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Latent Class Analysis of Cognitive Load Profiles in Women Experiencing Impostor Phenomenon: Implications for Academic Persistence

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A B S T R A C T

Objective: The objective of this study was to identify latent cognitive load profiles among female university students experiencing the Impostor Phenomenon and to evaluate the subsequent implications of these distinct profiles for their academic persistence.

Methods and Materials: Employing a quantitative, cross-sectional survey design, data were collected from a sample of 715female university students in Chile who reported experiencing the Impostor Phenomenon. Participants completed online self-report measures, including the Clance Impostor Phenomenon Scale, a multidimensional cognitive load inventory (assessing intrinsic, extraneous, and germane load), and an Academic Persistence Scale. Latent Class Analysis (LCA) was utilized to identify unobserved cognitive load profiles, and a robust three-step approach was applied to assess significant differences in the distal outcome of academic persistence across the emergent latent classes.

Findings: Correlational analyses initially revealed that the Impostor Phenomenon was positively associated with extraneous cognitive load and negatively associated with both germane cognitive load and academic persistence. Based on model fit indices, LCA supported a three-class model: (1) an Adaptive Cognitive Load profile (34.8%, $n = 249$), characterized by moderate intrinsic, the lowest extraneous, and the highest germane load; (2) an Extraneously Overloaded profile (46.2%, $n = 330$), characterized by high intrinsic, the highest extraneous, and the lowest germane load; and (3) a Compensatory Cognitive Load profile (19.0%, $n = 136$), characterized by the highest intrinsic, moderately high extraneous, and relatively high germane load. Academic persistence varied significantly among these profiles; the Adaptive class reported the highest persistence ($M = 4.25, SE = 0.08$), the Compensatory class reported moderate persistence ($M = 3.78, SE = 0.12$), and the Extraneously Overloaded class demonstrated the significantly lowest persistence ($M = 2.85, SE = 0.09$).

Conclusion: The Impostor Phenomenon functions as a critical cognitive bottleneck that generates a paralyzing extraneous cognitive load, severely hindering germane learning processes and significantly reducing long-term academic persistence among female university students.

Keywords: *Impostor Phenomenon; Cognitive Load Theory; Latent Class Analysis; Academic Persistence; Female University Students; Higher Education.*

1. Introduction

The Impostor Phenomenon represents a pervasive and debilitating psychological experience wherein high-achieving individuals harbor a deep-seated, internalized fear of being exposed as an intellectual fraud, despite possessing verifiable, objective evidence of their competence and sustained success. Originating from early clinical observations, the construct of the Impostor Phenomenon has evolved into a critical area of inquiry across diverse academic, professional, and clinical domains due to its profound capacity to disrupt individual functioning. Research has extensively documented the wide-ranging and detrimental effects of the Impostor Phenomenon on essential workplace outcomes, severely undermining employee well-being, overall task performance, and long-term career satisfaction (Swaidan, 2025). This internalized self-doubt is not confined to a single demographic, industry, or level of expertise; rather, personal accounts and rigorous empirical studies alike reveal its insidious presence in highly varied professional environments, often necessitating conscious, prolonged journeys to confront, manage, and ultimately overcome such paralyzing self-doubt in the workplace (Westover, 2025). The phenomenon notably transcends cultural and occupational boundaries, manifesting prominently among leadership roles, such as Korean daycare directors, where qualitative explorations utilizing grounded theory have uncovered complex, deeply ingrained dynamics of professional inadequacy and systemic pressure (Choi & Lee, 2025). Similarly, in high-stress healthcare environments, the Impostor Phenomenon operates as a powerful catalyst for burnout; for example, among Chinese nurses, these feelings significantly exacerbate severe emotional exhaustion, a relationship that is intricately mediated by the bidirectional pressures of work-family conflict (Li et al., 2025). Furthermore, the psychological ubiquity of the Impostor Phenomenon is such that it frequently co-occurs as a complicating common feature alongside other distressing somatic and clinical conditions, such as primary hyperhidrosis, thereby exponentially compounding the overall psychological burden and reducing the quality of life experienced by affected individuals (Shayesteh et al., 2024).

