See also the list of available services below.

The Student Development Centre at the University of Western Ontario

- Individual appointments are available for students. To make an appointment you can call [redacted] or you can make an appointment in person at the Reception Desk, Room 4100 of the Western Student Services Building.
- Psychological Services Staff will make every effort to respond as quickly as possible when an individual student requires an emergency appointment.
- Psychological Services Staff can help you deal with a variety of issues including those related to Traumatic Events, Sexual or Physical Assault, Date rape, Interpersonal Violence, and Gay, Lesbian, Bisexual, or Transgendered situations.
- More information about the services offered at SDC can be found at **http://www.sdc.uwo.ca/**

London Crisis Centres

Psychological Services Staff will make every effort to respond as quickly as possible when an individual requires an emergency appointment. If you are in crisis when the office is closed, please call one of the numbers listed below.

- **Mental Health and Addictions Crisis Centre**:[redacted]
- **Sexual Assault Centre London Crisis Line**:[redacted]
- Also 24 hour support line for sex trade workers: [redacted]
- **Women's Community House Help Line**:[redacted]
- Out-of-town calls:[redacted]

Student Health Services Counselling Centre

- SHS is located in **Room 11, (Lower Level) University Community Centre**, Western U., Main telephone line:[redacted]
- The Student Health Services Counselling Centre provides individual counselling for students. The Counselling Centre can be reached at[redacted]
- The Counselling Centre's Hours of Operation are as follows: Monday to Friday 8:30 a.m. - 4:30 p.m. (Please note the Counselling Centre will be closed when the university is closed.)

Canadian Mental Health Association – Middlesex (including London)

- CMHA offers a variety of services to residents of London and the wider Middlesex County; for more information about programs offered visit http://cmhamiddlesex.ca/programs/
- The London site is located at [redacted], telephone number:[redacted]
- Hours of operation at the London site are 8:30am to 4:30pm, Monday to Friday

Family Services Thames Valley

- Family Services Thames Valley is located at [redacted] A community service that provides counselling for individuals, couples, and families.
- FSTV also offers a weekly walk-in clinic for individuals, couples, and families in the community coping with mental health, emotional, or relational concerns.
- As no appointments are necessary, counselling sessions at the walk-in clinic are offered on a first-come, first-served basis.
- Walk-in clinic sessions will be available on Tuesdays from 1pm to 6:30pm.
- Financial limitations will not be a barrier to accessing resources, as a sliding scale may be used in the event that fees are applicable for services.

Emergencies After Hours

- If you are in distress during an after-hours time, please go to the **nearest hospital emergency room**.
- **On Campus:** University Hospital:[redacted]
- **South London:** Victoria Hospital: [redacted]
- **North London:** St. Joseph's Hospital: [redacted]

Referrals to Other Resources

- Family physicians can provide you with counselling services, and can make referrals to other community resources as needed.
- Specialized services for emotional and interpersonal problems are available, however, a referral from a physician is often necessary.

We hope that this information is helpful to those who need it.

If you are suffering from distress, we encourage you to seek help from an appropriately qualified individual or service centre. Please contact a University or Community Agency that can help you, or to speak with a physician who can refer you to the appropriate resource.

Appendix I

Study 3 Debriefing

Western

Thank you for participating in the initial questionnaire component of this study. You now have the option of participating in phase two of the study, which involves monthly follow-ups throughout the course of the academic year (i.e., 6 follow-up surveys).

If you would like to participate in the follow-up component of this study, please include your email below. Please note that your survey responses will not be linked with your email address, and all data will remain confidential. For follow-up purposes, you will be assigned a randomized and unique ID code that will link your follow-up surveys. This code will be removed from the data following the end of the study. If you choose to participate in the follow-up surveys, you will receive one entry into a draw for every survey in which you participate (i.e., 6 draws for a chance to win a $10 gift card), and those who participate in all six follow-ups will be entered for a chance to win a $100 gift card.
If you do not wish to participate in the follow-up surveys, you will not be penalized.