While the Impostor Phenomenon is highly prevalent in the professional workforce, it is arguably even more endemic and disruptive within the competitive confines of higher education environments. A comprehensive systematic review of the Impostor Phenomenon specifically localized within higher education highlights its extensive prevalence and severe detrimental consequences for both university students and faculty members, emphasizing the critical, unmet need for targeted, systemic institutional interventions (Yang et al., 2024). The urgency of addressing the Impostor Phenomenon within educational institutions cannot be overstated, as the persistent fear of intellectual illegitimacy directly undermines the primary institutional objectives of healthy intellectual development, collaborative learning, and student psychological well-being (Tasya et al., 2024). Interestingly, proactive integration into the university community does not necessarily serve as a protective buffer against these feelings. For instance, active participation in campus life, such as involvement in student organizations, does not insulate individuals; in fact, understanding the manifestation of the Impostor Phenomenon among highly active student organization members reveals that the heightened visibility, peer comparison, and leadership responsibilities can sometimes inadvertently trigger or intensify feelings of being an academic fraud (Andira & Daulay, 2025).

To thoroughly understand the roots and developmental trajectory of this phenomenon among university populations, it is essential to deeply examine its nomological network and underlying psychological correlates. Empirical evidence suggests a highly robust, interconnected relationship between the Impostor Phenomenon, maladaptive perfectionism, fluctuating and contingent self-esteem, and specific neurotic personality traits among diverse cohorts, such as Russian college students (Sheveleva et al., 2023). Furthermore, early developmental and familial factors play a crucial foundational role in establishing a predisposition to these feelings. Specifically, university students' retrospective recollections of controlling or highly critical parenting styles are strongly linked to the subsequent development of the Impostor Phenomenon, with elevated levels of social anxiety serving as a significant mediating psychological mechanism in this complex developmental pathway (Yaffe, 2021).

The psychological distress intrinsically associated with the Impostor Phenomenon is deeply multifaceted, operating through several destructive emotional channels. Individuals grappling with severe impostor feelings routinely experience profound interpersonal shame and demonstrate markedly diminished self-compassion, cognitive patterns which significantly exacerbate overall psychological distress. This dynamic is particularly pronounced and critically observed in minority populations navigating predominantly white

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institutions, such as Asian American students, who face intersecting pressures of cultural expectations and systemic marginalization (Wei et al., 2020). Moreover, the Impostor Phenomenon is intimately and paradoxically connected to a persistent, paralyzing guilt over success, which drives individuals toward maladaptive, self-sabotaging behaviors—such as chronic procrastination or rejecting valuable opportunities—rather than allowing them to internalize and celebrate their objective achievements (Fimiani et al., 2024). This pattern of self-sabotage becomes particularly relevant when systematically examining demographic variations, most notably gender differences. Exploring the expanded nomological network of the Impostor Phenomenon reveals that, while it certainly affects individuals across the entire gender spectrum, women frequently experience distinct manifestations, intensities, and professional consequences of the phenomenon. These unique female experiences are frequently intertwined with, and exacerbated by, systemic gender biases, societal stereotypes regarding female intellectual competence, and a lack of representative mentorship in historically male-dominated disciplines (Fleischhauer et al., 2021). Consequently, examining the Impostor Phenomenon specifically within female populations remains a critical scientific imperative to untangle the unique, intersectional psychological burdens they carry in highly competitive academic and professional spheres.

The ultimate, most consequential manifestation of unmitigated psychological distress and chronic self-doubt in educational settings is a measurable decline in academic persistence. Academic persistence is a highly complex, multidimensional construct that represents a student's continuous, unwavering commitment to their educational goals. It encompasses the vital behavioral engagement and cognitive resilience required to navigate inevitable academic challenges, overcome institutional barriers, and successfully complete a chosen degree program. Foundational educational psychology research underscores that academic persistence is fundamentally intertwined with active academic engagement, the progressive formation of a robust, secure academic identity, and successful, holistic psychosocial adjustment to the demanding university environment (Jafari & Abdi Zarrin, 2021). Consequently, the deliberate institutional cultivation of a successful academic identity has been empirically demonstrated to be a highly feasible and effective pedagogical pathway to simultaneously enhancing both student academic well-being and long-term academic persistence (Soleimani et al., 2023). Furthermore, the consistent fulfillment of basic psychological needs—namely autonomy, competence, and relatedness—alongside the adoption of adaptive, mastery-approach goal orientations, serve as critical psychological antecedents that fuel the sustained intrinsic motivation inherently necessary for academic persistence (Khodashahi, 2024). Social cognitive predictors, specifically task-specific self-efficacy and positive outcome expectations, have also been rigorously proven to be instrumental in predicting both student persistence and objective academic performance; importantly, the applicability of these social cognitive models extends effectively across varying gender and racial or ethnic groups, particularly within rigorous, high-attrition disciplines such as engineering and the broader sciences (Lent et al., 2016).