☐ **Yes, I would like to participate in the follow-up surveys conducted monthly during the academic school year. I consent to receiving the survey links via email on a monthly basis.** *(Participant directed to interim debriefing form)*

Please provide your email address here: _____

☐ **No, I do not wish to participate in the follow-up surveys.** *(Participant directed to final debriefing form)*

Interim Debriefing Form

Project Title: IPSD**:** Student Beliefs and Experiences across Time (118033)

Principal Investigator:
[redacted]
Department of Psychology, UWO
Email: [redacted]

Additional Researchers:
[redacted], PhD Candidate: [redacted]

Thank you for your participation in the initial phase of this study! As you have indicated interest in participating in the follow-up component of the study, we will provide you with a thorough debriefing of the study goals and intent at the end of the academic year. We will contact you at the email address provided once a month with the link to the survey to participate in the follow-up. Your email address will not be linked with your data. For follow-up purposes, you will be assigned a randomized and unique ID code that will link your follow-up surveys. This code will be removed from the data following the end of the study.

If you have any questions or concerns, please contact [redacted] by email at: [redacted]
If you are experiencing distress in any way, please see below for a list of resources at Western and in the London community that can assist you.
Thank you,

[redacted], **PhD Candidate**
Department of Psychology
Email: [redacted]

Final Debriefing Form

Project Title: IPSD**:** Student Beliefs and Experiences across Time (118033)

Principal Investigator:
[redacted]
Department of Psychology, UWO
Email: [redacted]

Additional Researchers:
[redacted], PhD Candidate: [redacted]

Thank you for your participation in this study. The purpose of the current study is to examine the beliefs and experiences of students with the goal of developing a new measurement for the experience of Impostor Phenomenon. People who experience Impostor Phenomenon, also known as the experience of "feeling like a fraud", often doubt their abilities and accomplishments, seeing their own abilities as being incompetent (despite any evidence to suggest the contrary), or attributing their successes to external factors such as luck. We are interested in examining how Impostor Phenomenon relates to constructs including perfectionism, self-esteem, personality, and stress. Through the use of longitudinal follow-up, we will also assess the stability of Impostor Phenomenon over the course of the academic year, and how it relates to stress and burnout in university students. The data collected for the present study will be used in the development and validation of a new measurement of Impostor Phenomenon.

Please feel free to consult the below references for further information about Impostor Phenomenon:

- Bravata, D. M., Watts, S. A., Keefer, A. L., Madhusudhan, D. K., Taylor, K. T., Clark, D. M., Nelson, R. S., Cokley, K. O., & Hagg, H. K. (2020). Prevalence, Predictors, and Treatment of Impostor Syndrome: A Systematic Review. *Journal of General Internal Medicine*, *35*(4), 1252–1275. https://doi.org/10.1007/s11606-019-05364-1
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Department of Psychology
Email: [redacted]

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- **North London:** [redacted]

Referrals to Other Resources

- Family physicians can provide you with counselling services, and can make referrals to other community resources as needed.
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We hope that this information is helpful to those who need it.

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Appendix J

Supplemental Tables

Table J1

Conceptualized 'Factors' in Existing Literature

Authors	***Factors***
Clance & Imes (1978)	Approval-seeking (charm, perceptiveness) Denial of competence Discounting praise External attribution of success (luck, effort) Fear of failure Intellectual inauthenticity
Harvey (1981)	Attributional style Reinforcing effects of situations Self-presentation Self-perception Self-esteem
Clance (1985)	Denial of competence Discounting positive feedback Fear and guilt surrounding failure and success Impostor cycle Need to be special/the very best Over-preparation Procrastination Super-person aspects
Clance & O'Toole (1987)	Impostor cycle Introversion Dread of evaluation Terror of failure Guilt about success Great difficulty internalizing positive feedback Generalized anxiety Overestimating others and underestimating oneself Skewed definition of intelligence False and non-affirming family messages
Harvey & Katz (1985)	Belief that has fooled others External attribution of success Fear of being exposed
Edwards et al. (1987)	Impostor Unworthiness
Kolligian & Sternberg (1991)	Inauthenticity Impression management, self-monitoring Self-deprecation / self-criticism
Friedman-Buchalter (1992)	Congruence of achievement and competence Sense of competence Not an impostor Self-esteem of intellectual ability
Holmes et al. (1993)	Intellectual phony, fraud, impostor