While the existing scholarly literature clearly and unequivocally establishes both the severe psychological harm inflicted by the Impostor Phenomenon and the paramount educational importance of maintaining academic persistence, the specific, underlying cognitive mechanisms that directly translate the emotional burden of impostor feelings into reduced educational persistence remain inadequately explored. One highly promising, theoretically robust framework for bridging this critical explanatory gap is Cognitive Load Theory. This established instructional design theory is predicated on the understanding that human working memory possesses a severely constrained processing capacity. During any academic or intellectual task, learners inevitably experience cognitive load, which is theoretically categorized into three distinct, interacting dimensions: intrinsic cognitive load, extraneous cognitive load, and germane cognitive load. Intrinsic cognitive load relates directly to the inherent, unalterable complexity and difficulty of the specific academic material being learned. Germane cognitive load refers to the productive, desirable cognitive effort actively dedicated to effective learning, deeper comprehension, and the construction of complex cognitive schemas. Crucially, extraneous cognitive load is generated by suboptimal instructional design or, more relevant to psychological states, by non-instructional internal and external distractions that siphon away vital working memory resources.

It is strongly hypothesized that the relentless, intrusive cognitive processes inherent to the Impostor Phenomenon—such as chronic rumination, performance anxiety, hyper-vigilance regarding social evaluation, and the exhausting, continuous fear of intellectual unmasking—act as a massive, continuous source of internal extraneous cognitive load.

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When a student's finite working memory capacity is persistently overwhelmed by the heavy extraneous load required to manage and suppress these impostor fears, mathematically insufficient cognitive resources remain available for the essential germane processing required for deep, meaningful learning. Over time, this chronic state of cognitive depletion and intellectual exhaustion likely degrades a student's ability to effectively employ sophisticated cognitive and metacognitive strategies—strategies that are definitively known to be vital for maintaining academic self-regulation and long-term academic persistence (Khoshesteh-Abbasi et al., 2023).

Traditional, variable-centered statistical approaches, such as multiple regression analysis, often fail to adequately capture the complex, multidimensional, and dynamic ways in which these three specific cognitive load dimensions interact within a single, functioning individual. Because cognitive load is an inherently idiosyncratic and dynamic experience, a person-centered statistical methodology, such as Latent Class Analysis, is strictly required to identify unobserved, naturally occurring subpopulations—or latent profiles—that are characterized by unique, holistic configurations of intrinsic, extraneous, and germane cognitive loads. By identifying these distinct, cohesive profiles specifically among women experiencing the Impostor Phenomenon, educational researchers can accurately determine whether specific configurations of cognitive load (for example, a profile characterized by exceptionally high extraneous load combined with severely depleted germane load) represent acute cognitive vulnerabilities for academic attrition. This sophisticated methodological approach moves beyond the limitations of analyzing isolated variables in a vacuum, allowing for a more comprehensive understanding of the holistic cognitive architecture and mental bandwidth of the female learner operating under chronic psychological distress.

The theoretical integration of the Impostor Phenomenon, Cognitive Load Theory, and the distal outcome of academic persistence within a rigorous, person-centered analytical framework offers a highly novel, mechanistic perspective on exactly why otherwise highly capable, intelligent women might prematurely abandon their educational pursuits. Despite the extensive, rich qualitative and quantitative literature documenting the emotional toll of the Impostor Phenomenon, there remains a distinct, glaring paucity of empirical research mathematically delineating how these internalized fears effectively hijack working memory capacity and subsequently derail academic persistence. Understanding these precise cognitive mechanisms is paramount for educational institutions aiming to develop targeted, evidence-based interventions that extend beyond traditional emotional support to include practical cognitive load optimization strategies. By identifying the specific cognitive load profiles that naturally emerge under the strain of the Impostor Phenomenon, higher education professionals can better support female students in navigating their complex academic trajectories. Therefore, the primary aim of this study was to identify the latent cognitive load profiles among women experiencing the Impostor Phenomenon and to subsequently evaluate the profound implications of these distinct profiles for their overall academic persistence.

2. Methods and Materials

2.1. Study design and Participant

The present study utilized a quantitative, cross-sectional survey research design to investigate the latent profiles of cognitive load and their association with academic persistence among women experiencing the Impostor Phenomenon. The target population consisted of female university students enrolled in undergraduate and postgraduate programs across various higher education institutions in Chile. A purposive sampling strategy was employed to recruit participants who self-identified as women and reported experiencing feelings associated with the Impostor Phenomenon. Recruitment was conducted through institutional emails, academic forums, and student association networks within Chilean universities. A total of 842female students initially responded to the survey. After screening for incomplete responses and establishing a baseline threshold for the Impostor Phenomenon to ensure the sample accurately reflected the target demographic, the final analytical sample comprised exactly 715participants. The participants represented a diverse range of academic disciplines, including science, technology, engineering, mathematics, humanities, and social sciences.

2.2. Measures

To capture the multidimensional nature of the variables under investigation, a comprehensive online survey was constructed using established, psychometrically sound instruments translated and validated for the Spanish-speaking Chilean context. The Impostor Phenomenon was assessed using the Clance Impostor Phenomenon Scale, a widely recognized self-report questionnaire consisting of

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twenty items that measure the frequency and intensity of impostor feelings, such as the fear of evaluation, attributing success to luck, and the inability to internalize objective achievements. Participants responded on a five-point Likert-type scale ranging from one (not at all true) to five (very true), with higher aggregated scores indicating a more severe manifestation of the phenomenon. Cognitive load, the primary grouping variable for the latent profile analysis, was measured using a multidimensional cognitive load inventory adapted from established cognitive load theory frameworks. This instrument evaluates three distinct components of cognitive architecture during academic tasks: intrinsic cognitive load, which relates to the inherent complexity of the academic material; extraneous cognitive load, which is generated by suboptimal instructional design, environmental distractions, or emotional interference; and germane cognitive load, which represents the mental effort successfully devoted to schema construction and deep learning. Participants rated their mental effort across these three domains using an eleven-point scale ranging from zero (absolutely no effort) to ten (maximum mental effort). Finally, academic persistence was evaluated utilizing a standardized Academic Persistence Scale, a self-report measure designed to capture students' commitment to completing their current degree program, their cognitive and behavioral ability to overcome academic obstacles, and their future enrollment intentions. The survey also included a demographic section to collect pertinent background information, including age, academic discipline, current year of study, and socioeconomic status, to serve as potential covariates and descriptive variables in the subsequent statistical modeling.

2.3. Data Analysis

The collected data were exported and subjected to a rigorous statistical examination to identify unobserved subpopulations, or classes, based on their cognitive load profiles. Prior to the primary analysis, data screening procedures were conducted using statistical software to assess for missing values, multivariate normality, and the presence of extreme outliers. The central analytical framework employed was Latent Class Analysis, a person-centered statistical approach utilized to categorize individuals into mutually exclusive and exhaustive latent classes based on their continuous response patterns across the three dimensions of cognitive load. The estimation of the latent classes was performed using robust maximum likelihood estimation procedures to account for potential non-normality in the data distribution. To determine the optimal number of latent classes, a systematic model-building process was undertaken, beginning with a one-class baseline model and sequentially adding classes until model fit was no longer significantly improved. The evaluation of model fit relied on several statistical indicators, including the Akaike Information Criterion (AIC), the Bayesian Information Criterion (BIC), and the Sample-Size Adjusted Bayesian Information Criterion ($SABIC$), where lower values signify a superior fit to the data. Additionally, the Lo-Mendell-Rubin Adjusted Likelihood Ratio Test ($LMR - LRT$) and the Bootstrapped Likelihood Ratio Test ($BLRT$) were utilized to statistically compare a model with $k$classes to a more parsimonious model with $k - 1$classes, with a significance level set at $p < .05$indicating that the inclusion of an additional class provides a statistically significant improvement in model fit. Entropy was also examined to assess classification accuracy, with values approaching 1.0indicating clear class delineation and high confidence in assigning individuals to their respective profiles. Once the optimal latent class solution was established, the final phase of the analysis involved examining the relationship between class membership and the distal outcome of academic persistence. This was achieved utilizing the automated three-step approach, which allows for the estimation of mean differences in academic persistence across the identified cognitive load profiles while accounting for classification error, thereby providing mathematically robust insights into how different cognitive load configurations impact the academic trajectory of women grappling with the Impostor Phenomenon.