	Difficulty accepting praise, believing it is deserved Disappointed in accomplishments, believes should have done more Fears others discovering lack of knowledge or ability Fears failure, fears cannot repeat success Tends to succeed even though feared failure before trying Afraid cannot live up to expectations Feels less capable than others or that not as bright despite objective evidence to the contrary Believes ritualistic behaviours necessary to ensure success Prefers low-level or unchallenging positions because fears will fail in position commensurate with ability Unable to internalize success, persists in belief in own ability despite accumulating objective evidence to the contrary
Chrisman et al. (1995)	Discounting Faking Luck
Byrnes & Lester (1995)	General hiding Hiding negative qualities Hiding positive qualities
Hellman & Caselman, (2004)	Self-confidence Core characteristics of impostor phenomenon (excessive subjective feelings of phoniness
Kets de Vries (2005)	Fear of failure or success Perfectionism Procrastination Workaholic personality
Want & Kleitman (2006)	Discrepant appraisals of outcomes Disregarding success Low appraisals of outcomes
Fujie (2010)	Feelings of fraudulence towards others Subjective incompetence
Lane (2015)	Perceived fraudulence Discrediting evidence of competence Self-doubt Comparison to others, evaluation
Ibrahim et al., (2020)	Competence doubt Working style Alienation Other-self divergence Frugality Need for sympathy

Table J2

Longitudinal Timeline and Participation

Follow-Up	Date	Participants	Consented	No Consent	Fully Complete	Partially Complete	Consent Only
1	October 25, 2021	228	227	1	188	16	24
2	November 29, 2021	167	164	3	132	16	19
3	January 2, 2022	148	148	0	118	5	25
4	February 9, 2022	122	122	0	106	3	13
5	April 14, 2022	96	96	0	79	8	9
6	May 12, 2022	91	91	0	78	5	8

Appendix K

Final Impostor Phenomenon Assessment (IPA) Measure

Please read each of the following statements carefully and indicate how characteristic it is of your own experiences.

1 Strongly Disagree	2 Moderately Disagree	3 Somewhat Disagree	4 Somewhat Agree	5 Moderately Agree	6 Strongly Agree

Doubts about Achievement
1. Even in situations for which I am well-prepared (e.g., studied very hard and long for an examination or worked tirelessly on a project), I still have doubts about my ability to perform well.
2. I often feel that I have to work harder than others to achieve all that I do.
3. I often get "down on myself' when I perform less than perfectly on a task or a problem.
4. I often worry about not succeeding on a task, even though others around me have considerable confidence that I will do well.
5. I often find myself putting more effort into tasks compared to others.
6. When it comes to achieving and attaining goals, I suppose one might call me a "perfectionist".
7. Others have told me that I often do more than necessary when it comes to completing a task.
8. I often compare my ability to those around me and believe they are more intelligent than I am.
9. 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.
10. When I've succeeded at something and received recognition for my accomplishments, I have doubts that I can keep repeating that success.
11. I often feel like I have to put more effort into my tasks because I am not as smart as those around me.
12. I'm often afraid that I will fail at a new assignment or undertaking even though I generally do well at what I attempt.
13. I often find myself spending more time than necessary in completing tasks or assignments.
14. When I'm praised for something, I sometimes wonder if I will be able to do as well the next time.
15. I feel discouraged if I'm not "the best" or at least "very special" in situations that involve achievement.
16. I often worry about whether others will view me as a success or a failure.
17. I tend to remember the incidents where I have not done my best more than those times that I have done my best.
18. I often foresee failure when entering new situations that require a demonstration of my abilities.
19. I avoid evaluations if possible and have a dread of others evaluating me.
20. I try not to get too involved in competitive environments, so it won't hurt so much if I lose or do poorly.
21. I am often surprised when I perform well on a project or a test.
22. When I receive a compliment, I find it difficult to accept the compliment, and often explain it away or give credit to others.
23. When I receive a compliment about my academic or professional abilities, I sometimes find myself making excuses for explaining away the compliment.
24. I'm afraid people important to me may find out that I'm not as capable as they think I am.
25. Even though I feel that I have a lot of potential, I sometimes feel like an intellectual "fraud" or "phony."