3. Findings and Results

Prior to conducting the primary analyses, preliminary data screening was performed to ensure the assumptions for multivariate analysis were met. Skewness and kurtosis values for all continuous variables fell within the acceptable ranges of $-2.0$to $+2.0$, indicating that the assumption of univariate normality was not substantially violated. Given the rigorous online data collection protocol which utilized forced-response formatting, there were no missing data within the final analytical sample of 715female participants. Descriptive statistics and bivariate Pearson correlations were computed to examine the fundamental relationships among the Impostor Phenomenon, the three dimensions of cognitive load, and academic persistence. As detailed in the

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correlational matrix, the Impostor Phenomenon exhibited a significant positive association with extraneous cognitive load, suggesting that heightened impostor feelings are closely linked to increased mental burden from non-instructional sources such as anxiety and emotional interference. Conversely, the Impostor Phenomenon demonstrated significant negative correlations with both germane cognitive load and academic persistence, indicating that women experiencing severe impostor feelings report less cognitive capacity dedicated to schema acquisition and a lower likelihood of persisting in their academic programs. Intrinsic cognitive load showed moderate positive associations with both extraneous and germane cognitive loads, reflecting the general baseline complexity of the academic tasks undertaken by the university students.

Table 1

Descriptive Statistics and Bivariate Correlations for Study Variables

Variable	M	SD	1	2	3	4	5
1. Impostor Phenomenon	68.42	14.15	–				
2. Intrinsic Cognitive Load	6.85	1.72	0.21^{*}	–			
3. Extraneous Cognitive Load	7.12	2.05	0.58^{**}	0.34^{**}	–		
4. Germane Cognitive Load	5.34	2.11	-0.42^{**}	0.18^{*}	-0.31^{**}	–	
5. Academic Persistence	3.58	0.84	-0.49^{**}	-0.11	-0.52^{**}	0.46^{**}	–

To identify the unobserved subpopulations based on participants' cognitive load configurations, a Latent Class Analysis was systematically conducted. Models specifying one through five latent classes were estimated and compared based on their relative fit to the data, parsimony, and theoretical interpretability. The fit indices for the latent class enumeration process reveal a clear progression of model improvement as classes were added. The transition from a two-class to a three-class model yielded substantial decreases in both the Akaike Information Criterion and the Bayesian Information Criterion, indicating superior model fit. Furthermore, for the three-class model, both the Lo-Mendell-Rubin Adjusted Likelihood Ratio Test and the Bootstrapped Likelihood Ratio Test produced statistically significant values, rejecting the more parsimonious two-class model in favor of the three-class solution. When evaluating the four-class model, although the information criteria continued to decrease slightly, the Lo-Mendell-Rubin test became non-significant, suggesting that the extraction of a fourth class did not provide a statistically meaningful improvement in fit over the three-class model. Additionally, the four-class solution resulted in a splintered class comprising less than 5%of the total sample, which reduces theoretical utility and limits the statistical power of subsequent analyses. The entropy value for the three-class model was robust, demonstrating a high degree of classification accuracy and clear separation among the profiles. Consequently, the three-class model was retained as the most statistically appropriate and conceptually meaningful representation of the cognitive load profiles within this specific population.

Table 2

Fit Indices for Latent Class Analysis Models (1 to 5 Classes)

Number of Classes	LL	AIC	BIC	$SABIC$	Entropy	$LMR-LRTp$	$BLRTp$
1Class	-4512.34	9036.68	9064.11	9044.92	–	–	–
2Classes	-4105.82	8231.64	8277.37	8245.39	0.78	$<.001$	$<.001$
3Classes	-3942.15	7912.30	7976.32	7931.55	0.84	0.012	$<.001$
4Classes	-3910.66	7857.32	7939.63	7882.07	0.81	0.185	0.034
5Classes	-3895.41	7834.82	7935.42	7865.08	0.76	0.412	

Following the selection of the three-class model, the distinct characteristics of each latent profile were analyzed based on their estimated marginal means across the three cognitive load indicators. The first class, comprising 34.8%of the sample ($n = 249$), was labeled the "Adaptive Cognitive Load" profile. Participants in this class exhibited moderate levels of intrinsic cognitive load, the lowest levels of extraneous cognitive load, and the highest levels of germane cognitive load relative to the other profiles. This pattern suggests an efficient allocation of mental resources

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where emotional interference is minimized, allowing for optimal schema construction. The second class, representing the largest segment of the sample at 46.2%($n = 330$), was designated the "Extraneously Overloaded" profile. This group was characterized by high intrinsic cognitive load, exceptionally high extraneous cognitive load, and significantly depleted germane cognitive load. The data indicate that for these women, the psychological burden of the Impostor Phenomenon likely manifests as severe emotional and cognitive interference, severely restricting the mental bandwidth available for actual learning processes. The third class, encompassing the remaining 19.0%($n = 136$) of the participants, was termed the "Compensatory Cognitive Load" profile. Women in this profile reported the highest levels of intrinsic cognitive load and moderately high extraneous cognitive load, yet they also maintained relatively high levels of germane cognitive load. This unique configuration implies a compensatory mechanism wherein these students exert an immense overall mental effort to counteract the high extraneous load generated by their impostor feelings, thereby forcing deep learning to occur despite the high psychological cost.

Table 3

Estimated Marginal Means and Standard Errors of Cognitive Load Indicators by Latent Class

Cognitive Load Dimension	Adaptive Load (**34.8**%)	Overloaded (**46.2**%)	Compensatory Load (**19.0**%)
Intrinsic Cognitive Load	5.92(0.15)	7.15(0.12)	7.85(0.18)
Extraneous Cognitive Load	4.85(0.18)	8.62(0.14)	7.68(0.22)
Germane Cognitive Load	7.25(0.14)	3.55(0.16)	6.18(0.24)

To investigate the implications of these distinct cognitive load configurations for students' educational trajectories, the final phase of the analysis evaluated the relationship between latent class membership and the distal outcome of academic persistence. Utilizing the robust three-step approach (BCH method) to control for classification error, significant mean differences in academic persistence were observed across the three profiles. The omnibus Wald chi-square test indicated a statistically significant overarching effect of class membership on academic persistence. Pairwise comparisons revealed that women in the Adaptive Cognitive Load profile exhibited the highest levels of academic persistence, which was significantly greater than both the Overloaded and Compensatory profiles. Notably, participants belonging to the Extraneously Overloaded profile reported distressingly low levels of academic persistence, scoring significantly lower than all other groups. This critical finding underscores that the specific cognitive load configuration characterized by high extraneous interference and low germane processing—most closely associated with severe impostor feelings—is highly detrimental to a student's intention and ability to persist in higher education. Interestingly, while women in the Compensatory Cognitive Load profile demonstrated significantly higher academic persistence than their counterparts in the Overloaded profile, their persistence scores remained statistically lower than those in the Adaptive profile, suggesting that relying on sheer mental overexertion to compensate for impostor-related emotional distress is a precarious strategy that still ultimately detracts from long-term academic resilience.

Table 4

Academic Persistence Distal Outcome Comparisons Across Latent Classes

Latent Class	Academic Persistence $M(SE)$	Pairwise Comparisons (χ^2)	p-value
1. Adaptive Load	4.25(0.08)	Class 1vs. Class 2: 45.62	$<.001$
2. Overloaded	2.85(0.09)	Class 1vs. Class 3: 12.35	$<.001$
3. Compensatory Load	3.78(0.12)	Class 2vs. Class 3: 28.41	$<.001$

4. Discussion

The primary objective of this study was to identify the latent cognitive load profiles among female university students experiencing the Impostor Phenomenon and to evaluate the implications of these profiles for academic persistence. By employing a person-centered analytical approach, the results revealed that the cognitive architecture of women grappling with impostor feelings is not uniform; rather, it manifests in three distinct, naturally occurring