26. If I’m going to receive a promotion or gain recognition of some kind, I hesitate to tell others until it is an accomplished fact.
27. I often achieve success on a project or test when I have anticipated that I would fail.
Perceived Discrepancy
28. I feel that I have attained my present academic or professional position through "pulling strings" or "having connections."
29. 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.
30. I often feel I receive praise or grades that I don't deserve.
31. If I get a high grade on a work assignment, I tend to feel that I’ve fooled my teacher or supervisor.
32. I obtained my present position because of something about me that I didn't work for (e.g., coming from an underrepresented group).
33. Sometimes I believe that my success in my life or in my job has been the result of some kind of error.
34. At times, I have felt I am in my present position or academic program through some kind of mistake.
35. I often feel that my success has been due to some kind of luck.
36. My achievements have been due more to external factors, such as luck or effort, rather than to my own inherent abilities.
37. On some occasions when someone has praised me for something, I tend to feel that I fooled them.
38. In some situations, I feel like a "great pretender": that is, I'm not as genuine as others think I am.
39. Sometimes I am afraid I will be discovered for who I really am.
40. I obtained my present position solely because of an affirmative action policy.
41. I often feel I am concealing secrets about my abilities from others.
42. I sometimes feel there's something false or misleading about me that others don't notice.
43. I feel that there is a significant disparity between the "intellectual self' that others perceive and the "intellectual self" that I really am.
44. I have sometimes convinced an important person that I am brighter or more talented than I really am.
45. People tend to believe I am more competent than I really am.
46. At a social event, I sometimes feel that I try to impress people by acting more intelligently than I really feel I am.
47. Significant people in my life tend to believe that I am more academically or professionally competent than I really am.
Self-Handicapping Behaviours
48. I find myself often leaving tasks to the last minute.
49. In preparing for deadlines, I often waste time doing other things.
50. I typically delay getting started on tasks because I worry that I'm not up to the challenge.
51. I worry about my ability to complete a task, and often end up delaying making decisions about the task until it is too late.
52. Mostly, I find that I measure up to the standards that I set for myself. (r)
53. My public and private self are the same person. (r)
54. I rarely do a project or task as well as I’d like to do it.

CURRICULUM VITAE
DEANNA L. WALKER, M.A.

EDUCATION

2017 – Present **Doctor of Philosophy: Clinical Science and Psychopathology** – *Western University*
Under the supervision of Dr. Donald H. Saklofske
Dissertation Title: *The initial development, factor structure, and validation of the Impostor Phenomenon Assessment (IPA): A novel assessment of impostor phenomenon.*

2015 - 2017 **Masters of Arts: Psychology –** *Carleton University*
Under the supervision of Dr. Cheryl Harasymchuk
Thesis Title: "*Let's have a date night!": The role of approach relationship goals in self-expanding relationship activities.*

2011 - 2015 **Bachelor of Arts, Honours: Psychology** – *Carleton University*
Under the supervision of Dr. John M. Zelenski
Thesis Title: *Why are we happier when we act extraverted? Examining social connectedness in well-being interventions.*

ACADEMIC PUBLICATIONS AND PRESENTATIONS

PEER-REVIEWED PUBLICATIONS

Walker, D. L. (in press). Highlighting the need for improved suicide training in psychology programs. *MindPad.*

van Allen, Z., Walker, D. L., Streiner, T., & Zelenski, J. M. (2021). Enacted extraversion as a well-being enhancing strategy in everyday life: Testing across three, week-long interventions. *Collabra: Psychology, 7*(1).

Bentley, M.*, Walker, D. L., Babcock, S., & Saklofske, D. (2021). Dark leaders: Examining the relation between dark triad personality traits and leadership styles in business students. *Western Undergraduate Psychology Journal, 9*(1).

Harasymchuk, C., Walker, D. L., Muise, A., & Impett, A. (2021). Planning date nights that promote closeness: The roles of relationship goals and self-expansion. *Journal of Social and Personal Relationships, 38*(5), 1692-1709.

Wilson, C., Walker, D. L., & Saklofske, D. H. (2020). Developing a model of resilience in older adulthood: A qualitative meta-synthesis. *Ageing and Society*, *41*(8), 1920-1942.