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subpopulations: the Adaptive Cognitive Load profile, the Extraneously Overloaded profile, and the Compensatory Cognitive Load profile. These findings offer a critical, mechanistic explanation for how the internalized fear of intellectual fraudulence actively disrupts the learning process and subsequent educational trajectories. The correlational results initially confirmed that the Impostor Phenomenon is significantly associated with elevated extraneous cognitive load and depleted germane cognitive load. This fundamental finding strongly aligns with the growing consensus in the literature that the Impostor Phenomenon is not merely a benign quirk of high achievers, but a pervasive source of severe psychological distress and emotional exhaustion that directly impairs functional capacity (Li et al., 2025; Wei et al., 2020). When female students are consumed by the fear of being unmasked as intellectual frauds, the cognitive bandwidth required to process these intrusive thoughts operates as a massive non-instructional burden, directly siphoning working memory resources away from schema construction and meaningful learning.

The identification of the Extraneously Overloaded profile, which constituted the largest segment of the sample at nearly half of the participants, is particularly alarming and theoretically revealing. Women in this profile exhibited exceptionally high extraneous cognitive load alongside significantly stunted germane cognitive load. This suggests that the psychological burden of the Impostor Phenomenon severely restricts their mental bandwidth, effectively rendering them incapable of deep cognitive processing. This state of cognitive paralysis is consistent with studies demonstrating how the Impostor Phenomenon significantly undermines well-being, performance, and overall satisfaction across diverse demanding environments (Swaidan, 2025). Within educational institutions, the urgency of addressing this phenomenon is magnified because this specific cognitive overload directly sabotages the core academic mission of fostering intellectual development (Tasya et al., 2024; Yang et al., 2024). Furthermore, the overwhelming extraneous load observed in this profile likely exacerbates, and is exacerbated by, deeply ingrained maladaptive behaviors, such as the tendency to engage in self-sabotage due to an internalized guilt over success (Fimiani et al., 2024). The cognitive exhaustion characteristic of this profile may also mirror the somatic and physiological burdens often seen when the Impostor Phenomenon co-occurs with other distressing conditions, thereby compounding the overall exhaustive experience (Shayesteh et al., 2024).

Conversely, the Compensatory Cognitive Load profile, comprising approximately one-fifth of the sample, highlights a highly complex and precarious psychological coping mechanism. These women reported elevated extraneous cognitive load due to their impostor feelings, yet they simultaneously maintained high levels of germane cognitive load. This configuration indicates that they are exerting an immense, potentially unsustainable amount of overall mental effort to counteract their internalized self-doubt and force learning to occur. This compensatory overexertion is deeply intertwined with the maladaptive perfectionism that frequently characterizes the nomological network of the Impostor Phenomenon (Fleischhauer et al., 2021; Sheveleva et al., 2023). In an attempt to prevent their perceived inadequacy from being discovered, these individuals chronically over-prepare and overwork, a dynamic frequently observed not only in academia but also among professionals in high-stakes leadership roles (Choi & Lee, 2025; Westover, 2025). Interestingly, this profile may also reflect the experiences of highly engaged students who, despite active participation in university life, still secretly harbor feelings of fraudulence and overcompensate through relentless academic labor (Andira & Daulay, 2025). The developmental roots of this exhausting compensatory strategy may often be traced back to early familial environments, where controlling parenting styles and resultant social anxiety condition individuals to equate relentless, anxiety-driven effort with self-worth (Yaffe, 2021).

The most consequential findings of the present study relate to the distal outcome of academic persistence, fundamentally demonstrating how these cognitive load configurations impact long-term educational resilience. The results indicated that the Extraneously Overloaded profile was associated with distressingly low levels of academic persistence, significantly lower than both the Adaptive and Compensatory profiles. When a student's cognitive resources are entirely consumed by the extraneous emotional interference of the Impostor Phenomenon, they lack the necessary mental capacity to employ the cognitive and metacognitive strategies crucial for overcoming academic hurdles (Khoshesteh-Abbasi et al., 2023). This profound cognitive depletion directly erodes the basic psychological needs of competence and autonomy, which are essential antecedents for maintaining the intrinsic motivation required to persist (Khodashahi, 2024). Furthermore, the inability to

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engage in meaningful germane processing prevents the formation of a secure, successful academic identity, a construct known to be highly protective of academic well-being and long-term engagement (Jafari & Abdi Zarrin, 2021; Soleimani et al., 2023). While social cognitive predictors such as self-efficacy are typically strong drivers of persistence across genders (Lent et al., 2016), the severe cognitive bottlenecks experienced by the Overloaded profile essentially neutralize these protective factors. Notably, while the Compensatory profile exhibited higher persistence than the Overloaded group, their persistence remained significantly lower than the Adaptive profile. This vital distinction illustrates that relying on sheer mental overexertion to battle impostor-induced extraneous load is a fragile strategy; the chronic cognitive fatigue it produces ultimately detracts from optimal academic resilience, leaving these women vulnerable to eventual burnout.

5. Conclusion

In conclusion, this study provides compelling empirical evidence that the Impostor Phenomenon is not solely an emotional affliction but a critical cognitive bottleneck that fundamentally alters the learning architecture of female university students. By identifying distinct latent profiles of cognitive load, the research demonstrates that the internalized fear of intellectual fraudulence manifests primarily as an overwhelming extraneous cognitive load that actively suppresses the germane processing necessary for deep learning. Specifically, the emergence of an extraneously overloaded subpopulation, characterized by an inability to manage impostor-related emotional interference, directly translates into a severe vulnerability for academic attrition. Conversely, while some women attempt to compensate for this self-doubt through immense mental overexertion, this strategy remains suboptimal for long-term educational resilience compared to an adaptive cognitive profile. Ultimately, to foster the academic persistence of high-achieving women, higher education institutions must recognize the Impostor Phenomenon as a significant detriment to cognitive capacity and implement targeted interventions that address both the psychological distress and the resulting cognitive overload.

6. Limitations and Suggestions

Despite the significant theoretical and practical contributions of this study, several limitations must be thoughtfully acknowledged. The cross-sectional nature of the research design precludes the ability to establish definitive causal relationships between the Impostor Phenomenon, cognitive load dimensions, and academic persistence; it is entirely plausible that a reciprocal relationship exists wherein reduced academic persistence further exacerbates feelings of intellectual fraudulence. Additionally, the reliance on self-report measures for all variables introduces the potential for common method bias and social desirability effects, particularly given the sensitive nature of assessing one's own perceived incompetence and mental exertion. Furthermore, while the sample of female university students in Chile provides valuable insights into this specific cultural and educational context, the findings may not be fully generalizable to male students, diverse racial or ethnic minority groups, or individuals operating within different international higher education systems characterized by distinct competitive pressures and cultural norms.

To build upon the findings of the present investigation, future research should prioritize longitudinal study designs to map the developmental trajectory of cognitive load profiles and their sustained impact on academic persistence across a student's entire university tenure. Researchers should also consider incorporating objective, physiological measures of cognitive load, such as eye-tracking technology, pupillometry, or electroencephalography, alongside ecological momentary assessments, to capture real-time fluctuations in mental effort and emotional distress during actual academic tasks. Furthermore, exploring these cognitive load profiles through an intersectional lens is critical; future studies should systematically investigate how the intersecting identities of race, socioeconomic status, and first-generation college student status compound the extraneous cognitive load generated by the Impostor Phenomenon. Finally, empirical research is urgently needed to design, implement, and rigorously evaluate the efficacy of specific cognitive-behavioral and instructional interventions aimed at actively shifting students from extraneously overloaded profiles toward more adaptive cognitive states.

The findings of this study offer several vital suggestions for practice within higher education institutions aiming to support women experiencing the Impostor Phenomenon. University counseling centers and academic advising units should collaborate to develop psychoeducational workshops that explicitly teach students about the principles of working memory and cognitive load, helping them reframe their impostor feelings not as personal defects, but as manageable sources of cognitive interference. Faculty members and

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instructional designers must actively prioritize the reduction of structural extraneous cognitive load in their courses by employing clear instructional scaffolding, transparent grading rubrics, and inclusive pedagogical practices, thereby freeing up students' mental bandwidth to process inevitable internal anxieties. Furthermore, institutions should establish robust, discipline-specific mentorship programs that pair female students with successful female faculty who openly discuss their own past or current struggles with the Impostor Phenomenon. Normalizing these experiences through transparent dialogue can significantly reduce the isolation and shame associated with these feelings, directly decreasing the emotional and cognitive burden required to conceal them, and ultimately fostering a more resilient and persistent student body.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

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Declaration of Interest

The authors report no conflict of interest.

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Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

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