** denotes Honour's Thesis student under my supervision*

MANUSCRIPTS UNDER REVIEW

Plouffe, R. A., Nazarov, A., Forchuk, C. A., Gervasio, J., Le, T., Liu, J. J. W., Nouri, M. S., Trahair, C., Walker, D. L., & Richardson, J. D. (under review). The roles of personality and resilience in associations between combat experiences and posttraumatic stress disorder among Canadian Armed Forces Veterans. Manuscript submitted, *Journal of Research in Personality.*

Walker, D. L., & Saklofske, D. H. (under review). *The initial development, factor structure, and validation of the Impostor Phenomenon Assessment (IPA): A novel assessment of impostor phenomenon.* Manuscript submitted, *Assessment.*

Walker, D. L., Bacev-Giles, C., Harasymchuk, C. (under review). *Challenges in self-expanding relationship activities and the role of growth and destiny beliefs*. Manuscript submitted, *Interpersona.*

Nelson, C. G., Dossett, K., & Walker, D. L. (under review). *Equine-assisted therapy for posttraumatic stress disorder among first responders.* Manuscript submitted, *Psychological Reports.*

Walker, D. L., Dave, H., Kowalski, C. M., Plouffe, R. A., Fiori, M., & Saklofske, D. H. (under review). *Emotion regulation as a moderator of the ability emotional intelligence-stress reactivity relationship.* Manuscript submitted, *Journal of Individual Differences.*

BOOK CHAPTERS

Plouffe, R. A., Walker, D. L., Johnson, L. K., Kowalski, C. M., & Forchuk, C. A. (2021). Assessment of sadistic personality. In Jonason, P. K. (Editor-in-Chief), *Shining light on the dark side of personality: Measurement properties and theoretical advances.* Boston, MA: Hogrefe.

Walker, D. L. (2020). Extraversion-introversion. In B. J. Carducci (Editor-in-Chief) & C. S. Nave (Vol. Ed.), The *Wiley-Blackwell encyclopedia of personality and individual differences: Volume I. Models and theories.* Hoboken, NJ: John Wiley & Sons.

CONFERENCE PROCEEDINGS

Plouffe, R. A., Nazarov, A., Forchuk, C. A., Gervasio, J., Le, T., Liu, J. J. W., Nouri, M. S., Trahair, C., Walker, D. L., & Richardson, J. D. (2022). *Roles of personality and resilience in associations between combat experiences and posttraumatic stress disorder among Canadian Armed Forces Veterans.* Paper presented at the Canadian Institute for Military and Veteran Health Research Forum, Halifax, Nova Scotia.

Plouffe, R. A., Nazarov, A., Forchuk, C. A., Gervasio, J., Le, T., Liu, J. J. W., Nouri, M. S., Trahair, C., Walker, D. L., & Richardson, J. D. (2022). *The roles of personality and resilience in associations between combat experiences and posttraumatic stress disorder among Canadian Armed Forces Veterans.* Paper presented at the International Society for Traumatic Stress Studies 38th Annual Meeting, Atlanta, Georgia.

Walker, D. L., Harasymchuk, C., & Bacev-Giles, C. (2019, June). *Challenges in shared relationship activities: Towards a perceptual model of growth in self-expanding activities.* Poster session presented at the International Association of Relationship Research, Ottawa, Ontario.

Harasymchuk, C. & Walker, D. L. (2018, January). *Personal growth from date nights: A self-expansion explanation.* Poster session presented at the Annual Convention of the Society for Personality and Social Psychology, Atlanta, Georgia.

Walker, D. L. & Harasymchuk, C. (2017, June). *Plan a date!: Self-expanding relationship activities and the role of relationship goals.* Paper presented at the meeting of the International Association for Relationship Research, Syracuse, NY.

Walker, D. L., Zelenski, J. M., & van Allen, Z. (2017, January). *Why are we happier when we act extraverted?: Examining social connectedness and novelty in well-being interventions.* Poster session presented at the Annual Convention of the Society for Personality and Social Psychology, San Antonio, Texas.

Walker, D. L. & Harasymchuk, C. (2017, January). *Plan a date!: Self-expanding relationship activities and the role of approach relationship goals.* Paper presented at the Carleton University Psychology Graduate Student Conference, Ottawa, Ontario.

Walker, D. L., & Zelenski, J. M. (2015, April). *Why are we happier when we act extraverted? Examining social connectedness in well-being interventions.* Poster session presented at the Annual Carleton University Psychology Undergraduate Research Event, Ottawa, Ontario.

INVITED TALKS

Walker, D. L. (2022, June). *Thriving in the face of stress: Positive psychology strategies for distress tolerance.* Invited symposium at Middlesex London Paramedic Services Peer Support Symposium, London, Ontario.

Walker, D. L. (2020, February). *Thrive: Positive psychology strategies for your everyday life.* Invited workshop presented at Bostwick Community Centre as part of the Advocacy Through Action Public Lecture Series, London, Ontario.

WORKSHOPS AND COMMUNITY OUTREACH

Walker, D. L. (2021, February). *From surviving to thriving: Positive psychology strategies for promoting your everyday mental health.* Workshop presented at the Advocacy Through Action Public Lecture Series, London, Ontario.

Yosopov, L., & Walker, D. L. (2020, February). *Perfectionism.* Talk presented at the Advocacy Through Action Public Lecture Series, London, Ontario.

Walker, D. L. (2020, February). *Distress tolerance.* Talk presented at the Advocacy Through Action Public Lecture Series, London, Ontario.

Walker, D. L. (2020, February). *Thrive: Positive psychology strategies for your everyday life.* Workshop presented at Advocacy Through Action Public Lecture Series, London, Ontario.

Walker, D. L. (2019, February). *Thrive: Positive psychology strategies for your everyday life.* Talk presented at Advocacy Through Action Public Lecture Series, London, Ontario.

Sarmiento, C., & Walker, D. L. (2019, February). *Distress tolerance: Coping with crisis.* Talk presented at the Advocacy Through Action Public Lecture Series, London, Ontario.

Walker, D. L., & Sarmiento, C. (2018, October). *Distress tolerance: Coping with crisis.* Workshop presented via the Laura Evans Wellness Lecture Series, Western University Psychological Services, London, Ontario.

TEACHING EXPERIENCES

GUEST LECTURES

Mental Illness and the Criminal Justice System– Abnormal Psychology, University of Waterloo (2019)
Trauma Resilience and Post Traumatic Growth – Psychological Trauma, Western University (2018)
Psychology: The Science of Behaviour – Introduction to Psychology, Western University (2017)

TEACHING CERTIFICATION

Advanced Teaching Program Certificate, Teaching Support Services, Western University (2017)
Teaching Mentor Program, Teaching Support Services, Western University (2017)

TEACHING ASSISTANTSHIPS

Prosocial and Antisocial Behaviour, Western University (Fall 2020, Winter 2021, Fall 2021)
Research Methods and Statistical Analysis in Psychology, Western University (Fall 2019, Winter 2020)
Human Sexuality, Western University (Winter, 2019)
Psychological Trauma, Western University (Fall, 2018)
Attitudes and Attitude Change, Western University (Winter, 2018)
Introduction to Psychology, Western University (Fall, 2017)
Social Psychology, Carleton University (Winter, 2017)
Positive Psychology, Carleton University (Winter, 2016; Fall, 2016)
Forensic Psychology, Carleton University (Fall, 2015)
Sports & Motivation Psychology, Carleton University (Summer, 2014; Winter, 2015)
Personality Psychology, Carleton University (Winter, 2014; Winter, 2016)

SUPERVISED UNDERGRADUATE HONOURS THESES

Madison Bentley (2020-2021)
Thesis Title: *Dark leaders: Examining the relation between dark triad personality traits and leadership styles in business students.*

Morgan Rochette (2019-2020)
Thesis Title: *Self-esteem as a mediator between perfectionism and the imposter phenomenon.*

Claudia Czechkowski (2018-2019)
Thesis Title: *Mental health service utilization by older adults: The influence of social support, personality, and coping skills.*

SUPERVISED UNDERGRADUATE RESEARCH ASSISTANTS

Malak Sadek (2021)
Carmen Wong (2021)
Sreenija Pappur (2021)
Geetha Samy (2021)

PROFESSIONAL AFFILIATIONS

American Psychological Association
APA Division 12: Section for Clinical Psychology
APA Section 10: Graduate Student and Early Career Psychologists
Association for Psychological Science
Canadian Psychological Association
Canadian Positive Psychology Association
International Association of Relationship Researchers
Ontario Psychological Association
Society for Personality and Social Psychology

PROFESSIONAL SERVICE

Association for Psychological Science (*Review Student Research Awards & Student Grant Awards)*
Journal of Social and Personal Relationships (*Peer Review)*
Society for Personality and Social Psychology (*Review Graduate Student Poster Awards)*
Western Undergraduate Psychology Journal (*Peer Review)*